

Standard Operating Procedure (SOP) 3: Field Computer Setup, Version 1.0

Dall's Sheep Monitoring Protocol

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

Kumi L. Rattenbury and Joshua H. Schmidt

National Park Service
4175 Geist Road
Fairbanks, Alaska 99709

March 2017

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

Please cite this Standard Operating Procedure as:

Rattenbury, K. L. and J. H. Schmidt. 2017. Standard Operating Procedure (SOP) 3: Field Computer Setup, Version 1.0. Dall's Sheep Monitoring Protocol, Arctic (ARCN) and Central Alaska (CAKN) Inventory and Monitoring Networks. National Park Service, Fairbanks, Alaska. Available online at <https://irma.nps.gov/DataStore/Reference/Profile/2238916>.

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 3 – Field Computer Setup

Standard Operating Procedure #3
 Version 1.0 (03/01/2017)

Revision History Log:

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #
Add rows as needed for each change or set of changes associated with each version.					

SOP 3 – Contents

	Page
SOP 3 - Figures	4
SOP 3.0 – Introduction	5
SOP 3.1 – Field Computer Setup	5
SOP 3.2 – Installing the Animal Marking ArcPad Applet on the Field Computer.....	6
SOP 3.2.1 – Contents of the Animal_Marking_ArcPad_Applet folder	6
SOP 3.2.2 – Installing the Animal Marking ArcPad Applet	7
SOP 3.2.3 – Installing the Fake GPS Extension.....	7
SOP 3.3 – Bringing the Transects and Pick Lists into ArcPad	7
SOP 3.4 – Background Map Images	10
SOP 3.5 – Reference Files for Observers	13

SOP 3 - Figures

	Page
Figure SOP3-1. The NPS Animal Tracking and other customized toolbars after the Animal Marking ArcPad Applet has been installed in ArcPad..	8
Figure SOP3-2. A screenshot showing transects displayed in ArcPad 7.1.1 for training in Fairbanks.	8
Figure SOP3-3. The New Session form in the Animal Marking ArcPad Applet.....	9
Figure SOP3-4. The ArcPad Table of Contents window where you can edit how your shapefiles are displayed or labeled.	9
Figure SOP3-5. The ArcPad Layer Properties window showing the Labels tab where you can label shapefiles by specified fields..	10
Figure SOP3-6. The Export Map window in ArcMap for creating a bitmap image of background topographic or aerial photograph maps to display with your transects in the ArcPad project and the NPS_Transect_Tool.mxd.	12

SOP 3.0 – Introduction

After successfully generating and exporting the transects and data field pick lists (pilot names, etc.) for a particular Survey ID (SOPs 2.3, 2.4 and 2.5), those files may now be uploaded to the Animal Tracking ArcPad Applet on the field computer used for data collection in the survey aircraft. This SOP explains this procedure as well as how to set up the ArcPad (ESRI, Inc., Redlands, CA) interface on the field computer. Data collection is explained in SOP 8. The 'Import/Export' tab on the Transect Tool Form in the NPS Transect Add-In (or Extension if using Windows XP) is also used to import the collected field data from the applet shapefiles back into the geodatabase at the end of a survey flight (SOP 9).

The Animal Tracking ArcPad Applet is one of the tools developed by GeoNorth LLC as part of the NPS Animal Tracking Project v2.0.5. This version is compatible with Windows XP and ArcPad 7.1 or ArcPad 7.1.1 only. It has not been upgraded but the NPS Alaska Region GIS office has since developed a new iPad applet for data collection that we began testing in 2016. However the Animal Tracking ArcPad Applet can use files generated from either the Extension (Windows XP) or the Add-In (Windows 7) in SOP 2. SOP 3.1 outlines the procedures for setting up the field computer. SOP 3.2 details installation of the Animal Marking ArcPad Applet and the Fake GPS Extension files onto the field computer. SOP 3.3 details uploading the transects and associated shapefiles and data field pick lists to the field computer for use within the ArcPad applet. The procedures in SOP 2 must be completed before the transects can be uploaded to the ArcPad applet as outlined in SOP 3.3.

SOP 3.1 – Field Computer Setup

For the 2009-2013 sheep surveys, ARCN and CAKN used field slates (or tablet PCs) from Xplore Technologies (Austin, TX). You can also use Panasonic Semi- or Fully-Rugged Toughbooks (Secaucus, NJ) or any other laptop device that can handle ArcPad (ESRI, Inc., Redlands, CA) and an external USB-GPS units (e.g., Garmin 18x, Olathe, KS) in the aircraft. You will need as many field computers, power supply systems and inverters for the field computers and USB-GPS units as there are survey aircraft. It is also recommended that you bring at least one spare setup for each base airstrip. Field computers used in the aerial surveys should be set up in the following manner.

- 1) Ensure that ArcPad 7.1 or 7.1.1 (ESRI, Inc., Redlands, CA) is installed on all field computers and they are running Windows XP.
- 2) Ensure that any screen saver was turned off and power conservation settings are changed so that the monitor and hard drive will not turn off due to inactivity.
- 3) Ensure that Spanner.exe (Garmin, Olathe, KS) is installed on all field computers. On the field slate desktop, there should be a blue circle icon with a green/yellow swirl in it that says "Shortcut to Spanner.exe". Spanner allows you to use a Garmin GPS 18x (USB-GPS unit) with most NMEA 0183-compliant mapping programs, such as ArcPad. It adds a virtual com port interface for the GPS 18x.

Spanner works only with GPS 18 software version 2.90 or later. Be sure to load the latest GPS 18 software before using this program. System Requirements - IBM-compatible PC running Windows XP operating system and an available USB port. However, Windows

Vista and Windows 7 are not supported by the Spanner software. For more information please search about this topic on Garmin's Customer Support site.

If you need to install Spanner (Windows XP only), please follow these instructions from Garmin:

- a. Go to the Garmin website:
http://www8.garmin.com/support/download_details.jsp?id=1627. Click Download and save the file to your computer. Choose a location where you can easily locate the file, such as the C:\ drive.
 - b. Uninstall any current version of Spanner that is already on your computer.
 - c. Locate and double-click the recently downloaded file. The Win-Zip Self Extractor opens. This program compresses the data to allow you to download files quickly.
 - d. A program window appears asking you where to unzip the files. Select a location where you can easily locate the file. Click Unzip.
 - e. Locate and double-click the unzipped file to begin the installation process.
 - f. Once the unzip process is complete, click Close to exit.
- 4) Follow SOP 3.2 to install the Animal Marking ArcPad Applet and the Fake GPS Extension onto the field computer. You can load these items to your desktop computer as well if desired.
 - 5) Follow SOP 3.3 to upload the transects, other shapefiles and the data field pick lists that were exported from the NPS Transect Add-In (or Extension) into ArcPad, and to test the applet and your files prior to training and/or the survey.
 - 6) Produce and load background map images into the ArcPad project pertaining to your Survey ID (SOP 3.4).
 - 7) Place copies of the project aviation safety plan, SOP 6 (Equipment Checklist), SOP 7 (Survey Flying), SOP 8 (Data Collection) and the 'Data Collection Cheat Sheets' found in Appendix SOP8-1 onto the desktop of the field computers per SOP 3.5.

SOP 3.2 – Installing the Animal Marking ArcPad Applet on the Field Computer

SOP 3.2.1 – Contents of the Animal_Marking_ArcPad_Applet folder

The Animal Marking ArcPad Applet files can be found in the folder with the same name and include the following files.

- Image Files (*.png): These image files are used for the various button icons throughout the applet.
- Application Files (*.apa and *.vbs): The files NPSApplet.vbs, NPSApplet.apa and NPSHelper.vbs contain the actual Animal Tracking ArcPad applet.

- DBF files (*.dbf): The 'Point Log' DBF file is used to backup GPS points per Transect segment. The 'default values' DBF stores application data and is produced when you generate transects.

SOP 3.2.2 – Installing the Animal Marking ArcPad Applet

You should install the applet onto the field laptops as follows.

- 1) Navigate to ArcPad's 'Applets' folder (i.e., C:\Program Files\ArcPad 7.1.1\Applets). Remove all existing content within this folder and place it in another folder on the field computer desktop called 'Original ArcPad Applets'.
- 2) Bring a copy of the Animal_Tracking_ArcPad_Applet folder over to the field computer.
- 3) Copy the contents only of the 'Animal_Tracking_ArcPad_Applet' folder into ArcPad's 'Applets' folder (i.e., copy the contents and paste them directly into C:\Program Files\ArcPad 7.1.1\Applets). These files (listed in SOP 3.2.1) will replace the default ArcPad applets and create new toolbars specific to collecting transect survey data when you open ArcPad.

SOP 3.2.3 – Installing the Fake GPS Extension

The Animal Marking ArcPad Applet also comes with a Fake GPS Extension folder. The folder contains six *.dll files and one text file.

- 1) Navigate to ArcPad's 'Extensions' folder (i.e., C:\Program Files\ArcPad 7.1.1\Extensions). Leave the pre-existing (default) contents in this folder (unlike when you installed the applet).
- 2) Copy the contents only of the 'Fake GPS Extension' folder and paste the copied files directly into the Extensions folder (i.e., C:\Program Files\ArcPad 7.1.1\Extensions).

SOP 3.3 – Bringing the Transects and Pick Lists into ArcPad

Once you have installed the Animal Marking ArcPad Applet and the Fake GPS Extension files onto the field computer, you can bring your transects, associated shapefiles and pick lists that you exported from the Add-In (or Extension; SOP 2.5) into ArcPad. You will then run a fake ArcPad session to ensure that everything was installed correctly.

- 1) Insert the USB thumb drive containing the 'Survey' folder that you exported in SOP 2.5 from the Add-In into the field computer.
- 2) Copy the 'Survey' folder into ArcPad's Applets folder (i.e., copy the folder to C:\Program Files\ArcPad 7.1.1\Applets).
- 3) Make a copy of the folder that houses that 'Survey' folder (e.g., the Itkillik2012_BlankSurveyFile folder) onto the desktop of the field computer (e.g., C:\Documents and Settings\All Users\Desktop\Itkillik2012_BlankSurveyFile\Survey).
- 4) Start ArcPad and ensure you can now see a toolbar with the text 'NPS Animal Tracking' (Figure SOP3-1). This indicates that the installation was successful.

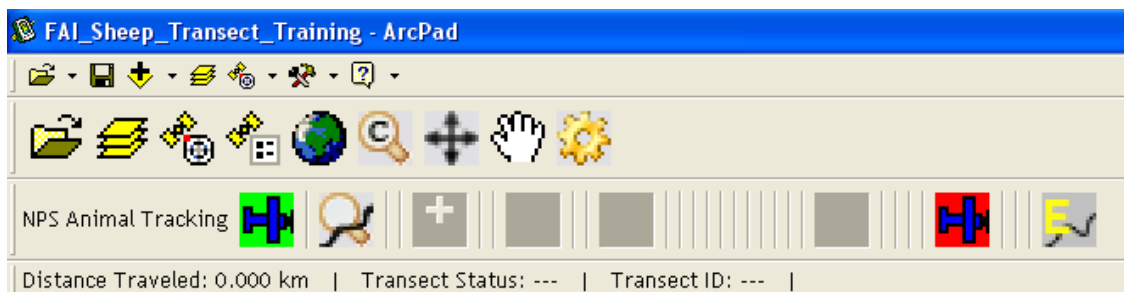


Figure SOP3-1. The NPS Animal Tracking and other customized toolbars after the Animal Marking ArcPad Applet has been installed in ArcPad. This example is for an ArcPad project for training observers in Fairbanks, Alaska.

- 5) Select the blue plane/green background icon  on the NPS Animal Tracking toolbar. The transects for your survey should appear on the map and all transects should be blue (i.e., in “not flown” status; Figure SOP3-2).

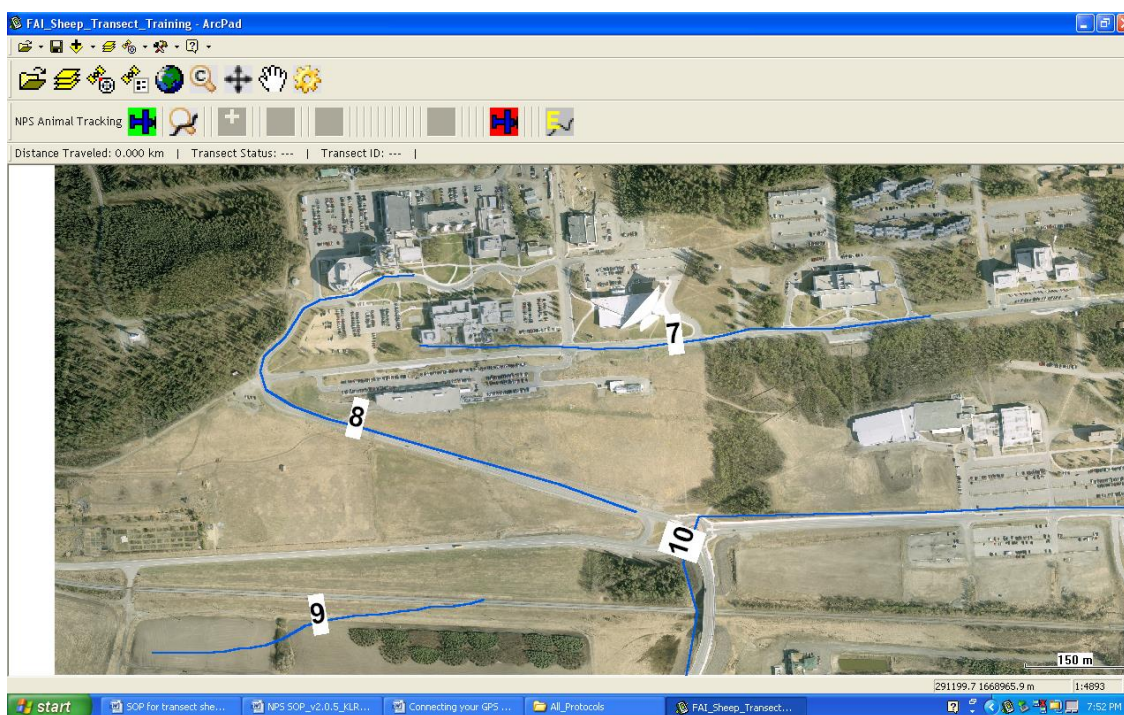
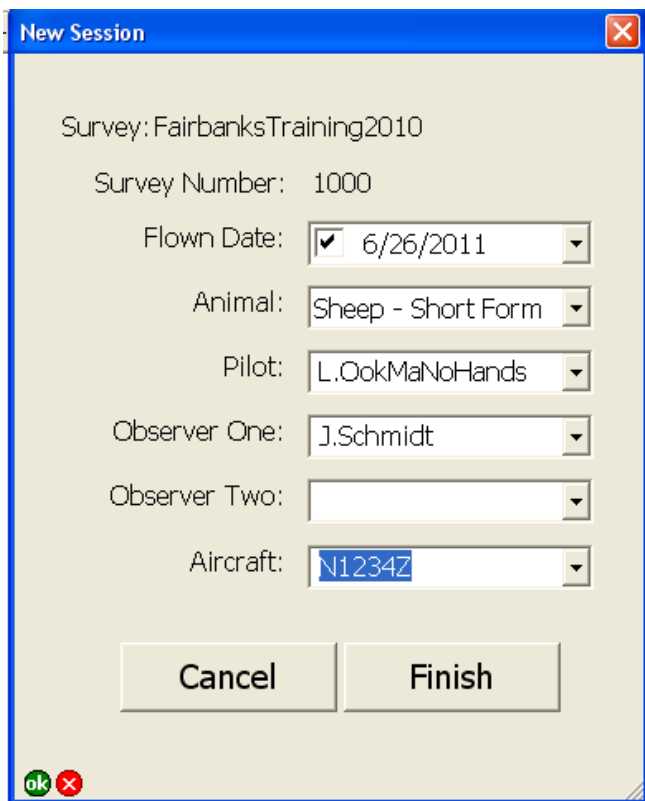


Figure SOP3-2. A screenshot showing transects displayed in ArcPad 7.1.1 for training in Fairbanks.

- 6) A ‘New Session’ form will also appear (Figure SOP3-3). Check to make sure that the ‘Survey:’ name is correct, and that you have all of the correct options in the Pilot, Observer and Aircraft pick lists. Then hit Cancel.



The 'New Session' form is a dialog box with a blue title bar and a close button. It contains the following fields and controls:

- Survey: FairbanksTraining2010
- Survey Number: 1000
- Flown Date: ☒ 6/26/2011
- Animal: Sheep - Short Form
- Pilot: L.OokMaNoHands
- Observer One: J.Schmidt
- Observer Two: (empty)
- Aircraft: N1234Z
- Buttons: Cancel, Finish
- Footer: ok, x

Figure SOP3-3. The New Session form in the Animal Marking ArcPad Applet. This screen shows when you initiate a survey flight for the day.

- 7) As long as everything looks OK (correct transects, correct pick lists), you can label the transects. If not, you will need to go back to the ArcMap Add-In and repeat SOP 2.5.

Click the Layers icon  from the toolbar above the NPS_Animal_Tracking toolbar. This will open the Table of Contents window (Figure SOP3-4).

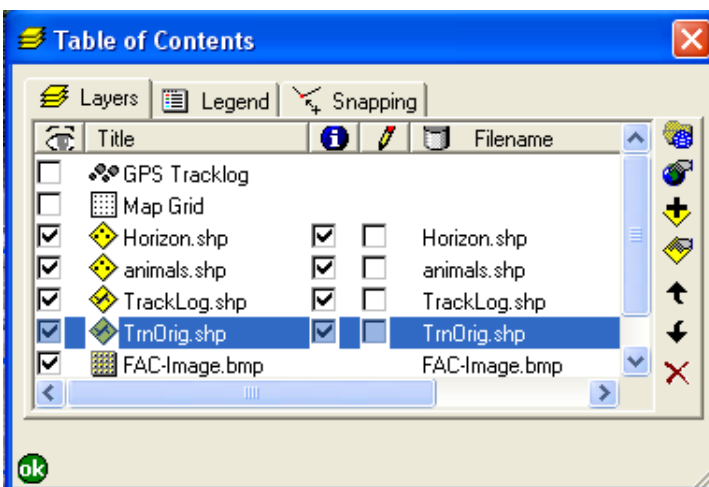


Figure SOP3-4. The ArcPad Table of Contents window where you can edit how your shapefiles are displayed or labeled. TrnOrig.shp is selected in order to label the transects.

Select (double-click on) TrnOrig.shp. This is the Generated Transects shapefile. This will open the Layer Properties window (Figure SOP3-5). Click on the Labels tab. Press the radio button for “Labels using field:” and scroll down to TransectID. To change the label font, click on the red A in the upper right hand corner and you can pick your label color, font and font size. The observers will have instructions to change this labeling if they want to.

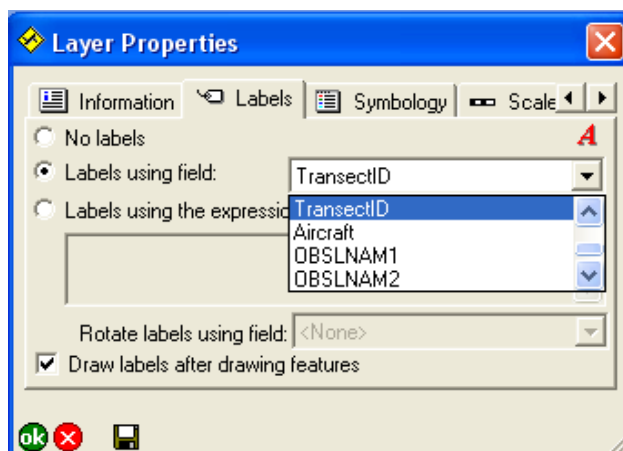


Figure SOP3-5. The ArcPad Layer Properties window showing the Labels tab where you can label shapefiles by specified fields. In this example the transect lines in the TrnOrig.shp (Generated Transects shapefile) will be labeled by Transect ID.

- 8) Close this survey session by selecting the blue plane/red background icon  on the NPS Animal Tracking toolbar.
- 9) Save this project to the desktop with the following naming system: ‘SurveyPark[or area]Year_SheepSurvey.apm’ (e.g., WRST2012_SheepSurvey.apm, Itkillik2012_Test_SheepSurvey.apm). You will add a background map to this project in SOP 3.4 and your observers will open this project directly during the survey.
- 10) You can also test the applet by connecting a GPS receiver (e.g., Garmin 18X, Garmin, Olathe, KS) to the laptop, going outside where you have satellite coverage, and then running an ArcPad session even if you aren’t yet at the survey site.

SOP 3.4 – Background Map Images

Topographic maps or aerial photographs can be created and added as uncompressed background image files (*.bmp) to your ArcPad project and the corresponding NPS_Transect_Tool.mxd. These layers are very helpful when collecting and editing data in the field. The image files are significantly smaller than a DEM, DRG or aerial photograph file, particularly when they have been clipped to just outside of your survey boundary. They will therefore load more quickly when the projects are opened. There may be existing background images for your park or survey area. Please check the following file location for existing background images:
O:\Projects\ARCN00037_Dall's Sheep Monitoring\Data\Spatial\BackgroundTopo_Images.
Background image files have been saved to this folder of topographic maps for each of the

ARCN and CAKN park units having Dall's sheep. Aerial photograph background images are also available for some areas in that folder.

If there are no background images for your survey area, you can create them as follows:

- 1) Open the NPS_Transect_Tool.mxd that pertains to your project. Have the Map (not the Layout) view showing. By using the NPS_Transect_Tool.mxd, your background image will be in the same projection (NAD83 Alaska Albers) as the ArcPad applet, which is important.
- 2) Turn off all layers except for the Survey Boundary, and park unit outlines if desired. Set the Survey Boundary symbol display to a thick black line and no fill, with 50% transparency. If you also want to display the park unit outlines, display this with a thick green line at 50% transparency. Transparency settings are on the Display tab of the layer's Properties window.
- 3) Add a DRG QM Quads Alaska layer (1:640,000 topographic map covering the state of Alaska) and a 90-m or 60-m hillshade DEM from the NPS Theme Manager to your map Layers. Set the hillshade DEM layer to display on top of the DRG and set its transparency level to 50-70% on the Display tab of the DEM layer's Properties window. These layers should both be displayed underneath the Survey Boundary. Alternatively, if there is a good aerial or satellite photograph of your survey area, this can be added rather than the topographic (DRG) and hillshade DEM layers.
- 4) Zoom to the Survey Boundary with at least a 20-km buffer outside of the boundary.
- 5) You will now export this Map view to a bitmap image (.bmp). Go to the File menu and select Export Map. A new window will open (Figure SOP3-6). Bitmap images are large files because they are not compressed like .jpg files are. However, bitmap images are better than .jpg files in ArcPad because the image doesn't have to be uncompressed each time you zoom or pan.

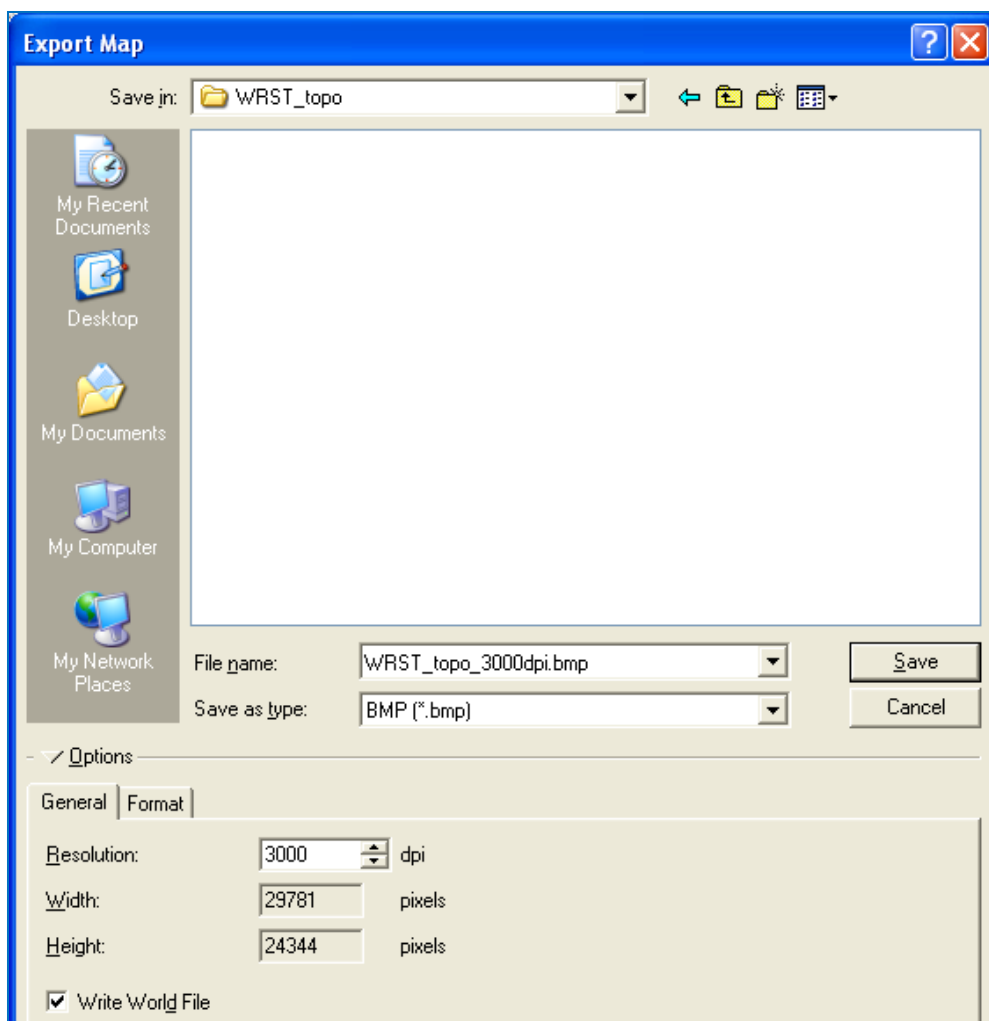


Figure SOP3-6. The Export Map window in ArcMap for creating a bitmap image of background topographic or aerial photograph maps to display with your transects in the ArcPad project and the NPS_Transect_Tool.mxd.

- At the top of the window, navigate to a file pathway associated with your survey project or to O:\Projects\ARCN00037_Dall's Sheep Monitoring\Data\Spatial\BackgroundTopo_Images. Create a folder there that will house the bitmap files (e.g., 'WRST_topo' as in Figure SOP3-6).
- For 'Save as type', select BMP (*.bmp) and set the Resolution to 3000 dpi. If the Survey Boundary is of a smaller area ($< 5,000 \text{ km}^2$), you can set the Resolution to 4000 dpi.
- Make sure that the box next to World Write File is checked; this georeferences the image.
- The export process will take some time. Four files will be produced in the folder that you designated.

- 6) Add the *.bmp back to the ArcMap project, and select to make pyramids when prompted.
- 7) Copy and paste the folder housing the *.bmp files to the field computer C drive. Open the ArcPad project (*.apm) for your survey. Add the *.bmp to this view. Save and close the ArcPad project.

SOP 3.5 – Reference Files for Observers

- 1) Save a copy of the Aviation Safety Plan that you produced for your particular survey (SOP 1) to the field computer's desktop. Make sure that observers have easy access to this and know where to find important emergency and flight following phone numbers.
- 2) Save a copy of the Data Collection Cheat Sheet (Appendix SOP8-1) to the field computer's desktop.
- 3) Save a copy of the Equipment Check List (SOP 3), the Survey Flying (SOP 7) and the Data Collection (SOP 8) to the field computer's desktop.