NORTH PACIFIC PELAGIC SEABIRD OBSERVER PROGRAM

OBSERVER'S MANUAL

U.S. Fish and Wildlife Service
Migratory Bird Management
Nongame Program
Anchorage, Alaska

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TABLE OF CONTENTS

LIST OF APPENDICES

BASIC SURVEY GUIDELINES

Observation/Weather Conditions:

We conduct 'strip transects' while the vessel is underway. Transects may be conducted whenever conditions are acceptable and visibility is good for a given transect width (100m, or 200m, or 300m). Designate the transect width before beginning your survey. The expected/optimum survey width is 300m, if visibility allows.

Transects may be conducted in less than ideal visibility if all of the following conditions are met:

- **Visibility is at least 100 meters** off to one side of the vessel and 100m ahead. 100m is the minimum survey width, but you can use 200m if necessary, and optimally 300m).
- Seas are ≤ Beaufort scale 6 on the open ocean.
- Daylight is sufficient to see the birds and ID them (silhouettes not acceptable).
- Rain is not so hard as to obscure viewing and lenses can be kept clean (if outside).
- Fog doesn't limit ability to see everything within the designated transect width.
- Glare does not obscure visibility or can be avoided by moving to other side of vessel.

Use the laminated Quick DLOG3 Data Entry Guide for environmental and observation codes.

Transect Requirements:

- Estimate the transit time between sampling stations before starting to survey.
  (Request an estimated transit time from the crew or estimate it from distances between sampling stations.)
- Transit time should be 10 minutes or more in duration.
- Can be done any time of day, as long as light and viewing conditions allow.
- Maximize daylight hours, but try to spread survey effort spatially and temporally.
- Should be kept to ~ 1-2 hour on long transits, with rest breaks between transects.
- Don't change transect width within transect; if conditions change, start new transect.

To Start Transects:

1. When opening DLOG, open current file or new file (which can have multiple transects on it), named: [ship's initialsMMDDYYa (or b); a= 1st file of GMT day (after 4pm AST), b=2nd file of GMT day, which is before 4pm AST]
2. Transect ID's are [ship's initialsMMYY001], with last 3 digits consecutive through a cruise.
3. To start, Type 'START TRAN' in Comment Field 1, & [YES/on effort/F11], then [ENTER].
4. To end transect, type 'END TRAN' in Comment Field 1, still [YES/on effort], hit [ENTER]
5. Then, hit [NO/Off Effort/F12] hotkey and hit [ENTER] (GPS is still recording)

To Pause Surveying:

If you need to temporarily pause surveying-

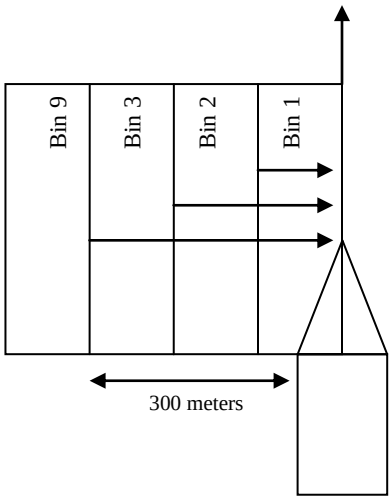
1. In the Comment field type "PAUSE TRAN", and go 'off effort' by hitting the [NO/Off Effort/F12] hotkey, and press [ENTER]
2. To resume surveying- In the Comment section type "RESUME TRAN", and go "on effort" by hitting the [YES/ON EFFORT/F11] hotkey, and press [ENTER].

* ***If break is > 10 min during a transect, end that transect & start a new transect.***
* ***Take a break*** as needed between transects.
* ***Remember*** to fill out a new section of the headersheet when starting a new transect.

Transect Width and Distance Bins:

- Optimum survey area is 300m strip transect.
- Record all observations in one of four Distance Bins:

  Bin 1 0- 100 meters
  Bin 2 100- 200 meters
  Bin 3 200 - 300 meters
  Bin 9 > 300 meters, or outside transect window (ie, other side of boat)



Bin 9 (off transect) was created to:

- Record unusual birds or mammals, birds of special interest (i.e., Short-tailed Albatross), or large numbers of **animals off transect (> 300** meters), or outside transect window.
- Record observations of interest that occur while you are 'off effort'.
- Record other boats in the vicinity beyond 300m. If time allows, estimate type or size of boat and distance in the comments fields.

Use hotkeys to enter distance bins.

F5	**Bin 1** = 0–100 meters
F6	**Bin 2** = 100–200 meters
F7	**Bin 3** = 200-300 meters
F8	**Bin 9** = > 300 meters

SURVEY PROTOCOLS

Read through the two sections below to become familiar with the survey protocols used to record marine birds and mammals. You should also read the DLOG2 and DLOG3 manuals, which will help you understand how the program and data entry works.

Note: Birds in the air are recorded differently than birds seen performing any other behavior. It is *critically* important that you understand the details of these protocols because they must be followed to properly calculate bird densities. *Please* ask questions or follow up in an email if there are any questions. An explanation for the necessity of using SCANS for flying birds is given in Appendix 4.

Section 1: Continuous Count Method - Birds & Mammals on water, on ice, foraging.

All species are **continuously** counted when observed on the water, on the ice, on a float or foraging for food within 300m of the ship (or flushed off water ahead of boat).
Birds that are in the **air** are counted differently, using the "Scan Method" and are addressed separately in Section 2 (below).

Continuous Count Guidelines:

- Observe and count all birds and marine mammals on transect (do not include birds in the air, with the exceptions outlined below).
- Each species requires its own record, even if they are mixed with other species.
- Record basic behavior (i.e., WATER, FORAGE, ON ICE, ON FLOAT).
- Estimate distance of birds & mammals using distance bins (1, 2, or 3).
- If it looks like a bird was flushed off the water by the ship, record the behavior as 'WATER', and do not consider it a flying bird.
- **Forage flocks** or individual birds hovering, picking at the surface, or surface-plunging are considered to be foraging and should be counted using the same methods used for birds on the water. Record foraging birds with behavior ='FORAGE' [F4]; (note – hotkeys may vary for different cruises). Multiple species present in a forage flock will be connected via time and location, but if there is time, **enter '*FF*' in the 1st comment field** for each species' entry.

Section 2: SCAN Method - Counting Birds in the Air

Birds in the air are counted using the 'SCAN' method. The SCAN method is a snapshot of the birds in the air within the transect window at the moment a timer chimes. The goal is to record birds in the air at a specific interval. The frequency of the SCAN interval is based on the ship's speed (see table below), such that a 'snapshot' is recorded for every 300m block that the ship passes while in transit. Set the timer at the start of each transect using the estimated ship speed.

A. SCAN Guidelines: follow these guidelines when the timer chimes

- Count birds in the air on one side and within an arc $0\text{-}90^0$ and 0-300m from th vessel.
- Record the behavior as [SCAN] using the <F2> hotkey.
- Do not repeatedly count birds that are following the vessel on the SCAN.
- Do not count any birds beyond 300m as part of a SCAN.

- Do not count any birds or mammals on the water as a SCAN.
- Estimate the distance of the bird when you first see it as the timer chimes, recording distance bins (1 [0-100m], 2 [100-200m], or 3 [200-300m]).
- Scans should not require binoculars except to confirm species ID
- If bird activity is high or for other reasons scans become problematic, do not record 'bins'. Otherwise record the bin where the bird was first observed as the timer went off.
- If no birds are in the air during the SCAN, you do not need to enter anything. The default assumption is that you are doing a SCAN at the appropriate intervals.
- Count all birds (except followers) in the transect window during a SCAN, even if you saw the bird enter the transect window prior to the timer going off.

B. Scan Intervals Relative to Average Vessel Speed Over Ground (SOG)

Vessel Speed	Scan Interval (seconds)
14–16 knots	**39**
11–13 knots	**49**
8–10 knots	**65**
5–7 knots	**97**

Note: Vessel speed will fluctuate, so don't continually try to reset the timer. The scan interval is based on an average vessel speed, and should be the same throughout a given transect.

C. Setting Scan Timer

A timer is installed on the desktop of the computer. At the start of every transect, set the timer for the correct interval based on the vessel speed. The crew on deck can usually provide you with an estimated speed of travel as they start a transit. The timer can be set by right clicking on the timer icon, go to 'edit value' and changing the time interval. Once set, hit the [green triangle] start button on the timer to activate it. Volume can be adjusted by clicking on the sound icon in the bottom right-hand corner of the screen. Be sure to adjust the volume so that you can hear it - but not too high to disturb others in the vicinity of the computer. If taking a break, be sure to turn off the chime by hitting the pause button, so the timer does not drive crew members crazy.

D. Followers and Potential Recounts:

With experience, you will come to rely on your ability to make a decision as to whether or not a bird is a follower. After recording a bird on its 1st sighting, ignore it. You will need to keep on eye on circling birds (or note unique plumage characteristics) to determine if they are followers, but not to the extent that you are overly distracted from the transect window.

- Do not record the same bird on subsequent scans, even if it leaves and re-enters the transect window.
- If a bird was recorded during a SCAN, then lands in front of the boat, do not record it as 'on water' in the transect.
- Make a note of following birds if/when you have time in 'Comments' Fields.
- If dozens or more birds are following the vessel, do not record them on transect, even at the first observation. Note the numbers of followers as a 'bin-9' entry, or on header sheet.
- In general, ignore 'followers' as they move around the ship and concentrate on looking for birds in front of the vessel and on the water.

Section 3: Additional Survey Scenarios: You may encounter some of the events below. Become familiar with the events and reference this section for more information.

A. Rare Flying Birds and Species of Interest:

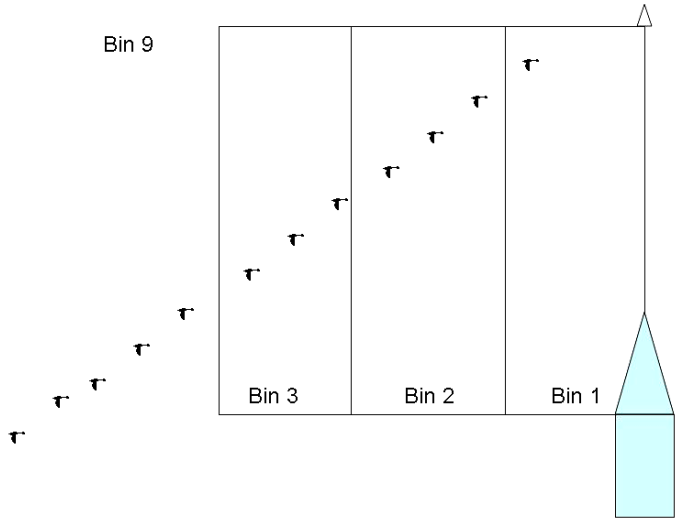
- **Record these observations only if time allows.** Species that fall into this category are birds that you have not yet seen in a region during the survey, or are species of interest. As a guideline, try to record all Albatross, Loons, Murrelets, Eiders.
- Do not divert your attention too long from the **main job of recording all birds within the transect window**. If you are busy, jot a note on the header sheet for later entry of rare birds and species of interest observed in the air.
- Record behavior as FLYING [F3]. If they do not enter the window during a SCAN, these observations will not be used for density estimates in NPPSD. (*An exception is density calculations for albatross, if the observer has recorded all albatross on transect*).
- Record distance of bird the same as you would for birds on the water (Bin 1, 2, 3, or 9).

B. Foraging Birds:

- Flocks or individual birds hovering, picking at surface or surface-plunging: are considered the behavioral equivalent of birds on the water, and should be recorded continuously, using the behavior FORAGE [F4].

C. Lines of Flying Birds:

- Do not count lines of birds as one observation unless they are all in the transect window simultaneously. Example: if a line of birds is entering your transect 'window', only count those birds that are in the window at the instant of the scan – not those that subsequently pass through the window.



Enter the example above of ducks in the air during a SCAN when the timer goes off as:

(Typically, this scenario occurs too quickly to visually separate birds into bins; you can leave the Bin field blank, which means all birds in bins 1-3 were within 300m).

Species	Number	Behavior	Bin
LTDU	1	SCAN	1
LTDU	3	SCAN	2
LTDU	3	SCAN	3

D. High Bird Densities or Large Numbers of Birds Landing and Taking Off

You may encounter areas with lots of birds on the water or milling about (*does not include followers milling around the boat*), such as large flocks taking off and landing continuously. In this case, do not try to separate 'flying' from 'water' birds – lump them together and count continuously in 300m blocks, similar to conducting Scans.

- **If bird densities on transect get too high to record everything, prioritize in this order:**
  1. Drop bins- record everything ≤ 300 m from vessel; leave bin field blank. A blank bin value assumes all observations are on transect.
  2. Drop behaviors (may record later in notes if most were on water or flying).
  3. Drop species for mixed groups. Note percentage of main species (note on header sheet and add into species, estimated numbers, & comments field when you edit file).
- Count everything at once in 300m blocks ahead (and to 1 side).
- At next interval or whenever boat has traveled another 300m – count again.
- Make note on header sheet or in 'Comments Field' (*ex*: *All birds lumped; counted in 300m blocks.* Note counting method *(ex: 'counted in 10's', or 'counted in 100's').*
- Count all birds or give best estimate. **Do not record rates of birds in Species and Number Fields** [ex. 20 STSH on water per 5 seconds]. Enter an actual number into the DLOG field. Periodically enter species as you travel through a large group of birds.
- In areas with very high abundance, note the extent of the mass of birds beyond the transect, how long you are traveling through them, and record the vessel speed. Record this information on the Header sheet for that transect.
- If you observe a large number of individuals in one record (e.g. 100 sooty shearwaters, or 10 Short-tailed albatross), make a note in the comment field that indicates the observation is not a mistaken entry. Use the designated hotkey [GOOD #] as a short cut.

Section 4: Counting Marine Mammals:

Record all marine mammals as you would birds on the water:

- Include distance bin of observation.
- Record 'off transect' mammals in bin 9 outside the 300m transect window.
- Record behavior (i.e., WATER, ON ICE, ON FLOAT, FORAGE).
- Count the total number of mammals observed. The total number of animals includes pups and calves. In Comment field add details on age or class composition if time allows.

Example: Total of 5 Spotted Seals are observed, 3 are adults and 2 are pups.
Enter data as: "SPSE 5", and in Comments Field type "2 pups"

GETTING READY TO SURVEY

Section 1: How to Estimate Distance of Observations

Practice judging distances using the Rangefinder whenever possible, but don't get distracted while surveying. Visual estimates will vary with vessel, seas, and weather conditions, so periodically check distances while in the harbor or if near a buoy, floating objects, or large birds. Note: large objects (in the harbor) may appear closer than a bird does on the water. Experiment with differently-sized targets when possible.

To accurately and quickly estimate distance bins of birds or mammals, we also use a geometric calculator method. Before starting surveys, the observer will need to take some measurements, plug them into an excel program, and put the calculated measurements on a pencil or wooden dowel (flat, wooden stir-sticks work fine). The **excel file** named: '**calc for bin pencils.xls'** is located on your laptop. Plug in your measurements to generate values for your distance tool.

How to Set Up Your Distance Tool:

1. Get height of the observation platform (height of vessel's bridge above water in meters).
2. Measure your height from floor to eye level in meters.
3. Measure the length of your outstretched arm when raised thumb-to-eye, in meters.
4. Plug measurements into the appropriate box in the excel program (calc for bin pencils).
5. Mark the pencil or dowel (starting from the top) with the measurements calculated by the excel program beginning with the 300m line (above line is bin 9), then the 200m line (between 1st and 2nd line is Bin 3), and the bottom mark at 100m (between 2nd and 3rd line is Bin 2; below the bottom line is Bin 1).
6. After marking the pencil or dowel with the 300, 200, 100m distances, stretch your dominant arm directly out in front of you and hold the pencil/dowel with the top of the pencil even with the horizon. The three marks you have made on the pencil/dowel will tell you the distance for each bin 0–300meters, and 'off transect (> 300m).

After numerous sessions using the dowel to estimate distance, you may be able to estimate the bin distance just using your eyes. Check your accuracy from time to time using your dowel, especially to adjust your eyes under different seas and weather conditions. You should also periodically check distances using the rangefinder where possible.

Calculator for Distance (Bins)

Name	Body height in meters (to eye)	Length of arm in meters	Height of observation platform off water (m)	300 m range mark (cm)	200 m range mark (cm)	100 m range mark (cm)	
McArthur							Measurements must be in meters
Guy	1.67	0.64	8.3	2.13	3.19	6.38	Observer's height is to eyes.
Healy							Length of arm to raised thumb-to-eye, arm outstretched
Kathy	1.55	0.55	18.288	3.64	5.46	10.91	Height of platform is floor of bridge above water
							Plug measurements into appropriate box.
David	1.75	0.65	18.288	4.34	6.51	13.02	Mark calculated cm from top of pencil.
							Reading distances:
Liz	1.63	0.59	18.288	3.92	5.88	11.75	Holding top of pencil or dowel to horizon, the 300 m mark is first,
							(Bin 9 is top of pencil to 300m mark)
Marty	1.95	0.75	18.288	5.06	7.59	15.18	Middle line is 200-300 m range, and below last mark = bin 1.

Section 2: Organizing Data Storage

1. Create a folder for each cruise with a shortcut to the desktop (i.e., 'MACE-1 2009' or 'Polar Sea 2009').
2. Create subfolders within the "cruise folder" for 'Raw Data' 'Edited Data', 'Headersheets', and 'Cruise Report'.
3. On the desktop there is a folder called "Survey Files". In this folder there is an excel spreadsheet called "Header Sheet". This file is a template for entering information from the header sheets. It is important to **transcribe your header sheet information into this electronic format at the end of the day.** Be sure to include ALL comments in the comment section. Entering the header sheets electronically is important because this is the location where we will look for comments, and it will provide you an opportunity to review all transect numbers and look for mistaken entries.
4. If the header sheet contains edits that cannot be done in the field (such as GPS errors) flag the hardcopy with a sticky note.

Section 3: Starting Up DLOG3

1. Fill out the hard copy **header sheet** information. Always do this **before** observations begin. There is a copy of a blank header sheet in Appendix 3. On the header sheet, be sure to record if there are one or two observers on the bridge, the transect width chosen for observation (width must not change during transect), and if observations are on 1-side or 2-sides of the vessel. If surveying alone, it will always be 1-side.
2. Start up the computer.
3. Double click on the DLOG3 icon.
4. Select **BSEA map**.
5. Name the data file.
    - Files are named using the ships initials followed by [MMDDYY], and an 'a or b' suffix to denote the first or second file in a GMT 24-hour day. Example of file name: OD082209a = Oscar Dyson, August 22, 2009, first file of the GMT day.
    - The first file of the day (**the 'a' file**) will **always** be the **first file created after 1600 AST**. The 'b' file will always be the first file created for the first observations of the AST day, and the last half of the GMT day. This is because data is recorded during the survey using GMT time (see below).
    - **Do not create a new file for each transect**.
6. Plug in the GPS cable. NOTE: On some ships, the GPS should be plugged in first!
7. ONLY create subsequent daily files (i.e. OD082209c, OD082209d, etc.) if the "a or b" file becomes corrupt or there are data recording problems, and note in header sheet.
8. **Be sure to sync the laptop's clock with the ship's clock at the start of the cruise.** The synchronization is important so we can match up the data that the ship collects with our observations. Most research and Coast Guard vessels operate on GMT time. The time displayed in the lower right-hand corner of the laptop's screen is the **GMT time** (Greenwich Mean Time). The ship's clock is also set to GMT time. GMT time is presented in military time or a 24-hour clock system (i.e., 8:00am is 0800 hours, 8:00pm is 2000 hours). GMT time is 8 hours ahead of Alaska Standard Time. Every day at 4:00pm/1600 Alaska Standard Time (AST), it is midnight GMT time and a new GMT day begins. So, **at 1600pm AST** (midnight on the GMT clock on your screen) **each day, you should end your transect, save the data, exit DLOG, and create a new file.**

Creating a new file is very important, otherwise DLOG will stop recording GPS data. To continue surveying, start up DLOG3, plug in the GPS, and create a new file name, which begins with 'a' because it is the first file of the GMT day.

Section 4: The GPS

- **Spastic Mouse Syndrome -** In some cases, if the GPS is plugged in while the computer is booting up, you may see the mouse jumping around the screen. Unplug the GPS and restart the computer, then plug the GPS back in after the computer has finished re-booting.

- With DLOG2 it is necessary to start up DLOG before plugging in the GPS, but this isn't usually necessary with DLOG3. For some ships, we found in necessary to plug the GPS in before starting up the computer. This will vary with ship and if using a hand-held.

- **Periodically Check the Latitude/Longitude Location** in the lower left hand corner of the DLOG screen. Make sure that the GPS unit is operating properly and updating the vessel's location. Watch for static GPS points (or entries piling on top of each other).

- **If the GPS is Not Working Properly**, check for loose connections or low batteries. Go 'Off Effort'/[F12] while you work on the problem. If it takes >10 min to resolve the problem, end the transect and start a new transect later. If the GPS is inoperable, you can continue to survey if you record a start and end lat/long and check that the computer time is synchronized with the ship's. When using this method, keep transects < 1hr in length and if possible record lat/long every 10 min, or at least when the course varies.

- **Time Zone Change and Crossing the International Dateline:** If the vessel crosses into a new time zone (i.e., crossing the international dateline), continue to use GMT time and reset the computer's internal clock. Record the time change on the header sheet each time you start a transect. On header sheets, record both Alaska Standard Time and GMT time. Make sure you record the date correctly for GMT and AST. **Remember** that GMT time is 8 hours ahead of Alaska time. Create a new transect when the ship crosses the dateline and make a comment in the header sheet. Remember that once the dateline is crossed from the US to Russia all longitude values are now recorded as being East (E). Please use the E label when recording the longitude on the header sheet. (Ex: Boat has crossed the dateline from Russia- 61 23.5 N, 178 42.56 **E)**.

- **GPS Settings:** DLOG is set up to use "NAD 83" or "WGS 84" coordinate system.

- **Missing Waypoint Data**: The computer program will stop entering automated waypoint data every 20 seconds when a new GMT day begins. These waypoints are critical to map out the transect lines. Therefore, start a new file and transect at the start of a new GMT day after 0000 hrs on the computer (1600AST).

ENTERING DATA IN DLOG3

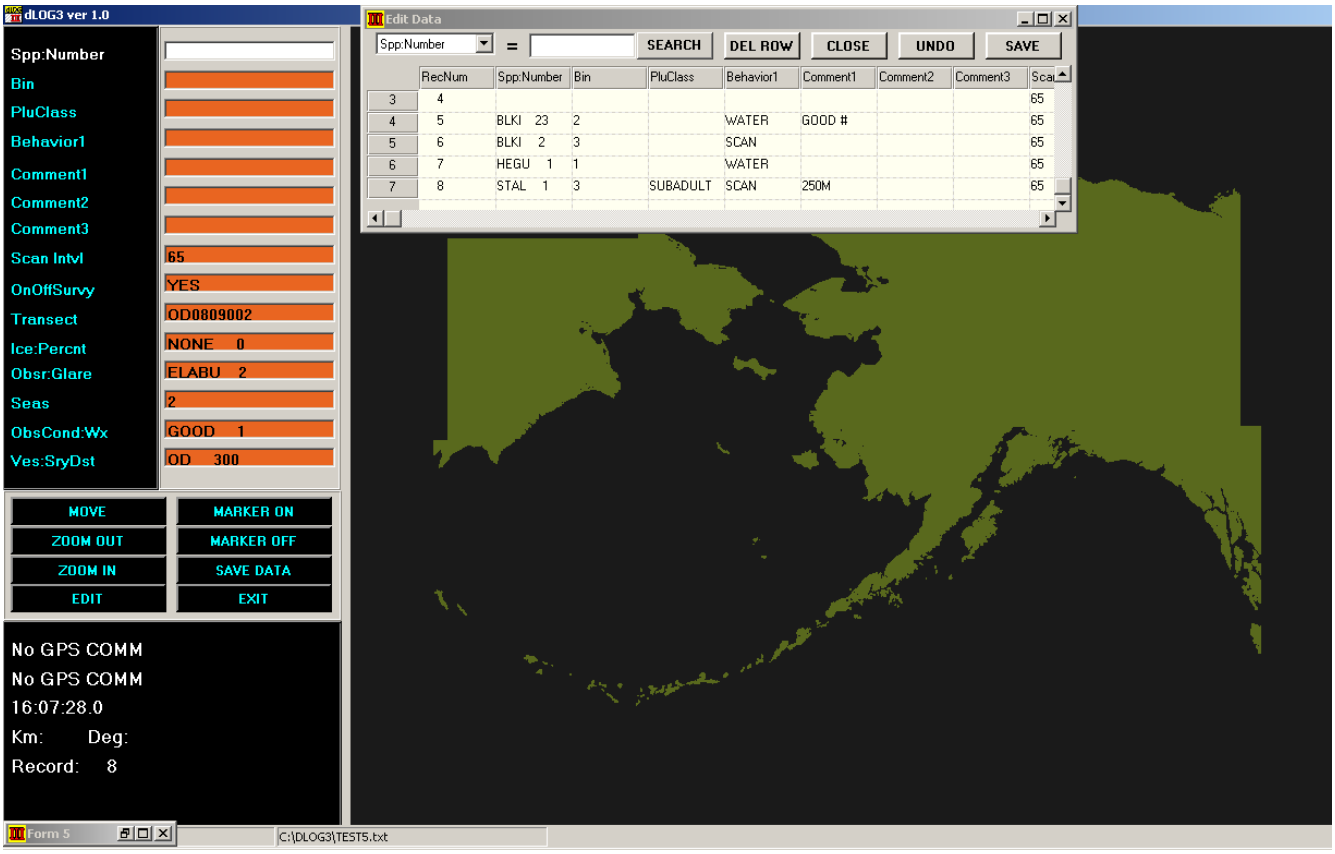
Section 1: Survey Program Background Information

- All observational data is entered using the survey program DLOG3. Become familiar with the details of this program before beginning a survey. Read the DLOG2 and DLOG3 manuals on your desktop file.
- A Data Entry Quick Reference Guide is included in your field materials. Keep the guide handy while you are surveying. The guide contains many of the codes that you will be frequently using while surveying.

Section 2: Data Entry Fields

All observations are entered by typing data (or the appropriate alias) into the correct fields. DLOG contains 15 data entry fields located along the left side of the screen.

- Below is an example of the DLOG data entry program. DLOG3 has a window in the upper right that shows you the last few entries (record #, species, number, behavior). This allows you to check that you have made the entry correctly, or to get the record # of an entry that you need to change later.



A. Persistent and Non-persistent Fields. DLOG has two types of fields:

Non-Persistent: Fields 1-7

- Are reset to a blank field each time you hit [ENTER]
- These field are where the species information is entered (species code, counts, distance bin, plumage [if appropriate], behavior, and comments related to this record).

Persistent: Fields 8-15

- Remain the same until they are changed by the observer (remember to hit [ENTER] once you've made a change or it will not be recorded in the data file).
- These fields contain environmental conditions and survey metadata (scan interval, on/off effort, transect ID, ice conditions, observer, glare, seas, survey conditions, weather, vessel name, transect width).

B. Data Entry Window – a new feature of DLOG3 is the window in the upper right, which shows the key components of your last few entries. This allows you to see if you entered your observations correctly, or you can get the exact record # for an entry you want to change later.

Section 3: Data Entry Shortcut Keys

A. Hotkeys F1–F12 The ultimate data entry shortcuts!

- These keys have been pre-set (in the 'HOTKEY.DAT' file) with codes for our project.
- The Hotkeys will aid in helping you enter frequently entered data quickly.
- Can be used while the cursor is in any data entry field.
- Do not need to toggle up/down between fields when entering observations

Typical Hotkeys and Function
(Designated Hotkeys may vary by cruise)

HOT KEYS

F1	Bird on **Water**
F2	**SCAN** (bird assumed to be flying)
F3	Bird **Flying** (not part of scan)
F4	Bird **Forage** (or 'on ice' for some cruises)
F5	**Bin 1** = 0–100 meters
F6	**Bin 2** = 100–200 meters
F7	**Bin 3** = 200–300 meters
F8	**Bin 9** = > 300 meters or other side of boat
F9	**Good #**
F10	**Immature** Plumage (limited/special use)
F11	**YES-** On Effort
F12	**NO-** Off Effort

B. Alias Keys (set for your region, using the DLOG file 'ALIAS.DAT')
Alias keys are also shortcut keys, but they only work if you are in the correct field.
Each entry is saved by hitting the [ENTER] key.
The full name of each species can be found in Appendix 2.

ALIAS	Species	ALIAS	Species	ALIAS	Species	ALIAS	Species
A	UNAL	**G**	UNGU	**M**	MAMU	**SB**	UNSB
B	BLKI	**GW**	GWGU	**ME**	UNME	**SH**	UNSH
BG	BLGU	**GG**	GLGU	**MG**	MEGU	**SL**	STSL
BR	BRMU	**HG**	HEGU	**MU**	UNMU	**SO**	SOSH
C	COMU	**H**	HOPU	**N**	NOFU	**ST**	STSH
CA	CRAU	**HS**	HASE	**P**	PIGU	**T**	TBMU
CL	COLO	**KI**	UNKI	**PA**	PAAU	**TU**	TUPU
DA	USDA	**L**	LTDU	**PC**	PECO	**UC**	UNCO
DC	DCCO	**LA**	LEAU	**PR**	PRCO	**CM**	UNML
DP	DAPO	**LP**	LESP	**R**	RLKI	**UP**	UNPE
F	FTSP	**LS**	UNLS	**S**	UDSH	**Z**	ZZZZ

Data Entry: Checking for Acceptable Values (see DLOG3 manual for details):
During data entry, DLOG3 processes each record when the [ENTER] key is pressed. At this point, DLOG3 checks the relevant fields for acceptable values. If a field contains an entry that does not match any acceptable values for that field, a warning box will pop up, indicating which field contained an unacceptable value and the unacceptable value itself. While the warning box is displayed, DLOG3 pauses all processing, including automatic recording of position and time. Therefore, the warning box should be cleared soon after it appears.
When the warning box appears, there are three possible actions:

Accept Entry -- This is the default action. The value is saved as originally entered. If you enter the same value again in the same field, you will get the same warning.

Cancel Entry -- The pop up box disappears, but the unacceptable entries are still present in the data record. They must be corrected in the data entry fields on the left, and you must hit <ENTER> again.

Always Accept Entry -- The unacceptable entry is redefined as a valid entry and the record is saved as originally entered. For the remainder of the DLOG3 session, the same value in the same field will be accepted without question. (Use this option with caution; it may be best to change the entry later during editing, unless you are sure of the code name and see it often).

When the warning box appears, the focus is set to the 'Accept Entry' button, so immediately hitting <ENTER> will allow you to continue quickly with data recording. The three buttons on the pop up box can be navigated using the up or down arrows.

Section 4: Data Backup

Periodically back up data by clicking on the "Save Data" button in DLOG3. The data is saved to a backup folder- C:/DLOG3BkUp. In DLOG3, a new file is created with each 'SAVE DATA' entry – with file extensions of (1, 2, 3...) at the end of the file name. **When copying a file or editing, be sure you use the file with the original name or latest number.**

Section 5: Recording Edits

If during the survey there are mistakes in entering the data or other changes, record that information immediately in the header sheets under the "Edits" section. On the sheet, record the Record # shown in the lower left of the DLOG screen; in DLOG2 this number will be approximate, since GPS records are written continuously. In DLOG3 you can get the exact record # from the data entry display window in the upper right of the screen. **Edit the data at the end of the day in excel only and not during the survey.**

EDIT KEY WARNING: **DO NOT** use the edit data button in DLOG3 to edit the data!! The program has been known to crash causing data loss.

Section 6: Exiting DLOG3 and editing files

- Make sure you 'Save Data' before exiting!!
- Click on the EXIT icon to exit out of the program.
- Do not edit a file until you are completely done with it; your edits will not be in the raw data if subsequent transects are added to it after you edit.
- You only need to **copy the '.csv' file for editing** and saving in your cruise file.
- Be sure you copy the correct raw data file for editing – if you 'Saved Data' multiple times, there will be data files ending with 1, or 2, or 3, etc. Use the file with no numbers, or the latest one. Check that last time entry matches your 'End Tran' time on the header sheet.

DLOG3 DATA ENTRY FIELDS

Field 1: **Species and number**:

Enter species and the number observed.

- **Species** - use 4 letter NPPSD code, or 1-2 letter alias key if available (see Alias Keys above and Appendix 1 for 4-letter NPPSD codes). The NPPSD is the North Pacific Pelagic Seabird Database. All survey data will be entered into this database.
  NOTE: A few 4-letter animal codes are different in the NPPSD data entry system, so enter all 4-letter codes as the NPPSD code in Appendix 1.
- **Number**: Total number of individuals observed.
- **Boats** in the transect are also entered in this field [BOAT, or KAYAK]. In comment section note approximate size in feet and activity (e.g., fishing, moving, anchored).
- **Good # hotkey-** use the F9 "Good Number" hotkey when you observe a large number of a particular species ('large number' may vary with species). This will aid in tracking down keystroke errors when editing data.
- You can enter in any sequence and they will go to the correct fields (number into 'count', and letter code into 'species'. The default is 1 animal, so if a single animal is observed, you only need to enter the species code, and a '1' will be entered into the Count field.
- When entering observations make sure that you are in the **Spp:Number field**. If the cursor is in another field at the time of species and number entry, that record will not be recorded. You can check the data entry display window to confirm that the data was recorded.

Field 2: **Distance Bin**

Estimate the distance bin where the species was first observed.

- You can use hotkeys to enter the distance bins from any field when making the entry. .
- If no bin is entered, the default is that the observation was 'on transect' (≤ 300m off center).
- Distance of the animal is the perpendicular distance to the vessel's center track line.
- If too busy to enter bin, leave the field blank for default "on transect record".

DISTANCE

HOTKEYS	
F5	**Bin 1** = 0–100 meters
F6	**Bin 2** = 100–200 meters
F7	**Bin 3** = 200–300 meters
F8	**Bin 9** = > 300 meters

Field 3: **Plumage Class/Age Class**

Plumage characteristics, is not a critical field. Record only if time allows or for a special project. Use mainly for recording age groups in albatrosses, plumage characteristics of guillemots, and changes from winter into breeding plumages (or visa versa for fall surveys).

- Default is leaving the field blank which designates an AHY (after hatch-year) year, and **Summer** plumage.
- Other plumage categories include: **Winter, Transitional, Immature** (F12), and **Juvenile** (HY bird; a hatching-year bird was hatched and fledged within the year).
- If a group of species such as albatrosses contain mixed age categories or plumages, and if there is time, make separate records for birds in each age category/plumage. Note in the comment field that the birds were observed together.

Field 4: **Behavior**

Record behavior when species is first observed.

List of Behaviors:

- **WATER**: sitting or swimming on the water. Includes birds that take off or are flushed by the vessel, or land on the water.
- **SCAN**: use for birds observed in the air during a SCAN when the timer chimes.
- **FLYING**: for counting a rare or uncommon bird (for a given region), but missed during scans. (*use only as time permits, but try to record all albatrosses and murrelets*).
- **FORAGE:** birds actively foraging or holding fish**;** includes surface-plunging from air; use for all participants in a feeding flock, even if the birds are just sitting near the periphery.
- **ON ICE:** animal is observed on the ice. (*You can record animal tracks in comments field*).
- **ON FLOAT:** use when a species is observed sitting on a floating object (log, kelp, etc.). This does not have a Hotkey, but can be typed into the Behavior field. Although our pelagic surveys don't usually go near land, you can also type in 'On Land' in the Behavior field, if you are surveying near the coast and see animals on land.
- **DEAD:** use when you observe a dead animal during the survey- add notes in header or comment sections as needed. You will have to type 'DEAD' into the Behavior field.

Behavior & Corresponding Hotkeys

HOT KEYS are listed if available

F1	WATER
F2	SCAN (assumed to be flying)
F3	FLYING (not part of SCAN)
F4	FORAGE (sometimes used for 'On Ice')

- Use hotkeys as data entry shortcuts.
- Hotkeys can be used from anywhere on screen and at any time.

Field 5: **Comment 1**

Type in comments relative to the survey or observation - 10 spaces available.

What to record in Field 5:

- Document change in survey effort:
  - **'**START TRAN' or 'END TRAN' (use these phrases)
    To start a transect, type **START TRAN** in comment field, hit **F11** and <ENTER >
    At end of a transect, type **END TRAN** in comment field, hit **F12** and <ENTER>
  - **'**PAUSE TRAN' or 'RESUME TRAN' (use these phrases)
    For a short break (< 10 minutes) during the survey type **PAUSE TRAN** in comment field and go 'off effort' by hitting F12.
    When you resume the survey type **RESUME TRAN** and go back 'on effort' by hitting the F11 hotkey.

  Remember to update information in Field 8 (Yes, ON effort / No, OFF effort) when resuming after break using hotkeys F11 (YES) & F12 (NO).
- Secondary behaviors: behaviors not recorded in Field 5 (e.g., forage flock, fish-holding bird, dead bird, etc.).
- Notes on age or sex composition: e.g., if sea otters have pups (1 was pup), or ratio of male/female ducks (3m 1f).

NOTE: For longer comments continue in Comment fields 2 & 3. If more space is needed hit "Enter" to save comment, and continue to type in Comment fields; hit [ENTER] again to save comment. If you have detailed notes that you would like to save, write them on the headersheets and then type those comments into the electronic headersheet at the end of the day.

**** In addition to comments in Field 5, provide details in the header sheets, if events may be difficult to interpret by others who will work with your observations in the future. ****

Field 6: **Comment 2**

Type in comments relative to the survey or observation - 10 spaces available.

Field 7: **Comment 3**

Type in comments relative to the survey or observation - 10 spaces available.

Field 8: **Scan Interval**

This field designates the Scan Interval (in seconds) that is being used to count birds in the air.

- Scan intervals are based on the ship's speed.
- Use the DLOG Quicksheet to determine the appropriate Scan intervals.

Field 9: **On/Off Effort**

Record survey effort by using the hotkeys:

- F11 for YES/ON EFORT- surveying
- F12 for NO/OFF EFFORT- not surveying

Enter "No" if you are not on effort due to the vessel meandering a lot, backing up through ice, or if you go out to take a picture, etc. **Remember to enter YES/ON EFORT once you are underway again. Because the GPS is recording data whenever it is hooked to the computer, this helps us to 'clip out' track lines that were not actually surveyed, and we can identify actual 'on effort' track lines for density calculations.

Field 10: **Transect ID**

Transects are identified by the vessel's initials, the month, year, and a consecutive transect #

- The transect number is consecutive throughout the cruise, and increases by 1 every time you start a new transect.
- Example: The first transect surveyed on March 23, 2006 aboard the Magdan would be entered as: MAG0306001. The next transect would be MAG0306002, etc. If 10 transects were done the first day, the second day of survey would begin with the transect MAG0306011.
- Update this field each time you start a new transect
- Duplicate Transect Numbers:

If you forget to change the transect number and end up with two transects with the same Transect ID, re-number the transects when editing the data files. The first transect with the same ID number should be appended with an "a" suffix, and the second with a "b" suffix, etc. Example: Transect ID MAG0306001 was used twice, re-number the 1st transect as MAG0306001a, and the 2nd transect as MAG0306001b. Explain in headersheet.

Field 11: **Ice Type and Percent Cover**

This is a split field that records two variables- Ice type and Percent Cover

Do not leave this field blank!

- **If there is no ice: record the following**
  Ice Type= None
  Percent Cover- 0
- **Types of Ice**: New, Brash, Pancake, Ice Cake, Small Floe, Medium Floe, Big Floe, Vast Floe, Giant Floe, Belt, Strip, Beach, Fast Ice. (See page 16 in Sea Ice Guide book for ice descriptions). Enter 'TRACE' if only a few floating pieces of ice are in the area.
- **Percent Cover/Concentration of Ice**: Use whole numbers when entering data.
  1= < 1 tenth open water, 2= 2 to 3 tenths "very open drift", 4= 4 tenths "open drift", 5= 5 tenths "open drift", 6= 6 tenths "open drift", 7= 7 to 8 tenths "close pack", 9= 9 tenths "very close pack", 10= 10 tenths "compact".

Field 12: **Observer Name/Glare Conditions**

This is a split field that records two variables- Observer's Initials and Glare Conditions

- **Observer's Name** (First name initial, last name (up to 9 characters).
  Example: KKuletz (no space or period between initial and last name)
- **Glare Conditions:**
  0= none
  1= slight / grey (light)
  2= bright / 1 side (moderate)
  3= bright / forward (harsh/reduces visibility, if not transient -move to other side of bridge if possible)

Field 13: **Sea Conditions (if swell but no surface waves, note swell height in Comments)**

Record Beaufort Sea State using numerical code.

Seas:

0= Calm (sea smooth and mirror-like) **No waves**
1= Light Air (scale-like ripples without foam crust) **1/4 ft. waves**
2= Light Breeze (small, short wavelets; crests have a glassy appearance and do not break) **1/2 ft. waves**
3= Gentle Breeze (large wavelets; some crests begin to break; foam of glassy appearance. Occasional white foam crests) **2 ft. waves**
4= Moderate Breeze (small waves, becoming longer; fairly frequent white foam crests) **4 ft. waves**
5= Fresh Breeze (moderate waves, taking a more pronounced long form; many white foam crests; there may be some spray) **6 ft. waves**
6= Strong Breeze (large waves, taking a more pronounced long form: many white foam crests; there may be some spray) **10 ft. waves**

Field 14: **Observer Conditions/Weather Conditions**

This is a split field that records two variables- Observer Conditions and Weather Conditions
Enter general observation conditions (letter code), and weather conditions (numerical code).

Observer Conditions:

E= excellent: all spp. visible to 300+ m
G= good: all spp. visible to 300 m
F= fair: storm-petrels, phalaropes, auklets visible to 200m & all other spp. to 300m
P= poor: storm-petrels , phalaropes, auklets visible to 100m & all other spp. to 200m
X= extremely bad: storm-petrels, phalaropes, auklets not reliably detected to 100m & all other spp. cannot be reliably detected to 200m

- **Weather:**
  0 = <50% Clouds
  1 = >50% Clouds
  2 = patchy fog
  3 = solid fog
  4 = mist / light rain
  5 = med / heavy rain
  6 = fog & rain
  7 = snow

Field 15: **Vessel Name & Survey Distance**

This is a split field that records two variables- Vessel Name and Survey Distance

- **Vessel's Name**

Limited to 10 characters- abbreviate when necessary, but be consistent throughout survey.

- **Survey Distance**

Enter the transect width. (Ex: 100m, 200m or 300m)

****Do not vary the transect width (SryDst) while on transect****

DATA EDITING & MANAGEMENT

Section 1: Saving Data

1. Navigate to the folder C:/Program Files/DLOG3
2. Select the current data file. The file will have an excel icon and .csv extension.
3. Back up the data file into the "Raw Data" backup subfolder (under the "cruise name" folder on your desktop).
4. Open the raw data file in excel and save the edited file with a "Z" extension in the "Clean Data" subfolder (under the "cruise name" folder on your desktop) (Ex: OD030607Z.csv).
5. Start edits on the file in the "Clean Data" subfolder.
6. Back up all clean and raw data files on the c:drive of the computer and on a jump drive, or CD.

Section 2: Field Edits (what to look for)

1. **Proof Species Field**
   - Make sure the correct NPPSD 4-letter code was used, unfortunately not all are consistent with AOU (e.g., NPPSD uses KIWH not ORCA, and uses HEGU not HERG). Look for keystroke errors, and make sure that the species code was entered in the correct field/space.
   - To check for correct species codes (or field values): a quick trick is to click on an empty box in the species column and then to hold down the "Alt" and "Down Arrow" buttons on the keyboard. A pop-up box will appear with a scrolling list of all species codes that were used in this file. This is a quick way to review what codes were used in this field and to look for keystroke errors. **Warning!** Codes can inadvertently change if you select one of the species codes from the pop-up box. **Be cautious** when using this function to review the entries. The pop-up window method only works on fields that contain text and does not work for numerical fields.

   - Alternatively – click on upper left box to 'select all', go to 'DATA' ➔ 'LIST' ➔ createlist ➔ OK, and each column will have an arrow box. Click on the arrow for list of entries - works for numbers and text.

2. **Proof the Species Number Field**
   - Look for species numbers that could possibly be incorrect, especially large numbers of birds for species that are usually seen in low densities). Example: Did you really see "12 LAAL" on the water, or did you see 1 LAAL in bin 2?

3. **Proof all of the data entry fields for valid entries**
   Make sure that only valid entries show up in each respective field.
   - Behaviors: see DLOG Quicksheet Guide
   - Ice Codes: Do not make up new codes or hybridize them.
   - Are entries in the correct field? (Ex: bin values have ended up in 'Behavior' field).
   - Check Observation Conditions, Sea Conditions, look for unintended blanks or odd records.

4) **On/Off Effort Field** Delete the Off Effort (NO) records between transects. **Do not** delete the NO records when you go Off Effort for a short duration during the transect.

Keep Data in Chronological Order
Do not re-sort the data.

Missing Waypoint Data: If your data file only contains "sighting data" this means that a new file was not started at the beginning of a new GMT day. The computer program will stop entering automated waypoint data every 20 seconds when a new GMT day begins. These waypoints are critical to map out the ship's location. In the future start a new file and transect at the start of a new GMT day 0000 hrs on the computer (1600AST). Flag all transects that are missing these automated GPS waypoint data with a posit on the headersheet, and record all of these files with errors in your final report. Avoid this error in the future!

APPENDIX 1. NPPSD 4-LETTER CODES FOR BIRD AND MARINE MAMMAL SPECIES

Species Group	Common Name	NPPSD 4-Letter Code
	No Birds	NONE
	Unidentified Bird	UNBI
Loon/Grebe	Unidentified Loon	UNLO
	Common Loon	COLO
	Yellow-billed Loon	YBLO
	Arctic Loon	ARLO
	Red-throated Loon	RTLO
	Pacific Loon	PALO
	Unidentified Grebe	UNGR
	Red-necked Grebe	RNGR
	Horned Grebe	HOGR
	Western Grebe	WEGR
Albatross/Fulmar/Shearwater/Petrel	Unidentified Procellariiformes	UNPR
	Unidentified Albatross	UALB
	Short-tailed Albatross	STAL
	Black-footed Albatross	BFAL
	Laysan Albatross	LAAL
	Northern Fulmar	NOFU
	Unidentified Shearwater	UNSH
	Unidentified Dark Shearwater	UNDS
	Unidentified Light Shearwater	UNLS
	Sooty Shearwater	SOSH
	Short-tailed Shearwater	STSH
	Unidentified Petrel	UNPE
	Fork-tailed Storm-petrel	FTSP
	Leach's Storm-petrel	LESP
Cormorant	Unidentified Cormorant	UNCO
	Pelagic/Red-faced Cormorant	PRCO
	Double-crested Cormorant	DCCO
	Pelagic Cormorant	PECO
	Red-faced Cormorant	RFCO
Duck/Goose/Swan	Unidentified Duck	UNDU
	Unidentified Goldeneye	UNGO
	Common Goldeneye	COGO
	Barrow's Goldeneye	BAGO
	Bufflehead	BUFF
	Long-tailed Duck	LTDU
	Harlequin Duck	HADU
	Unidentified Eider	UNEI
	Steller's Eider	STEI
	Common Eider	COEI

APPENDIX 1. NPPSD 4-LETTER CODES FOR BIRD AND MARINE MAMMAL SPECIES (CONT'D)

Species Group	Common Name	NPPSD 4-Letter Code
	King Eider	KIEI
	Spectacled Eider	SPEI
	Unidentified Scoter	UNSC
	White-winged Scoter	WWSC
	Surf Scoter	SUSC
	Black Scoter	BLSC
Eagle/Falcon	Bald Eagle	BAEA
Shorebird	Unidentified Shorebird	UNSB
	Black Oystercatcher	BLOY
	Unidentified Plover	UNPL
	Unidentified Phalarope	UNPH
	Red Phalarope	REPH
	Red-necked Phalarope	RNPH
Jagers/Skua	Unidentified Jaeger	UNJA
	Pomarine Jaeger	POJA
	Parasitic Jaeger	PAJA
	Long-tailed Jaeger	LTJA
Gulls	Unidentified Gull	UNGU
	Glaucous Gull	GLGU
	Glaucous-winged Gull	GWGU
	Herring gull	HEGU
	Mew Gull	MEGU
	Unidentified Kittiwake	UNKI
	Black-legged Kittiwake	BLKI
	Red-legged Kittiwake	RLKI
Terns	Unidentified Tern	UNTE
	Arctic Tern	ARTE
	Aleutian Tern	ALTE
Alcids:Murre, Guillemot, Murrelet, Auklet, Puffin	Unidentified Alcid	UNAL
	Unidentified Small Dark Alcid	USDA
	Unidentified Murrelet	UNML
	Unidentified Murre	UNMU
	Common Murre	COMU
	Thick-billed Murre	TBMU
	Unidentified Guillemot	UNGI
	Black Guillemot	BLGU
	Pigeon Guillemot	PIGU
	Brachyramphus Murrelet	BRMU
	Marbled Murrelet	MAMU
	Kittlitz's Murrelet	KIMU

APPENDIX 1. NPPSD 4-LETTER CODES FOR BIRD AND MARINE MAMMAL SPECIES (CONT'D)

Species Group	Common Name	NPPSD 4-Letter Code
	Ancient Murrelet	ANMU
	Unidentified Auklet	UNAU
	Cassin's Auklet	CAAU
	Parakeet Auklet	PAAU
	Crested Auklet	CRAU
	Least Auklet	LEAU
	Whiskered Auklet	WHAU
	Rhinoceros Auklet	RHAU
	Unidentified Puffin	UNPU
	Horned Puffin	HOPU
	Tufted Puffin	TUPU
Dolphin/Porpoise	Pacific White-sided Dolphin	PWSD
	Unidentified Porpoise	UNPO
	Harbor Porpoise	HAPO
	Dall's Porpoise	DAPO
Whale	Unidentified Whale	UNWH
	Killer Whale	KIWH
	Beluga Whale	BEWH
	Sperm Whale	SPWH
	Unidentified Beaked Whale	UBKW
	Unidentified Baleen Whale	UNBW
	Gray Whale	GRWH
	Sei Whale	SEWH
	Fin Whale	FIWH
	Humpback Whale	HBWH
	Right Whale	RIWH
Seal/Sea Lion/Walrus	Unidentified Pinniped (Seal or Sea Lion)	UNPI
	Steller Sea Lion	STSL
	Northern Fur Seal	NOFS
	Walrus	WALR
	Unidentified Seal	UNSE
	Spotted Seal	SPSE
	Ringed Seal	RISE
	Ribbon Seal	RBSE
	Harbor Seal	HASE
	Bearded Seal	BESE
Otters	Sea Otter	SEOT
	River Otter	RIOT

Alias	spp. code	common name
A	UNAL	Unid. Alcid
B	BLKI	Black-legged kittiwake
BR	BRMU	Brachyramphus murrelet
BG	BLGU	Black guillemot
C	COMU	Common murre
CA	CRAU	Creasted auklet
CL	COLO	Common loon
DA	USDA	Unid. Small Dark alcid
DP	DAPO	Dalls Porpoise
F	FTSP	Fork-tailed storm-petrel
G	UNGU	Unid. gull
GW	GWGU	Glaucous-winged gull
GG	GLGU	Glaucous gull
HG	HEGU	Herring gull
H	HOPU	Horned puffin
HS	HASE	Harbor Seal
KI	UNKI	Unid. Kittiwake
L	LTDU	Long-tailed duck
LA	LEAU	Least Auklet
LP	LESP	Leach's storm-petrel
LS	UNLS	Unid. Light Shearwater
M	MAMU	Marbled murrelet

Alias	spp. code	common name
ME	UNME	Unid. merganser
MG	MEGU	Mew gull
MU	UNMU	Unid. murre
N	NOFU	Northern Fulmar
P	PIGU	Pigeon Guillemot
PA	PAAU	Parakeet auklet
PC	PECO	Pelagic cormorant
PR	PRCO	Pelagic/red-faced cormorant
S	UNSH	Unid. Shearwater
SB	UNSB	Unid. shorebird
S	UNDS	Unid. Dark Shearwater
SL	STSL	Steller's sea lion
SO	SOSH	Sooty shearwater
ST	STSH	Short-tailed shearwater
T	TBMU	Thick-billed murre
TU	TUPU	Tufted puffin
UC	UNCO	Unid. Cormorant
UM	UNML	Unidentified murrelet
UP	UNPE	Unid. Petrel
Z	ZZZZ	Unid. Animal(s), bird, fish

U.S. Fish and Wildlife At-Sea Surveys

Month:_____ Day:_____ Year:_____GMT

Month:_____ Day:_____ Year:_____AST File name:_____

Vessel Name:_____ Vessel Size:_____ Platform Height:_____

Transect ID:		Start Time (GMT):	Start Location:	End Location:
Transect: □ strip □ line □ station		End Time (GMT):		
Transect Width (m): □ 100 □ 200 □ 300		Start Time (AST):		
Observer Location:		End Time (AST):		
Observer Initials:		% Ice Cover:	Air Temp:	Water Temp:
Vessel Activity:	Vessel Speed:	Ice Type:	% Clouds:	Wx Code:
			Wind (speed/dir) :	

General Notes:

Edits (√)	Record #	Edit notes:

Transect ID:		Start Time (GMT):	Start Location:	End Location:
Transect: □ strip □ line □ station		End Time (GMT):		
Transect Width (m): □ 100 □ 200 □ 300		Start Time (AST):		
Observer Location:		End Time (AST):		
Observer Initials:		% Ice Cover:	Air Temp:	Water Temp:
Vessel Activity:	Vessel Speed:	Ice Type:	% Clouds:	Wx Code:
			Wind (speed/dir) :	

General Notes:

Edits (√)	Record #	Edit notes:

APPENDIX 2. DATA FIELD DESCRIPTIONS FOR DLOG3

(Fields as they appear in Final Data File – for editing)

*The definition for codes used in the below fields are listed in the section highlighted in yellow in the excel file for editing.

Latitude	latitude of observation
Longitude	longitude of observation
hh	hour
mm	minute
ss	second
YYYY	year
MM	month
DD	day
Rec	record number
Type	type of record- auto gps entry (for track line) or user entry (observation)
Spp	species, in 4-letter code or use alias
Number	number of that species
Bin	distance bin (bin1= 0-100m, bin2=100-200m, bin3=200-300m, bin9=off transect)
PluClass	plumage class (winter, summer, juvenile, immature, transitional)
Behavior	behavior (on water, flying, on ice, on float, on land, feeding, following)
Comments1	comments on observations
Comments2	comments on observations
Comments3	comments on observations
Scan Interval	interval of scan period (in seconds).
On/Off Survey	[F11] or Yes = observer is surveying (on effort), [F12] or No = pause in survey (off effort)
Transect	transect ID
Ice Type	type of ice present; see ID sheet
Ice Percent	percent ice coverage (use 8ths as in ID sheet)
Observer	observer first initial+last name (up to 9 characters)
Glare	glare conditions
Seas	sea conditions (Beaufort scale)
ObsCo	observation conditions (based on detectability of small & large birds)
Wx	weather conditions (see ID sheet)
Vessel	vessel name (full or 3 letter code)
Survey Dist	transect width (usually 300, sometimes 200 or 100).

APPENDIX 3. SCANS FOR FLYING BIRDS: JUSTIFICATION

SCANS FOR FLYING BIRDS: JUSTIFICATION

By Vivian M. Mendenhall

According to the survey protocol, you count flying birds (other than foraging flocks) *only* during scans, not continuously. This rule is hard for many people to understand; e.g., since less-common species usually seem to be flying, are we underestimating them? This section gives the reasoning behind the scan method.

There are two reasons for the method. Previous pelagic surveys in Alaskan waters were conducted this way, so in order to compare with their estimates, we have to use the method. More importantly, a continuous count of flying birds results in overestimating their numbers.

Imagine that you are in a satellite, looking down on 100 square kilometers of ocean. You can see every seabird that is flying around below. Let's assume (for the sake of simplicity) that the density of flying birds is uniform.

You want to know how many flying birds are in your study area. You snap a satellite photo that shows the true number of flying birds. However, you want to use ship transects in the future, so you evaluate that method.

Your colleague Jimbo is currently conducting transects on a vessel below you. He counts all flying birds as they cross his transect. But, from your perch in the satellite, you can see that more birds are *passing through* the transect during the survey than those representing the *actual density* of birds within the transect area. It is that density which you need to know, not the total number coming and going.

You have always assumed that birds flying into the transect would be "corrected for" by other birds moving out of it, so that Jimbo ends up with the right number. But the "flux" of birds (a technical term for flow, as opposed to a static condition) is greater than their number at a given time.

Because of this problem, the best way to estimate flying birds is by "snapshots," so you are sampling their actual density at moments in time. In other words, by using our instantaneous scans. The birds that you see crossing the transect *between* scans are *extra* ones. The problem is easiest to visualize with a simple graphical model.

The following diagram shows a pelagic study area from a "satellite view." Eighty-one birds (each represented by a different symbol) are distributed in an area that is 900 m on each side.

On the next pages, the two counting methods are simulated graphically. Diagrams A and B show flying birds that are counted continuously during a transect; diagrams C and D show the same birds if they are counted in instantaneous scans. The two methods give different results: scans give an unbiased estimate of numbers, but continuous counts are biased too high.

In the diagrams of simulated counts (diagrams A and C), the vessel is moving up the left side of the diagram; all birds are flying right to left; both vessel and birds are moving at 10 kt. The vessel is counting a square 300m on each side. Each diagram in Part A advances the simulation by 20 seconds.

A. Distribution of flying seabirds on a hypothetical ocean (an area of 81,000 km2). Each symbol is an individual bird.

A	B	C	D	E	F	G	H	I
J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	α
β	γ	δ	ε	ζ	τ	λ	μ	π
ρ	σ	ψ	ξ	ω	&	@	#	%
?	!	=	+	¥	Ω	∞	≠	±
≤	Œ	€	≥	‰	†	¶	¢	‡
Æ	¿	©	™	*	Ë	∫	≈	Ñ
Ø	Δ	«	£	Ü	fl	◊	÷	»

A. Estimate of flying birds if counted continuously in transect. Ship starts at bottom left, and cruises *up diagram* at 10 kt; the area counted every 20 sec. is shaded. All birds are flying *left* at 10 kt. Each small square = $100m^2$.

A	B	C	D	E	F	G	H	I
J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	α
β	γ	δ	ε	ζ	τ	λ	μ	π
ρ	σ	ψ	ξ	ω	&	@	#	%
?	!	=	+	¥	Ω	∞	≠	±
≤	Œ	€	≥	‰	†	¶	¢	‡
Æ	¿	©	™	*	Ë	∫	≈	Ñ
Ø	Δ	«	£	Ü	fl	◊	÷	»

A.1: Start; 9 birds

B	C	D	E	F	G	H	I	a
K	L	M	N	O	P	Q	R	b
T	U	V	W	X	Y	Z	α	b
γ	δ	ε	ζ	τ	λ	μ	π	b
σ	ψ	ξ	ω	&	@	#	%	e
!	=	+	¥	Ω	∞	≠	±	f
Œ	€	≥	‰	†	¶	¢	‡	g
¿	©	™	*	Ë	∫	≈	Ñ	h
Δ	«	£	Ü	fl	◊	÷	»	i

A.2: 20 sec, 100 m; add 5 new birds, total=14

C	D	E	F	G	H	I	a	j
L	M	N	O	P	Q	R	b	k
U	V	W	X	Y	Z	α	b	k
δ	ε	ζ	τ	λ	μ	π	b	m
ψ	ξ	ω	&	@	#	%	e	n
=	+	¥	Ω	∞	≠	±	f	o
€	≥	‰	†	¶	¢	‡	g	p
©	™	*	Ë	∫	≈	Ñ	h	q
«	£	Ü	fl	◊	÷	»	i	r

A.3: 40 sec, 200 m; + 5 birds, total = 19

D	E	F	G	H	I	a	j	s
M	N	O	P	Q	R	b	k	t
V	W	X	Y	Z	α	b	k	t
ε	ζ	τ	λ	μ	π	b	m	u
ξ	ω	&	@	#	%	e	n	v
+	¥	Ω	∞	≠	±	f	o	w
≥	‰	†	¶	¢	‡	g	p	x
™	*	Ë	∫	≈	Ñ	h	q	y
£	Ü	fl	◊	÷	»	i	r	z

A.4: 1 min, 400 m; + 5 birds, total = 24

E	F	G	H	I	a	j	s	A
N	O	P	Q	R	b	k	t	J
W	X	Y	Z	α	b	k	t	S
ζ	τ	λ	μ	π	b	m	u	β
ω	&	@	#	%	e	n	v	ρ
¥	Ω	∞	≠	±	f	o	w	?
‰	†	¶	¢	‡	g	p	x	≤
*	Ë	∫	≈	Ñ	h	q	y	Æ
Ü	fl	◊	÷	»	i	r	z	Ø

A.5: 1 min. 20 sec, 500 m; + 5 birds = 29

F	G	H	I	a	j	s	A	B
O	P	Q	R	b	k	t	J	K
X	Y	Z	α	b	k	t	S	T
τ	λ	μ	π	b	m	u	β	γ
&	@	#	%	e	n	v	ρ	σ
Ω	∞	≠	±	f	o	w	?	!
†	¶	¢	‡	g	p	x	≤	Œ
Ë	∫	≈	Ñ	h	q	y	Æ	¿
fl	◊	÷	»	i	r	z	Ø	Δ

A.6: 1 min 40 sec., 600m; + 5 birds = 34

G	H	I	a	j	s	A	B	I
P	Q	R	b	k	t	J	K	R
Y	Z	α	b	k	t	S	T	α
λ	μ	π	b	m	u	β	γ	π
@	#	%	e	n	v	ρ	σ	%
∞	≠	±	f	o	w	?	!	±
¶	¢	‡	g	p	x	≤	Œ	‡
∫	≈	Ñ	h	q	y	Æ	¿	Ñ
◊	÷	»	i	r	z	Ø	Δ	»

A.7: End—2 minutes, 700 m; add 5 birds. **Grand total = 39 birds.** Extrapolation to overall numbers in large square is 117 birds. This is an ***overestimate***— the correct number is 81 birds.

B. *Initial positions* of all flying birds that were included in continuous count during transect in diagram A, which resulted in overestimate of total numbers. Compare with diagram of flying birds counted only during scans (D, below), which gives correct estimate.

A	B	C	D	E	F	G	H	I
J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	α
β	γ	δ	ε	ζ	τ	λ	μ	π
ρ	σ	ψ	ξ	ω	&	@	#	%
?	!	=	+	¥	Ω	∞	≠	±
≤	Œ	€	≥	‰	†	¶	¢	‡
Æ	¿	©	™	*	Ë	∫	≈	Ñ
Ø	Δ	«	£	Ü	fl	◊	÷	»

C. Estimate of flying birds if counted in three instantaneous scans during transect. Ship starts at bottom left, and cruises *up diagram* at 10 kt; the scan areas (at start, 1 min, and 2 min) are shaded. 9 birds are counted in each scan, for a **grand total of 27 birds.** This gives an estimate of overall numbers in the large square as 81 birds, which is the correct number. Therefore, instantaneous scans give an ***unbiased estimate*** of the true bird density.

A	B	C	D	E	F	G	H	I
J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	α
β	γ	δ	ε	ζ	τ	λ	μ	π
ρ	σ	ψ	ξ	ω	&	@	#	%
?	!	=	+	¥	Ω	∞	≠	±
≤	Œ	€	≥	‰	†	¶	¢	‡
Æ	¿	©	™	*	Ë	∫	≈	Ñ
Ø	Δ	«	£	Ü	fl	◊	÷	»

D. *Initial positions* of flying birds that would be counted in 3 instantaneous scans. Compare with diagram B, above.

A	B	C	D	E	F	G	H	I
J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	α
β	γ	δ	ε	ζ	τ	λ	μ	π
ρ	σ	ψ	ξ	ω	&	@	#	%
?	!	=	+	¥	Ω	∞	≠	±
≤	Œ	€	≥	‰	†	¶	¢	‡
Æ	¿	©	™	*	Ë	∫	≈	Ñ
Ø	Δ	«	£	Ü	fl	◊	÷	»

Concluding remarks:

Similar conclusions have been drawn by various authors (references available on request). Hopefully this simulation will promote more seabird observers' understanding of the need for instantaneous scans (as it did mine).

An important caveat: the actual bias created by continuous counting will vary greatly with speed of the birds relative to the vessel, the angle of their trajectory with the vessel's, and other factors. And, of course, real birds behave differently from those in this simulation—they fly at various speeds, come from all directions, etc. Therefore, even if the magnitude of bias could be estimated in the field (in this simple model it was 41%), you could not derive a useful "correction factor" that could be applied to a continuous count.

Finally, the scan method does not solve all problems, such as underestimation of hard-to-see birds (fork-tailed storm-petrels), or the lack of precision in estimating densities of rarely-seen ones (jaegers, some alcids).