Standard Operating Procedure (SOP) 7: Data Collection in Notebooks and iPads

Protocol for Monitoring Small Mammals

Central Alaska (CAKN) Inventory and Monitoring Network

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SOP 7 – Data Collection in Notebooks and iPads

Standard Operating Procedure #7
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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.					

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SOP 7.0 – Introduction

This SOP outlines the steps in collecting small mammal data in the field using data notebooks and the Park Observer application on the iPad. See SOP 2 for details on the setup of the data fields in the data notebook and the setup of the iPad and Park Observer prior to the small mammal survey. See SOP 6 for details on Conducting Surveys prior to data collection. SOPs 8 and 9 cover data downloading, editing and archiving that observers perform at the end of each trapping session in the field and back in the office.

SOP 7.1 – How to Record Small Mammals Data: Instructions for Observers

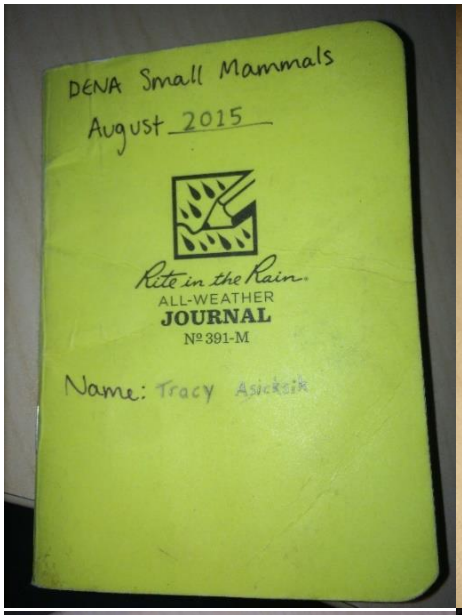
Each observer is responsible for multiple pieces of equipment (iPad, back up battery, cords, data notebook, field notebook) used to collected data. All survey equipment, including the iPad and data notebook, is packed into survey fanny packs, field vests or back packs and carried with the observer during the surveys. The instructions below provide an overview of how to record small mammal observations and survey metadata (e.g. journal of daily activities, crew assignments, etc.) while trapping. Each small mammal data observation should be recorded in BOTH a field data notebook AND on the iPad in Park Observer. However, if there are technical difficulties with the iPad (loss of GPS signal on the iPad, loss of battery power to the iPad, Park Observer freezes or stops working, etc.), the data notebook should be used as the sole medium for data collection. The protocol (data sheet or data form) in Park Observer is set up to be very similar to the data collection on the data notebook. Rite-in-the-Rain field notebooks are also used to record the schedule and provide a journal or trip report about the daily events during the survey (e.g. metadata such as members of each crew, who is assigned which equipment, weather on each trap check, etc.).

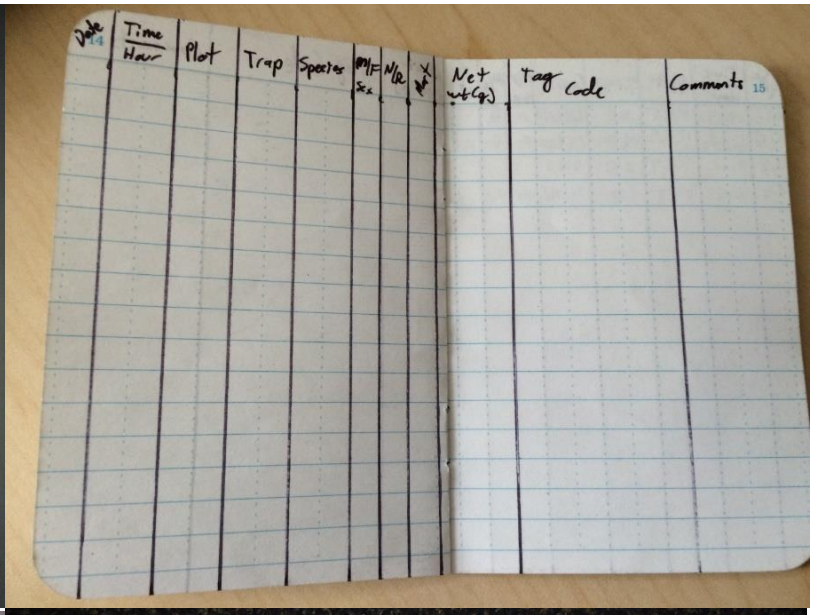


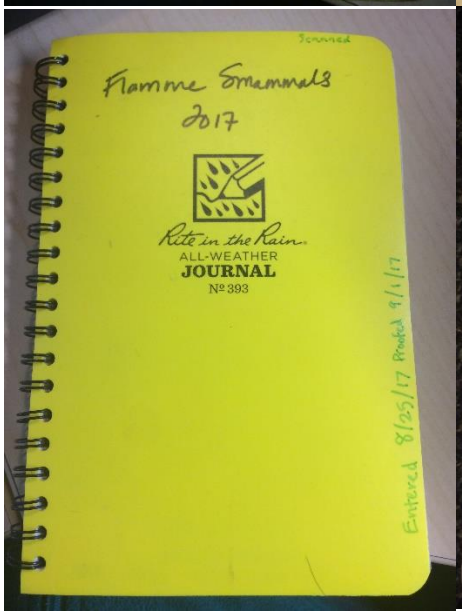


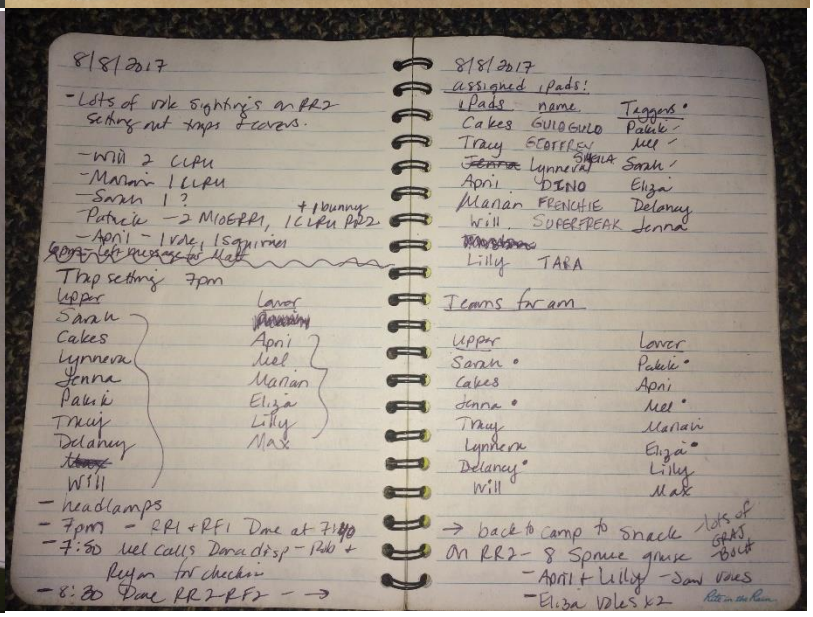
SOP 7.1. 1 – Paper Field Data Notebooks

A Rite-in-the-Rain data notebook (see below and SOP 2) is assigned to each observer for data collection. Each data notebook is comprised of all data fields to be collected. Data will be collected both into the Park Observer app on the iPads and into the data notebooks for each unique capture record. Observers will maintain possession of their data notebooks for the duration of the survey but when working with other crew members, capture records may be recorded into the notebook or iPad of either observer. Each unique capture record should only be entered into one notebook and one iPad. Crew leaders will also be assigned larger, spiral-bound Rite-in-the-Rain field notebooks for recording the schedule and a journal or trip report about the daily events during the survey (e.g. metadata such as members of each crew, who is assigned which equipment, weather on each trap check, and other logistics, etc.).









SOP 7.1. 2 – How to Record Small Mammal Observations:

In the data notebooks, required data fields for target species include (from left to right) date, time/hour, plot, trap, species, sex, new/recapture (n/r), mort, net weight, tag code and comments. The Park Observer application has the same fields in a similar layout. The following explains what each data field is and the information that should be collected for each in both the data notebooks and the iPads.

a. **Date**: (e.g. Aug 12, 2017=8/12/17; Date is automatically recorded in Park Observer)

b. **Time/ Hour:** This refers one of the three trapping sessions. We use military time to reduce confusion between am and pm. Time/Hour are automatically recorded on the iPad in Park Observer when the record is started. In the data notebooks, records as:

   - 0600 (6am)
   - 1300 (1pm)
   - 2000 (8pm)
   - A slash will follow the "Hour" and the "Time" (actual time collecting the data record) will be written in military time. For example, 1300/1346; 2000/2258.

c. **Plot ID**: There are four options:

   - RR1
   - RR2
   - RF1
   - RF2

d. **Trap ID**: This refers to the trap location on the specified plot and is written as a two character number and a letter combination. The number is for the trap line ID and a letter designates the actual trap location within the line. For example, plots will contain trap lines 1-10 and trap locations on each line A-J (e.g. 1A, 2F, 4I, 9J). In Park Observer, use the side arrow pulldowns to select the correct number and letter combination for trap location.

e. **Species ID**: This field contains four letter codes/abbreviations for target and non-target species captures. A * indicates a target species for the study. In Park Observer, use the side arrow pulldown to select the correct species code or type in an alternative in the Comments.

   - CLRU* (*Clethrionmys or Mydoes rutilus*; northern red-backed vole)
   - MIOE* (*Microtus oeconomus*; tundra vole)
   - MIMI* (Microtus *miurus*; singing vole)
   - MIXA (Microtus *xanthagnathus*; yellow-cheeked vole)
   - SOSP (*Sorex* species, species of shrews)

- SYBO (*Synaptomys borealis*; northern bog lemming)
- LETR (*Lemmus trimucronatus*; North American brown lemming)
- GLSA (*Glaucomys sabrinus*; northern flying squirrel)
- BCCH (Black-capped Chickadee)
- BOCH (Boreal Chickadee)
- DEJU (Dark-eyed Junco)
- GRAJ (Gray Jay)
- RESQ (Red Squirrel)
- ERMN (Ermine)
- Other Species (**write/type name in the "Comments"**)

f. **Sex**:

- Use "**M**" for male
- Note reproductive features in comments:
  - Scrotal
- Use "**F**" for female
- Use "**U?"** for unknown
- Note reproductive features in comments (tap to select all that apply in Park Observer):
  - Mammaries (present but not enlarged)
  - Pregnant
  - Lactating (enlarged for nursing)
  - Gave birth (plus number of "pinkies" or pups)
  - Perforate (has been bred or given birth; the vagina is open, large and/or bloody)
  - Imperforate (has not been bred; vagina will not be open)

g. **New or Re-Capture:**

- Write/tap "**N**" for a new animal (one that has never been captured before and does not have a PIT tag).

- Write/tap "**R**" for a recaptured animal (one that has been caught before and has a PIT tag inserted; or one that appears to have been caught before and has a grease smear on its back from the antibiotic ointment used in the tagging process). Tap to select the correct category in Park Observer (New or Re-capture).

- If an animal is suspected to be a recapture (has a grease stain or an insertion wound on its back from tagging but not a tag), **make a note in the Comments**. For example, "**grease stain, R?**" At times, if PIT tag readers are cold, the tag code may not be detected. Use another reader to scan the animal to see if the tag code can be detected. Sometimes tags migrate to another location in the body and may be hard to scan. It is possible on occasion, for tags to work their way back out of the insertion wound and the tag may be lost. When an animal may have lost its tag, write "**lost tag?**" in the comments. Note: Palpate the entire animal carefully before inserting a new tag. The readers cannot detect codes if tags are close together.

h. **Net Weight** (in **grams**):

- For target species:

  - TOTAL WEIGHT: To weigh the animal, dump the entire contents of the trap into a gallon sized baggie. Clip the top of the Pesola to the top center of the baggie, being sure to include both sides of the baggie in the clip. Leave about ¼ of the bag unzipped on one side so air can get in and the animal can breathe. Weigh the animal in the bag with trap debris from the trap (animal+bag+debris) with the Pesola (in grams). Write this as the first number in the "Weight" column in field data notebook and enter it into the iPad under "Total Weight." Put a slash after this number. Process and release the animal but DO NOT DUMP OUT THE DEBRIS IN THE BAG.

  - BAG WEIGHT: Weigh the bag again with just the debris (after the animal has been processed and released). Write the bag+debris weight in grams after the slash (and enter it on the iPad under "Bag Weight").

  - NET WEIGHT: Subtract the Bag Weight from the Total Weight (animal+bag+debris) to get the **Net Weight of the animal**.

  - Write another slash and record the **Net Weight** and enter this number into the "Net Weight" cell on the iPad**.**

  - For example, "**animal+bag+debris/ bag+debris/NET WEIGHT**"

- For non-target shrews and voles:

  - Follow the same procedures as above.

- For mortalities:

  - Weigh animal by the tail. Enter the animal weight (a single number) into the Net Weight column (no need to collect Total and Bag Weights).

- For all other non-target species or animals that escaped before being weighed:
    - Do not weigh; release the animal (e.g. birds, squirrels, weasels, etc.). Put a dash in the Net Weight field to indicate weight was omitted on purpose. For escapees with no weight, state "no weight" in the Comments.

i. **Mortality (mort):** If the animal dies, put a check mark in this column or select "Mort" in Park Observer. Add notes on the cause of death (e.g. hypothermic, eaten by GRAJ, eaten by weasel, caught in trap door, etc.).

j. **Tag Code (PIT Tag Code):** Tag code accuracy is critical to the mark recapture analysis. Several different generations (or batches) of PIT tags are used. Tag codes are either 10-15 alphanumeric or numeric characters in length. Some tag codes differ by only one digit (e.g. some batches have 100 consecutive numbers, differing by only 1-3 characters at the end). It is very important to record tag codes correctly. The sequential numbers of tag batches increases the likelihood of tag code transcription errors (typos). Different types of transcription errors include 1) Nonsense tag codes (typos resulting a non-existent tag code); 2) Missense tag code (typos resulting in tags codes for another animal or a currently unused tag); 3) Irreconcilable tag code error (tags codes missing characters or with too many errors to reconcile). See examples below:

- For example, tag code 6C0001234567890 is inserted into a female CLRU on plot RR1, trap 4C. She is recaptured but her tag code is entered incorrectly as 6C0001234567891. This is the actual tag code of another female CLRU caught at 5J on plot RR1 during the same trap check. In this situation, the data cannot be reconciled to figure out which tag numbers correspond to each individual. When reconciling the data, this might be detected by having two captures for this tag during the same trap check. In this situation, it is impossible to reconcile if there are two animals or one. Was 91 at both locations, was 90 at both locations or were both of them on plot RR1 at the same time (or perhaps neither was and it's another tag code number altogether)?

- For this reason, it is critical to be **very conscientious and meticulous** about reading and recording tag codes prior to tagging each animal. After tagging, the animal is scanned to ensure the tag is inserted. The tag code is repeated again to ensure accuracy before the animal is released.

- If tag code errors are suspected, provide details notes made in the comments in the field notes. For example, if an error like the example occurs:
    - Provide sufficient detail to describe the situation. Discuss the situation after the trap check with the project manager immediately and document in the field notes. This information is useful when proofing and reconciling data.
    - Example: noted detailing a tag code error issue, "90 may be the wrong tag for this animal. I saw most of the tag but the reader died before I caught the last number. This animal weighed 14 g and was a juvy female at 4J. It was a new animal and we just inserted tag 90. Delaney thinks she had a 90 earlier in the day on this plot so likely this is the wrong tag code for the juvy."

- **Escapees**: If an animal escapes prior to being tagged, write "**escaped**" in the "Comments" (type it into the "Tag End" cell in Park Observer). Records of escapes

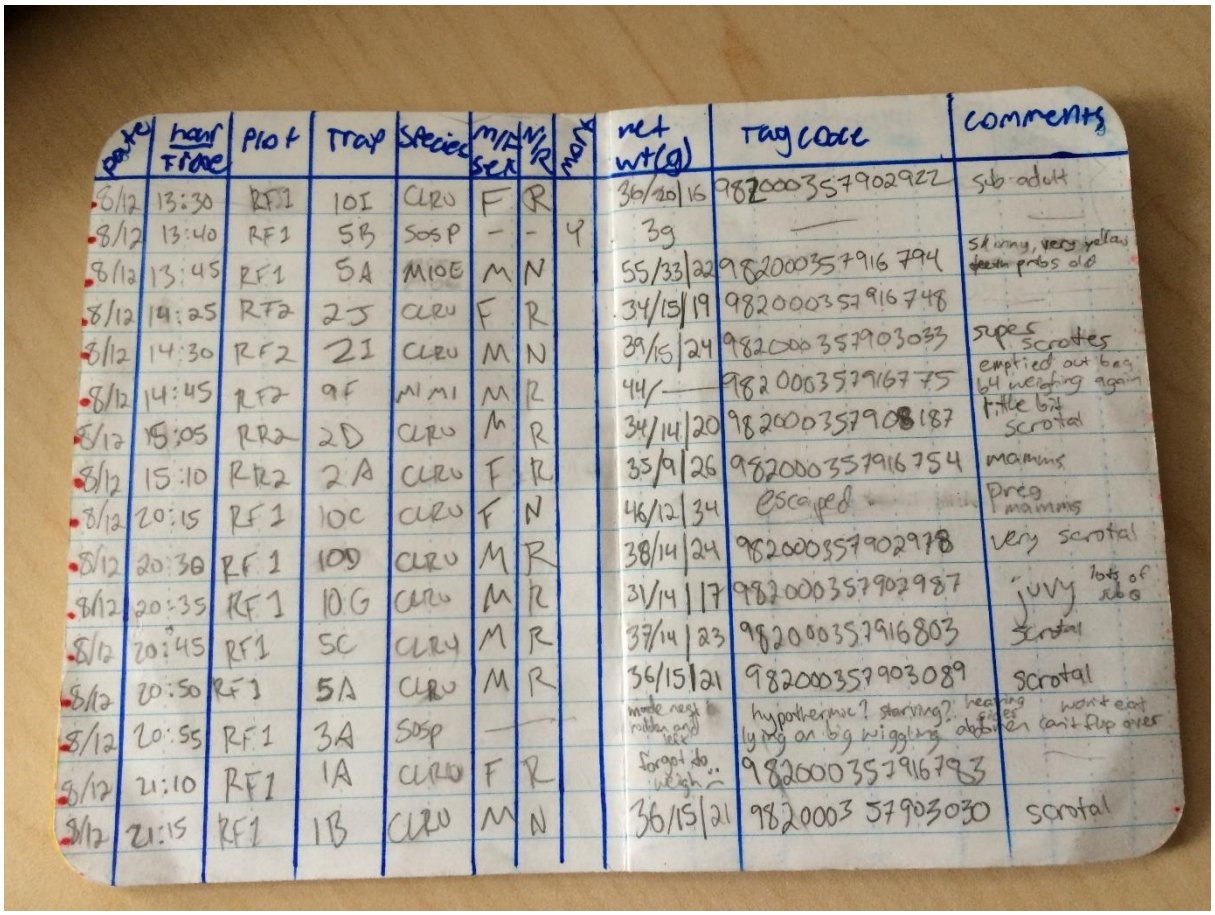
without tag codes cannot be used in analysis. Enter a dash in the tag code column for all escapes for which a tag code is unknown. If weight was recorded prior to escape, weigh the bag and record the net weight of the animal.

- **Releases**: Some captured animals are too fragile or small for tagging. Juvenile (juvy) target voles under 10 g are not tagged. Females that have given birth in the trap (with babies) or injured or sick animals are not tagged. Write/type "**released**" in the "Comments" and make a note of the reason. Put a dash in tag code field to indicate there is no tag. Non-target animals are not tagged. Shrews are too small for tagging; weigh and release them. All birds are released. Weasels, squirrels and other larger, non-target mammals are released and not tagged. Enter a dash in the tag code column for all non-target, released animals.

k. **Comments:** This section is used for anything of significance to provide more detailed information about any of the other data fields. See the photo on page 11 for an example of a completely filled out data booklet with various comments. Many of these comments can be selected as options in Park Observer. Scroll through the entire data sheet to select all of the appropriate options. In addition to the uses already discussed, other common uses of this field include recording:

- Pictures, "took photo of…."
- Equipment malfunctions, "reader cold; used Patrick's."
- Incidents, "moose on plots, had to leave area."
- Weather events, "snowing."
- Changes in crew members, "lower crew arrives to help upper crew."
- Plot or trap maintenance, "RR2, 4G trap needs wire," "missing trap cover RF2 6F ", "missing metal tag or flag on RF2 1A."
- Time a plot is completed, "RF2 done@1600."
- Sample collection, "swabbed for DNA," "feces collected," "ectoparasites collected."
- If an animal escapes while being tagged, "escaped!"
- If an animal appears to be a recap without a tag, "recap?"
- If an animal appears to have lost a tag, "lost tag?"
- If an animal is too small or sick to tag, "under 10 g juvy, released"
- If an animal just had a litter, "10 pinkies, released mom untagged."
- If there are sick, injured or hypothermic animals needing rehabilitating, "hypothermic, warming up." Any rehabilitated animals will be returned and released on the plots on which they were caught. Also make a note when the rehabilitated animal is released.

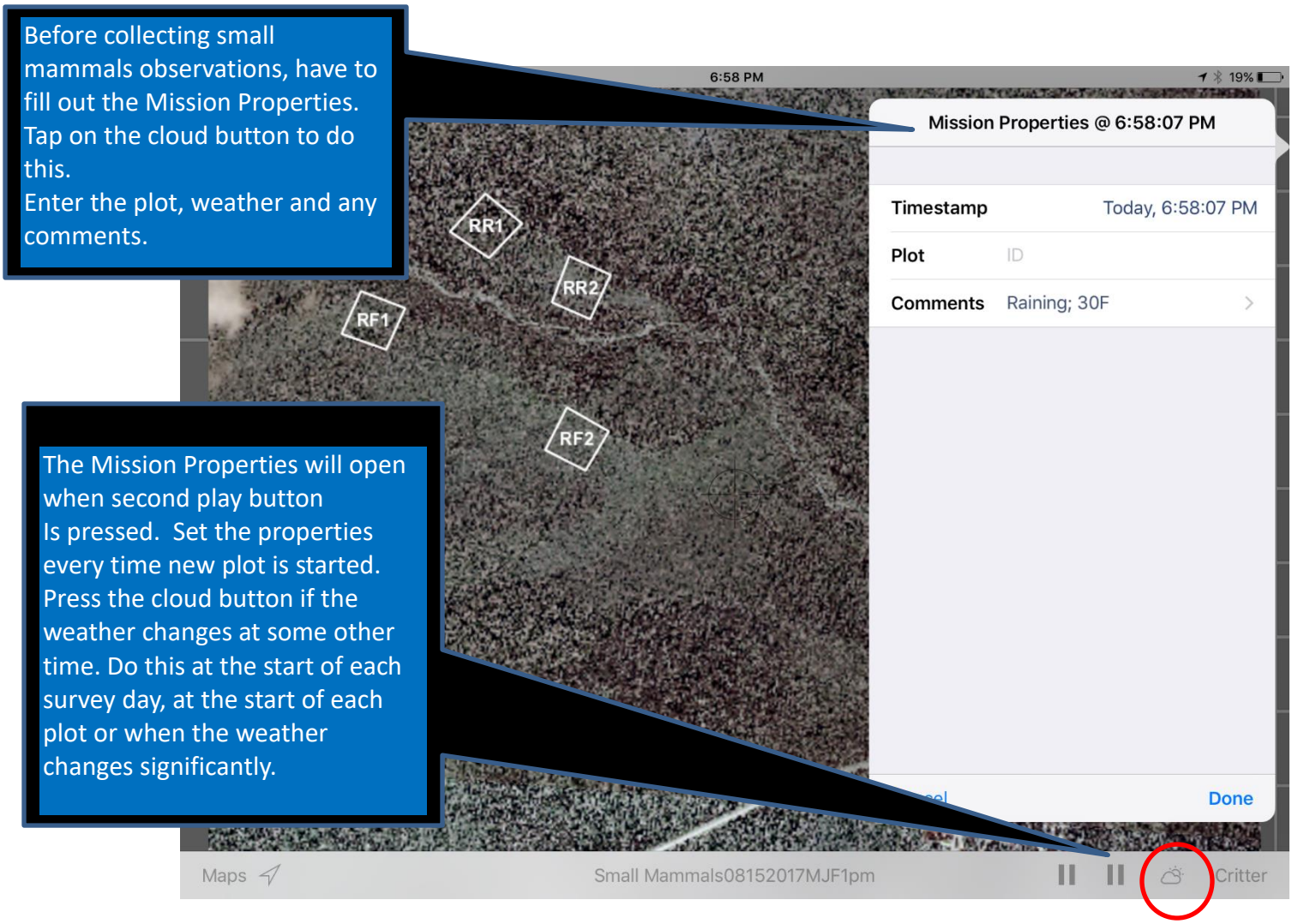
- Color morphs, “chocolate back, black back, pale, etc.”
- Body condition of the animals, “fat, skinny, little subQ (subcutaneous fat), mange, missing hair, bot fly, injured leg, ectoparasites, etc.”
- Age class information: We usually infer this from the weight but other traits, such as size, large yellow incisors and well developed secondary sexual characteristics help to distinguish age class. There are rough categories and include: pinky, juvy (juvenile=animal 12 g or less), sub-adult (13-17 g), adult 18+g, overwinter survivor (these animals will be large, bony with big, long yellow teeth, skinny with lots of loose skin and if tagged, will have codes from the previous summer).
- Has “ectos” (ectoparasites=little red mites or other small crawlies on the voles).
- Cause of death for mortality.



SOP 7.2 – Recording Small Mammal Observations in Park Observer

1. Refer to SOP 2 for setting up the iPad and Park Observer for Small Mammal surveys. Before collecting small mammal observations, define the Mission Properties each time plot is started or weather changes significantly.

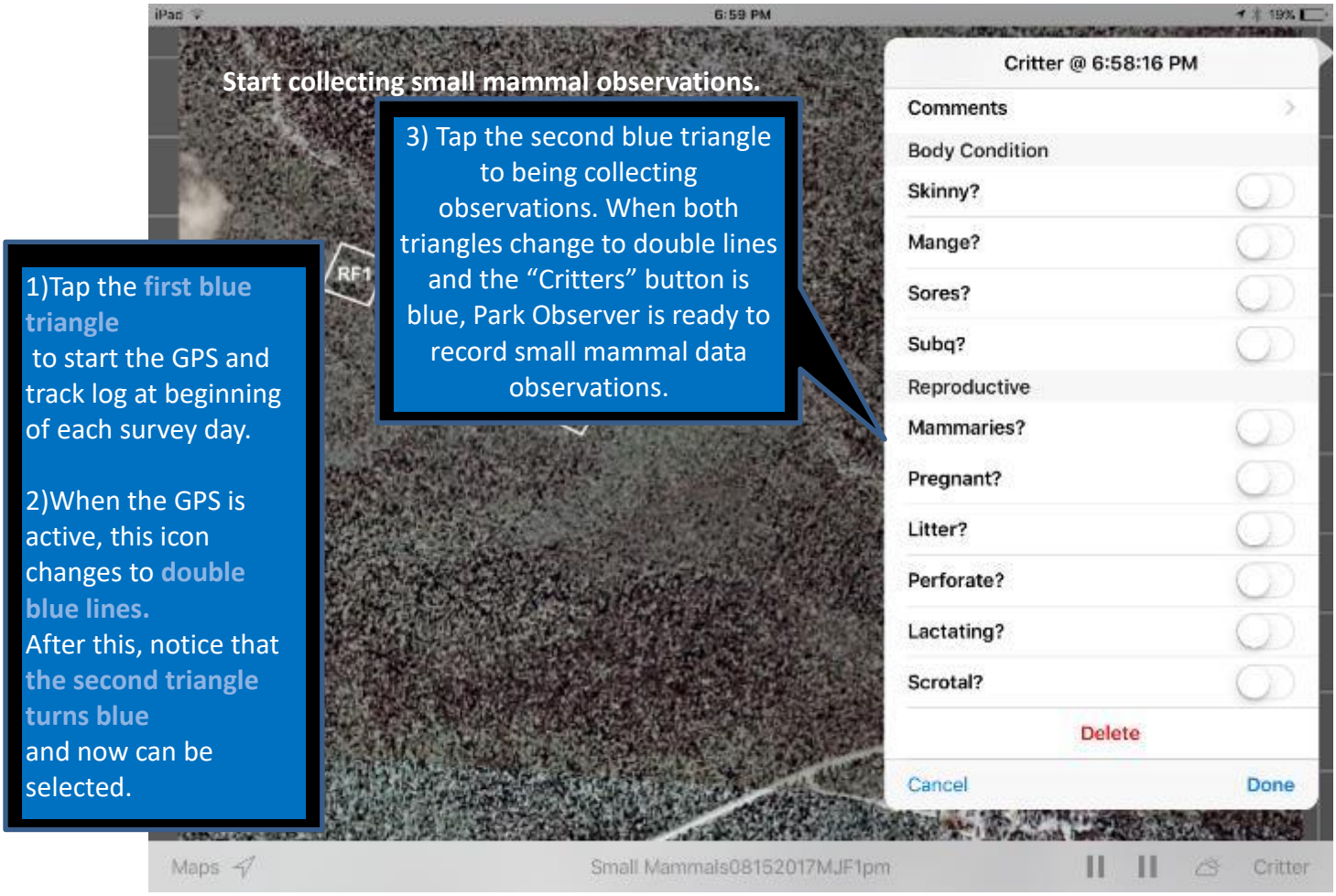
2. Hit the cloud button to bring up the Mission Properties window.
3. Mission properties information includes the timestamp, hour and date (these are automatically recorded in Park Observer), Plot ID and Comments, including information on weather conditions. Hit done to close the window.



4. To begin recording small mammal observations in Park Observer at the start each survey day, tap on the first blue triangle icon. This starts the GPS and track log. To begin the plot, press the second blue play button.


Start/stop observing (flag track log as now "on plot") by tapping second blue triangle.
RR1
RR2
RF1
RF2
1) The double lines indicate that the GPS and track log are active. This starts the survey day.
2) Next, tap the second blue arrow. This starts the survey plot begins data collection in Park Observer. This arrow will be toggled on and off each time plots are entered and left. This records effort per plot via start and stop times.
Maps
Small Mammals08152017MJF1pm
Critter

5. Both play buttons should now look like pause buttons. The "Critter" button at the far, bottom right of the Park Observer screen will now be active (blue). The data sheet can now be opened to record observations.



6. **Summary of how to activate the GPS and Park Observer to begin data collection:**

   a. Press the first **blue triangle button** to start tracklogging – when leaving camp but before getting to the plot. Turn this off when trap check is completed.

   b. Whenever a new plot is started, press the **second blue triangle button** to start collecting data.

   c. When the plot is finished, press the second blue pause button to stop collecting data.

To summarize there are *three states* in Park Observer

1) When: Button1 is a blue play, and button2 is a gray play: App is idle, no data is being collected **Tracklog inactive.**



2) When: Button1 is a blue pause, and button2 is a blue play: App is collecting locations (GPS is active and track logging) **GPS active, but not on plot**.



3) When: Button1 is a blue pause, and button2 is a blue pause: App is collecting locations (track logging), **GPS active and on plot.**



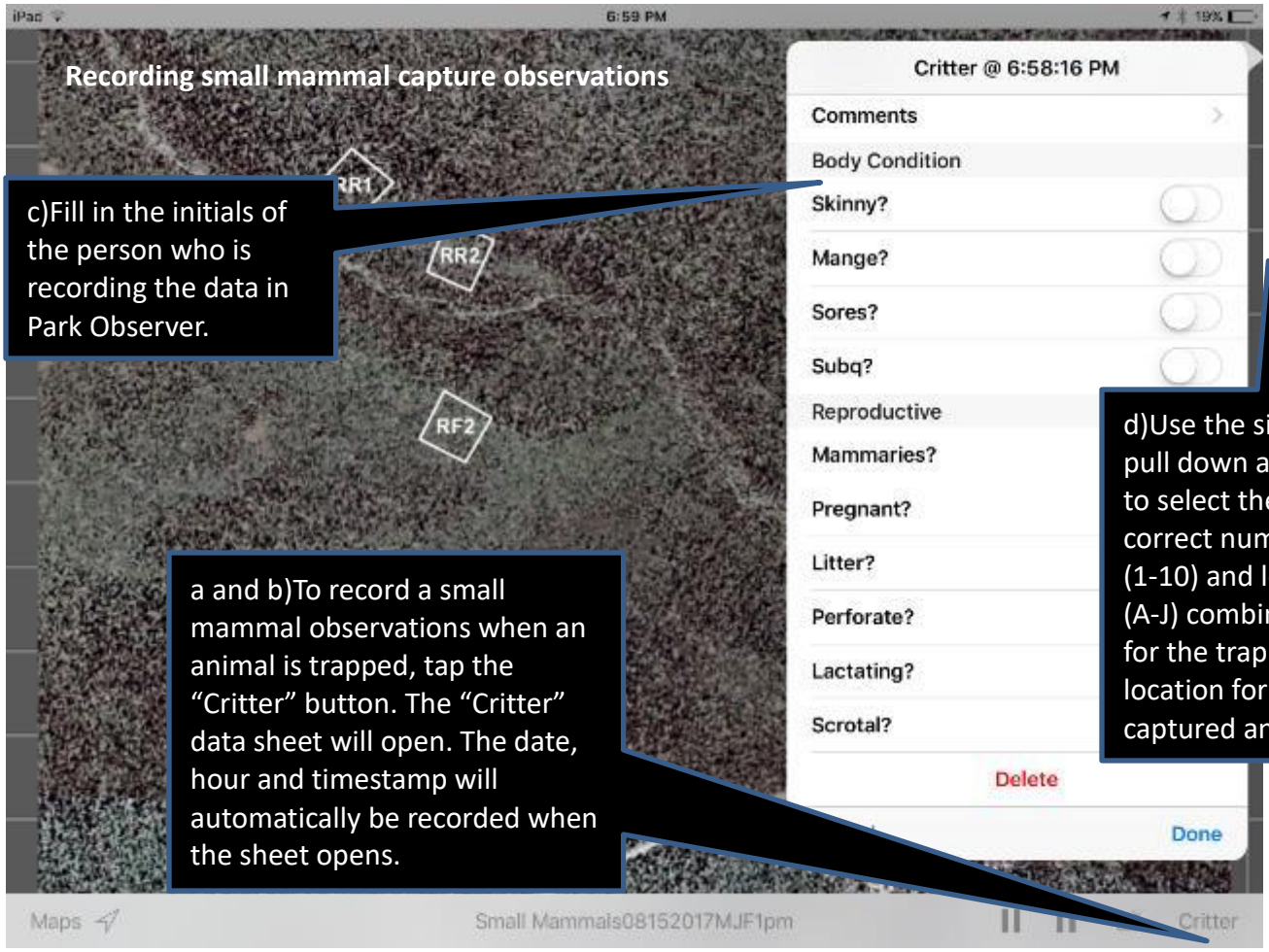
7. **How to record small mammal observations in Park Observer:**

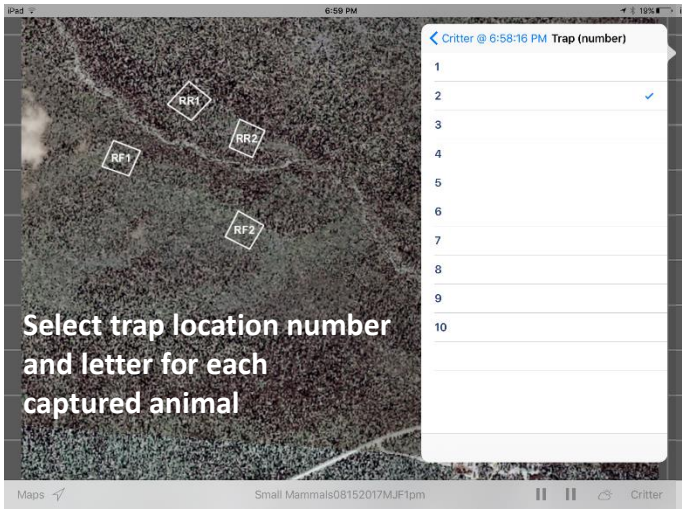
   a. **Tap the "Critter" button at the bottom right of iPad screen.** The small mammal observation data sheet window will open. Close the data sheet by tapping elsewhere on the map (or pressing "Done" when the data sheet if fully completed). Repeat this each time an animal is in a trap (we record observation data for target and non-target animals). NOTE: Dara are also recorded each in the field data notebooks simultaneously.

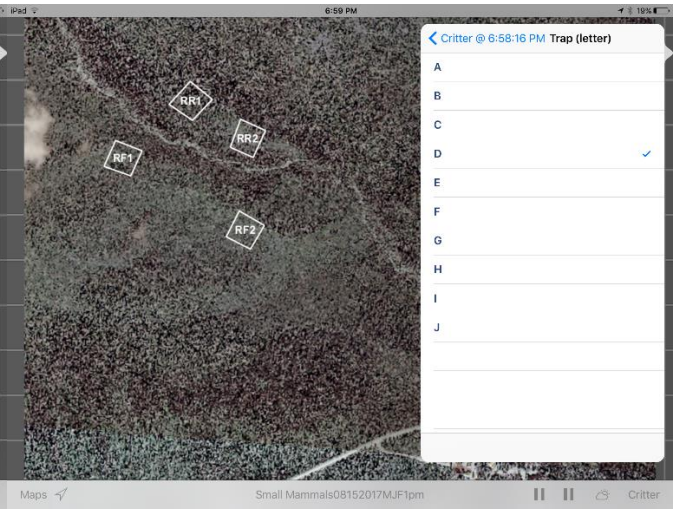
   b. **Fill in information on the data sheet completely for each capture.** The date, hour and time stamp will auto fill once the "Critter" data sheet opens. Scroll down to complete the entire data sheet.

   c. First, fill in the initials of the "Observer." This should be the initials of the person recording the data in Park Observer.

   d. **Next, fill in the trap location** (number and letter for the particular trap). Use the side pull arrows to select the correct number (1-10) and letter (A-J) combination for the trap location for each capture record (e.g. 4J, 5C, 8E, etc.).

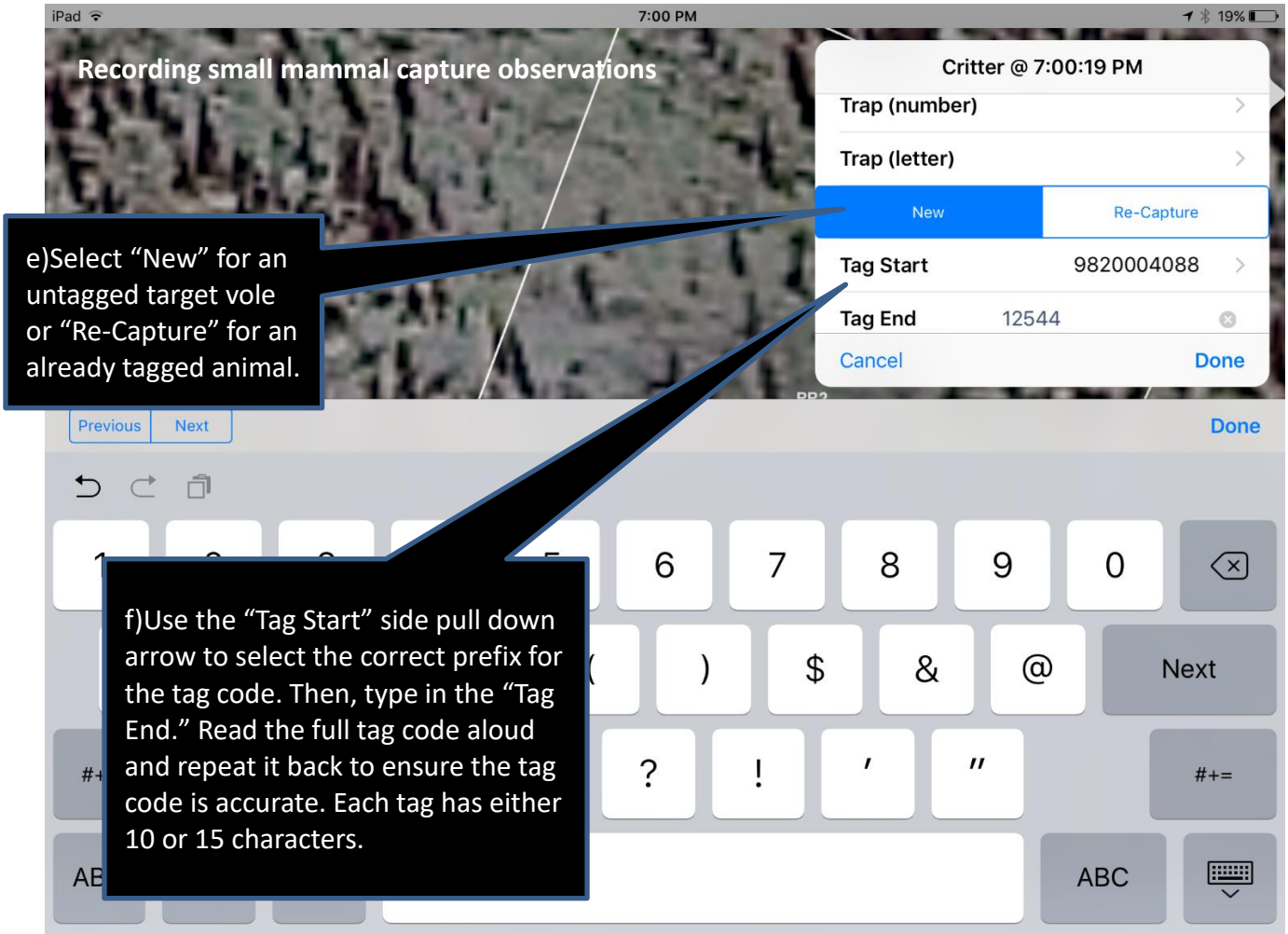

Recording small mammal capture observations
c)Fill in the initials of the person who is recording the data in Park Observer.
a and b)To record a small mammal observations when an animal is trapped, tap the "Critter" button. The "Critter" data sheet will open. The date, hour and timestamp will automatically be recorded when the sheet opens.
d)Use the side pull down arrows to select the correct number (1-10) and letter (A-J) combination for the trap location for each captured animal.
Critter @ 6:58:16 PM
Comments
Body Condition
Skinny?
Mange?
Sores?
Subq?
Reproductive
Mammaries?
Pregnant?
Litter?
Perforate?
Lactating?
Scrotal?
Delete
Done
Maps
Small Mammals08152017MJF1pm
Critter


Select trap location number and letter for each captured animal
Critter @ 6:58:16 PM Trap (number)
1
2
3
4
5
6
7
8
9
10


Critter @ 6:58:16 PM Trap (letter)
A
B
C
D
E
F
G
H
I
J

e. **Scan each vole with the reader to determine if it is a "New" animal (not yet tagged) or a "Re-Capture" (already tagged).** Tap on the appropriate selection in Park Observer.

f. **Enter the tag number.** Enter the complete tag number accurately. Use the "Tag Start" side pull down arrow to select the appropriate prefix for the tag code. Using the prefix will help to eliminate typos. Type in the rest (suffix) of the tag code number. Read the full tag code aloud and have it repeated back to ensure accuracy. Each tag has either 10 or 15 characters. Count the number of characters to check accuracy. Enter tag codes for both New and Re-Captured animals. A tag code is not required for non-target species. If a Re-Captured animal escapes prior to tagging or scanning and the code is unknown, record "Escaped" in the "Tag End" section and leave the "Tag Start" blank. Obtain the tag code from taggers as they prepare to tag new animals. Scan the pit tag in the needle with the reader and read the tag code aloud it is entered it into iPad and field data notebook. Read the tag aloud again to confirm accuracy. Count the number of characters in the code to confirm accuracy.



g. **Identify the species of the small mammal in the bag.** Tap on the appropriate selection. Use the "Species" side pull down arrow to select the appropriate abbreviation for the three target voles species:

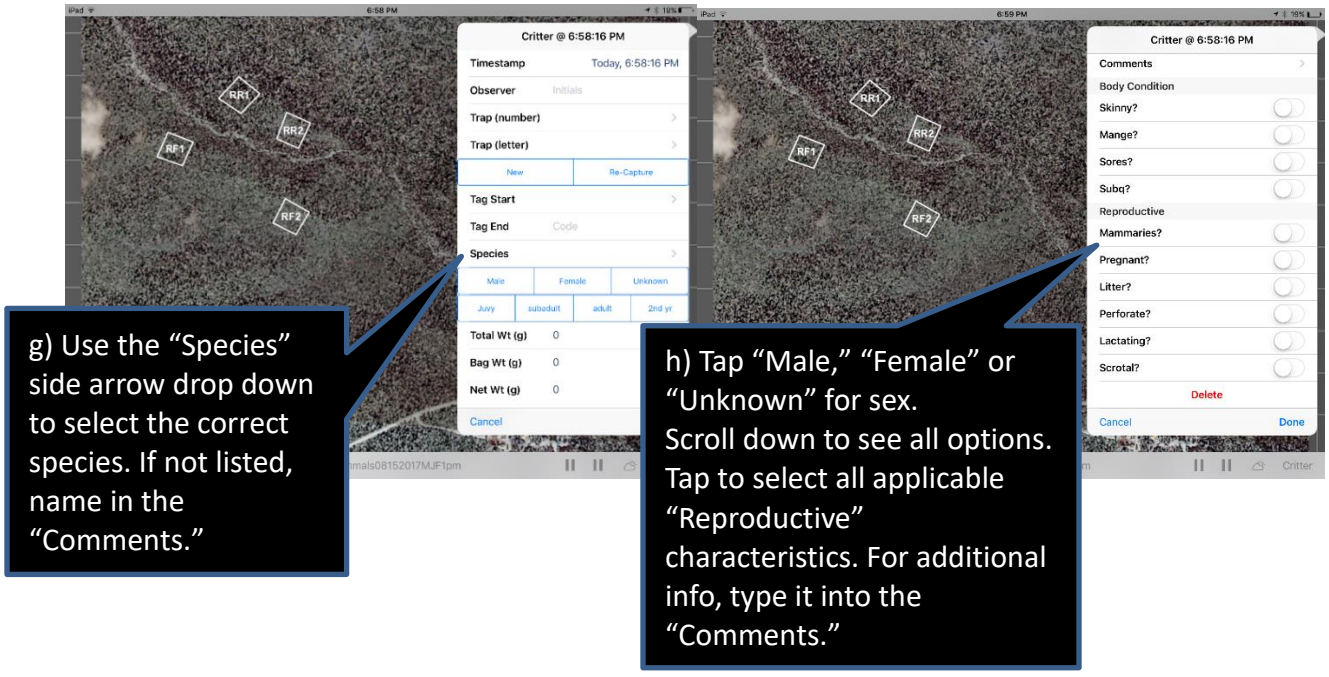
i. CLRU* (*Clethrionmys or Mydoes rutilus*; northern red-backed vole)

ii. MIOE* (*Microtus oeconomus*; tundra vole)

iii. MIMI* (Microtus *miurus*; singing vole)

iv. See page 6 for the abbreviations for the non-target species.

h. **Identify sex of the small mammal in the bag.** Tap the appropriate selection for sex and species. Consult crew members or examine the animal when sex or species identification is uncertain. Weighing the animal will also help to identify age class. If the animal is immature and sex is uncertain, DON'T GUESS! Make a note in the "Comments" ("U?") in the data notebook and enter "Unknown" on the iPad. Often, immature animals are very difficult to identify to sex. Look for secondary sexual characteristics or "Reproductive" traits to help confirm sex and reproductive status (e.g. scrotal, mammaries, perforate, etc.) Select all of the sexual characteristics that apply (scroll down to find them on the data sheet). Put additional information (e.g. gave birth in trap; 7 pups) in "Comments."



i. **Weigh the small mammal in the bag with the debris from the trap (using the Pesola) to get the "Net Weight"** (in **grams**). Follow these directions:

1. **For target species:**

   a. First weigh the animal in the bag with trap debris from the trap (animal+bag+debris) with the Pesola (in grams). Write this as the first number in the Net Weight column. Put a slash after this number.

   b. Then, weigh the bag again with just the debris (after processing and releasing the animal). Write the bag+debris weight after the slash.

   c. Subtract the bag+debris weight from the intial weight (animal+bag+debris) to get the **Net Weight of the animal**.

   d. Write another slash sign and record the **Net Weight.**

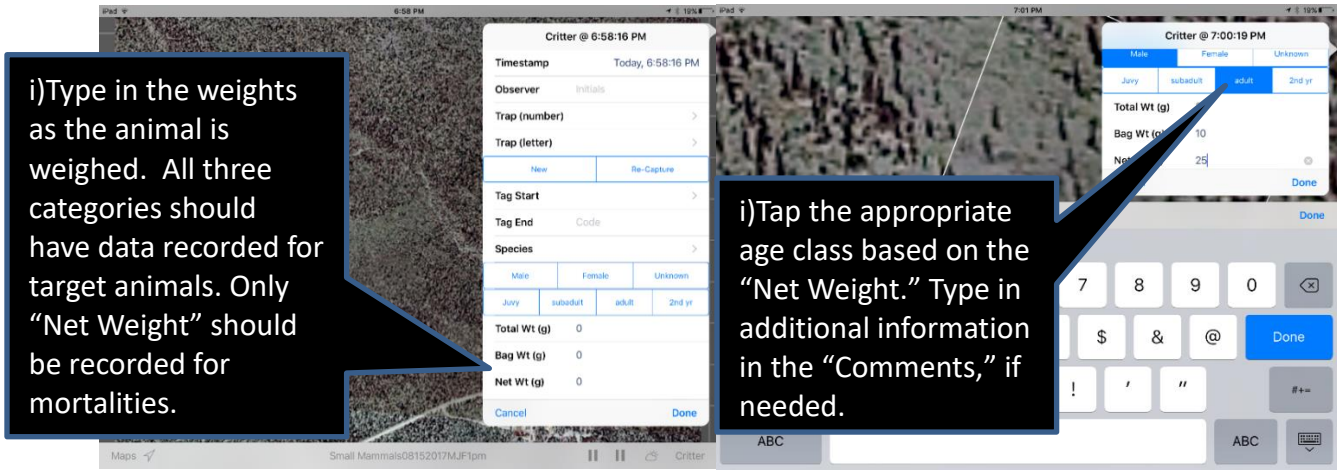
   e. For example, "**animal+bag+debris/ bag+debris/NET WEIGHT**"

2. For **non-target** shrews and voles, follow the same procedures as above.

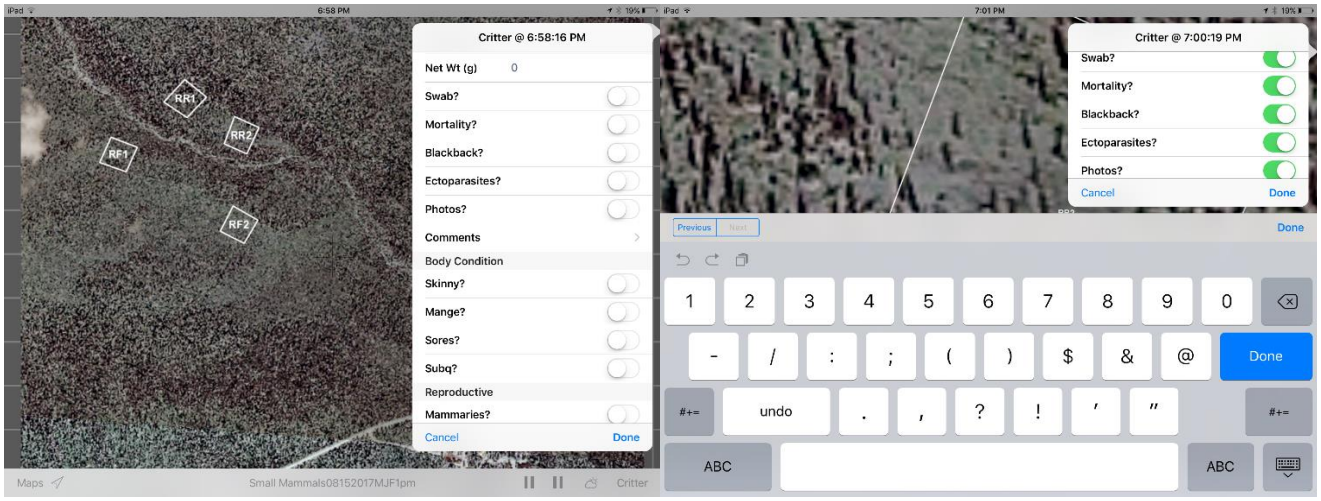
3. For **mortalities**, weigh animal by the tail. Enter the animal weight (a single number) into the "Net Weight" column.

1. For **all other non-target species**; do not weigh; just release the animal (e.g. birds, squirrels, weasels, etc.). Use a dash in the "Net Weight" field indicate weight was omitted on purpose. If an animal escapes prior to weighing it, put an "x" in the "Net Weight."

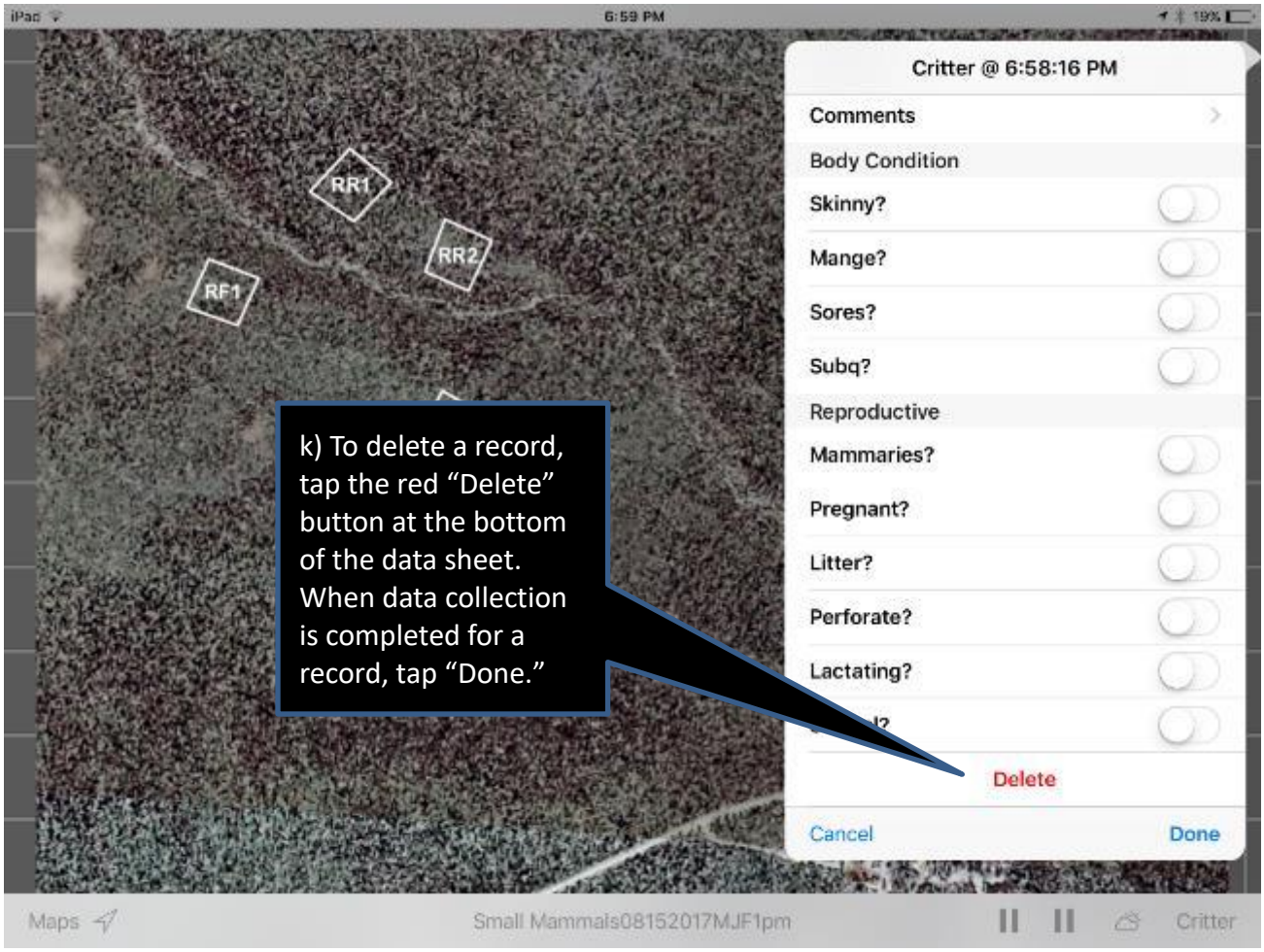
ii. **For age class**, use these rough guidelines based on the "Net Weight" to select the correct category: pinky, juvy (juvenile=animal 12 g or less), sub-adult (13-17 g), adult 18+g, overwinter survivor (~40+g these animals will be large, bony with big, long yellow teeth, skinny, lots of loose skin and if tagged, will have codes from the previous summer). Note in the "Comments" if it may be overwintered.



j. Comments: This section is used for anything of significance to provide more detailed information about any of the other data fields. In Park Observer, scroll through the entire data sheet to select all of the appropriate options for color, body condition, samples, etc. Common uses of this field can be found on pages 10-11 of this document. See SOP 2 for more details on data fields.



k. Delete a record or complete a record. To delete a record, scroll to the bottom of the data sheet and select the red "Delete. To finish a record, scroll through entire data form to ensure fields are complete and accurate. Select "Done" at the bottom right corner of the data sheet.


iPad
6:59 PM
19%
RR1
RR2
RF1
Critter @ 6:58:16 PM
Comments
Body Condition
Skinny?
Mange?
Sores?
Subq?
Reproductive
Mammaries?
Pregnant?
Litter?
Perforate?
Lactating?
Delete
Cancel
Done
k) To delete a record, tap the red "Delete" button at the bottom of the data sheet. When data collection is completed for a record, tap "Done."
Maps
Small Mammals08152017MJF1pm
Critter

8. **Tap the second pair of double blue lines when a plot is completed.**



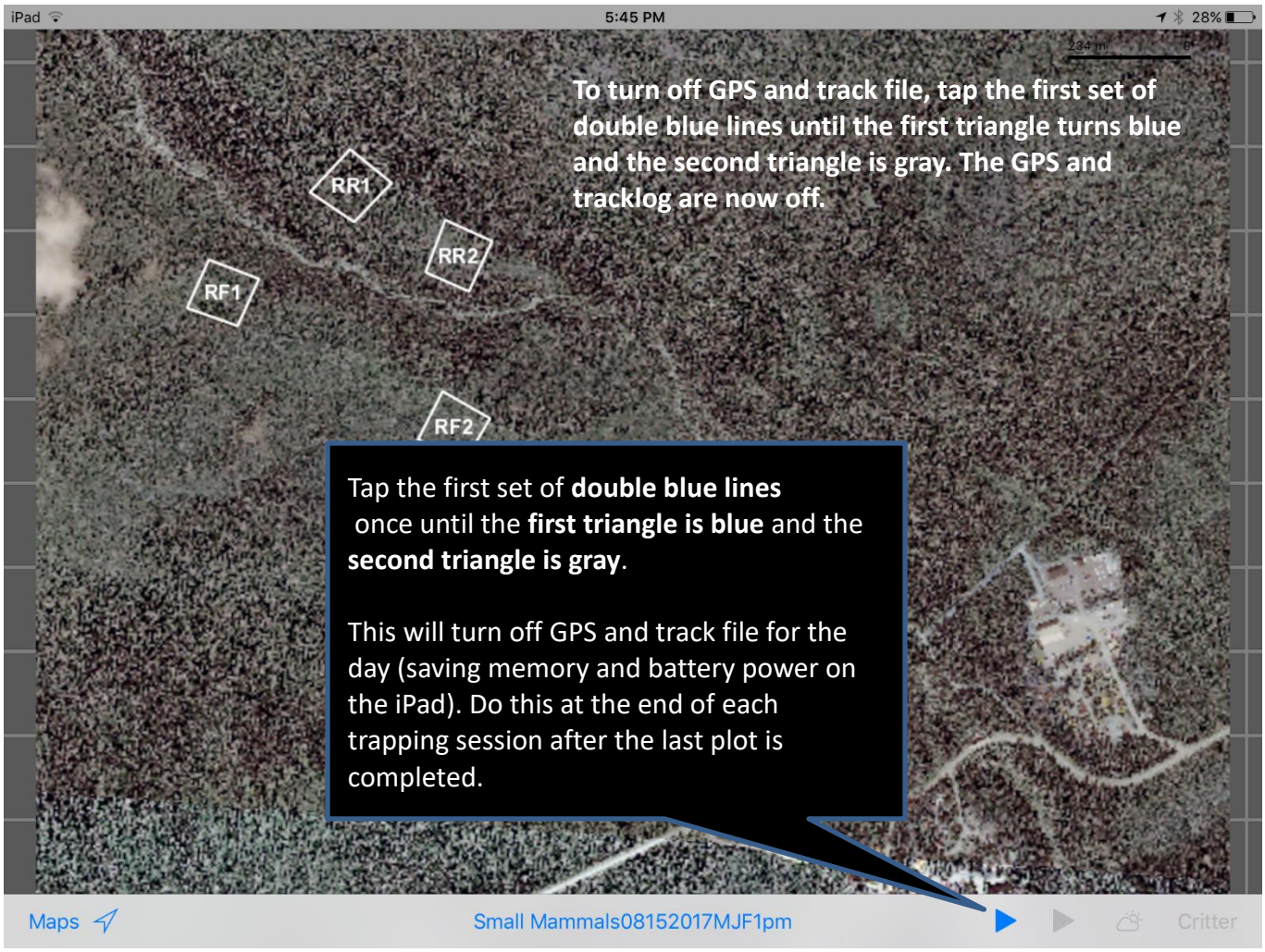
a. This stops data collection and the clock measuring survey effort. The blue lines turn into a blue triangle signaling "off plot." Do this each time plots are completed and data is not being collected (saves battery life on the iPad). Note: the GPS and tracklog are still running.



SOP 7.3 – Ending the Trapping Session

1. At the end of each trapping session, turn off GPS by tapping the first set of double blue lines until the first triangle is blue and the second is gray (saves battery power on iPads).

2. Once back a camp, review data records in both Park Observer and field data booklets to for accuracy and completeness. Ensure all of the mortality and specimen tags are updated and accurate and entered into iPads and field data notebooks. Check that all records are entered into both field data booklets and iPads. Crew leaders update field notes (journals) after each trapping session.



3. Check the iPad's battery power and charge it using the external battery pack, if needed. iPads should start the trapping sessions charged to 100%.

4. Turn off the iPad.

5. Once back at the office, refer to SOP 8, Data Downloading, to edit, proof, download and archive survey data with iTunes.