

Standard Operating Procedure (SOP) 2: Field iPad Set Up, Version 1.0

Protocol for Monitoring Brown Bears

Arctic (ARCN) Inventory and Monitoring Network

¹Hillary L. Robison, ²Kumi L. Rattenbury, and ¹Eric S. Boyd

¹National Park Service
Western Arctic National Parklands
P.O. Box 1029
171 Third Ave.
Kotzebue, AK 99752

²National Park Service
4175 Geist Road
Fairbanks, Alaska 99709

September 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:

Robison, H. L., K. L. Rattenbury, and E. S. Boyd. 2017. Standard Operating Procedure (SOP) 2: Field iPad Set Up, Version 1.0. Protocol for Monitoring Brown Bears in Arctic (ARCN) Inventory and Monitoring Networks. National Park Service, Fairbanks, Alaska. Available online at <https://irma.nps.gov/DataStore/Reference/Profile/2210687>

The main Narrative for the Protocol for Brown Bears in Arctic (ARCN) Inventory and Monitoring Networks is available from the NPS Inventory and Monitoring Arctic Network website (<http://science.nature.nps.gov/im/units/arcn/>) and the Natural Resource Publications Management website (<http://www.nature.nps.gov/publications/nrpm/>)

SOP 2 – Field iPad Set Up

Standard Operating Procedure #7

Version 1.0 (09/01/2017)

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 2 – Contents

SOP 2.0 – Introduction	4
SOP 2.1 – Installing Park Observer on the iPad.....	5
SOP 2.1.1 –iPad specifications required to run Park Observer	5
SOP 2.1.2 – Updating the iPad to the most current version of iOS and Park Observer.....	5
SOP 2.1.3 – Installing Park Observer without wireless.....	6
SOP 2.1.4 – Making Background Maps (aka Tile Packages or .tpk)	9
SOP 2.2 – Setting up the iPad and Park Observer app for brown bear Surveys	10
SOP 2.2.1-Getting started on the iPad	10
SOP 2.3-Setting Up Park Observer for Collecting Brown Bear Data	11
SOP 2.3.1 -Select a survey base map.....	11
SOP 2.3.2 -Select a survey base protocol (datasheet).....	12
SOP 2.3.3 -Start the GPS and an active tracklog.....	15
SOP 2.3.4 -Enter Mission Properties prior to survey.....	16

SOP 2 – Figures

Figure 1 – List of Apps including Park Observer.....	7
Figure 2 – Adding files to Park Observer.....	8
Figure 3 – Schematic for SOP 2.3	11
Figure 4 – Setting iPad map to “no auto pan”	12
Figure 5 – Choosing the data sheet on iPad using “Select Survey”	13
Figure 6 – Choosing and editing the data sheet, step 1	14
Figure 7 – Choosing and editing the data sheet, step 2	14
Figure 8 – Choosing and editing the data sheet, step 3	14
Figure 9 – Selecting the survey form.....	15
Figure 10 – Starting the GPS and an active tracklog.....	15
Figure 11 – Mission Properties and weather data for each unit	16
Figure 12 – The Mission Properties and weather data entry screen	17
Figure 13 – Indicating that you are “On Transect” and observing.....	18

SOP 2.0 – Introduction

This SOP describes how to prepare and use the iPads with the Park Observer enterprise app (developed by the Alaska Regional Office GIS Team) to collect field data for Brown Bear aerial surveys. Some specific tasks are covered by other SOPs. Park Observer and iPad preparation and training tasks include: 1) installing Park Observer on the iPad; 2) making background maps (aka Tile Packages or .tbk); and 3) setting up the iPad and Park Observer app for Brown Bear surveys.

SOP 2.1 – Installing Park Observer on the iPad

SOP 2.1.1 – iPad specifications required to run Park Observer

For Brown Bear surveys ARCN uses Apple iPad Air 2 Wi-Fi with the following specifications required to run Park Observer in the aircraft:

Product Description Apple iPad Air 2 Wi-Fi + Cellular - tablet - 128 GB - 9.7 - 3G, 4G

Product Type Tablet

Display 9.7 IPS TFT - LED backlight - 2048 x 1536 (264 ppi) - Multi-Touch

Processor Apple A8x - 64-bit

Storage 128 GB

Cellular Technology 3G, 4G

Cellular Protocols GSM, UMTS, EDGE, CDMA 2000 1X EV-DO Rev. A, HSPA, HSPA+, LTE, DC-HSDPA, CDMA 2000 1X EV-DO Rev. B

Wireless Connectivity Bluetooth 4.0, 802.11a/b/g/n/ac

Camera 8 Megapixel rear + (1.2Mpix front camera)

HD Video Recording 1080p

Location A-GPS/GLONASS

Security Devices Fingerprint reader

Battery Run Time Up to 10 hours

Dimensions (WxDxH) 6.7 in x 0.2 in x 9.4 in

Weight 15.66 oz

You will need as many iPads, power supply systems and inverters for the iPads, USB-GPS units (optional) and USB cables as there are survey aircraft. It is also recommended that you bring at least one spare set up for each base airstrip. iPads with the cellular option are required because only iPads with the cellular option come with an integrated GPS. A cellular plan, however, is not required.

SOP 2.1.2 – Updating the iPad to the most current version of IOS and Park Observer

Each year, the most current version of Park Observer and iOS required to run it must be updated. The National Park Service has permission from Apple to place the NPS enterprise application, Park Observer, on iTunes for downloading onto iPads. All versions of Park Observer are signed with an expiring certificate and will no longer run when the certificate expires. This is a licensing limitation imposed by Apple annually. After the annual Apple license expires, we will need to update the iPads with the appropriate version of iOS required to run the most recently updated version of Park Observer under the renewed Apple certificate. Regan Sarwas, with the Alaska

Regional Office GIS Team, handles the annual renewal of the Apple licenses and the updates to Park Observer. He will send out an email (usually in early April) detailing the current version of iOS and Park Observer to use. Follow the instructions at this link to download and install the latest version of NPS Observer: <https://akrgis.nps.gov/Observer/index-other.htm> . To update the iPad to the newest version of iOS, follow these instructions:

SOP 2.1.3 – Installing Park Observer without wireless

The iPads used in the aerial surveys should be set up in the following manner:

1. Go to the Alaska Region NPS GIS shop website to look for the latest set of instructions and version of the iPad Park Observer app and the associated .obsprot for the bear survey.
2. Go here for Park Observer downloading <http://akrgis.nps.gov/observer/no-wifi.htm>. Download the application package (Park_Observer_1.2.0.ipa) and the Park Observer Toolbox (ParkObserver.pyt) to a PC or Mac with iTunes. The latest is v1.2.0 (as of June 20, 2017)*.
3. Connect your iPad to your computer with a USB cable. The iPad can only be synced with one computer at a time, so always try to use the same computer.
4. Open iTunes on the computer.

Note: You do not need to be on the network or connect to the iTunes store. Nor do you need to have an iTunes or iCloud account, or authorize the device on the PC. Make sure no one is logged into iTunes – to check, select the “Account” menu from the main screen and make sure you see “Sign in” as an option. If not, select “Sign out”. If further problems arise, try logging out of the iTunes account on the iPad by opening the Music app, clicking on the small red user logo (person’s head in a circle) and selecting “Sign out”.

5. Click "Allow" in iTunes when prompted to allow access to the connected iPad.
6. Click the "Trust" alert on your iPad.
7. Select the iPad icon at the top left of the iTunes window to see the details of your iPad.
8. Click on Apps in the list on the left of the iTunes window.
9. Click the small icon “File” at the very top left and select Add File to Library... (or press Control-O).
10. Browse to and open the file downloaded in the first step. Or drag the download from step 1 onto the app page in iTunes.
11. Click the Install button next to Park Observer in the list of Apps (see Figure 1 below).

*NOTE - Permission for the Park Observer application to run on your iPad expires every year, and the application will refuse to launch. The June 20, 2017 version of Park Observer will expire April 3, 2018. This is a licensing limitation imposed by Apple. You should always download the latest

iteration – the version name may be the same, but the license will then be good until April of the following year. If you plan to use Park Observer in a given year, be sure to download and install the latest version. Regan has been working on bug fixes and requested enhancements resulting in the latest version 1.2.0. You should also update your iOS on your iPads as versions < 10 will not be supported in the near future. For maximum security, keep your iPad OS updated. The current version is 10.3.1. You can check/upgrade in the general tab of the Settings App.



Figure 1. List of Apps including Park Observer

12. Click on the Apply button at the bottom left of the iTunes window.
13. Installation progress will be reported in the banner at the top of the iTunes window (e.g, “Syncing Apps. . .”)
14. When done, click the eject button next to the name of your iPad, but leave the iPad attached to the computer.
15. Tap the Park Observer App icon on the iPad.
16. An "Untrusted Enterprise Developer" alert will appear, tap Cancel.
17. Tap on the Settings App icon and navigate (scroll down) to General -> Device Management -> National Park Service and tap on Trust National Park Service.
18. Press the Home button (round actual button at base of iPad).
19. Tap the Park Observer App icon on the iPad.
20. Tap Allow when asked if Park Observer can access your location.
21. Download [maps](#) (.tpk)* and [protocols](#) (.obsprot – the latest version is arcn_bears2.obsprot [ARCN Bears v2.0]) from the server – or get these from the survey PI. Save these to a file on your computer. You may need to generate your own map if one does not yet exist.

*Note – you may not have background maps (tile packages) made yet for your survey. To make tile packages, see the next section, then return to this section to finish loading files for your iPad(s).

22. Reattach iPad to the computer. It should appear as a device in iTunes.
23. In iTunes, click on your iPad under Devices in the left sidebar in iTunes.
24. Click on Apps, in the list of options along the left side of the iTunes window, and you should see a list of apps on your device.
25. Scroll down the list of apps (scroll way down), and select Park Observer.
26. Scroll down some more. At the bottom right is a button to add files to Park Observer (see Figure 2 below). Click the Park Observer button on the left and navigate to where your maps (tile caches [.tpk]) and protocols (.obsprot) are and “Add File” the maps and protocols downloaded in the previous step. See screen shot below which is from the sheep survey but will look similar for bears or other .obsprot and survey types.
27. Hit Apply. When it is done syncing, click Done and then eject the iPad from the laptop.

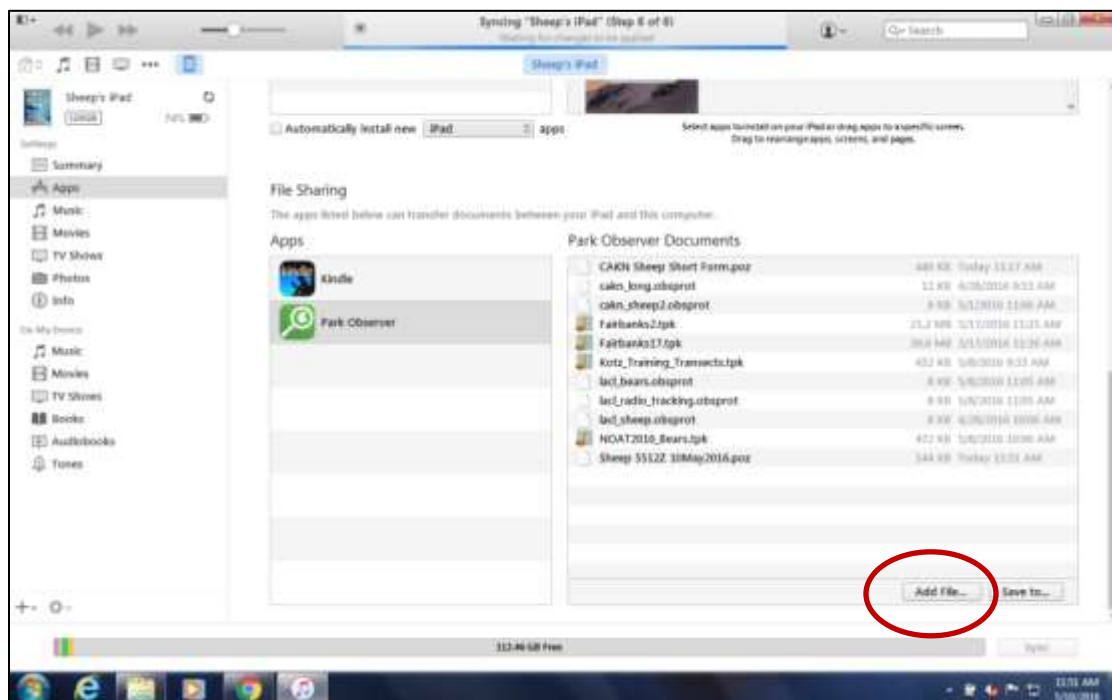


Figure 2. Adding files to Park Observer.

** See also Appendix which includes all instructions from the regional office.

SOP 2.1.4 – Making Background Maps (aka Tile Packages or .tpk)

These instructions are borrowed from the AKRO GIS website (<http://akrgis.nps.gov/observer/no-wifi.htm>). Please see this website for the latest and greatest instructions, and also for existing tile package base maps for your area (maybe you do not have to recreate one ☺).

Basemaps can be created in ArcMap 10.1 or greater. The map is converted into a collection of small images at various scales for rapid rendering on the iPad device. You can use any image or vector datasets that you like in your map, however you can **not** use proprietary online basemaps (like Google, Bing, or ArcGIS).

To create a basemap (aka tilecache or .tpk) in ArcMap:

1. Turn on the tool by selecting “ArcMap Options” in the Customize menu item. Then select the Sharing tab, and check the *Enable ArcGIS Runtime Tools*
2. Assemble your map – display background imagery and any unit boundaries or transect lines, set symbology, labeling, scale dependencies, etc. to your liking and based on your background image (e.g., bright royal blue lines show up on topos but may not show well on aerial photos).
3. Zoom to the full extents of the area you would like to have in the tile cache. To minimize file size you should make the area as small as necessary.
4. Export the map by selecting File->Share As->Tile Package from the ArcMap menu
 - a. Tile Package Tab
You will want to save the package to a file. Give it any name you want. When done, this file can be loaded into the app via iTunes.
 - b. Tile Format Tab
You will want to leave the Tile scheme as *ArcGIS Online / Bing Maps / Google Maps* and Tile Format as *PNG*. You will want to leave this at 17 or lower, unless you have a very small survey area, and need a very high resolution of data. 5m resolution imagery will generally not look any better at more detail than level 17. The higher the number, the longer the tile cache will take to generate, and the larger the tile package will be. Generating an entire park at level 17 may take several hours or more. Experiment with small areas and low zoom levels to get a feel for how long it takes, and what zoom level gives you adequate resolution. Be aware each increase in zoom level will quadruple the size and time it takes to generate the tile cache.
 - c. Item Description Tab
As a minimum, you are required to provide a Summary and Tags.
5. Load the tile cache you just created on to your device with iTunes.

6. If you want the tile cache to appear in the list of basemaps available to all users contact Regan Sarwas at AKRO GIS office. If you do this the .tpk will be available for future surveys

SOP 2.2 – Setting up the iPad and Park Observer app for Brown Bear Surveys

SOP 2.2.1-Getting started on the iPad

1. **Power and back-up power in the plane** - Make sure iPad is at 100% at the start of the day. Bring two external battery packs (e.g., Kanex GoPower portable battery 11,000 mAh). Plug the iPad into one of the battery packs at the start of the day in the plane (use the 2.1A port); the other is backup. The iPad will look like it is charging, but the battery pack just helps to slow the battery drain during the day. You may be at 50% or so at the end of the day, but it would be 0% without the battery pack. Alternatively, you can plug it into the cigarette lighter outlet in the plane (2.4 amp) with a long-leash cable. Make sure you have a single (or dual) USB splitter for the cigarette lighter outlet.
2. **Turn iPad on.**
3. **Set up the Dual Bluetooth GPS* or just use the internal iPad GPS.** To set up the Dual Bluetooth with your iPad:
 - a. Hold down the power button on the “Dual GPS receiver” until the blue light blinks, which indicates it’s looking for a Bluetooth connection.
 - b. Go to settings in iPad. Select and turn on Bluetooth.
 - c. Wait for the device name starting with “XGPS150” and ending with the numbers labeled on the GPS receiver to appear under “devices” (e.g., XGPS150-40C881). Select this device.
 - d. When prompted to download the app to use device, “ignore” this request.
 - e. Once the Bluetooth connection is established with your iPad the blue light on the Dual receiver will stay lit. The GPS button will flash green until it’s picked up enough satellites, then it will stay lit.

*Note – the external GPS has been found to “drop-out” at times and the internal GPS does not seem to do this.
4. **Swipe screens until you see the Park Observer app** and select it.



5. Your screen will look like this more or less like the figure below. Instructions for using the app follow in the next section. Instructions under “Setting Up Park Observer for Collecting Brown Bear Data” correspond with the numbers on the **Figure 3** below (1-6).

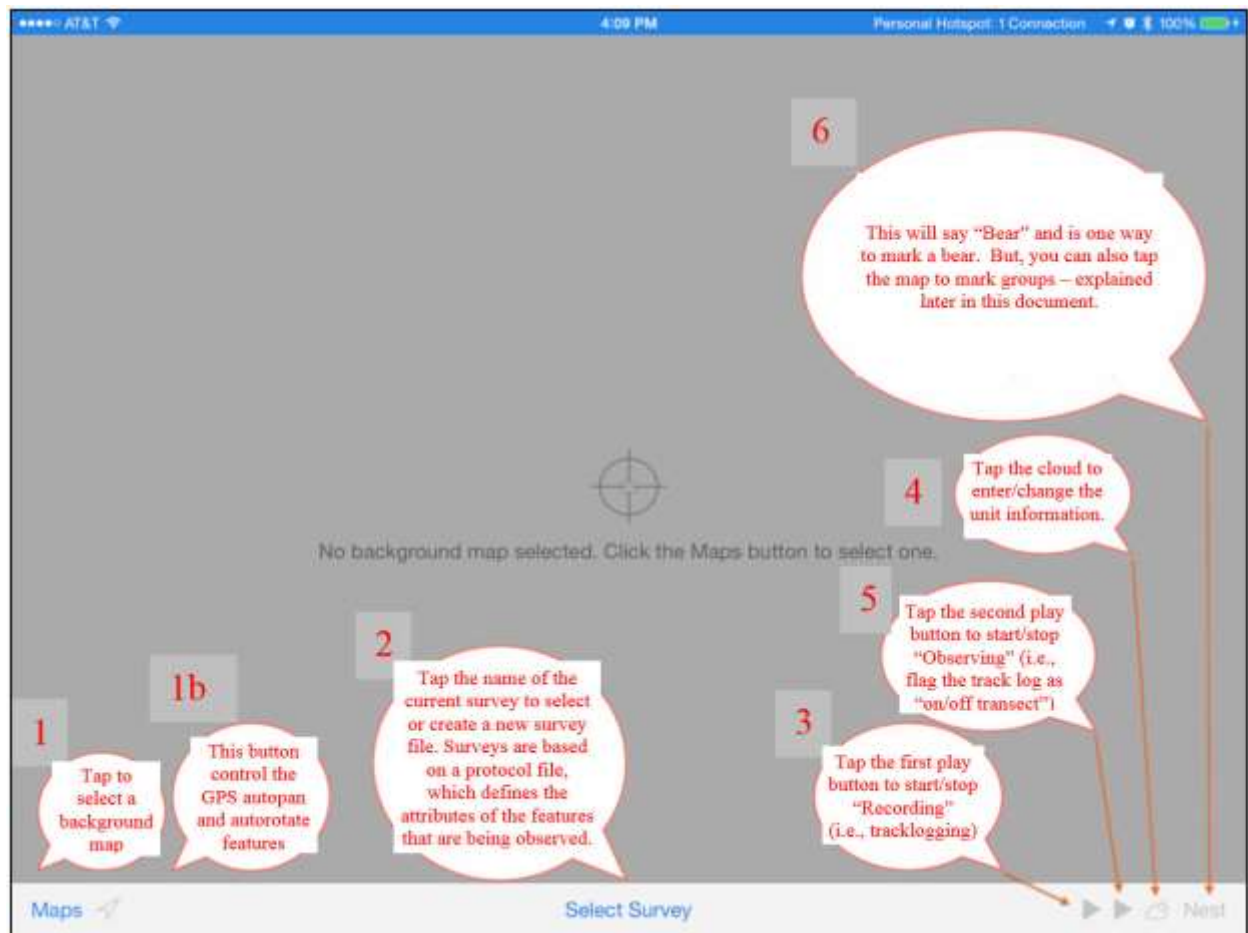


Figure 3. Schematic for SOP 2.3

SOP 2.3 – Setting Up Park Observer for Collecting Brown Bear Data*

SOP 2.3.1 - Select a survey base map

1. **Select Maps** (lower left) and select a base map from the list (**Figure 3, step 1**). If you are already in the field and have been using it, Observer will remember your map. Maps can be expanded and stretched with your fingers or by double-tapping the map with finger or stylus. Making features larger can help with more accurate placement (dragging) of waypoints (yellow dots) to specific locations on the map. To shrink again, just “squeeze” image with fingers.

*See also AKRO GIS website for updated apps, files, info and instructions

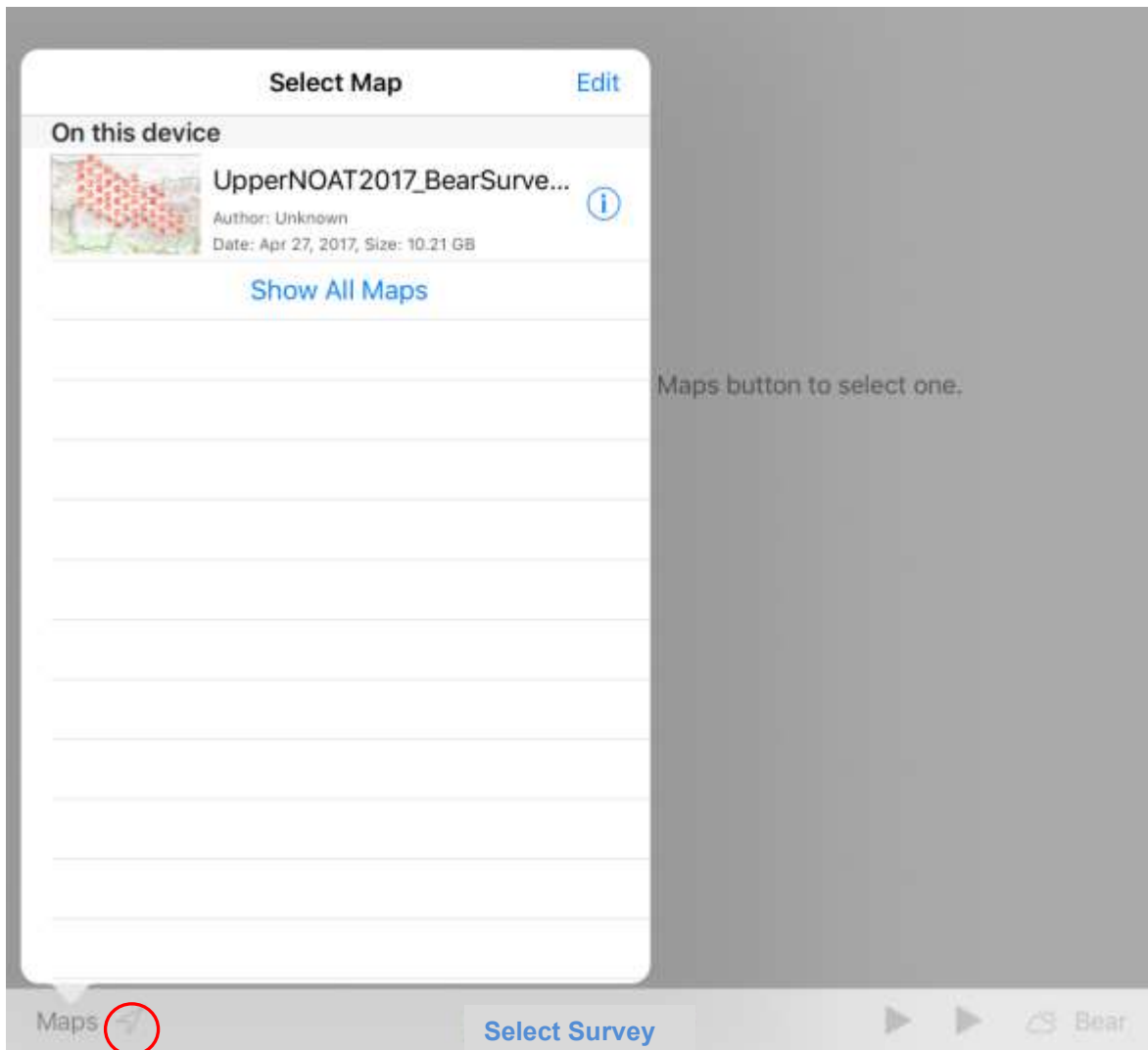


Figure 4. Setting iPad map to “no auto pan”

1b. Keep the open arrow icon for map on “no auto pan” (Figure 4, Figure 3, step 1b). You can toggle through this to look at your options for panning or for setting the map so up is in the direction you are flying. A red arrow in the upper right hand corner will reset so north is up.

SOP 2.3.2 -Select a survey base protocol (datasheet)

1. **Select Survey** (Figure 3, step 2 [middle tab]).

1a. The Select Survey window will open with a list of survey types including the ARCN Bears version 2. This may be empty, do not panic, proceed to 1b below.

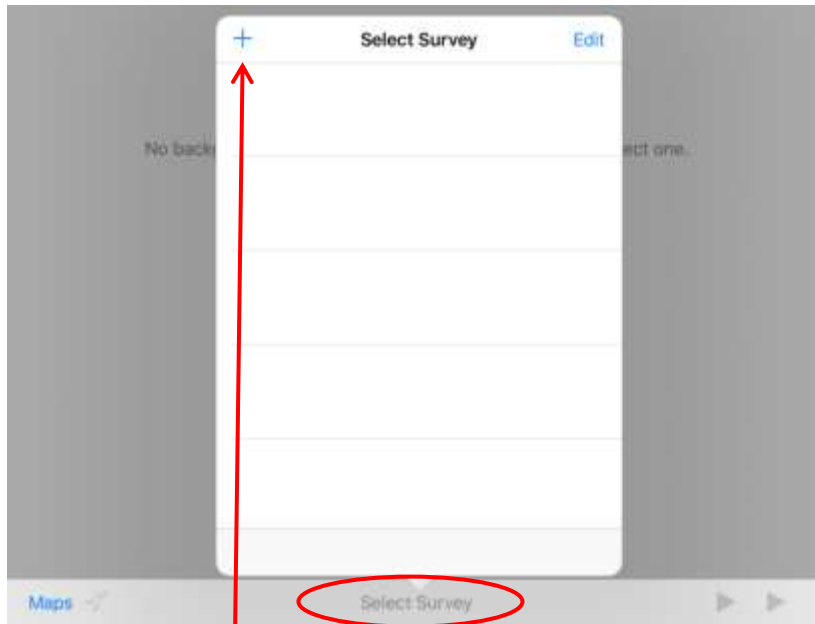


Figure 5.

- 1b. Click the plus sign in the upper left corner of the Select Survey window (Figure 5; Figure 3, step 2). A new window will open (Select Protocol window) showing the list of possible survey types again, with potentially more options. Choose “ARCN Bears version 2” (or the most recent version). This window will close and the “Select Survey” window will reopen with a new survey at the top of the main list. Proceed to 1c.
- 1c. Press the edit button (top right) and change the name of that to “Your Tail Number_Date”, for example “N5512Z_10Jul2017” (Figures 6-8; Figure 3, step 2). Do NOT put /s in the file name or you will not be able to download your data; use - or _ instead for dates, etc. Then click done. You will work off this survey file to record today’s data. In the example, the second form has been edited for a plane on July 10, 2017. Please make sure to put an N in front of tail number (file name should start with letter), or you can add “Bear” in front of the tail number (see screenshot below with survey forms set up for July 10 and 11). You will repeat step 2 (a, b, c, d) each morning so there is a new survey form for each day.

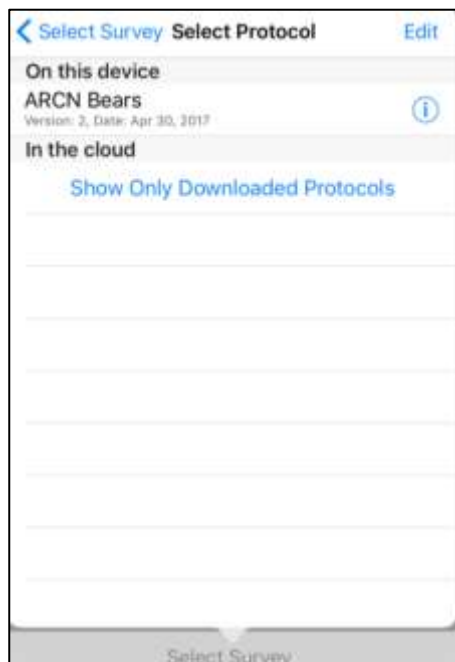


Figure 6. Choosing and editing the data sheet, step 1

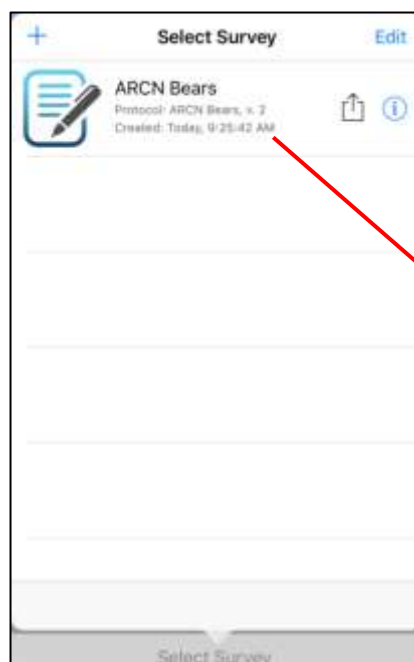


Figure 7. Choosing and editing the data sheet, step 2

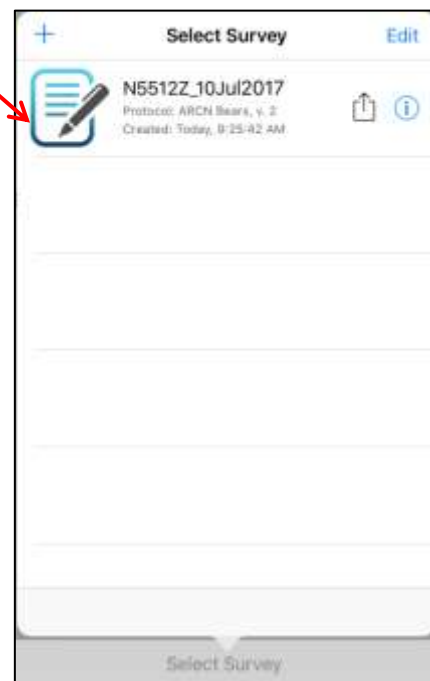


Figure 8. Choosing and editing the data sheet, step 3

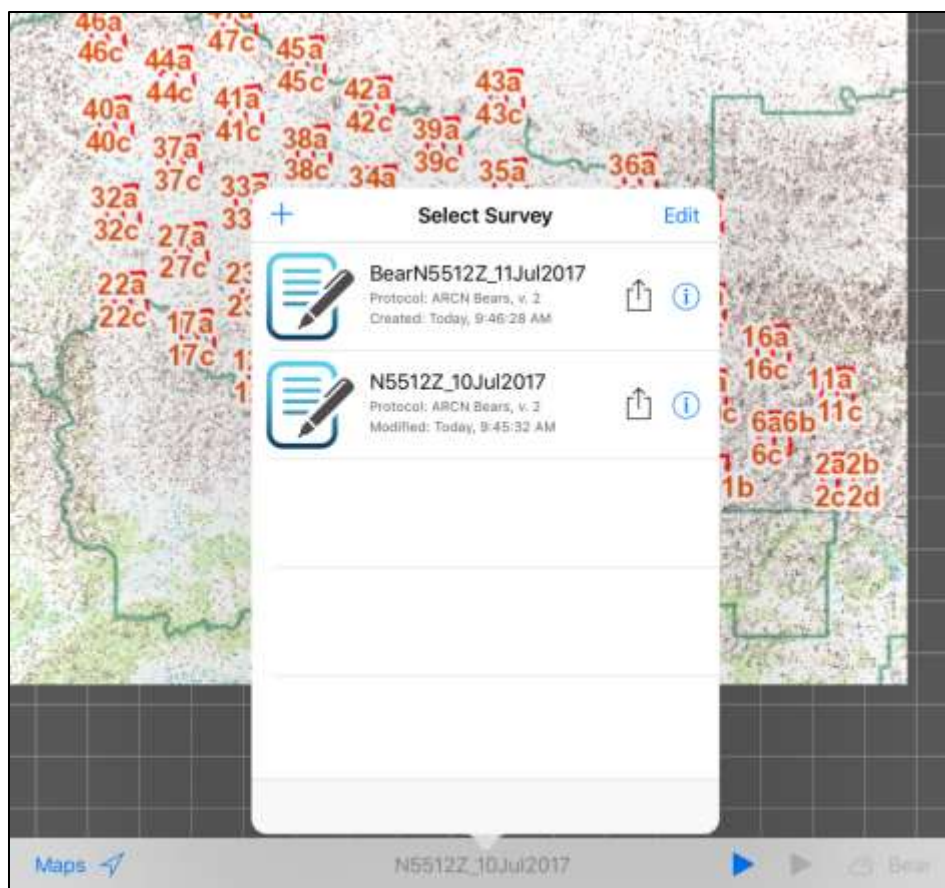


Figure 9. Selecting the survey form.

- 1d. Now select the survey form that you just named (Figure 9; Figure 3, step 2). The Select Survey window will close and your survey for the day will show at the bottom of your map screen.

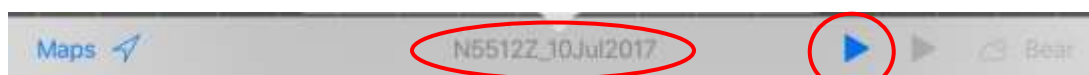


Figure 10. Starting the GPS and an active tracklog.

SOP 2.3.3 -Start the GPS and an active tracklog

1. **Press the first blue play button** to start an active tracklog before you reach your survey unit (Figure 3, step 3; Figure 10). The first play button will now look like a pause button, and the second play button and cloud button will turn blue (Figure 11 below). At the top left of your screen you will see “Recording NOT observing” as your status. Your tracklog may look like a blue dotted line on your map - recording one location point every 1-2 seconds. You are the big blue dot on the screen and you should be able to track your movements.

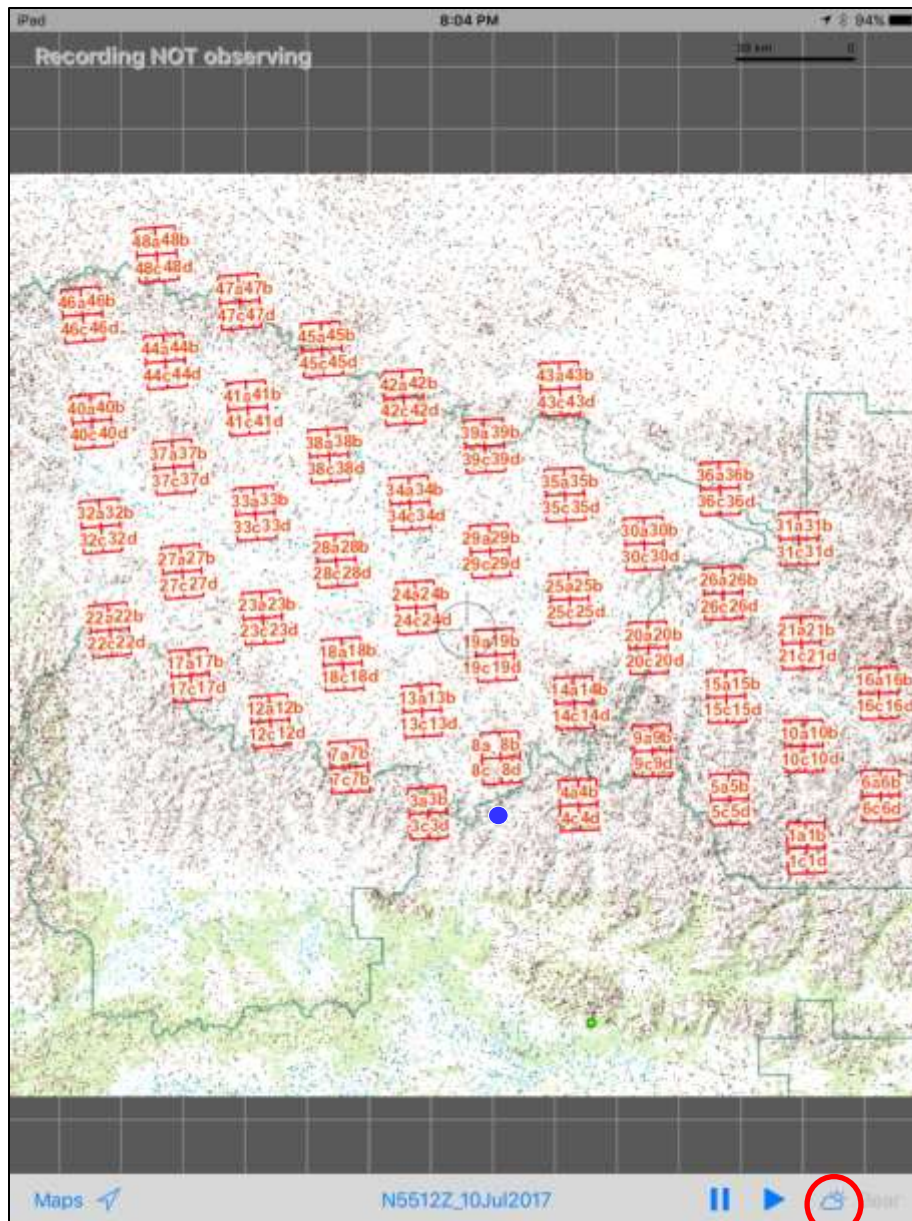


Figure 11. Mission Properties and weather data for each unit.

SOP 2.3.4 -Enter Mission Properties prior to survey and for each unit

Enter pilot/observer/plane and weather information using the cloud button before starting the unit (Figure 3, step 4; Figure 11).

1. The Mission Properties window will open and have entries from your last unit or it will be blank at the start of the day. Enter Unit ID, Survey ID (survey area and year; e.g., UpperNoatak2017), Pilot initials, Observer initials, Aircraft tail number, and tail number of your Partner plane if you know it (i.e., the plane double sampling the same unit) (Figure 12 below).

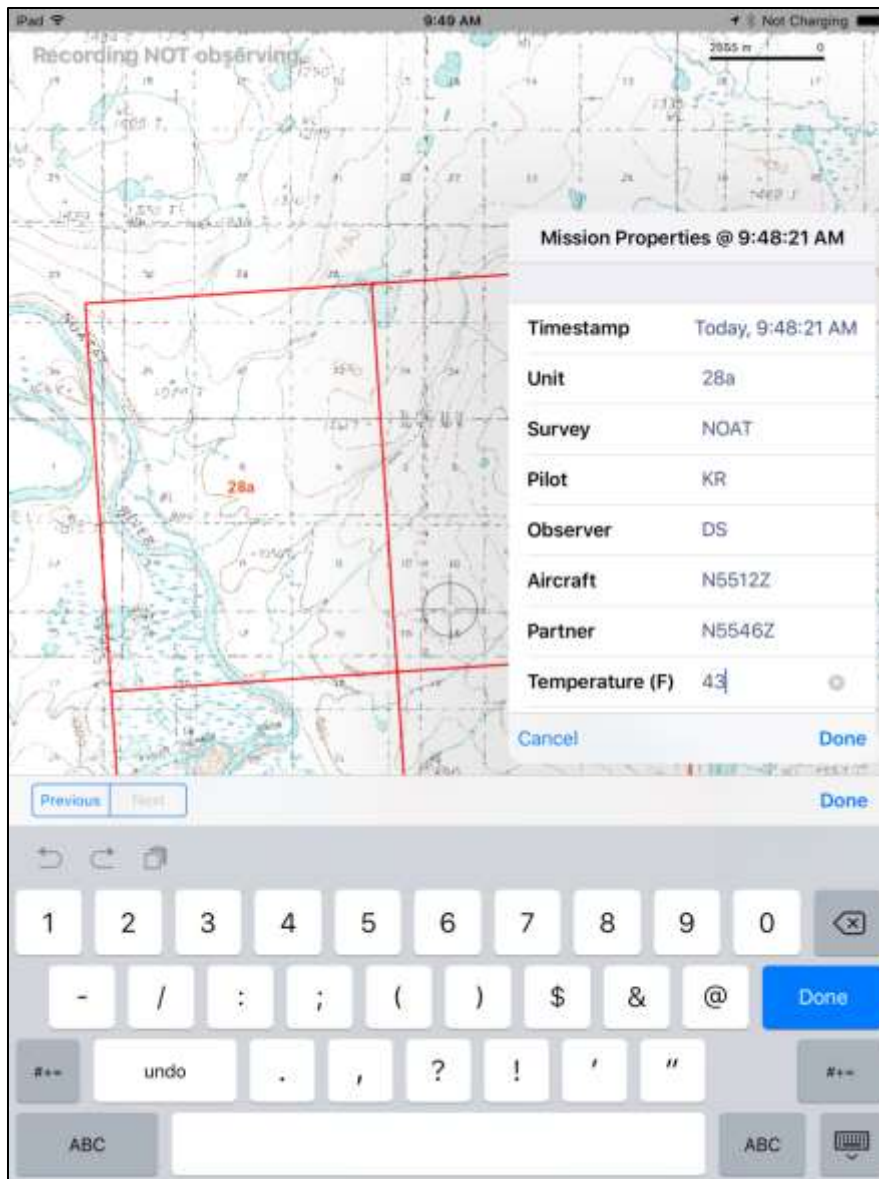


Figure 12. The Mission Properties and weather data for each unit.

2. **When you enter the unit, press the second blue play button to indicate you're "ON Transect" (Figure 3, step 5; Figure 11).** Both play buttons should now look like pause buttons (Figure 13 below). The "Bear" button on the far right will now be active (blue) as well (Figure 13 below). At the top left of your screen you will see "On Transect" in pink as your status. **A green square will mark your start point and a green line will track your movements** on the map (not shown in this screenshot). The data for the unit will be attached to this green tracklog line.

3. **Now you will fly the sample unit and collect data** on bear groups and dens observed (Figure 3, step 6; **instructions in SOP 6 “Flying Surveys and Collecting Data”**).
4. **When you finish surveying the sample unit, tap the second play button** – the iPad changes from saying “ON Transect” to “Recording NOT Observing” and a green square will appear at the end of your track (Figure 11; Figure 3, step 5).
5. **Also after you finish surveying the unit**, tap on the green square at the beginning of your tracklog line – this will allow you **to enter the bear track data** and **to update** the temperature, weather, turbulence, snow, and vegetation data.

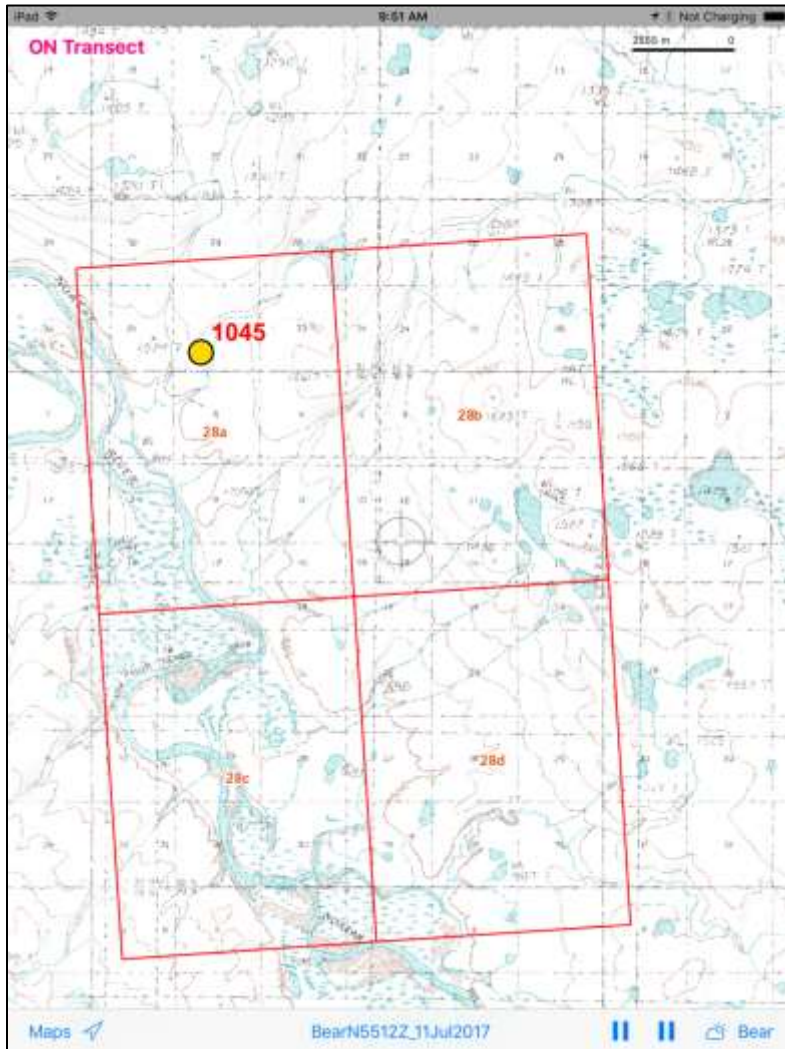


Figure 13. Indicating you are “On Transect” and observing.

Now, proceed to SOP 6 “Flying Surveys and Collecting Data” because once you have loaded the Brown Bear base maps, selected the appropriate brown bear protocol (datasheet), entered mission properties and created a new survey for the current date, you are ready to begin collecting brown bear data (Figure 3, step 6; see SOP 6 Flying Surveys and Collecting Data).