

Standard Operating Procedure (SOP) 9: Data Downloading and Backup, Version 1.0

Dall's Sheep Monitoring Protocol

Arctic (ARCN) and Central Alaska (CAKN) Inventory and Monitoring Networks

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The main Narrative for the Protocol for Monitoring Dall's Sheep, Arctic (ARCN) and Central Alaska (CAKN) Inventory and Monitoring Networks is available from the NPS Inventory and Monitoring Arctic Network website (<http://science.nature.nps.gov/im/units/arcn/>), the NPS I&M Central Alaska Network website (<http://science.nature.nps.gov/im/units/cakn/>) and the Natural Resource Publications Management website (<http://www.nature.nps.gov/publications/nrpm/>).

SOP 9 – Data Downloading and Backup

Standard Operating Procedure #9
 Version 1.0 (03/01/2017)

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SOP 9.0 – Introduction

SOP 9 gives the procedures for observers at the end of each survey day to download and backup data and prepare (e.g., recharge) survey equipment for the following survey day. It also includes instructions for some minor editing of the data that may be required due to field computer error or other complications in flight that may have affected the data collected. When there are problems recording data on the field computer, the observer should note this on the paper datasheet while still in-flight so that if issues arise during data downloading and/or edits are necessary these issues are not a mystery. All data are downloaded to a laptop (not the same as the field computer) that has the full ArcMap project (NPS_Transect_Tool_DOTNET.mxd), associated geodatabase (NPS.gdb) and Add-In (or Extension if running Windows XP) for your survey. Backup copies of the data are saved to USB or thumb drives. Below is a summary of the data downloading, backup and equipment care steps that are detailed in the following SOP sections with the corresponding number.

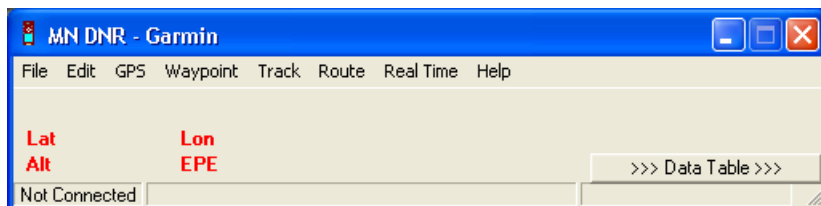
1. Download pilot's Garmin 296/495/496 tracklog and waypoints and your Garmin 76csx tracklog.
2. Copy today's Survey folder from ArcPad Applets on the field computer to the main laptop. Load a blank Survey file to the field computer's ArcPad Applets folder for tomorrow.
3. Import today's Survey file into the ArcMap project (NPS_Transect_Tool_DOTNET.mxd) using the Add-In (or Extension). Make sure your data from today displays.
4. Download your photographs.
5. Check any notes on your paper datasheet and make those edits in ArcMap if you have time in the evening or on a weather day, or clarify your notes for the Project Manager.
6. Back up all data on a thumb (USB) drive.
7. Charge all electronics – field computer, camera, satellite phone. Check Garmin 76csx battery power and replace the batteries (AA) if needed. Give the pilot back his/her Garmin GPS unit.
8. Eat, drink water, go to sleep.

SOP 9.1 – Downloading the Garmin GPS Units

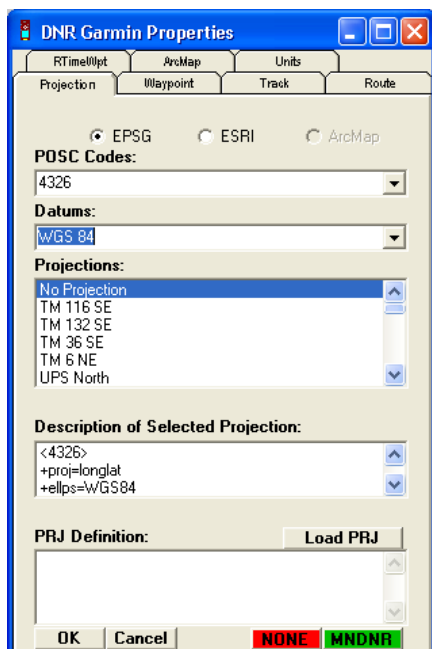
Download the pilot's (Garmin 296/396/496) tracklog and waypoints and your tracklog (Garmin 76csx) using DNR Garmin. If there is not a copy on your machine, or it's not working, you can go online to find the most up-to-date DNR Garmin version. Minnesota Department of Natural Resources (DNR) produces this free software. *Important* – these screenshots are helpful, but please use the following file naming convention: PilotInitialsDate_Waypoints.shp (e.g., for Pilot Lance Williams: LW02Jul2011_Waypoints.shp); and PilotInitialsDate_Tracklog_Points.shp, (e.g., LW02Jul2011_Tracklog_Points.shp). See also Appendix SOP9-1 regarding the file naming and pathway convention.

SOP 9.1.1 – DNRGarmin Setup

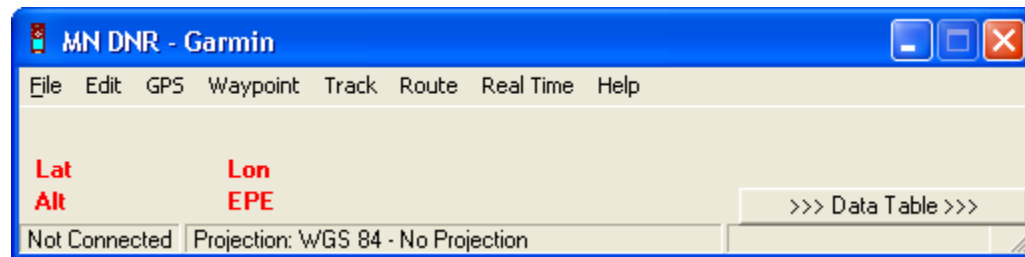
- 1) Turn on the laptop and open DNRGarmin.
- 2) Before downloading tracklogs and waypoints, you must set the projection in DNRGarmin. Select **File** dropdown menu → **Set Projection**. This will open the DNR Garmin Properties window, 'Projection' tab. See screenshots below.



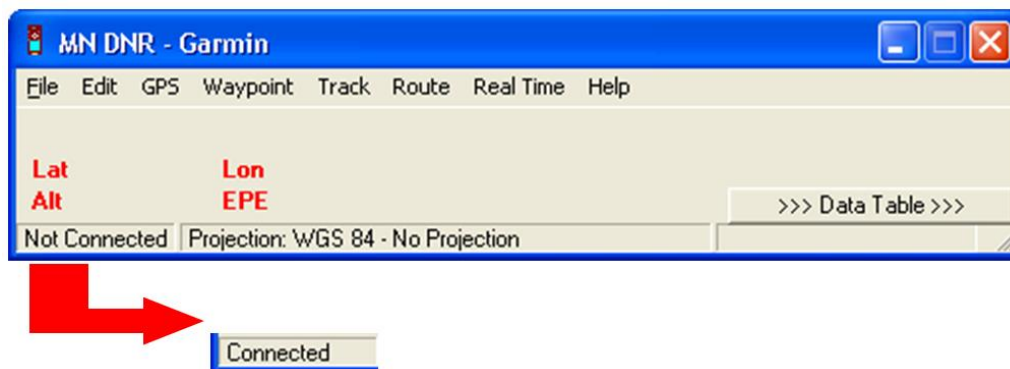
- 3) Select WGS84 from the pull-down list for Datum, and No Projection for Projections.



- 4) Hit OK. The main DNR Garmin page will now show your Projection as 'WGS 84 – No Projection'.

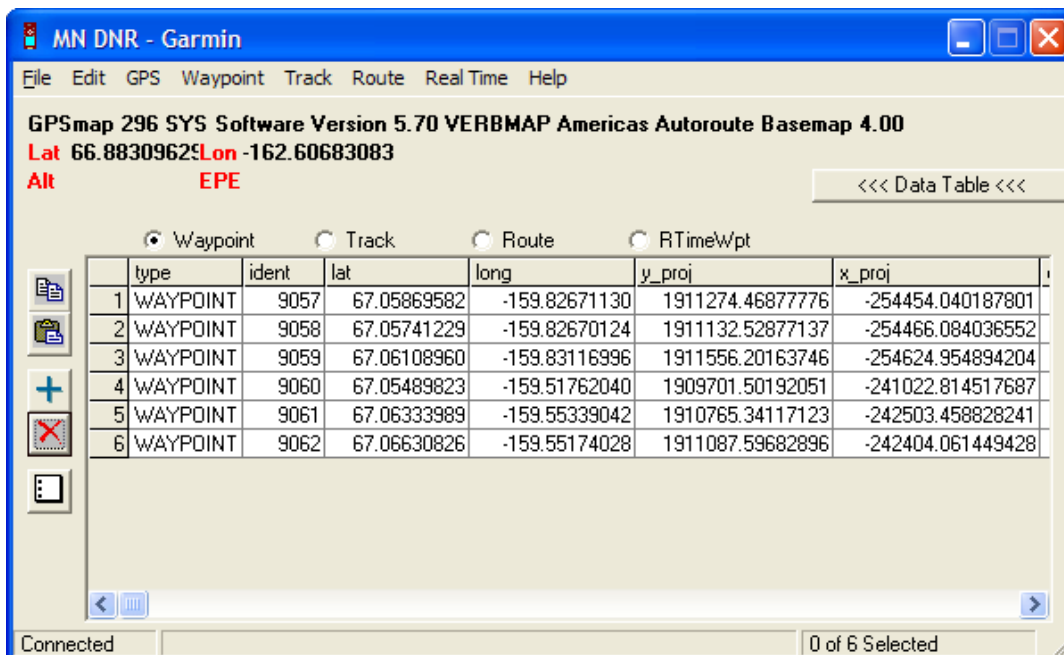


- 5) Using the USB cord (you can use the white USB cord from the Canon camera case if you don't have a Garmin-specific, black USB cord), connect the pilot's GPS unit the laptop computer and turn the GPS on.
- 6) DNR Garmin should recognize your GPS unit. If not, go to the **GPS** pull-down menu, and make sure **Set Port** is set to **USB**. Once connected, information about your GPS unit will show below the menu, above Lat Lon.

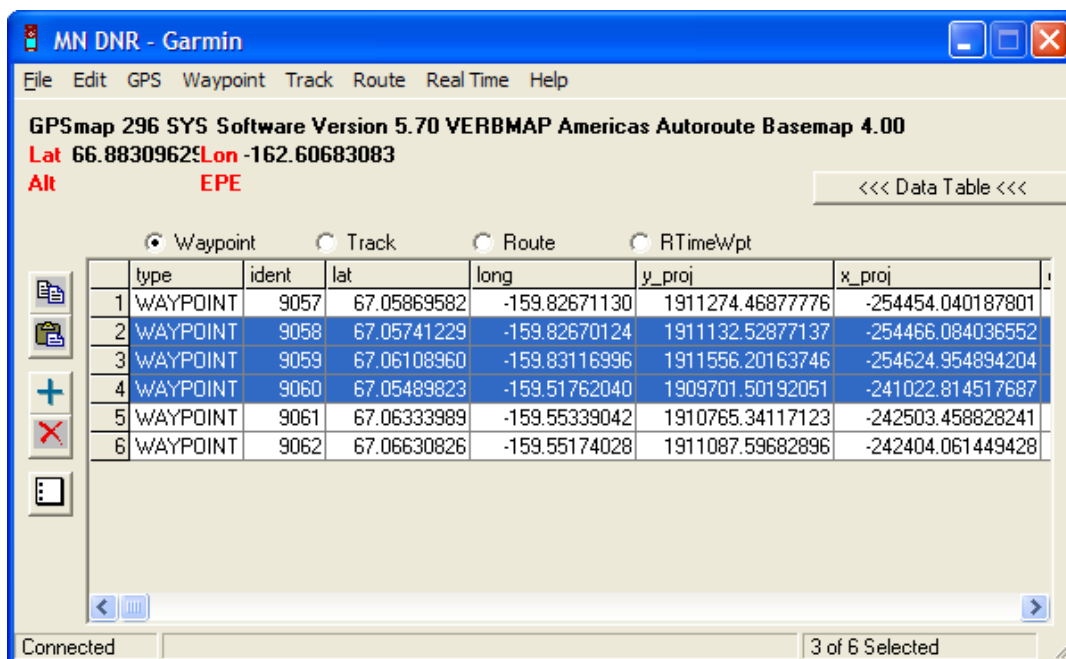


SOP 9.1.2 – Downloading Waypoints

- 1) Go to the Waypoint pull-down menu, select Download, and DNR-Garmin will download your waypoints. This may take some time.



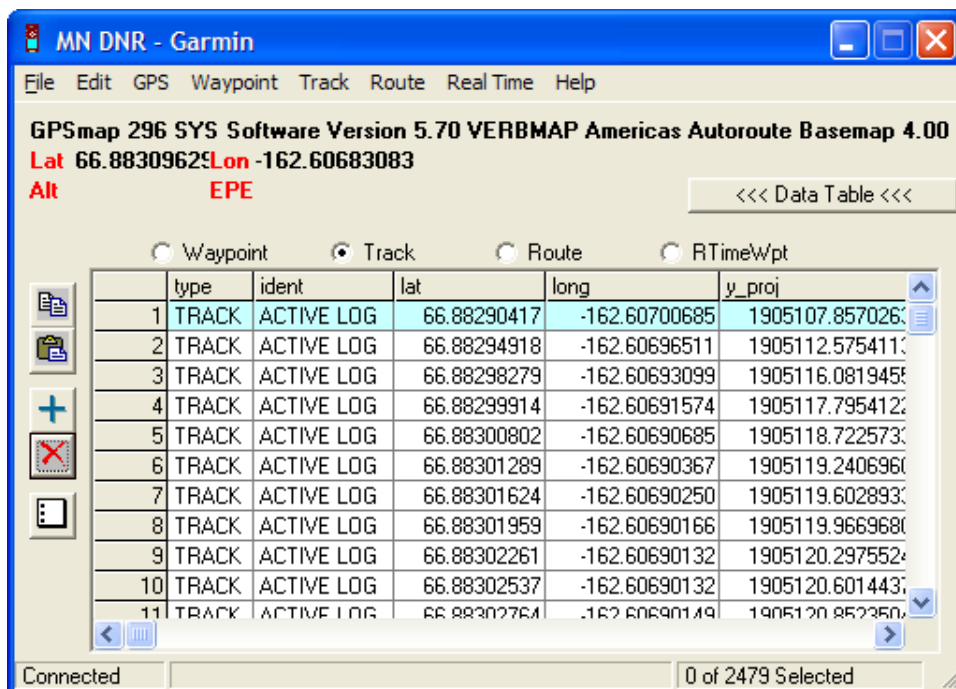
- 2) Highlight all waypoints that you want to save. This step is necessary because the pilot's GPS will likely have lots of unrelated waypoints and the more waypoints you select for downloading, the longer the process takes. You can scroll to the right to see the date and just download waypoints with today's date.



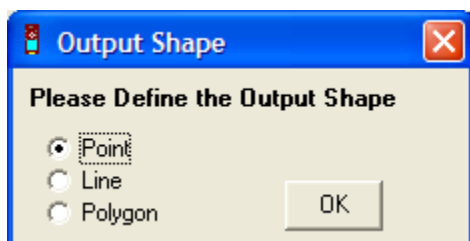
- 3) Go to the File pull-down menu → Save to → File. Pick the file location (e.g. C:\ARCN_CAKN_Sheep\Ikillik2011\Waypoints; see also **Appendix SOP9-1**).
- 4) A Save As window will open. For 'Save as type:' choose 'ArcView Shapefile (Unprojected) (*.shp)'.
- 5) Name the waypoint file using pilot's initials, date and the word Waypoints (e.g., LW02Jul2011_Waypoints.shp).
- 6) If your field computer conked out mid-flight and you had to start using your Garmin 76csx to collect waypoints for the on-transect sheep, you will repeat **SOP 9.1.2** for your Garmin 76csx.

SOP 9.1.3 – Downloading Tracklogs

- 1) Select the Track pull-down menu → Download. This download will take considerably longer than the waypoints download because you should have a few thousand points.



- 2) Highlight all TRACK points that you want to save. They should all say 'ACTIVE LOG' in the 'ident' column. Again, you can scroll to the right to see the date and just download points with today's date.
- 3) Go to the File pull-down menu → Save to → File. Pick the file location (e.g. C:\ARCN_CAKN_Sheep\ltklik2011\Tracklogs; see also [Appendix SOP9-1](#)).
- 4) A Save As window will open. For 'Save as type:' choose 'ArcView Shapefile (Unprojected) (*.shp)'.
- 5) Name the tracklog file using pilot's initials, date and the words 'Tracklog_Points' (e.g., LW02Jul2011_Tracklog_Points.shp). Do not enter the projection into the name yet.
- 6) IMPORTANT: The exception for tracklogs (compared with waypoints) is that you will be asked for the output shape after navigating to the directory and typing a filename. Please select 'Point'. Be careful, the default is 'Line'.



- 7) If you want you can repeat steps 5 and 6 and save another shapefile as a line shapefile.

- 8) Repeat **SOP 9.1.3** for your Garmin 76csx tracklog. Label that tracklog shapefile as per the following example: LW02Jul2011_Tracklog_Points_76csx.shp.

SOP 9.1.4 – Checking the Waypoints and Tracklog Shapefiles

- 1) Make sure that you have waypoints and tracklog shapefiles where you saved them. There will be 4-7 files for each waypoint or tracklog shapefile. They should all have the same name (e.g., LW02Jul2011_Waypoints – with different extensions for each: *.shp, *.prj, etc.).
- 2) Check your waypoints and tracklogs by adding them to your ArcMap project's map view. If asked to choose a Geographic Transformation to bring these WGS84 shapefiles into your ArcMap project, select Nad_1983_To_WGS_1984_2 (ArcMap 10.0, not available in 10.1 or 10.2 but it will suggest another option – go with it). If they don't project, or display in the map in the wrong area, go to SOP 9.1.5.

SOP 9.1.5 – Projecting the Waypoints and Tracklog Shapefiles

- 1) If your tracklogs and waypoints don't project or display, select the Search function and search for Define Projection. Select your waypoint or tracklog shapefile as the Input Dataset or Feature Class. Set the Coordinate System by clicking the browse button, then select Geographic Coordinate Systems → World → WGS 1984.prj. Click OK, and OK again.
- 2) If step 1 doesn't work, open Excel and open the .dbf file of your shapefile there. Save this as a .csv. Open ArcCatalog and navigate to your .csv file. Right click on this file, select 'Create Feature Class' and then select 'From XY Table'. Set the X Field as the 'Long' field from the *.csv (not the projected long field, just the Long field). Set the Y Field as the 'Lat' field from the *.csv. Click on the 'Coordinate System of Input Coordinates' button and navigate to the WGS84 coordinate system (Select→Geographic Coordinate Systems→World→WGS 1984.prj). Specify where you want to save the shapefile. Now you should have a shapefile in WGS84 coordinate system.

SOP 9.2 – Copying the Survey Folder Data to the Laptop Computer

- 1) Create a folder on the thumb drive with the following naming convention: Pilot'sInitialsDate_Survey (e.g., F:\LW02Jul2011_Survey where F:\ is the thumb drive).
- 2) Go to the C:\Program Files\ArcPad 7.1\Applets folder on the field computer and copy the 'Survey' folder over to the folder you created in step 1 on the thumb drive (e.g., F:\LW02Jul2011_Survey\Survey).
- 3) Delete today's Survey folder from the ArcPad Applets folder on the field computer.
- 4) Put a blank (no data) Survey folder into the ArcPad Applets folder of the field computer for tomorrow. There should be a copy of the blank Survey folder on the desktop of the field computer.
- 5) Turn off and charge the field computer for tomorrow.

- 6) Insert the thumb drive into the laptop computer, and save the folder housing today's Survey folder (the one you created in step 1) to the following file path:
C:\ARCN_CAKN_SHEEP\SurveyNameYear\ArcPadApplets_SurveyFolder\

For example, for pilot Lance Williams, flying the Itkilik survey area on July 2, 2011:
C:\ARCN_CAKN_Sheep\Itkilik2011\ArcPadApplets_SurveyFolder**LW02Jul2011_Survey\Survey**.

The filing system is delineated in **Appendix SOP9-1**. You may need to create this filing system for your survey on day one of the survey. **ALWAYS SAVE THE SURVEY FOLDER HERE FIRST BEFORE DOING ANY EDITS.** This way it will not get overwritten accidentally.

SOP 9.3 – Importing and Processing the Survey Folder Data in ArcMap

SOP 9.3.1 – Importing Survey Folder Contents into the ArcMap Geodatabase

To import the Survey folder contents (your data from today's survey flight), follow these steps:

- 1) On the laptop, open the ArcMap project NPS_Transect_Tool.mxd associated with the current survey.
- 2) Click on the blue plane button in the NPS Transects toolbar. This should open the Transect Tool Form as shown in the sample screenshot below.

The screenshot shows the 'TransectToolForm' dialog box. At the top, there's a 'Select Survey:' dropdown menu with 'Itkilik2012_Test' selected. To its right is a 'Remember Last Survey' checkbox and a 'Close' button. Below this is a 'Progress of this Survey' section with four steps: Step 1, Step 2, Step 3, and Step 4. Step 4 is highlighted. Underneath the progress bar are tabs for 'Step 1', 'Step 2', 'Step 3', 'Step 4', 'Import/Export', 'Tools', and 'Config'. The 'Import/Export' tab is active. Inside this tab, 'Current SurveyID' is 1000. There are two main sections: 'Export' and 'Import'. The 'Export' section has an 'Export Path' text box containing 'C:\ARCN_CAKN_Sheep\SOP_Screenshots_GeoNorth205', a 'Browse' button, and an 'Export' button. Below the path is a note: '(do not include the 'Survey' folder name in the path.)'. The 'Import' section has an 'Import Path' text box, a 'Browse' button, and an 'Import' button. Below the path is a note: '(do not include the 'Survey' folder name in the path.)'.

- 3) You will have to select your survey name from the pull-down menu, such as 'Itkilik2011_Test' in the screenshot example.

- 4) Go to the Import/Export tab and enter the *location* of the 'Survey' folder in the 'Import Path' field (do not include the 'Survey' folder name in the path). For example, you will navigate to or enter the following in the import pathway:

C:\ARCN_CAKN_Sheep\Itkillik2011\ArcPadApplets_SurveyFile\LW02Jul2011_Survey

The program will import the Survey folder data into the ArcMap project and the NPS.gdb. This will change the color of the transects that were flown that day, and import and display the data collected from those transects (animal groups, on- and off-transect segments, etc.).

SOP 9.3.2 – Checking the Survey Data in ArcMap

Data that are imported using the NPS Transect Tool are imported into the geodatabase and should display on your map in ArcMap. If these data won't import (e.g., gives a runtime error, etc.), you can add the data manually. Click Add Data button (yellow diamond with black cross). Navigate to your Survey folder for today. Add animals.shp, tracklog.shp – they should display on screen, though not with the fancy red-green track or green cross icons.

If you don't see your track and animals for the day, check to make sure there is data in the dbf files for tracklog and animals.

If there's nothing in the shapefiles either, let the Project Manager(s) know. We will have to digitize your data from the pilot's waypoints and tracklogs – bit of a pain, but not a fatal problem. The import error often happens when there is a drop in GPS locations on the field computer, or the field computer loses power in the plane.

SOP 9.3.3 – Editing the Survey Data

If you discover that the GPS lost signal during the survey and some, but not all of your data are missing, you can use the pilot's tracklog and waypoints to edit the NPS.gdb, and specifically the feature classes for DB TrackLog and DB Animal. First download the pilot's tracklog and waypoints if you haven't done so already ([SOP 9.1](#)) and add these to the ArcMap project. Using your notes on the data sheet, you can identify the start and end points of flown transects and the sheep locations. Start an Editing session in ArcMap, and make sure 'DB Animal' and 'DB TrackLog' are set as the targets to be edited. The Create Feature window should open on the right of your ArcMap project. Double-click on DB TrackLog and then use your cursor to trace the portion of the pilot's tracklog that corresponds to the missing portion of the on-transect. You only need to digitize the on-transect segments. Fill in the attributes table for those created segments or transects. Having to do this is not ideal, but it is a way to salvage the data if the GPS loses contact with your reality. You may have to edit or add the sheep group information as well by moving or creating sheep group points for DB Animal and/or making edits in the data table for DB Animal. All of this can be done later in the office by the Project Manager, but please clarify that this needs to be done with explicit notes on your datasheets.

SOP 9.3.4 – Updating the Flown Transects List for Other Aircraft

You can also update your ArcMap project with all of the finished transects from other planes – this is important for those planes which share a border with you. Get a list of the other planes' finished transects by email, from the Project Manager, or you can call the other plane's base station directly. On the laptop, open the ArcMap survey project (NPS_Transect_Tool.mxd). Go

to the Editor pull-down menu and Start Editing the Generated Transects layer. Open the Attributes Table of Generated Transects by right-clicking on the shapefile name in the left-hand menu. Edit the Flown column (field) for all transects completed by other planes by changing N to Y. When you are finished with your updates, select to Stop Editing and Save Edits. This should change how these completed transects display on the screen: the blue lines (not surveyed) will now display as thicker black-white striped lines. You should also mark these flown transects with a highlighter on your and your pilot's paper maps so that you do not repeat transects.

SOP 9.3.5 – Backup of Survey Data Edits

Close the ArcMap project. Select yes if it asks you to save it. Make a backup copy of the folder housing the ArcMap project and the gdb to the following location on the main laptop computer:

C:\ARCN_CAKN_Sheep\Year\SurveyNameYear\GDB_Backup\Pilot initials, today's date\

For example, C:\ARCN_CAKN_Sheep\2011\Itkillik2011\GDB_Backup\LW02Jul2011_GDB

Just copy the whole project folder over every day for backup. Save another copy after any editing. This way you will have a copy of the geodatabase from today and all previous days saved in the event that future versions become corrupted.

SOP 9.4 – Downloading and Filing Photographs

- 1) Create a folder filing system (see step 2 and Appendix SOP9-1 for an example of the filing system) to house the photographs you will be downloading from the Canon camera.
- 2) You can use the Microsoft Scanner and Camera Wizard to download your photographs. Prompt the wizard to save the photographs to the file pathway as shown in the following example where Lance Williams was the pilot on July 2, 2011 in the Itkillik:

C:\ARCN_CAKN_Sheep\Itkillik2011\Photos\LW02Jul2011_Photos

Use the auto labeling function when you download the photos so that they download like this into the LW02Jul2011_Photos folder:

- LW02Jul2011_photo1.jpg
- LW02Jul2011_photo2.jpg
- etc.

- 3) Please delete all blurry photos.
- 4) If you have time, please GPS-Photo Link the remaining photos. This will make it easier when the photos are relabeled and when the photos are used during the QA/QC process for checking the data. See SOP 10 for GPS-Photo Linking instructions.
- 5) Also if there's time, please weed through the remaining photos to select the best 1-3 photos for each group and re-label the photos with 'Transect#_group#_photo#.jpg'. It is easier to do this if you GPS-Photo Link the photographs first, particularly if the photos all look the same, you had a lot of groups in one area or if your memory of them is not fresh.

Not all sheep groups will have photos. Please use the following examples as a guide when relabeling photos:

- LW02Jul2011_GPSphoto.jpg [*GPS photo*]
- Transect20_Group1_photo1.jpg [*Sheep on transect*]
- Transect20_Group1_photo2.jpg [*Sheep on transect*]
- Transect20_Group2_photo1.jpg [*Sheep on transect*]
- LW02Jul2011_off-tr_ewelamb_photo1.jpg [*Sheep off transect*]
- LW02Jul2011_landscape1.jpg [*Landscape, snow, thermokarst photos*]
- LW02Jul2011_tr44_brnbear1.jpg [*Other species on transect*]
- LW02Jul2011_muskox1.jpg [*Other species not on a transect*]

SOP 9.5 – Checking Paper Datasheets

Check any notes on your paper datasheet and make those edits in ArcMap ([see SOP 9.3.3](#)) if you have time in the evening or on a weather day. If you don't have time the same day that you collected the data, clarify your notes for the Project Manager.

SOP 9.6 – Data Backup

All data will be backed up on a thumb drive each day that survey flights occur. Set up the same filing system on the thumb drive as you have on the base airstrip's laptop computer ([Appendix SOP9-1](#)). After you have downloaded and processed all data on the main laptop computer, copy each of the day's folders (e.g., LW02Jul2011_Survey folder, LW02Jul2011_Photos folder, etc.) to the filing system on the thumb drive.

SOP 9.7 – Preparing Equipment for the Following Survey Day

Clear your tracklog on the Garmin 76csx and ask the pilot to do the same for his/her Garmin GPS unit. Erase all photographs on the camera. Plug in and charge the field computer, the satellite phone and camera battery. Replace the AA batteries in the Garmin 76csx if needed.

SOP 9.8 – Final Steps at End of Survey Day

If you haven't done so already, call an observer at the other base airstrips and relay the transects that were completed that day by all crews at your site. Make sure you have closed out properly with Denali Dispatch ([see SOP 1](#)). Check in with your pilot and the Project Manager to make plans for the following day assuming the weather will cooperate again. Then, and most importantly, eat, drink water and go to sleep, early.

Appendix SOP9-1 – Sample Data Filing System

The data storage and backup filing system should be as follows, using data from July 2, 2011, pilot Lance Williams (LW) as the example.

C: \ARCN_CAKN_Sheep**\Itkillik2011****\ArcPadApplet_SurveyFiles****\LW02Jul2011_Survey****\Survey**

\Contents of Survey file that you copied from the field slate's ArcPad Applets folder - contains the data you recorded on July 2.

\Photos**\LW02Jul2011_Photos**

Use the auto labeling function when you download the photos so that they download like this:

\LW02Jul2011_photo1.jpg

\LW02Jul2011_photo2.jpg, etc.

If you have time to name photos – this is the naming convention. Not all sheep groups will have photos:

\LW02Jul2011_GPSphoto.jpg [GPS photo]

\Transect20_Group1_photo1.jpg [Sheep on transect]

\Transect20_Group1_photo2.jpg [Sheep on transect]

\Transect20_Group2_photo1.jpg [Sheep on transect]

\LW02Jul2011_off-tr_ewelamb_photo1.jpg

[Sheep off transect]

\LW02Jul2011_landscape1.jpg

[Landscape, snow, thermokarst photos]

\LW02Jul2011_tr44_brnbear1.jpg [Other species on transect]

\LW02Jul2011_muskox1.jpg [Other species not on a transect]

\GDB_Backup**\LW02Jul2011_GDB****\Itkillik2011_8kmgrid_ArcGIS10_Laptop**

Just copy the whole project folder over every day for backup. Save another copy after any editing.

\Waypoints

\LW02Jul2011_Waypoints.shp [will be several files per shapefile]

\Tracklogs

\LW02Jul2011_Tracklog_Points.shp [pilot's 296 tracklog]

\LW02Jul2011_Tracklog_Points_76csx.shp [your 76csx tracklog]