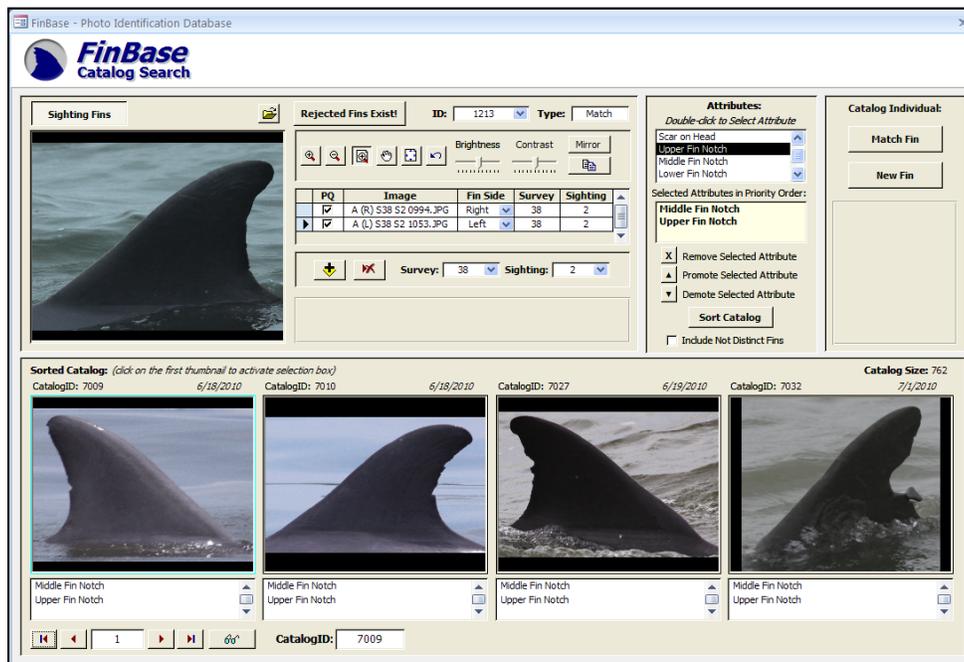




## PHOTO-IDENTIFICATION FIELD AND LABORATORY PROTOCOLS UTILIZING FINBASE VERSION 2

BY

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December 2011

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NOAA Technical Memorandum NMFS-SEFSC-627

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December 2011

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This report should be cited as follows:

Melancon, RAS, S Lane, T Speakman, LB Hart, C Sinclair, J Adams, PE Rosel, L Schwacke. 2011. Photo-identification Field and Laboratory Protocols Utilizing FinBase Version 2. NOAA Technical Memorandum NMFS-SEFSC-627. 46 p.

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## **Introduction**

Marine mammal photo-identification surveys are conducted for multiple reasons that include estimating or evaluating abundance, survival, spatial and temporal habitat use, social structure and/or health. Surveys are performed along set tracklines in designated survey areas. When animals are sighted during a survey they are digitally photographed with an effort to capture images of all animals in a sighting for individual identification. Additionally, ancillary data and observations of the animals are recorded onto datasheets. The data obtained is then entered into FinBase, a customizable database system for managing photo-identification catalogs.

These protocols were designed for small boat based dolphin photo-identification surveys, but can be utilized for any type of photo-identification surveys. Since FinBase is customizable the user can make changes to fit the needs of their specific survey. All the data and cropped images collected from photo-identification surveys can be stored in and managed with FinBase. Using the cropped images a catalog of individuals can be created and structured based on the attributes assigned to each animal. Within FinBase the user can track the sighting history of each individual, mother and calf relationships, and known associates of the individual.

## **Photographic Survey Procedure**

Photo-identification (id) surveys are typically conducted using small boats with 1-2 outboard motors along designated tracklines. At the beginning of each survey, start a *Survey Form* (Figure 1) by recording Survey Type and Survey Area in the spaces provided and completing the first line under Survey Conditions: Date, Time, Waypoint (WPT), Sightability, and Notes (typically a verbal description of the start location). This form should be updated as sighting conditions change over the course of the survey (Table 1). Once the survey is finished, complete the *Survey Form* by checking whether the survey was complete and record survey hours, distance surveyed, and number of sightings as follows: a survey is considered complete if all the designated tracklines were finished; survey hours equal the hours the survey took from start to finish (recorded in decimal hours, i.e., 7 hrs 30 min is recorded as 7.5 hrs); distance equals the total number of kilometers traveled during the survey; number of sightings equals the sum total of dolphin group sightings for each survey. The survey number is automatically

generated during data entry in FinBase. If there are multiple boats on a given day, each boat will have an individual survey number, thus sighting numbers start at one for each boat.

The *Survey Effort Worksheet* (Figure 2) is also started at the beginning of each survey. Record the Date, Time, GPS WPT (waypoint), GPS Odom (Odometer) in km (typically 0), Effort (on/off), and Notes (usually a verbal description of start location). Effort is recorded such that “on-effort” data is collected while on the designated tracklines, while “off-effort” data is collected while covering already completed tracklines, traveling to a designated start location or during other effort not designated as “on-effort.” This form should be updated every time the boat goes on- or off- effort as well as at the end of the survey day.

Surveys are conducted along predefined tracklines at 26-32km/hr with the boat operator and two to three additional observers. Observers visually search (with naked eye) a 180° area centered around the bow of the boat until dolphins are sighted. Before approaching the dolphin(s), mark the boat location using the GPS, and record the waypoint and a verbal location description, Distance (GPS odometer), Start time, and Initial dolphin behavior on a *Sighting Form* (Figure 3, Table 2 and 3) under sighting location and behaviors, respectively; save the waypoint on the GPS’s memory. After approaching the dolphin(s) (vessel maneuvered within 2-10m of the dolphin group), mark a second waypoint (Start WPT) on the GPS, record it on the *Sighting Form* and save on the GPS. Then, effort is made to acquire high quality photographs of the left and/or right side of every individual’s dorsal fin, without regard to apparent distinctiveness. Individual dorsal fins are photographed with a digital camera equipped with a telephoto lens. Throughout the sighting, continue filling out the *Sighting Form* by recording the date, platform name, sighting number (recorded sequentially i.e. 1,2,3,etc and restarts each day), effort (on or off), crew information, sighting conditions, animal heading, salinity, water temperature, and water depth (Table 2 and 3). Again the survey number is automatically generated in FinBase.

A sighting ends once all dolphins have been photographed, the group is lost, 40 minutes have elapsed, or the dolphins prove intractable to photo-id efforts. Mark another waypoint on the GPS and record the end time and location (WPT) at the conclusion of the sighting. Distance is recorded once the boat is back on the trackline at or past where the sighting started. In the Field Estimates section of the *Sighting Form*, record the minimum, maximum and best counts of

total dolphins, calves, and neonates as well as the number of no counts (NC) (i.e., the number of dolphins previously sighted during the survey). Total dolphins should include all dolphins sighted including calves and neonates, while total calves excludes neonates. Calves are defined as dolphins lacking fetal folds, up to approximately 75% of the presumed mother's length, and often seen surfacing in “echelon” position; neonates are characterized by fetal folds (approximately 5-7 vertical stripes, lighter than the surrounding skin) and darker coloration, and an uncoordinated surfacing patterns (Mann and Smuts, 1999). A dolphin group is defined as all dolphins in proximity (<100 m) to one another, generally moving in the same direction and engaging in similar behavior (Quintana-Rizzo and Wells, 2001; Zolman, 2002). Finally, record the camera information (e.g., camera name, folder pictures are in, start and end frame numbers and total pictures taken), all behaviors observed throughout the sighting, observations (e.g., presence of *Xenobalanus globicipitus*, shark bites, sucker fish, skin disorder (SDO), cohesiveness, oil in water, and oil on shore), and any sighting notes (i.e., relevant information about the sighting, including behavioral descriptions not covered elsewhere). If known dolphins were sighted, their name and/or catalog number can be recorded in the dolphins sighted section. Whenever possible, document presumed mothers textually and photographically.

Each subsequent sighting is handled the same as described above. Sighting and photographic data collected while completing the designated survey trackline are considered “on-effort” data. Data collected while returning along completed tracklines or during other opportunistic survey encounters is labeled as “off-effort” data. If another group of dolphins is sighted (>100m away) while already engaged in a sighting, this new sighting is considered “off-effort” and can be commenced after completing the current sighting.

### Health Observation

During collection of photo-id data, a visual health inspection of the animals can be made, with the results recorded on the *Health Observations Form* (Figure 4) or alternatively in the notes section of the *Sighting Form*. If possible, record the frame numbers depicting the dolphin(s) with skin lesions or other abnormal behavior(s) in the notes section of the *Sighting Form*. While processing the photos, if skin lesions (“skin disorders” SDO) are observed complete the *Photo-ID Skin Lesion Data Sheet* (Figure 5 and 6).

## **FinBase**

FinBase Photo-id Database system (FinBase) is a customized Microsoft Access database that can be obtained via Jeffery Adams<sup>1</sup> (Adams et al., 2006). After completing the setup and designating a FinBase folder, adjustments can be made based on the needs of the specific study (Figure 7). FinBase uses two separate Microsoft Access databases, FinBase.mdb (backend database), which contains the data tables, and FinBase\_FE.mdb (frontend database), which contains the data entry and analysis forms. Each time any FinBase database is opened, make sure to click “Options” at the top of the screen by the security window and then click “Enable this content,” followed by OK (Figure 8). After familiarizing yourself with FinBase, delete the sample data. To delete the data, open the Survey and Individuals Tables in FinBase.mdb and delete all records in both tables. Then, delete all files/folders in the following folders: catalog, GIS, GPS, Images, and Sightings.

After deleting the sample data, you can customize FinBase for your study area. First, change the look up tables (luSurveyArea, luSurveyType, luSubArea, luPlatform, luCamera, and luCamcorder) for each specific area/research. Open FinBase.mdb, go to *Tables*, located on the left side of the screen, and click on the lookup table to be modified (Figure 9). For example, to change the names of the survey types click on luSurveyType table and under survey type enter the type of survey being conducted (i.e., photo-id, biopsy, capture, etc.). However, be sure the codes are not changed.

Next, in the GPS folder (located in the main FinBase directory) create three new subfolders: Waypoint, Trackline, and Raw GPS. To create new folders, click on the “make a new folder” in Windows Explorer. In the Sightings folder (located in the main FinBase directory) create a subfolder labeled Photos. Finally, create two new folders in the main FinBase directory: Documents (for photo-id checklists, mother/calf lists, etc.) and Datasheets (for scanned datasheets from each survey).

After returning from the field, download the GPS and save the data as mm-dd-yy (if multiple vessels save as mm-dd-yy\_vessel) in the RAW GPS folder in FinBase. Next, download the photos and save in a folder labeled as mm-dd-yy (if multiple vessels save as mm-dd-yy\_vessel) in the “Photos” folder in FinBase (located in the Sightings folder) and verify that the

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<sup>1</sup> Jeffery Adams: Jeff.Adams@noaa.gov

frame numbers and number of photos on the sighting sheets correspond to the downloaded photos. Backup all the data (including GPS data and photos) on an external hard drive or onto a server. Finally, scan the datasheets (*Survey Form, Survey Effort Worksheet, Sighting Form, Health Observation Form, Photo-ID Skin Lesion Datasheet*) after double checking that all the fields of the data sheet are completed, save them as an Adobe PDF, again using the mm-dd-yy format (if multiple vessels mm-dd-yy\_Vessel), and place in the Datasheets folder.

## GPS

Trackline and waypoint files need to be created in a FinBase-friendly format. DNRGarmin, which can be downloaded from the Minnesota Department of Natural Resources,<sup>2</sup> is used as an example. If the GPS file is already a GPX file, go straight to using DNRGarmin. GDB files can be converted to the GPX format using Garmin Mapsource, available from Garmin<sup>3</sup>. Open Garmin Mapsource and select file, open, and navigate to the survey of interest (located in RAWGPS folder in the GPS folder). Once open, click file, save as, and change the “save as” type to GPX. To create waypoint and trackline files, open DNR Garmin and select file, load from, file, and navigate to the survey of interest (GPS folder in FinBase directory). When the *feature type* box appears click on waypoint and then OK. A box will appear stating the file was loaded successfully then click OK. Click file, save to, file, and navigate to the waypoint folder and save as the date followed by the letters “wp” (mm-dd-yy wp, if multiple vessels mm-dd-yy\_Vessel wp). Be sure to save as a text file. To save the trackline file in DNRGarmin, select file, load from and navigate to the survey of interest. When the *feature type* box appears, click on Trackline then OK. Repeat the same steps as when saving the waypoint file except navigate and save in the Trackline folder and save as the date followed by the letters “tr” (mm-dd-yy tr, if multiple vessels mm-dd-yy\_Vessel tr).

## Survey Data

To enter the survey data, open FinBase\_FE and click on *Enter Survey/Sighting Data* (Figure 10): FinBase will automatically generate the next survey number in sequence. Next, enter survey type (i.e., photo-id, biopsy, etc), select the survey area, check whether or not the

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<sup>2</sup> DNRGarmin website: <http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html>

<sup>3</sup> Garmin website: <http://www.garmin.com/us/>

survey was completed, and enter the survey hours and distance. Then, select the type of GPS utilized (GPS 76 or GPS 12) and import the trackline and waypoint files for the given survey by clicking on the folder symbol to the right of each area (). Once opened FinBase will automatically navigate to the correct folder (i.e. waypoint or trackline) located in the GPS folder. To import the data into FinBase, click on the file with the corresponding survey date (and/or name in the case of multiple vessels). The database will automatically change the name of the file to the corresponding survey (ex S1.txt) upon importing the file.

To enter survey conditions, found on the *Survey Form*, click on add/edit condition, this opens the *Survey Condition Form* (Figure 11). Navigate to the appropriate date (date of survey) and ensure the little box to the left is checked. Use the drop down menu to the right of the WPT box to scroll to the waypoint for the survey condition being entered. Select the waypoint to automatically bring in time, latitude, and longitude. Select: Poor, Fair, Good, or Excellent based on information from the *Survey Form* using the down arrow to the right of the Sightability box. In the Notes box enter any associated notes (typically comments on sightability conditions or location). If multiple sighting conditions are listed, click on the new blank record () at the bottom to enter in a new condition.

To enter the sighting information listed on the *Sighting Form*, open the Sighting Data Entry Form (Figure 12) by selecting add/edit sighting on the Survey Data Entry Form. Use the survey's *Sighting Form(s)* to complete the sighting data entry. Each sighting sheet constitutes a new sighting. For surveys containing multiple sightings (a common occurrence), click on blank new record () at the bottom to create a new sighting record. Navigate to the correct day and make sure the little box to the left is checked. The date will stay the same for each additional sighting entered; simply click the box to the left to "activate" the sighting sheet. Fill in the remaining information from the *Sighting Form*. To import waypoints, use the drop down menu to the right of each box and select the appropriate waypoint; latitude and longitude will automatically come in once the waypoint is selected. Make sure the start and end times match the times on the corresponding waypoint. To select Animal(s) Heading, Beaufort sea state (BSS), Oil in water, Oil on shore, Camera, and /or Camcorder, use the drop down menus on the right of each corresponding box.

## Images

The first step in processing the images is to batch rename them. Open FinBase\_FE, and select *Batch Rename* (Figure 13) under *Forms*. When the form opens, click on the yellow open folder icon (📁) to browse to the survey photos and select the images to rename. In the *Remove* area type IMG or WH6V, depending on camera type. If there are four number digits (i.e.0000) and the highest frame number is not past 0999 for that survey, you can also type IMG\_0 or WH6V\_0. Next, type in the appropriate survey and sighting numbers (as navigating to each section the renamed file will appear in the Renamed column). Click *Rename Images*. The new name for the images will have the following format: survey number, sighting number and the image number (ex. S1 S1 100). The image number (or frame number) is the number automatically given to each picture by the camera at the time it is taken. Repeat the batch rename process for all sightings. After all images have been renamed in the sighting(s), click exit.

The second step in photo processing is sorting the images. To begin, navigate to the sighting folder and delete all the water shots, out of focus images, and poor angle images (make sure to complete this step only after all images have been backed up as stated previously). All non-dolphin photos should be stored in a miscellaneous (Misc.) folder and organized by type (i.e. shrimp boat, aircraft, social dolphins, feeding dolphins, birds, etc.) in subfolders. Next, open all photos for the appropriate sighting in Adobe Photoshop using the file browser. Find the best left and/or right image for each individual, crop to the dorsal fin, rotate the fin(s) to perpendicular (so the base of the fin is parallel with the bottom of screen), and adjust brightness and contrast as necessary. When cropping the image ensure the entire fin is in view with all attributes visible. In some cases, additional photos of an individual should be saved. For instance, if a dolphin has a distinctive scar on its peduncle region crop one photo to show only the dorsal fin, and a second that shows both the dorsal fin and the peduncle scar. Use a temporary identifier (A-Z) to save the cropped images, for example A (L) S1 S1 018, with “A” being the temporary identifier and “(L)” being the side of fin that is shown. For sightings with more than 26 animals use AA-AZ, BA-BZ, etc. Make a separate note of the dolphins saved and all mom/calf pairs or possible calves. Transfer these notes to the *Photo-Id checklist* (see below & Figure 14) after completing

the sighting. After saving the cropped images delete all the unsaved, uncropped photos from the sighting folder.

The final step in image processing is assigning a photographic quality (PQ) grade to each image. To open the PQ form, open FinBase\_FE, under *Forms* to select *Photographic Quality* (Figure 15). When the form opens, click on the open folder icon (  ) to the right of the Current Image field, and navigate to the appropriate sighting (in Sighting folder), and select all images. Image names will appear in the Image area, with the first image of the sighting in the window. To scroll through the images, use the scroll bar to the right of the image name. To obtain an overall photographic quality (PQ) score of an image, rate each of the following characteristics: Focus, Contrast, Angle, Partial, and Distance. Each quality criterion has point scores listed to score the photo: *Focus*: 2 (Excellent), 4 (Moderate), and 9 (Poor); *Contrast*: 1 (Ideal) and 3 (Excessive/Minimal); *Angle*: 1 (Perpendicular), 2 (Slight Angle), and 8 (Oblique Angle); *Partial*: 1 (Fully Visible) and 8 (Partially Obscured); *Distance*: 1 (Subtle Features Distinct) and 5 (Very Distant). “Angle” denotes the angle of the dorsal fin relative to the camera lens; the goal is for the fin to be perpendicular to the camera lens. “Partial” indicates the amount of dorsal fin visible in the image. “Distance” is the estimated distance of the dorsal fin from the camera at the time the picture was taken. If an image has excellent focus, ideal contrast, perpendicular angle, fully visible, and the subtle features are distinct, click the Set Defaults tab, and FinBase will automatically select these criteria. If the total of the score is twelve or greater the tabs for each criterion turn pink, otherwise after each criterion are checked the tabs turn yellow. After selecting the appropriate scores for each field for all images, click add/update, otherwise the PQ data will not be saved. Repeat the scoring process for each image of every individual in each sighting.

### Excel Spreadsheets

The *Photo-Id Checklist* (Figure 14) is an Excel spreadsheet created by the user for every survey listing all individuals in each sighting. First, create tabs based on how many sightings were in a particular survey and label each tab according to its corresponding sighting number (i.e. Sighting 1, Sighting 2, etc.). Within each tab, create a box (template shown in Figure 14) that corresponds to each dolphin within a particular sighting. Begin with temporary identifier

“A” and continue labeling alphabetically. Mom/calf pairs are noted by listing the corresponding mom or calf temporary id in the F? or calf section of the form. Known neonates or calves whose mothers are unknown are also recorded here. The checklist example (Figure 14), shows a box with F?, Calf and M?. The F? should be used when a mom/calf pair is present. If the animal is a mom, mark yes (or Y) of the calf’s letter. If the animal is a calf, mark yes (or Y) of the mom’s letter. If the animal is a neonate, make note here as well. If there is a calf and the mom is unknown enter: calf Y of ?. M (male) should only be checked if the dolphins sex has been confirmed. Once all the animals have been entered in their corresponding sightings, save as S#\_mm-dd-yy in the *Documents* folder of FinBase (S# = Survey number (i.e. S1)).

The *Mom/Calf list* is also an Excel Spreadsheet listing all mom/calf pairs (Table 4). This spreadsheet is filled out after dolphins have been entered into FinBase and receive a catalog number. Within this spreadsheet, birth year and year(s) of calf sightings are recorded. The list consists of a single spreadsheet, so if surveys extend over multiple years, add additional columns for each year. The *Catalog Changes* spreadsheet (Table 5) is filled out in cases where a dolphins catalog number is changed.

### Enter/Match Animals

To enter/match fins, open FinBase\_FE and select *Match/Catalog Fins* (Figure 16). To bring in a fin to match, make sure the *Sighting Fins* tab is depressed, click on the open folder icon () , browse to the desired sighting folder and select an image (select all images for an individual (i.e. A(L) S1 S1 011 and A(R) S1 S1 012)). Once all images are chosen, the images will appear on the left side of the screen. If both the left and right side images are available, click on the corresponding image name in the middle of the form to view that photo. The table which contains the names of the images has multiple columns: “PQ” (Photographic Quality) has a check mark when photographic quality has been performed, if not checked, double click on the box and the Photographic Quality form will appear and can be completed; “Fin Side” lists the side of the fin for that image, this can be changed in this form if listed incorrectly; and “Survey” and “Sighting” number. Below the Image table is an add image icon () . When clicked, the sighting folder currently used is opened and images can be added (only add images for the same individual). If the wrong image is accidentally brought in, select the image and click on Remove

Selected Image icon () , the image will go back into the Sighting folder. If the Survey or Sighting numbers are listed incorrectly they can be changed using the respective dropdown menus for each, respectively. There are also image tools to help with examining an image: zoom, brightness, contrast, etc. to the right of the image box. To match an animal to other cataloged individuals, attributes have to be assigned to “sort” the catalog. To assign attributes, double click on the selected attribute(s); each selected attribute will then appear in the Selected Attributes box with the highest ranked attribute listed at the top followed by any additionally ranked attributes below. The buttons below this box can be used to remove an attribute or assign an attribute a different priority. If looking at non-distinct fins (i.e. calves), click on the box to the left of *Include Not Distinct Fins*; when this box is checked all non-distinct fins will be brought into the catalog. Use the *Photo-Id Checklist* to record which attributes are assigned to each fin. Chopped, Apex, Lead, and Freezebrand attributes take precedence over the other attributes. Upper, Middle, and Lower (referring to the upper, middle, and lower thirds of the trailing edge of the dorsal fin) are assigned in order of largest to smallest notches (Table 6). Rake marks are not recommended for long-term matching of dolphins, since these marks fade and disappear over time (Gowans et al., 2001). Rake marks are useful, when differentiating dolphins within a sighting or if matching over a short time period. After assigning attributes to the fin, click the *Sort Catalog* box to bring the catalog individuals into FinBase. The catalog will be arranged based on the prioritized attributes previously selected. After sorting the catalog, scroll through the catalog by using the red triangles. If a potential match is found, click on the catalog image followed by the eyeglass icon (). The image being searched for will come up alongside the image of the catalog individual in *Image View* (Figure 17), where zoom, brightness and contrast can be adjusted. If the possible match is a tentative fin (unverified), the image name, data, survey, sighting, and catalog status will be in red. If the two fins being compared are a match, close out of *Image View* and click on the catalog fin and then click on *Match Fin*, in the *Catalog Search* frame (Figure 16). If the matched animal is tentative and still needs to be verified, a pop-up window will appear with the message: *Tentative Entry Selected* “The selected catalog match has not been verified. Verify the selected match and try again.” When the *Match Fin* window opens (Figure 18), first recheck that the fins do indeed match. Then enter the *Dolphin Class*: neonate, calf, other, or unknown; *Distinctiveness*: high, average, low, or non-distinct; and *Fin*

*Obstruction*: none,  $\leq 1/3$ , or  $> 1/3$  (this is solely based on the dorsal fin obstructed by the barnacle, *Xenobalanus*).

Individual distinctiveness is based on the attributes on the leading or trailing edge of the fin. An dolphin is classified as highly distinctive if the attributes are evident in even poor quality photos (Friday et al., 2000; Urian et al., 1999), average distinctiveness if there is an average amount of attributes, low distinctiveness if the dolphin is marginally distinct (distinctive markings from some, but not all perspectives), and non-distinct if the dolphin has a clean fin (no markings). Sex is entered based on the presence of a calf (probable female) or the observation of a male pair (probable male). Male and Female (definite) are only used if the dolphin sex has been confirmed via genetics or physical exam. If the dolphin is the calf of a known mom, the mother's catalog number can be entered by either typing or using the drop down list beside the "Mom" tab. Once the above information is entered, click *Add Match Fin* and write the catalog number in the *Photo-Id Checklist* and note that it is a match (i.e., =8000). If unsure of match, click *Cancel Match Fin*.

In the case of a new catalog individual (if the fin wasn't matched after searching the entire catalog), click on *New Fin* in the *Catalog Search* frame. In the *New Fin* frame (Figure 19) the user must select a catalog series (Table 7) for the prospective new fin based on the primary fin attribute. FinBase will assign the new fin the next available catalog number from the selected series. If the dolphin is not distinct, select clean under catalog series, a catalog number (from the 20,000 catalog series) will be generated along with Not Distinct for the distinctiveness and the attributes. The 'Miscellaneous' catalog series is for dolphins with distinctive scarring, skin disorders, or marks located elsewhere than the dorsal fin (typically on the peduncle region of the body). Record on the *Photo-Id Checklist* the catalog number that was generated and the corresponding attributes that were assigned. Next, enter the dolphin class, distinctiveness, and fin obstruction. Repeat steps to enter information concerning dolphin gender and/or mom's catalog number, if applicable. Finally, assign attributes with the highest priority first and click *Add New Fin*. The catalog series should always be the first attribute. For example, if the new fin was assigned a number from the Lower catalog series, then the first attribute assigned should be lower fin notch. If the catalog series was miscellaneous, then the most distinctive attribute of

the fin should be ranked first (i.e. SDO, peduncle scar/notch, etc.). If unsure of new fin, click Cancel New Fin.

### Verification

The verification process should be completed by a second, independent, researcher. First, open FinBase\_FE and then click on *Verify Fin Entries* (Figure 20). This form displays all *Tentative Catalog Entries* to be verified (Table 8). To begin, sort the catalog as described for Enter/Match Animal above to search for each individual. If confirming a match, select Verify Fin and mark on the *Photo-Id Checklist*. If unable to confirm a match, select Reject Fin, making note of the outcome in the *Photo-Id Checklist*. If the dolphin is a new fin, select attributes for this particular dolphin and sort the catalog. Look through the entire catalog to ensure the fin does not match any pre-existing catalog entries. If the dolphin is confirmed as a new fin, select Verify Fin. However, if a match is found upon review, select Reject Fin, making note of the outcome in the *Photo-Id Checklist*. Matches may also be rejected to change the catalog series of an individual. After each individual is verified a pop-up window appears with the message: *Set Catalog Status?* “The sighting has been verified. Would you like to set/edit the Catalog Status for the images belonging to the catalogued individual?” Always click yes. The *Catalog Status* form will appear (Figure 21). Using the drop down arrow under catalog status, make sure every animal has the best image marked as “Default”; the other (non-default) side should be listed as “Yes”. The rest of the images can be marked as “No”.

### Rejected Fins

Dolphins rejected in the verification process are automatically placed into the rejected fins section of *Match/Catalog Fins* (Figure 16). To reenter these fins, click on the “Rejected Fins Exist!” tab; if more than one rejected fin exists use the “ID” drop down menu to select the Catalog number of the dolphin to reenter. Repeat the same steps as above for enter/match fin and then repeat the verification process. To switch back to entering new fins click on the “Sighting Fins” tab in order to utilize the open folder icon (  ).

## Other Forms

The *Attribute Edits* form (Figure 22) allows the user to view and change the Attributes given to an individual. If the attributes of an individual change over time, use this form to remove, add, or change the priority of the attributes. If the changes are incorrect, select the *Undo* tab to revert back to the original settings; this can only be done before the changes are saved. Once the correct attributes are displayed, click the *Update* tab for the changes to be saved. Within the *Attribute Edits* form the user can also make changes to the *Catalog Status* of an individual.

The *Catalog Edits* form (Figure 23) allows the user to *Assign a New CatalogID* and/or *Reject Selected Matches* (the *Merge Catalog Individuals* is not a usable feature at this time). *Assign a new Catalog ID* is used when a dolphin's fin has changed such that it requires a new catalog series. In order to assign a new number select the dolphins Catalog number by either typing the catalog number in the box (in-between the black arrows) or scrolling to the dolphins number using the black arrows. Once the correct individual is selected, select the new series of the individual using the drop down menu located beside "Series" and record the new Catalog number that was generated (located in the Catalog ID box) in the *Catalog Changes* spreadsheet. In order for the changes to be saved click the *Assign New CatalogID* tab. *Reject Selected Matches* is used if there are incorrect matches for an individual. To utilize this feature, first select the individual that has an incorrect match, by either typing the Catalog number or scrolling to the correct number. Next select the incorrect match for the displayed individual in the listing provided in the lower left portion. Finally, select the *Reject Selected Matches* tab to save the changes.

## Photo-Analysis

Photo-Analysis is the final verification step, confirming that all images were entered correctly. To verify Photo-Analysis, open FinBase\_FE under forms click *PhotoAnalysis*, a new window will be displayed labeled *Photo Analysis* (Figure 24). First, verify that the survey and sighting information is correct. Then, compare the photo analysis numbers with the field estimates. Field estimates are the minimum, maximum, and best count of the dolphins sighted during each Sighting. After the sorting and matching process if the count of individuals

(regardless of distinctiveness), based on high and average quality photos, is the same as the best count, then the photo analysis numbers would be the same as the best count. This makes the sighting a Grade 1 and then there are no changes in the revised estimates. However, if the count of individuals is one or more than the best count, then the photo analysis and revised estimates numbers would increase to the number of individuals entered. This is also considered a Grade 1 since more individuals were positively photographed than the best field estimate. If there were no photos from a sighting or fewer individuals were identified than the best field estimate, the revised estimates would stay the same as the field estimates and would not qualify as a Grade 1 sighting.

## **Literature Cited**

Adams, J.D., T.R. Speakman, E.S. Zolman, L.H. Schwacke 2006. An automated cataloging, matching, and analysis tool for photo-identification of bottlenose dolphins. *Aquatic Mammals*, 32(2):374-384.

Friday, N., T.D. Smith, P.T. Stevick, J. Allen. 2000. Measurement of photographic quality and individual distinctiveness for the photographic identification of humpback whales, *Megaptera novaeangliae*. *Marine Mammal Science*, 16(2):355-374

Gowans, S. and H. Whitehead. 2001. Photographic identification of northern bottlenose whales (*Hyperoodon ampullatus*): Sources of heterogeneity from natural marks. *Marine Mammal Science*, 17 (1):76-93

Mann, J. and B. Smuts. 1999. Behavioral development in wild bottlenose dolphin newborns (*Tursiops* sp.). *Behavior*, 136 (5): 529-566.

Quintana-Rizzo, E. and R.S. Wells. 2001. Resighting and association patterns of bottlenose dolphins (*Tursiops truncatus*) in the Cedar Keys, Florida: Insights into social organization. *Canadian Journal of Zoology* 79:447-456.

Urian, K.W., A.A. Hohn, and L.J. Hansen. 1999. Status of the photo-identification catalog of coastal bottlenose dolphins of the western North Atlantic: Report of a workshop of catalog contributors. NOAA Administrative Report NMFS-SEFSC-425, 22p.

Zolman, E. 2002. Residence patterns of bottlenose dolphins (*Tursiops truncatus*) in the Stono River estuary, Charleston County, South Carolina. *Marine Mammal Science* 18:879-892.

## **Acknowledgments**

We thank Eric Zolman and Keith Mullin for reviewing drafts of the manuscript.

## Survey Form:

**Survey #:** \_\_\_\_\_ (provided by database)  
**Super Survey #:** \_\_\_\_\_  
**Survey Type:**     PHO    BIO    RTR    STR  
                           CAP    FOC    OTH  
**Survey Area:**     Chand Sound    Miss Sound  
                           Barataria Bay    SJB  
**Complete:**         YES    NO  
**Survey Hours:**    \_\_\_\_\_  
**Trackline:**        \_\_\_\_\_  
**Waypoints:**        \_\_\_\_\_  
**Distance (km):**    \_\_\_\_\_  
**# of Sightings:**    \_\_\_\_\_

**\*Be sure to take photo of GPS at start/end of each day\***

### Survey Conditions:

Date	Time	WPT	Sightability	Notes
_____	_____	_____	<input type="checkbox"/> Exc <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	_____
_____	_____	_____	<input type="checkbox"/> Exc <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	_____
_____	_____	_____	<input type="checkbox"/> Exc <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	_____
_____	_____	_____	<input type="checkbox"/> Exc <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	_____
_____	_____	_____	<input type="checkbox"/> Exc <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	_____
_____	_____	_____	<input type="checkbox"/> Exc <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	_____
_____	_____	_____	<input type="checkbox"/> Exc <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	_____
_____	_____	_____	<input type="checkbox"/> Exc <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	_____
_____	_____	_____	<input type="checkbox"/> Exc <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	_____
_____	_____	_____	<input type="checkbox"/> Exc <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	_____

Figure 1. Survey Form



# Sighting Form:

Date: \_\_\_\_\_ Sighting: \_\_\_\_\_  
 Survey #: \_\_\_\_\_ (provided by database) Effort:  On  Off  
 Platform: \_\_\_\_\_ Time: \_\_\_\_\_ to \_\_\_\_\_

**Crew:**

Number: \_\_\_\_\_  
 Photographer: \_\_\_\_\_  
 Recorder: \_\_\_\_\_

Crew #1: \_\_\_\_\_ Crew #4: \_\_\_\_\_  
 Crew #2: \_\_\_\_\_ Crew #5: \_\_\_\_\_  
 Crew #3: \_\_\_\_\_

**Sighting Location:**

SubArea: \_\_\_\_\_  
 Location: \_\_\_\_\_

Boat WPT/Distance: \_\_\_\_\_ / \_\_\_\_\_  
 Start WPT: \_\_\_\_\_  
 End WPT/Distance: \_\_\_\_\_ / \_\_\_\_\_

**Sighting Conditions:**

Animal(s) Heading: \_\_\_\_\_

Precipitation:  None  Rain  Tstorm  Snow  
 Cloud Cover:  Clear  PtCldy  Overcast  
 Visibility:  Clear  Haze  Fog  
 Sightingability:  Exc  Good  Fair  Poor  
 Shrimp Boats:  None  Pri/NA  Pri/A  
 Swell:  0-2ft  2-4ft  4-6ft  >6ft

BSS: \_\_\_\_\_ Salinity (‰): \_\_\_\_\_  
 H<sub>2</sub>O Temp (°C): \_\_\_\_\_ Depth (m): \_\_\_\_\_

**Field Estimates:**

	Min	Max	Best
Total Dolphins:	_____	_____	_____
Total Calves:	_____	_____	_____
Total Neonates:	_____	_____	_____

\*NC: \_\_\_\_\_  
 \*number of dolphins previously sighted during survey

**Behaviors:**

ST:  Init  Obs  
 FT:  Init  Obs  
 pFD:  Init  Obs  
 FD:  Init  Obs  
 SO:  Init  Obs  
 Oth:  Init  Obs

*\*describe other behaviors in sighting notes*

**Observations:**

Xenos:  Single  Multiple  Not Obs  
 Shark Bites:  Single  Multiple  Not Obs  
 Sucker Fish:  Single  Multiple  Not Obs  
 SDO:  Single  Multiple  Not Obs  
 Cohesiveness:  <10  11-50  51-100

Oil in water: yes no CBD (if yes, describe)  
 Oil on shore: yes no CBD no view of shore

**Photo/Video:**

Camera: \_\_\_\_\_  
 Folder: \_\_\_\_\_  
 Start Frm: \_\_\_\_\_ End Frm: \_\_\_\_\_  
 Num Pics: \_\_\_\_\_  
 Camcorder: \_\_\_\_\_  
 Tape: \_\_\_\_\_  
 Start Ctr: \_\_\_\_\_ End Ctr: \_\_\_\_\_

**Sighting Notes:**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Dolphins Sighted:**

Name:	Number:	Name:	Number:	Name:	Number:
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

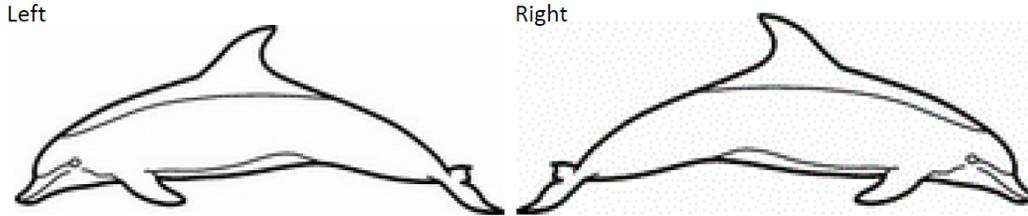
Figure 3. Sighting Form

## Health Observations

Date: \_\_\_\_\_ Survey #: \_\_\_\_\_ Sighting #: \_\_\_\_\_

**Skin Lesions/Wounds** (*circle one*):      none observed                  observed

(Please indicate location of lesions on diagram):



<i>Lesion Indicator</i> (Ex. "1", "2")	<i>Distribution</i> (circle one)	<i>Color of lesion</i>	<i>Shape</i>	<i>Form</i>	<i>Photo?</i> <i>Frame #</i>
	Single Multiple	<input type="checkbox"/> Black <input type="checkbox"/> Grey <input type="checkbox"/> White Other _____	<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> CBD	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Ulcerated <input type="checkbox"/> CBD	Y   N
	Single Multiple	<input type="checkbox"/> Black <input type="checkbox"/> Grey <input type="checkbox"/> White Other _____	<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> CBD	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Ulcerated <input type="checkbox"/> CBD	Y   N
	Single Multiple	<input type="checkbox"/> Black <input type="checkbox"/> Grey <input type="checkbox"/> White Other _____	<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> CBD	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Ulcerated <input type="checkbox"/> CBD	Y   N

**Definitions:**

*Color:* 'Other' could be pink, yellow, red, etc.

*Shape:* 'Pinhole' = small dots or speckling; 'Irregular' includes tattoos, splotchy areas

*Form:* 'Ulcerated' = open wound, may be bloody (may be used in combination with flat or raised)

Describe other observations of **abnormal behavior or health concerns** (e.g. labored or abnormal respirations, abnormal surface patterns, etc.). *If none observed, please indicate:*

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Figure 4. Health Observation Form

**Photo-ID Skin Lesion Data Sheet**

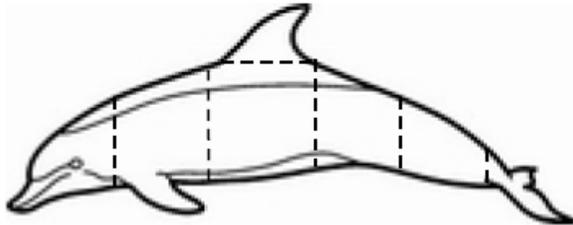
Date:  Survey #:  Sighting#:  SDO Present? Y N

Identifier:  Sex:  Photo Coverage: R L D V DF H F

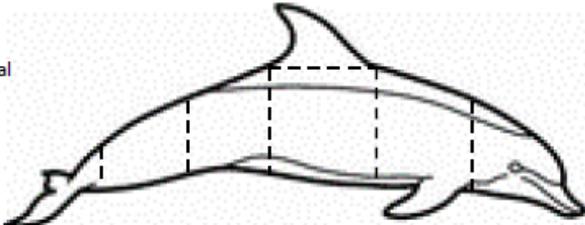
Location:  Temp:  Salinity:

Overall Photo Quality: Clear Blurry Dark Washed out Backlit Glare

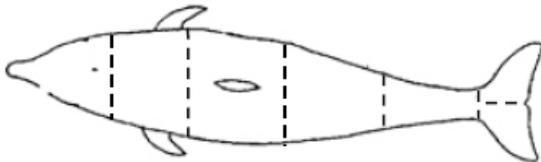
Left Lateral



Right Lateral



Dorsal



Ventral

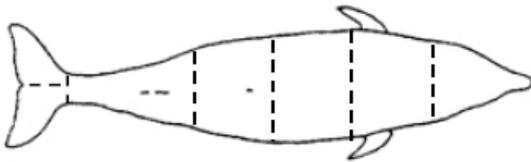


Figure 5. Front of Photo-ID Skin Lesion Data Sheet. Identifier is the catalog number. Sex can be unknown, probable male, probable female or male or female if known. Photo coverage indicates the body parts captured in all photos of the individual in the sighting: R=right, L=left, D=dorsal, V=ventral; DF=dorsal fin; H=head; F=fluke. Overall photo quality is the overall quality of the photos for an individual dolphin in the sighting. On the dolphin diagrams mark the location of lesions on the body areas. Each lesion type (i.e. lesions with different appearances) should be indicated with "A, B, C..." or "1, 2, 3..."

**Notes:**

1. Lesions should be designated with a letter. If the lesions are well-separated, they should receive successive letter. Example: Lesion on fluke and pectoral fin would be "A" and "B", whereas, lesions that are adjacent should maintain the same letter and be numbered, such as two lesions that are on the fluke that are similar and 1mm apart would be "A1" and "A2".

2. Please indicate on the drawings above the approximate lesion location and letter designation.

3. Photo quality of reference photo: Cl=clear; Br=blurry; Da=dark; Wo=washed out; Bl=backlit; Gl=glare

Lesion Indicator (Ex. "A")	Distribution (circle one)	Color of lesion	Shape	Form	Status	Photo (circle) Frame Number	Photo Quality (circle)
	Single Multiple		<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> Tattoo <input type="checkbox"/> Other _____	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Depressed <input type="checkbox"/> Ulcerated <input type="checkbox"/> Cauliflower	<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Active/Healing <input type="checkbox"/> Healed <input type="checkbox"/> NA	Y N	Cl Br Da Wo Bl Gl
	Single Multiple		<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> Tattoo <input type="checkbox"/> Other _____	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Depressed <input type="checkbox"/> Ulcerated <input type="checkbox"/> Cauliflower	<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Active/Healing <input type="checkbox"/> Healed <input type="checkbox"/> NA	Y N	Cl Br Da Wo Bl Gl
	Single Multiple		<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> Tattoo <input type="checkbox"/> Other _____	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Depressed <input type="checkbox"/> Ulcerated <input type="checkbox"/> Cauliflower	<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Active/Healing <input type="checkbox"/> Healed <input type="checkbox"/> NA	Y N	Cl Br Da Wo Bl Gl
	Single Multiple		<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> Tattoo <input type="checkbox"/> Other _____	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Depressed <input type="checkbox"/> Ulcerated <input type="checkbox"/> Cauliflower	<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Active/Healing <input type="checkbox"/> Healed <input type="checkbox"/> NA	Y N	Cl Br Da Wo Bl Gl
	Single Multiple		<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> Tattoo <input type="checkbox"/> Other _____	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Depressed <input type="checkbox"/> Ulcerated <input type="checkbox"/> Cauliflower	<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Active/Healing <input type="checkbox"/> Healed <input type="checkbox"/> NA	Y N	Cl Br Da Wo Bl Gl
	Single Multiple		<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> Tattoo <input type="checkbox"/> Other _____	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Depressed <input type="checkbox"/> Ulcerated <input type="checkbox"/> Cauliflower	<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Active/Healing <input type="checkbox"/> Healed <input type="checkbox"/> NA	Y N	Cl Br Da Wo Bl Gl
	Single Multiple		<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> Tattoo <input type="checkbox"/> Other _____	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Depressed <input type="checkbox"/> Ulcerated <input type="checkbox"/> Cauliflower	<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Active/Healing <input type="checkbox"/> Healed <input type="checkbox"/> NA	Y N	Cl Br Da Wo Bl Gl
	Single Multiple		<input type="checkbox"/> Pinhole <input type="checkbox"/> Round <input type="checkbox"/> Irregular <input type="checkbox"/> Tattoo <input type="checkbox"/> Other _____	<input type="checkbox"/> Flat <input type="checkbox"/> Raised <input type="checkbox"/> Depressed <input type="checkbox"/> Ulcerated <input type="checkbox"/> Cauliflower	<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Active/Healing <input type="checkbox"/> Healed <input type="checkbox"/> NA	Y N	Cl Br Da Wo Bl Gl

**Comments:**

Figure 6. Back of Photo-ID Skin Lesion Data Sheet. Lesion Indicator: "A, B, C..." or "1, 2, 3...", depending on how the lesions are noted on the diagrams from Figure 5. A separate row should be completed for each lesion type (i.e. lesions with different appearances). Distribution: single indicates that only one lesion of a particular type

was observed in photo(s); multiple indicates more than one lesion observed of a particular lesion type. Color: description of major colors of the lesion (e.g. black, white, pink, pale center with dark border, orange, etc.). Shape: indicates shape/area of the lesion of a particular type, multiple fields can be marked (e.g. if some of the "A" type lesions are round and irregular). Form: describes the lesion relief (i.e. elevation or lack of). Lesions may be flat, raised, depressed, ulcerated, or have a cauliflower texture (i.e. lacaziosis), multiple fields can be indicated for lesions of a particular type. Status: indicates whether an infection appears to be active (i.e. ulcerative), healed (i.e. light gray areas if regressing lesions), active/healing ( i.e. a mix of active and regressing lesions), healed, or N/A (unsure or not enough information to determine the status). Photo information: "Y" is circled if photos are available for a particular lesion type and the frame number of the photo that depicts the lesion type should be noted. "N" may be circled if a lesion was observed in the field, but no photos were available. Multiple frame numbers can be listed for multiple images that depict the same lesion type.

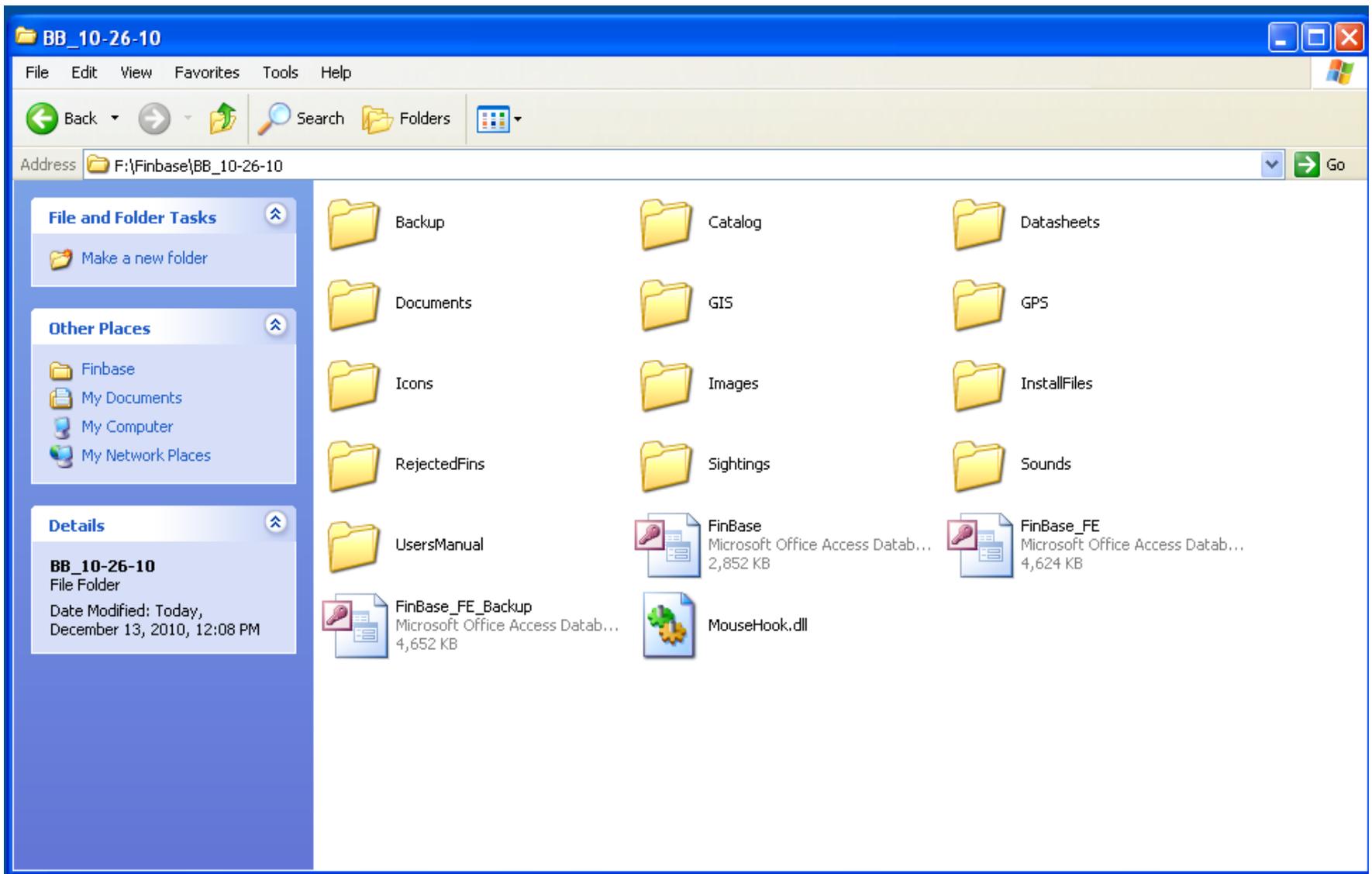


Figure 7. FinBase directory showing all associated subfolders and files

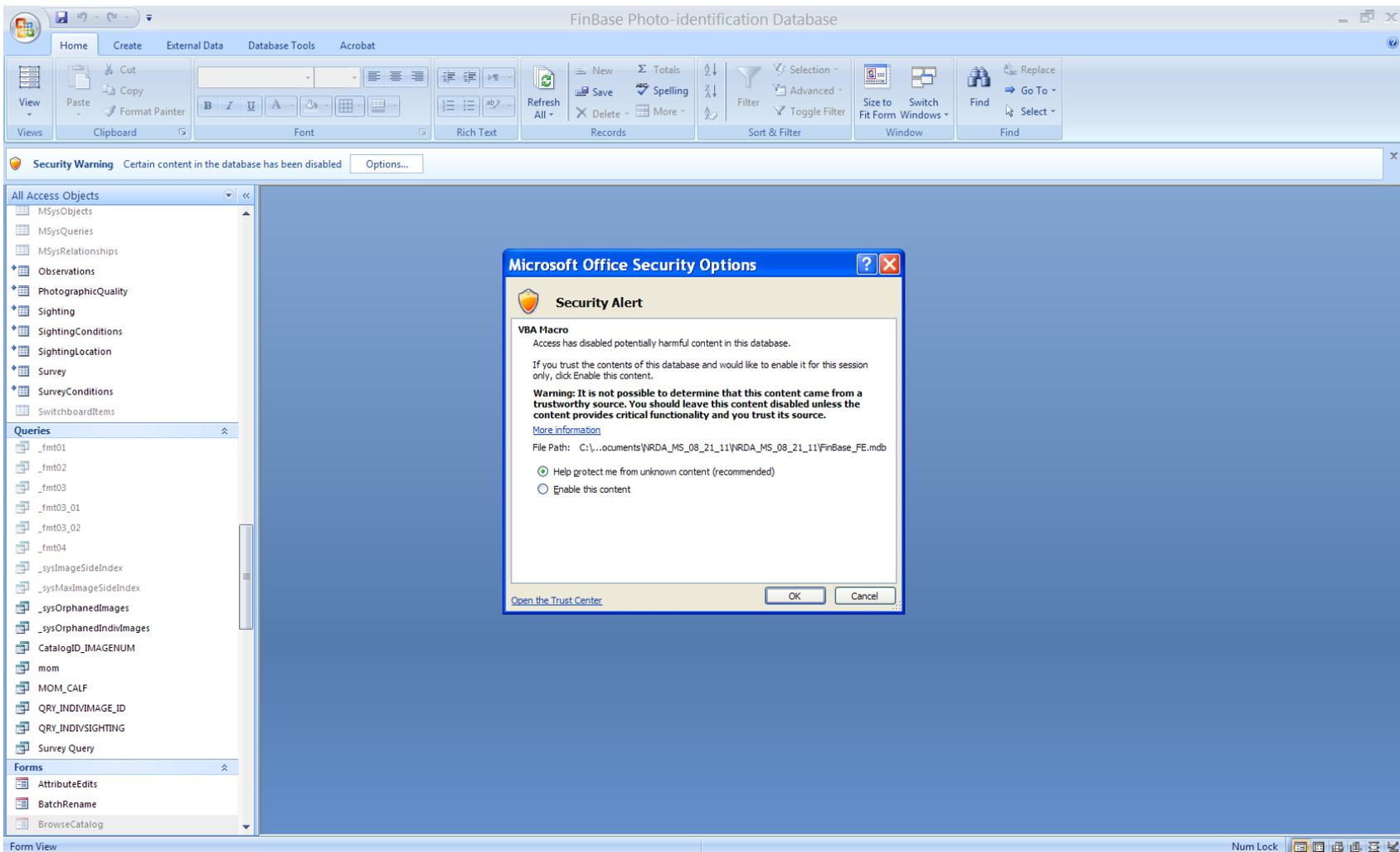


Figure 8. When FinBase first opens select "Options," this will prompt the Security Alert allowing the user to select "Enable the Content" and "OK" in order for FinBase to run properly.

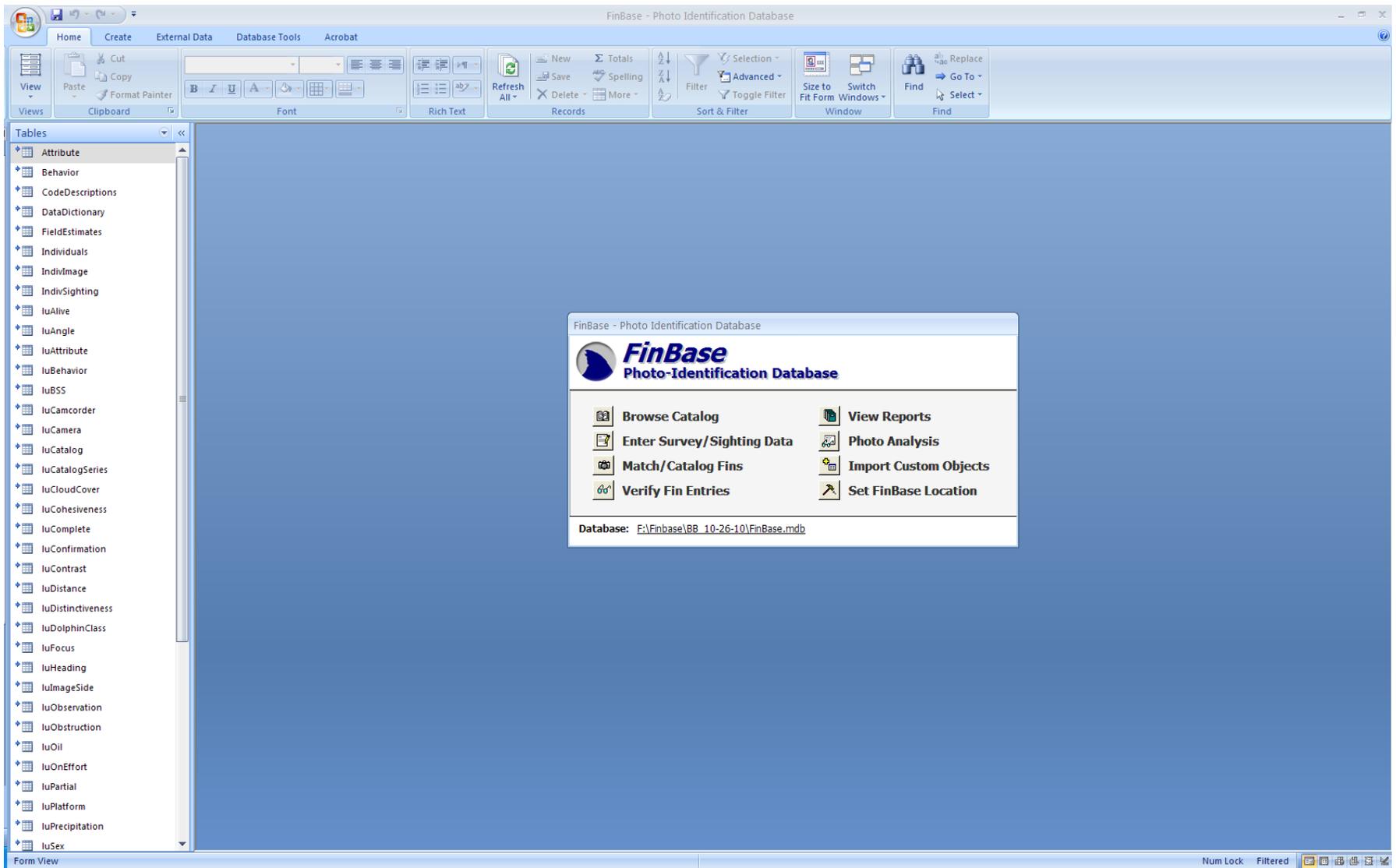


Figure 9. FinBase Photo-Identification Database main screen

FinBase - Photo-Identification Database



**Survey #:**   
**Super Survey #:**   
**Survey Type:**    
**Survey Area:**    
**Complete:**  Yes  No  
**Survey Hours:**   
**Distance:**

**GPS Unit:**    
**Trackline:**    
**Waypoints:**  

**Conditions:**

**Sightings:**

Record:   51 of 53  No Filter

Figure 10. Survey Data Entry

FinBase - Survey Conditions



# FinBase

## Survey Conditions Data Entry

**Date:**

**WPT:**

**Time:**

**Latitude:**

**Longitude:**

**Sightability:**

**Notes:**  
NOAA Dock Pass.

Record: 1 of 1 Filtered Search

Figure 11. Survey Conditions Data Entry

FinBase Sighting Data Entry Form



Date: 9 / 9 / 2010      Sighting: 1  
 Survey #: 263 (provided by database)      On Effort:   
 Platform: Trailing Egde      Time: 9:28 to 10:34

Number in Crew: 3  
 Photographer: CS  
 Recorder: KB  
 Crew #1: MH      Crew #4:   
 Crew #2: CS      Crew #5:   
 Crew #3: KB

Sub Area:   
 Location: Horn  
 Boat: WPT 002      Lat: 30.22039      Lon: -88.61342  
 Start: WPT 003      Lat: 30.2212      Lon: -88.61492  
 End: WPT 008      Lat: 30.2204      Lon: -88.60105

Animal Heading: E  
 Precipitation:  None  Rain  Tstorm  Snow  
 Cloud Cover:  Clear  PtCldy  Overcast  
 Visibility:  Clear  Haze  Fog  
 Sightability:  Exc  Good  Fair  Poor  
 Shrimp Boats:  None  Pr/NA  Pr/A  
 Swell:  0-2 ft  2-4 ft  4-6 ft  >6 ft  
 Tide:  Low  Flood  High  Ebb  
 Beaufort SS: 3      Salinity: 27.4  
 Water Temp: 29.8      Depth: 3.1

	Min	Max	Best
Total Dolphins:	50	70	60
Total Calves:	8	12	10
Total Neonates:	0	0	0
*NC:	0		

*\*number of dolphins previously sighted in survey*

ST:  Init  Obs  
 FT:  Init  Obs  
 pFD:  Init  Obs  
 FD:  Init  Obs  
 SO:  Init  Obs  
 Oth:  Init  Obs  
*\*describe other behaviors in sighting notes*

Xenos:  Single  Multiple  Not Obs  
 Shark Bites:  Single  Multiple  Not Obs  
 Sucker Fish:  Single  Multiple  Not Obs  
 SDO:  Single  Multiple  Not Obs  
 Cohesiveness:  <10m  11-50m  51-100m  
 Oil in Water: No (if yes, describe)  
 Oil on Shore: CBD  
*\*describe other observations in sighting notes*

Camera: 50D  
 Num Pics: 161  
 Camcorder:   
 Tape:   
 Frame From: 125  
 Frame To: 285

**Sighting Notes:**  
cohesiveness based on subgroups

Record: 1 of 6      Filtered      Search

Figure 12. Sighting Data Entry

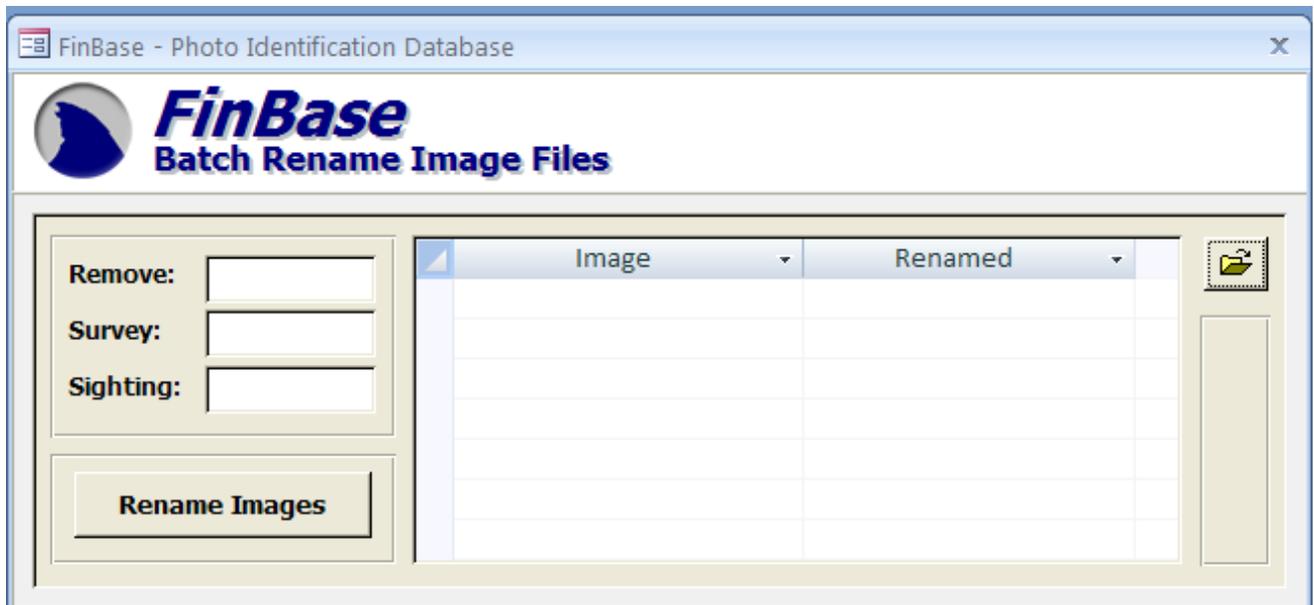


Figure 13. Batch Rename pre-sorted Image Files



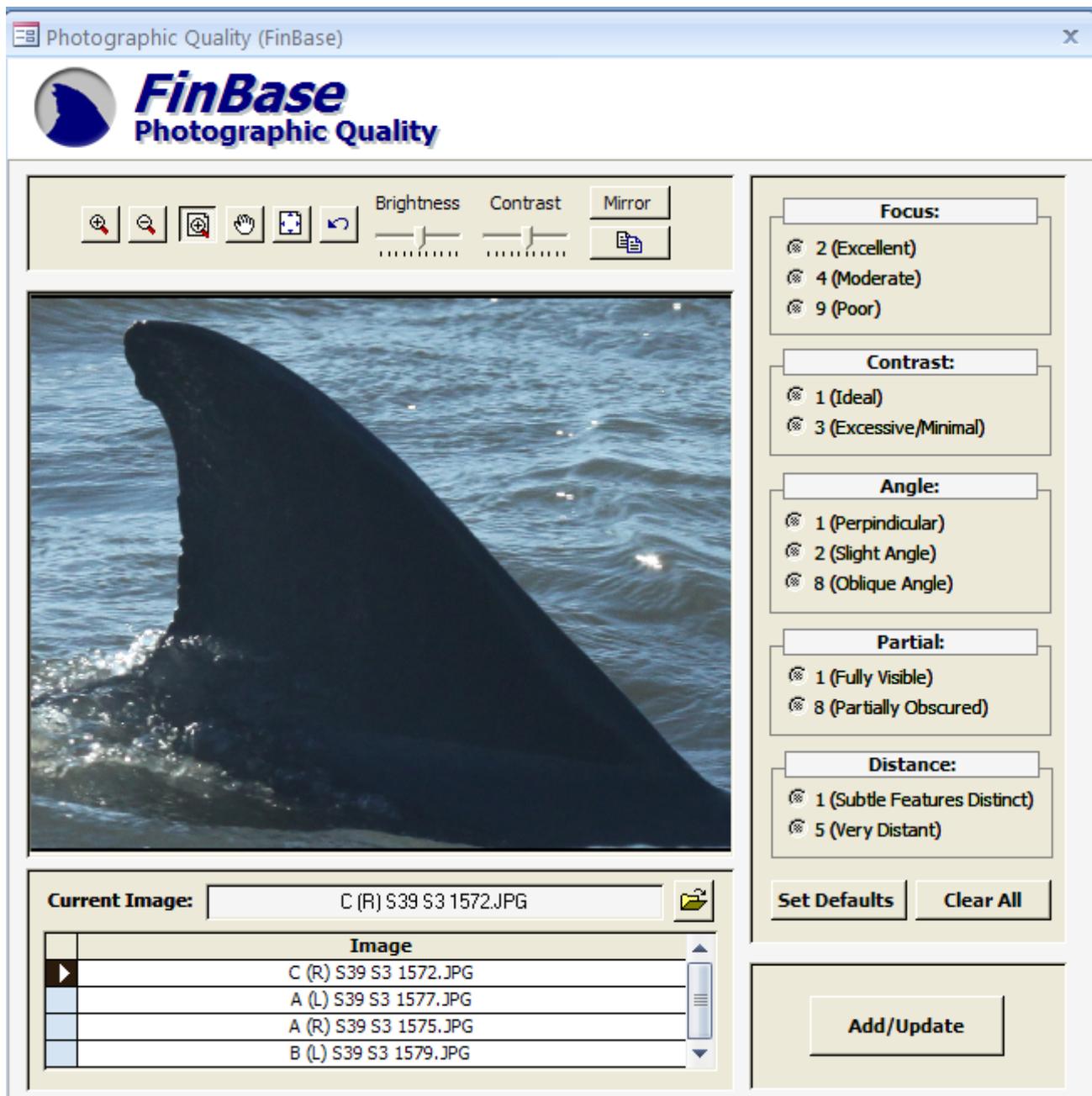


Figure 15. Photographic Quality

FinBase - Photo Identification Database

**FinBase**  
Catalog Search

**Sighting Fins**

Rejected Fins Exist! ID: 1213 Type: Match

Brightness Contrast Mirror

PQ	Image	Fin Side	Survey	Sighting
<input checked="" type="checkbox"/>	A (R) S38 S2 0994.JPG	Right	38	2
<input checked="" type="checkbox"/>	A (L) S38 S2 1053.JPG	Left	38	2

Survey: 38 Sighting: 2

**Attributes:**  
Double-click to Select Attribute

- Scar on Head
- Upper Fin Notch
- Middle Fin Notch
- Lower Fin Notch

Selected Attributes in Priority Order:  
Middle Fin Notch  
Upper Fin Notch

Remove Selected Attribute  
 Promote Selected Attribute  
 Demote Selected Attribute

Sort Catalog

Include Not Distinct Fins

Catalog Individual:  
Match Fin  
New Fin

**Sorted Catalog:** (click on the first thumbnail to activate selection box)

Catalog Size: 762

CatalogID: 7009	6/18/2010	CatalogID: 7010	6/18/2010	CatalogID: 7027	6/19/2010	CatalogID: 7032	7/1/2010
Middle Fin Notch Upper Fin Notch							

1

CatalogID: 7009

Figure 16. Catalog Search

FinBase - Photo Identification Database

**FinBase**  
Image View

Brightness Contrast Mirror



Image	Survey	Sighting
A (R) S3 S1 131.JPG	3	1

Brightness Contrast Mirror



Image	Date	CatalogStatus
8000R01S5S1.JPG	6/18/2010	Default
8000L01S18S1.JPG	7/4/2010	Yes
8000R01S18S1.JPG	7/4/2010	No

Figure 17. Image View

FinBase - Photo Identification Database

**FinBase**  
Match Fin

Brightness Contrast Mirror



PQ	Image	Fin Side	Survey	Sighting
<input checked="" type="checkbox"/>	J (R) S21 S3 282.JPG	Right	21	3
<input checked="" type="checkbox"/>	J (L) S21 S3 358.JPG	Left	21	3

Brightness Contrast Mirror



Image	Date	Survey	Sighting	CatalogStatus
456.JPG	5/10/2010	1	4	Default

Catalog ID:

FB:

Alias:

Age:

AgeDate:

Sex:

Alive:

Mom:

Dolphin Class:

Distinctiveness:

Fin Obstruction:

Figure 18. Match Fin



🔍
🖱️
🔄
🖱️
🔄

Brightness

Contrast

Mirror



**Catalog Series:**

**Attributes:**

*Double-click to Select Attribute*

- Chopped Fin
- Apex
- Lead
- Extension

Selected Attributes in Priority Order:

Remove Selected Attribute  
 Promote Selected Attribute  
 Demote Selected Attribute

**Dolphin Class:**

**Distinctiveness:**

**Fin Obstruction:**

**Notes:**

**Catalog ID:**

**FB:**

**Alias:**

**Age:**

**Age Date:**

**Gender:**

**Alive:**

**Mom:**

PQ	Image	Fin Side	Survey	Sighting
<input checked="" type="checkbox"/>	J (R) S21 S3 282.JPG	Right	21	3
<input checked="" type="checkbox"/>	J (L) S21 S3 358.JPG	Left	21	3

**Add New Fin**

**Cancel New Fin**

Figure 19. New Fin





Brightness Contrast Mirror

Tentative Catalog Entries:

CatalogID	Type	Survey	Sighting
7034	Match	21	3
7054	Match	21	3
6033	Match	21	3
1006	Match	23	1

Image(s):

Image	Survey	Sighting	Date
799.JPG	21	3	8/14/2010
800.JPG	21	3	8/14/2010

**Attributes:**  
*Double-click to Select Attribute*

Chopped Fin  
Apex  
Lead  
Extension

Selected Attributes in Priority Order:

X Remove Selected Attribute  
▲ Promote Selected Attribute  
▼ Demote Selected Attribute

**Sort Catalog**

Include Not Distinct Fins

Verify Fin

Reject Fin

---

**Sorted Catalog:** *(click on the first thumbnail to activate selection box)*

**Catalog Size:**

CatalogID:



CatalogID:



CatalogID:



CatalogID:



◀ ◁ 1 ▷ ▶

CatalogID:

Figure 20. Verify Fin Entries screen

FinBase - Photo Identification Database

**FinBase**  
Catalog Status

Image	Date	Survey	Sighting	CatalogStatus
1736.JPG	11/14/2010	34	11	No
799.JPG	8/14/2010	21	3	No

Image	Date	Survey	Sighting	CatalogStatus
133.JPG	7/1/2010	11	3	Default
800.JPG	8/14/2010	21	3	No

Figure 21. Catalog Status. The entry in red is a tentative match that is unverified.

FinBase - Attribute Entry Form

**FinBase**  
Attribute Edits

Brightness Contrast Mirror



	Image	Date	Survey	Sighting	CatalogStatus
▶	629.JPG	5/12/2010	3	3	Yes
▶	811.JPG	5/12/2010	3	4	No

Brightness Contrast Mirror



	Image	Date	Survey	Sighting	CatalogStatus
▶	630.JPG	5/12/2010	3	3	Default
▶	812.JPG	5/12/2010	3	4	No

ID: 1001

FB:

Alias:

1001

**Attributes:**  
*Double-click to Select Attribute*

- Chopped Fin ▲
- Apex
- Lead
- Extension ▼

Selected Attributes in Priority Order:

- Chopped Fin**
- Bend**
- Middle Fin Notch**

X Remove Selected Attribute

▲ Promote Selected Attribute

▼ Demote Selected Attribute

Update

Undo

Figure 22. Attribute Edits

FinBase Photo-identification Database

**FinBase**  
Catalog Edits

ID:   
 FB:   
 Alias:   
 Age:   
 YOB:   
 Sex:   
 Alive:   
 Mom:

Brightness  Contrast  Mirror



**Assign New CatalogID**  
 If Catalog Series is used to generate CatalogID, select appropriate series for individual. Otherwise, the next available CatalogID will be assigned.  
 Series:   
 Catalog ID:

**Reject Selected Matches**  
 Select incorrect matches for the currently displayed individual in the listing provided in the lower left portion of this form.

**Merge Catalog Individuals**  
 Select the cataloged individual with which you wish to merge the currently displayed catalog entry. The merged individual will assume the CatalogID and stored attributes of the individual selected below.  
 Catalog ID:

	Survey	Sighting
<input type="checkbox"/>	26	1
<input type="checkbox"/>	27	5

	Image	Date	Survey	Sighting	CatalogStatus
<input type="checkbox"/>	1316.JPG	11/10/2010	27	5	Default <input type="text" value="v"/>
<input checked="" type="checkbox"/>	958.JPG	11/9/2010	26	1	No <input type="text" value="v"/>

Figure 23. Catalog Edits

FinBase - Photo Identification Database



**Survey:**  **Sighting:**

**Survey Area:**  **Date:**

**Survey Type:**  **Time:**  to

**Platform:**  **On Effort:**

**Grade 1**  **Field Estimates** **Photo Analysis** **Revised Estimates**

	Min	Max	Best	ID'd	Mrk	Unmrk	Min	Max	Best
Total Dolphins:	<input type="text" value="2"/>	<input type="text" value="2"/>	<input type="text" value="2"/>	<input type="text" value="2"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="2"/>	<input type="text" value="2"/>
Total Calves:	<input type="text" value="0"/>								
Total Neonates:	<input type="text" value="0"/>								

**Marked** **Unmarked**

Catalog ID	Class	Status
▶ 2031	Other	Verified

Catalog ID	Class	Status
▶ 12033	Other	Verified

**Sighting Notes:**

oth=w/boat; initially well marked single; erratic surf's w/some pFD; later joined by 2nd clean fin; began close boat appr's and bow riding; pair surfaced sub-sync along port side; 1 sampled marked initial single. Bio obt @ 12:00 (wpt 041 - TYP052710-01)

Record:   14 of 38  No Filter

Figure 24. Photo Analysis

**Table 1. Definitions of the Survey Conditions in the Survey Form**

<b>Data</b>	<b>Definition/meaning</b>
Date	Date of survey, make sure the little box to left is checked
WPT	Waypoint number of the location when sightability was recorded
Time	Time when sightability conditions were recorded; will be automatically imported if WPT file is linked to survey
Latitude	In degree decimals; will be automatically imported if WPT file is linked to survey
Longitude	In degree decimals; will be automatically imported if WPT file is linked to survey
Sightability	Recorded as Poor, Fair, Good, or Excellent
Notes	Comments on sightability conditions or location.

**Table 2. Sighting form definitions**

<b>Data</b>	<b>Definition/Meaning</b>
Date	Date of survey, make sure the little box to left is checked
Survey #	Automatically generated by FinBase
Platform	Survey Vessel name
Sighting	Recorded serially and restarts for each day
Effort	On or Off depending on whether the vessel is on the survey track line when animals are sighted
Time	First box is the start time of when animals were first sighted and the second box is the time when the sighting is over. Time is recorded in 24 hr time and is generated from the boat and end waypoints.
Number in Crew	How many crew members were on the vessel during the sighting
Photographer	Initials of the crew member who took photographs during that particular sighting
Recorder	Initials of the crew member who recorded the data during that particular sighting
Crew #1-5	Initials of crew members for that sighting
Sub Area	Components of the Survey areas; breakdown of the general survey area (this comes in after using an extra data layer in ArcGIS based on the start location)
Location	General description of where you are in the survey area (i.e. 1 km N of Horn Island)
Boat: WPT	GPS location of boat when animals were first sighted; drop down list will have saved waypoints from the survey
Start: WPT	GPS location of boat when photographic efforts of animals began; drop down list will have saved waypoints from the survey
End: WPT	GPS location of boat when sighting effort ended; drop down list will have saved waypoints from the survey
Lat	Latitude expressed in decimal degrees. Automatically generated after selecting the waypoint.

<b>Data</b>	<b>Definition/Meaning</b>
Long	Longitude expressed in decimal degrees. Automatically generated after selecting the waypoint.
Animal Heading	Orientation of animals when first sighted, expressed as compass headings (i.e. N, NNE, NE, E, etc.). Two non-directional options are mill and var (variable)
Precipitation	Recorded as none, rain, T storm (thunderstorm), or snow
cloud Cover	Recorded as clear, PTCldy (Partly Cloudy), or overcast
Visibility	Recorded as Clear, Haze, or Fog
Sightability	Recorded as Exc (Excellent), Good, Fair, or Poor
Shrimp Boats	Recorded as None, PR/NA (presents but not associated), or PR/A (present and associated). Animals are marked as associated with a shrimp boat when they are close to the stern of the shrimp boat and are displaying fee/probable feed behaviors. If an animal is only bow riding a shrimp boat, they are not deemed as associated with the shrimp boat.
Swell	Recorded as 0-2ft, 2-4ft, 4-6ft, or >6ft
Tide	The tide is not manually entered, it is based on tide charts which can be imported into FinBase and are based on the sightings start time. Recorded as Low, Flood, High, or Ebb.
Beaufort SS <sup>4</sup>	Beaufort Sea State; estimated by observer using the scale in Table 3.
Water Temp	Temperature of water in degrees Celsius
Salinity	Salinity of waster recorded as parts per thousand
Depth	Depth of water recorded in meters
Total Dolphins	Includes all age/size classes of animals in a sighting
Total calves	Includes all calves in a sighting not including neonates. Calves are up to about 75% of the presumed mothers length
Total Neonates	Includes calves that have darker coloration, head-up surfacing patterns, and fetal folds (gray stripes)
Min	Minimum estimate of animals present
Max	Maximum estimate of animals present
Best	Best count of animals present or midpoint of minimum and maximum
NC	NoCount. Number of animals from current sighting sighted during previous sighting(s) on same day
ST	Slow travel; movement with minimal wake
FT	Fast Travel; movement with significant wake
pFD	Probable feed; recorded when there are indications of feeding (repeated dives, variable movement)
FD	Feed; recorded only when animal is observed with fish in mouth
SO	Social; when animals have bodily contact including sexual interactions and chasing one another
Oth	Other; any activity not described above (i.e. bow riding). Include other behavior in sighting notes

<sup>4</sup> See Table 3 for the Beaufort Sea State definitions

<b>Data</b>	<b>Definition/Meaning</b>
Init	Initial. Dolphin behavior when first sighted is recorded as "Init"
Obs	Observed. Any subsequent behaviors recorded as "Obs"
Xenos	<i>Xenobalanus globicipitus</i> ; a stalked barnacle typically located on trailing edge of appendages (i.e. dorsal and pectoral fin, flukes)
Shark Bites	Recorded when there is an apparent shark bite present on an animal
Sucker Fish	Recorded when a sucker fish is observed attached to an animal
SDO	Skin Disorder; recorded when any type of apparent skin disorder is observed
single	Only if a single animal
multiple	If found on multiple animals
Not Obs	If observation not Observed
Cohesiveness	The mean distance among individuals and/or subgroups within a sighting. Recorded as tight <10m, loose 11-50m, or dispersed 51-100m
Oil in Water	Mark using drop down menu if oil seen in water: Yes, no, or CBD (could not be determined)
Oil on Shore	Mark using drop down menu if oil on shore: yes, no, CBD (Could not be determined), or no view of shore
Camera	Camera name
Num Pics	Total number of photographs taken during the sighting
Camcorder	Camcorder name
Tape	Camcorder tape number/name
Frame from	If using only camera start frame of photographs, if using only camcorder it is the camcorder counter number for the beginning of the sighting. If using both put photograph count here and in notes write camcorder start number
Frame to	If using only camera end frame of photographs, if using only camcorder it is the camcorder counter number for the end of the sighting. If using both put photograph count here and in notes write camcorder end number
Sighting Notes	Comments about sighting. Write if any other observations were seen throughout the sighting.

**Table 3. Beaufort Sea State definitions**

Beaufort SS	Conditions
0	Water is flat and calm
0.5-1.5	Light air, slight ripples on water without crests. Wave height less than 1 ft.
2-2.5	Light breeze, small wavelets, but waves are not breaking. Wave height less than 2ft.
3-3.5	Gentle breeze, large wavelets with scattered white caps. Wave height less than 3.5ft
4	Moderate breeze, small waves with frequent white caps

**Table 4. Mom/calf spreadsheet design**

Calf	Mom	Mom Name	Birth Yr	2010 Sighted	Comments
Catalog number	Catalog number	If mom has a name or is freezebranded	If birth year is known	Mark an X if sighted	Any important notes about pair (i.e. mom not seen with calf , possible m/c pair, etc)

**Table 5. Catalog Changes Spreadsheet design**

New Catalog Number	Old Catalog Number	Date Changed	Initials	Notes
Changed catalog number	Original catalog number	Date the catalog number was changed	Initials of person who made changes	Reason for change

**Table 6. Attributes and their definition**

<b>Attribute</b>	<b>Definition</b>
Chopped Fin	Upper part (at minimum) of fin is severed
Apex	Mark in tip of dorsal fin
Lead	Mark in leading edge of dorsal fin
Fluke scar/notch	Scar or notch on fluke
Peduncle scar/notch	Scar or notch on peduncle
Scar posterior to Fin	Scar posterior to Fin
Scar anterior to Fin	Scar anterior to Fin
Scar on head	Scar on head
Upper fin notch	Mark is in upper third of fin
Middle Fin notch	Mark is in middle third of fin
Lower fin notch	Mark is in lower third of fin
Bend	Fin angled to right or left
Lasagna	Fin has scallops along trailing edge (frequently seen in young calves)
Freezebrand	Fin has number/letters on dorsal fin (from captures)
Fin shape	Distinctive fin shape
Fin scar	Fin scar
Skin disorder	Splotches of white/pink areas
Rake	Rake marks are scratches on the dolphins surface that can occur from teeth of other dolphins when playing or fighting
Other	Other distinctive markings not listed
Marginally distinct	Distinctive markings from some, but not all perspectives. Can also include poor photo-quality images
Non-distinct	Fin is not distinct enough to permit matches across sighting

**Table 7. List of Attributes and their catalog series. \* To be used if the animal has distinctive scarring, skin disorder, or marks other than ones on the dorsal fin.**

<b>Attribute</b>	<b>Catalog Series</b>
Chopped Fin	1000 - 1999
Apex	2000 - 2999
Lead	3000 - 3999
Miscellaneous*	5000 - 5999
Upper fin notch	6000 - 6999
Middle Fin Notch	7000 - 7999
Lower fin notch	8000 - 8999
Bend	10000 - 10999
Marginally distinct	12000 - 12999
Freezebrand	13000 - 13999
Clean	20000 - ∞

**Table 8. Definition of the Tentative Catalog Entries spreadsheet in the Verify Fin Entries**

Catalog Number	Type	Survey	Sighting
Catalog number of animal	If this animal is a match fin or new fin	Survey number	Sighting number