Standard Operating Procedure (SOP) 6: Conducting Surveys

Protocol for Monitoring Small Mammals

Central Alaska (CAKN) Inventory and Monitoring Network

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The main Narrative for the Protocol for Monitoring Small Mammals in Central Alaska (CAKN) Inventory and Monitoring Networks is available from the NPS Inventory and Monitoring 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 6 – Conducting Surveys

Standard Operating Procedure #6
Version 1.0 (September 2018)

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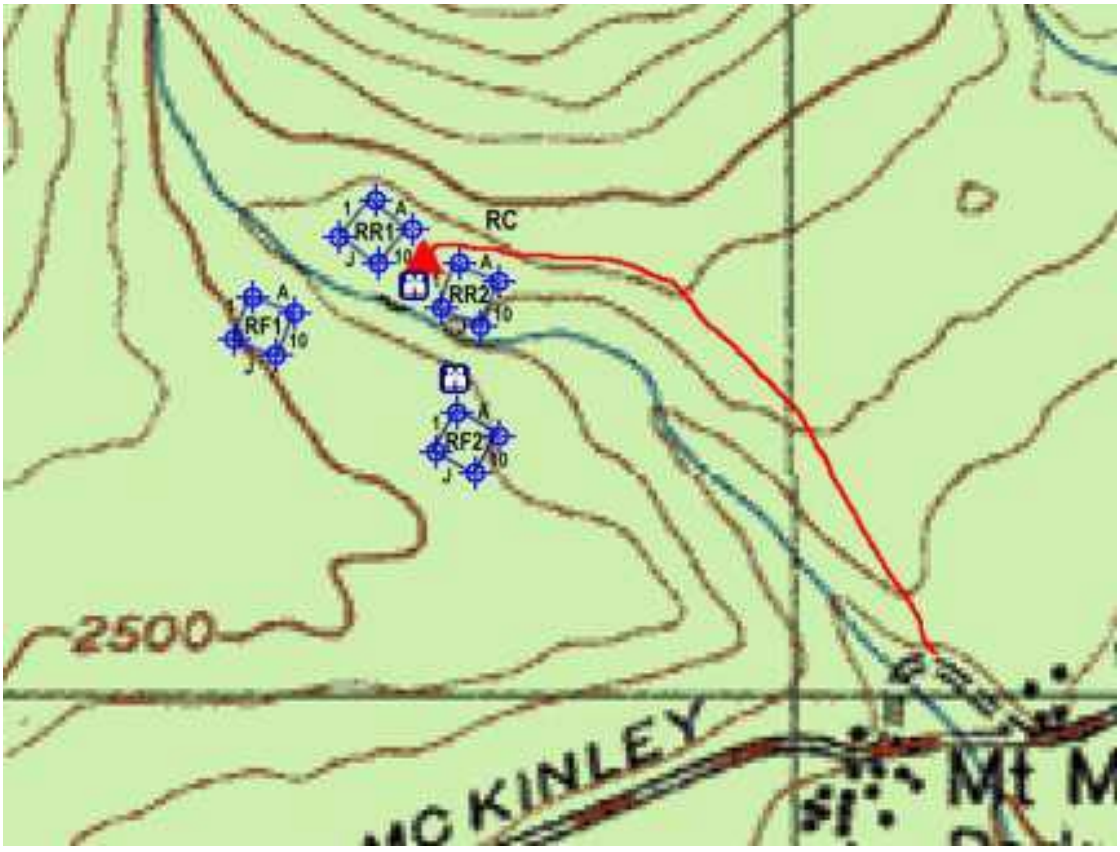
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SOP 6.0 – Introduction

SOP 6 outlines the roles and responsibilities of the crew members when conducting live-trapping and mark-recapture surveys for the CAKN's Small Mammals monitoring program at the Rock Creek legacy plots in Denali National Park and Preserve. The crew works as a team, communicates frequently and works closely together to safely trap and handle small mammals, ensure all traps are checked on each trap check, accurately collect data and maintain safety in the field. See also SOP 2 (Field Notebook Set up and Data Fields), SOP 3 (Training), SOP 4 (Plot and Trap Set up), SOP 5 (Equipment and Tasks Lists) and SOP 7 (Data Collection) prior to conducting these surveys.

Prior to each day of the survey, all crew members conduct a safety and survey briefing to determine which members will work together. Removing animals from the traps quickly mitigates trapping morbidity and mortality. To conduct the work most efficiently and get animals processed gently, safely and quickly, the crew splits into two groups. One group is assigned to survey the "upper plots," RF1 and RF2. Simultaneously, the other group surveys the "lower plots," RR1 and RR2. Group members will rotate so that everyone gets a chance to work together and to survey all of the plots. Each group will need to have at least one tagger (two is even better). The map below shows the four Rock Creek legacy plots, RR1 and RR2 (lower riparian plots) and RF1 and RF2 (upper forested plots). Rock Creek camp is at the end of the red arrow and Rock Creek is the drainage between the upper and lower plots (blue line).



Consideration should be given for those with knee or ankle issues and they should be kept on the lower plots to avoid exacerbating injuries. Those lacking appropriate footwear (e.g. rubber boots) or who are fatigued also stay on the lower plots. Hiking to the upper plots is strenuous and requires crossing Rock Creek. The upper plot trails are more brushy and circuitous so rotation of crew members provides a rest from this to minimize fatigue and to keep the work engaging. Different species occur in different habitats on the plots so it is useful to provide the entire crew opportunities to see each species. Below is a picture of the crew ready to hike to the upper plots for the 0600 trap check.



SOP 6.1 – Instructions for Crew Members-Conducting Trap Checks

1. **Team work:** The crew members work as an interactive team to check traps and process captured small mammals. Constant communication between crew members is required to assure that all traplines are checked and all animals are processed gently and efficiently and data collection is accurate and consistent. Communication and team work are essential to mitigate misidentification of small mammal species, age class or reproductive status and to ensure all data are collected (e.g. bag weight, tag number). Further, team members must work together with a tagger to tag an animal (two people are required to safely insert the tag). They must communicate frequently to optimally navigate the plots to ensure all traps have been checked. When in doubt about a procedure and when equipment malfunctions (e.g. walkie talkies, readers, Pesola), team members need to work together to answer questions or share equipment.

2. **Wildlife precautions:** Once groups have been assigned, each team will hike together to their plots (either upper or lower). As they hike, they will all carry their peppers sprays and consistently talk and yell for bears and moose, particularly when nearing Rock Creek. Rock Creek can swell with rainfall and can be quite loud. The approach to Rock Creek is very brushy with low visibility so is very important to make a lot of noise to warm wildlife of the crew's approach. Bears and moose have previously been encountered on the plots and Rock Creek. Pepper sprays are carried by each crew member at all times.

3. **Trapping session schedule**: During the field work week, traps are checked for four days, three times per day from Wednesday to Saturday (promptly at 0600, 1300 and 2000). Military time is used to prevent confusion between am and pm. Checking four hundred traps three times per day results in 4800 trap checks for the season (400 x 3 x 4).

Mon	Tues	Wed	Thur	Fri	Sat	Sun
Drive to DENA	Training	**Trap check 0600**	**Trap check 0600**	**Trap check 0600**	**Trap check 0600**	Pull traps
Training	Set up plots x2	**Trap check 1300**	**Trap check 1300**	**Trap check 1300**	**Trap check 1300**	Break camp
Haul gear (2-3 trips)	Set out traps x4 plots	**Trap check 2000**	**Trap check 2000**	**Trap check 2000**	**Trap check 2000**	Haul gear (2-3 trips)
Set up camp	Open traps 1800-2000				Close and pull traps	
Set up plots x2 (or previous week)						Drive to FAI

4. **Prompt start:** Prompt starts for each trapping session (0600, 1300, 2000) are important to prevent small mammal morbidity and mortality and to get animals out of traps quickly. Earlier starts are permitted for inclement weather (e.g. heavy rain, snow, frost).

    a. **Lower Crew**: Trap checks start on plot RR1 and move to RR2 after RR1 is completed.

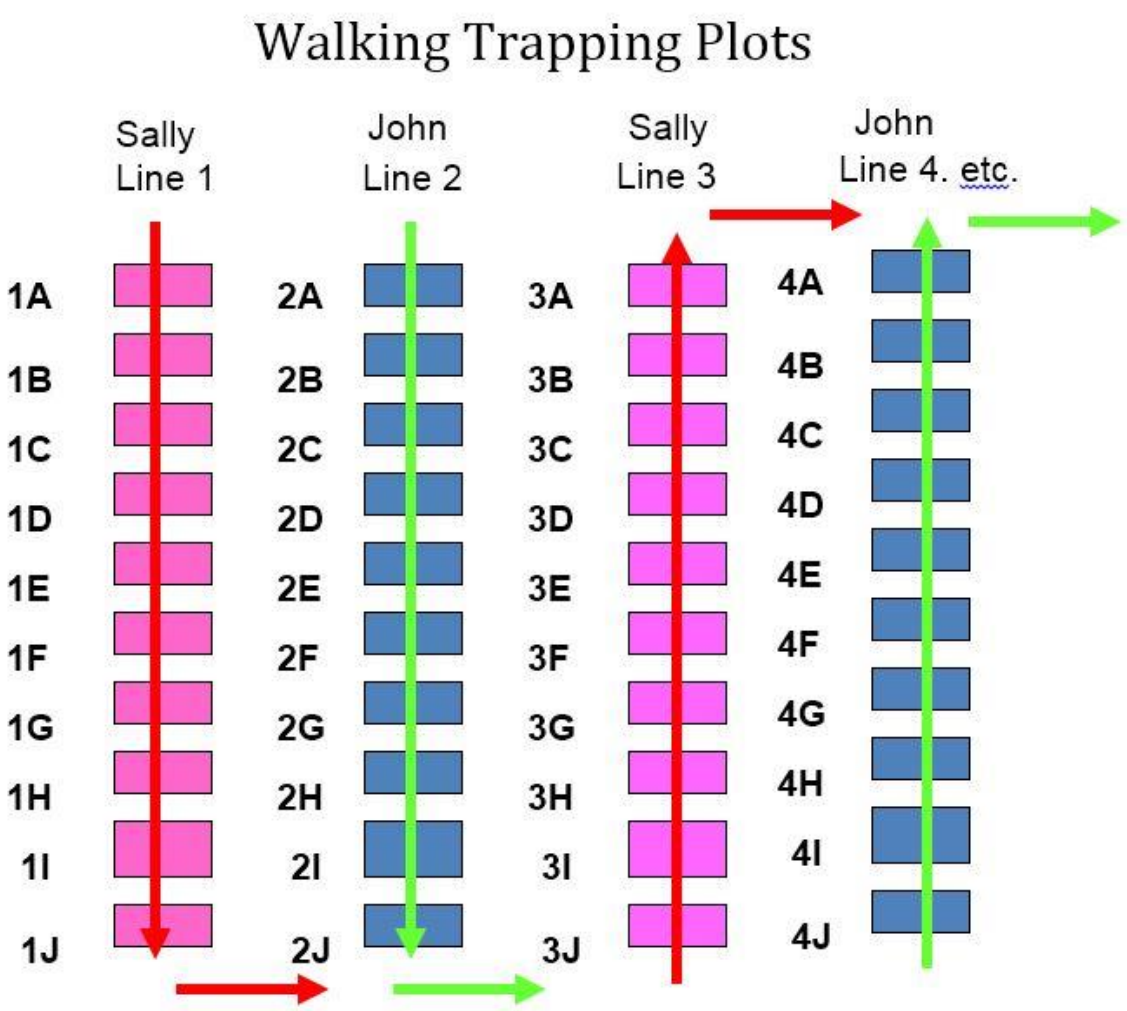
        i. **Surveying RR1**: At the start of RR1, crew members hike two minutes above Rock Creek camp to reach the "bottom" of the RR1 plot (line J) and each crew member checks a consecutive trap line (for example, one crew member will start at 10J, the next at 9J, the next at 8J, etc.) until each member is on a trap line. Taggers are placed on lines in between other crew members for efficiency. Taggers or crew members may hike to one another to process animals. The team has flexibility to find the system that is most efficient completing trap checks.

        ii. **Communication on the Plots:** Crew members start at trap J and work up traplines to A. Once at the top of the line (at trap "A") crew members communicate about when traplines are completed via walkie talkie or yelling and ask which trap lines are available ("open"). If other crew members are busy processing animals, it is acceptable for a crew member to "leap frog" and finish checking their lines. The team proceeds until all of the trap lines on the plot are finished. The figure below shows an example of how trap lines can be checked. Every other trap line is flagged with either bright pink or blue flagging to clarify trap lines and more easily locate traps (10 traps per line, A-J). Each flag is labeled with the trap location (e.g. 1A, 1B, 1C, etc.). Metal tags with the plot and trap location etched into them permanently mark the trapping locations.



iii. **Completed plot:** Crew members make notes in the data booklets of times plots are completed (using the next open data line in the notebook to enter this like a record). For example, "RR2 done 1438."

iv. **Surveying RR2:** When RR1 is completed, crew members hike to RR2. The hike takes five minutes down past Rock Creek Camp to the "top" of RR2 (lines 10A, 9A, 8A, etc.). Lines 7, 8, 9 and particularly, line 10, are very wet. An ephemeral stream runs along line 10 and overlaps line 9, so rubber boots are highly recommended. RR2 is a more exposed meadow, so great care is taken to ensure traps do not fall into the stream, lack protection from rain, or get too hot from direct sun exposure. The metal traps can get very hot in the sun, even with the milk jug trap covers. If any traps are in exposed positions, they can be moved within 2 m (6 feet) of the original spot. Traps should be moved to shade, or covered with moist sod under the trap cover to keep them cool so captured animals do not overheat (see SOP 4 for more details). Each crew member should check trap lines as they did for RR1 until the plot is completed. Plot completion time is recorded in the field notes.


Walking Trapping Plots
Sally
Line 1
John
Line 2
Sally
Line 3
John
Line 4. etc.
1A
1B
1C
1D
1E
1F
1G
1H
1I
1J
2A
2B
2C
2D
2E
2F
2G
2H
2I
2J
3A
3B
3C
3D
3E
3F
3G
3H
3I
3J
4A
4B
4C
4D
4E
4F
4G
4H
4I
4J

b. **Upper Crew**: The hike to upper plots takes 10-15 min to the start or RF1 from Rock Creek camp. The upper crew leaves about 15 min prior to the start of the trapping session to arrive to RF1 by the start time for the trapping session (e.g.0600). Once RF1 is finished, plot completion time is noted. Crew members hike to RF2 in 10 min. Both the routes to the upper plots and between the plots are well flagged (pink and blue). The crew crosses Rock Creek on the way to and from the upper plots.



i. **Surveying RF1:** The crew arrives at the "top" (10 A, 9A, 8A, etc.) of plot RF1 to start checking traps. Trap checks proceed as described previously for Plot RR1. Crew members take consecutive lines and work towards trap J. Once at the bottom of a line at trap J, crew members communicate to discern which lines are available. Exposed traps are moved to shade and cover within 2 m (6 feet) of their original position (See SOP 4 for more details).

ii. **Pit of Despair**: Lines 1, 2 and 3 on RF1 have tall dwarf willow, downed trees and thick mud (the "Pit of Despair"). It takes more effort to locate traps and navigate these lines. Knee boots are essential.



iii. **Completed plot:** When RF1 is completed, completion time is noted in the field data booklets. This will indicate either the start of the next plot or the completion of the trapping session.

iv. **Hiking to RF2**: The crew meets at trap **1J** on RF1 to hike together to the next plot (RF2). The hike is .75 km, and circuitous with many intersecting moose trails. Flagging is followed to stay on course. Crew members make noise while hiking to alert moose and bears.

v. **Surveying RF2:** When crew members arrive at RF2, they start at the "top" of the plot (e.g. 1A, 2A, 3A, etc.). Each crew member takes a line and works down to J as they did on RF1 until the plot is completed.

vi. **Completed plot:** Once line 10 on RF2 is completed, crew members record stop time in their notebooks. All crew members meet at trap **10A** to hike back to Rock Creek camp together. The trail to Rock Creek camp includes a steep downhill through shrubs and thick alders that is slippery and muddy. Crew members use caution and yell for wildlife in the thick brush and near the noisy creek. Crew member cross Rock Creek to return.

vii. **Hiking back from upper plots:** After crossing Rock Creek, the trail leads to the "bottom" of plot RR2. Upper crew communicates via yelling or radio to the lower crew on RR2 to see assistance is required. Lower crew

responds with instructions on which lines to finish. Likewise, lower crew communicates with upper crew to offer assistance.

c. **Last Trap Check of the Week:** Trap checks continue for 11 trapping sessions. On the last session of the week (the 12th), traps and covers are pulled after processing animals. Bait and nestlets are not needed. Crew members bring headlamps, rain gear, gallon zip bags (for trash). Back packs and trap boxes are brought for carrying full trap boxes and trap covers back to camp.

   Tasks are divided by crew members. Some pull traps and other sweep behind to pick up trap covers and pull flagging during the trap check. After traps are picked up, debris and old flagging are dumped into trash bags. Any remaining bait in the traps is shaken out onto the ground. Traps are folded and placed in trap boxes once the entire line of 10 trap is pulled. Traps are counted frequently to ensure none are missing. Each crew members counts traps at the end of each trapline to ensure there are 10. Likewise, crew members count all traps in trap boxes at the end of the trapping session to ensure there are 100 total for the plot. Traps are counted before proceeding to the next plot. If traps are missing, crew members return to traplines to find them. After both plots are checked and pulled, trap boxes, covers and trash back are hiked to camp in back packs (5 boxes or 200 traps from the upper plots to be counted prior to hiking back down to camp). There are also 200 traps from the lower plots and the spare (11th) box of traps for a total of 440 traps.

SOP 6.2 – Instructions for Crew Members-Processing Captured Animals

1. **Personal Protective Equipment (PPE):** Every crew member handling small mammals wears PPE, including nitrile gloves for animal handling. Hand sanitizer, biodegradable soap and bleach wipes are provided in camp for frequent and thorough hand after every trap check, even though gloves are worn. Crew members also wear warm clothing and rain gear to protect them from inclement weather and hypothermia.

2. **Processing a new animal:** When a new animal is processed and tagged, the team member who caught the animal calls for a tagger's assistance. The steps involved in processing a captured animal are detailed in the figure below and text that follows.

















1. Check trap
2. Peek if closed (is it occupied?)
3. Transfer animal to bag
4. Record data (throughout process)
5. Check species identification (while in bag)
6. Scan animal (in bag-N or R?)
7. Weigh (bag, debris and animal=Total Weight)
8. Wrangle (remove animal from bag)
9. Check sex, body condition, repro status, ectos (out of bag)
10. Tag (if N) call out tag code (position on shoulder for tagger)
11. Verify tag number (data recorder reads back tag code)
12. Swab or collect other samples (if needed; optional)
13. Scan again (confirm animal is tagged and check tag code)
14. Release animal (on ground)
15. Weigh bag (bag and debris without animal=Bag Weight)
16. Reset trap
17. Process mort (if needed)
18. Check/complete data
19. Repeat until all traps on the four plots are checked















Steps 1 and 2: The trap is checked for an animal (door is closed). The crew member picks up the trap, gently tips it vertically and slowly presses the door slightly open to "peek" if an animal is present. Animals can easily escape through small spaces. Sharp trap edges may injure animals. Holding the traps vertically helps minimize injury to animals that try to escape.





i. **Pulling a wire to release a non-target animal:** Birds (Gray Jay, Boreal Chickadee, Dark-eyed Junco, etc.), squirrel or weasel may be in the closed trap if feathers or fur sticking are visible, the trap is rattling or unusually heavy. When it appears something other than a small mammal is captured, **DO NOT** tip the trap vertically and peek in the door. The animal may be too large to push the door in. The delicate wings of birds can easily be caught in the seams of trap or by the door. Rather, place the trap carefully on the ground in the upright position about a foot away. Pull the top wire to release the top panel of the trap. Carefully open the top panel away from you to release larger animals. Give the animal room to escape as it may be fatigued from struggling in the trap. Clean the trap with nestlets if the animal has left a mess. Keep track of the wire to reassemble the trap; they are easy to lose in the tundra.



ii. To release other non-target animals: For other small non-target mammals like shrews (*Sorex* sp.), the animal is weighed in the bag, photographed (optional) and released. To release, place the open bag on the ground and allow the animal to walk out.



Step 3: Transfer the target small mammal to a gallon-sized plastic bag. Hold the trap in the vertical position with index and middle fingers placed over the closed trap door. Tightly secure the bag around the hand and the edge of the trap. Continue to hold the trap vertically and use fingers that are now inside the bag to slowly depress hold the trap door open. Make a swift bowing motion (bend at the waist) so the animal slides down into the trap. Hold the trap door firmly to prevent it closing on the animal. **DO NOT** shake the animals out of the traps. The animal may be injured by sharp trap edges.





Step 4: To begin collecting data, one crew member processes the animal and the other enters data. See SOP 2 (field notebook set up) for description of the data fields. Military time and correct plot and trap location information are used. Data is entered into one iPad and one field data notebook (does not matter which) as the animal is processed.

Step 5: After transferring animal to a bag, species, sex, weight, and body condition and reproductive status of the animal are assessed by both crew members.







Step 6: The animal is thoroughly scanned in the bag with a reader to detect a tag (new or recapture). Tags can migrate under the skin and may be lost from the insertion wound. Several passes with the scanner are made over the full surface of the animal's body to locate the tag (see diagram on the front of the readers), concentrating on the area by the shoulders. The animal is scanned with another reader if a tag is not found or a reader is malfunctioning. Notes are made of any trouble obtaining a tag code. Tag codes are carefully recorded, with each crew member repeating the number aloud and counting the number of characters for accuracy.



Step 7: Animals are weighed while inside the plastic bag. The bag is partially unzipped (~¾ of the way) to allow airflow but prevent the animal from escaping. The bag is held upright and from the top (small mammals can climb and escape if the bag is tipped). The Pesola scale (100g) is clipped to the top center of the bag. The bag is steadied to prevent spinning or flapping. When the bag is still, it is easier and more accurate to read the weight on the scale. The scale is graduated from top to bottom in 1g increments, with longer marks for 5g and numbers denoting each 10g graduation. The graduations start at 1g at the top and progresses downward to 100g at the bottom. The weight of the bag will pull down the scale of the Pesola. A plunger in the middle of the Pesola will indicate the measurement as the weight of the animal as the bag pulls it downward. The ring at the top of the Pesola is held while the weight is read. The measurement is read to closest 1g.



When processing an animal, weigh the animal along with the debris (nestlets, bait, leaves, etc.) in the bag using the Pesola. The animal + debris + bag weight = Total Weight (see SOP 2 for more details about recording weight in the data notebooks). **DO NOT** dump out the debris in the bag after weighing the animal. After processing animal, weigh bag again with the debris to get Bag Weight (debris + bag). Subtract the bag weight from the total weight to get the Net Weight (weight of animal).

Accurate weight is important because weight is used to help assess the age category and reproductive status of the animal. Broad weight classes are used to roughly assess age class. For example, for the three target voles, young animals (juveniles or "juvys") weigh under 12 g; subadults are between 13-17 g; adults are 18 g and above. Pregnant or overwintered animals can weigh more than a typical first-year adult (~40-70 g), depending on species.

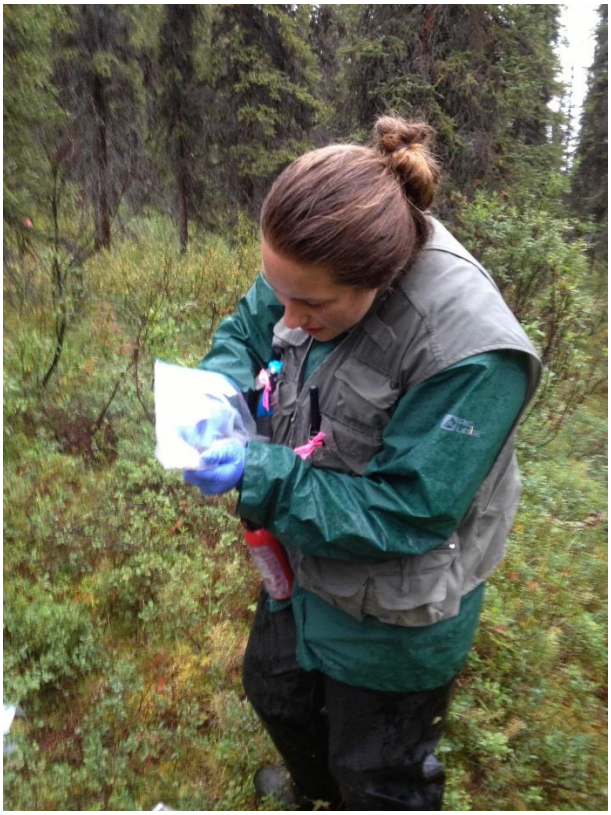
Step 8: Animal handling ("wrangling"): When it is time to tag a new animal, it must be carefully but firmly removed from the bag and held. Wrangling techniques minimize the chance of crew members being bitten and ensure animals are handled carefully.



While in the bag, the animal is nudged into a bottom corner with its nose pointing into the corner and head down. We ensure the head is down to prevent injury to the animal's neck. The crew member uses their non-dominant (non-writing) hand to gently grasp the

animal from underneath. The animal sits on their palm and their fingers gently wrap around the animal. The thumb and pointer finger will gently fold over the animal's head and hold it to prevent attempts to bite. Care is taken not to squeeze around the animal's neck too tightly or the tongue and eyes may protrude. The grasp should be firm enough to hold the animal in place and keep the head from turning but should be loose enough for the animal to wriggle around a bit and not be choked (like holding a child's hand).

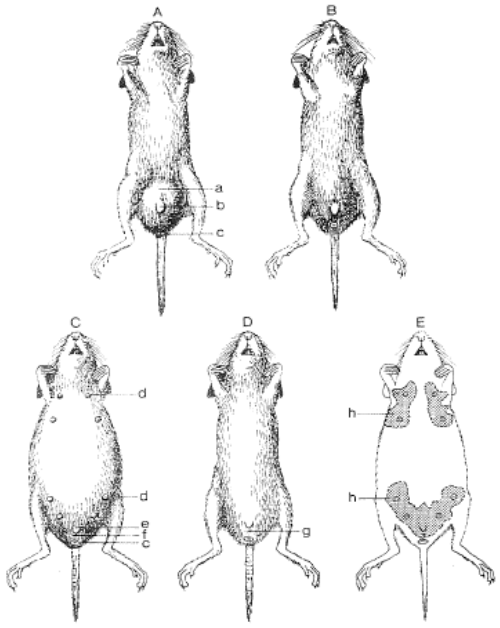
The crew member uses the dominant (writing) hand's thumb, pointer and middle fingers to gently grab the scruff of the animal's neck. The scruff is gently clasped using fingers to trace the back of the animal's skull behind the ears. The scruff is pulled inward from both sides until fingers meet. The grip is firm to prevent the animal from wriggling and biting but care is taken not to squeeze too tightly (protruding eyes or tongue indicate the animal is being held too tightly). With a firm but gentle grip, the animal is slowly pulled from the bag. The bag is kept close to put the animal into again if the grasp on the animal is insufficient.



Step 9: The crew member holds scruff and tail to examines the animal. Species identification, sex, reproductive status, body condition and age class are assessed. See SOP 2 for details on recording these data in the data notebooks. The diagram below details how to assess the sex and reproductive status of voles.



Record reproductive status



External genitalia of a male and female rodent: a scrotum, b penis, c anus, d teats, e vulva, f vaginal opening (perforate), g vaginal opening (imperforate), h mammary tissue.

A Adult male with enlarged scrotum.

B Immature male without an enlarged scrotum.

C Vulva, anus and perforate vagina on a pregnant female.

D Female with membrane covering vaginal opening (imperforate condition).

E Position of mammary tissue under teats.

Step 10, 11, 12, 13: The animal is prepared for tagging. The tagger prepares the tag and needle while the wrangler weighs and examines the animal and records data. Needle preparation includes sterilizing the needle with an iodine rinse, loading the needle with a tag, covering the tip of the needle with a triple antibiotic, scanning the tag code with a reader, reading the tag code aloud as it is entered into the data notebook, and repeating the tag code back to ensure accuracy.

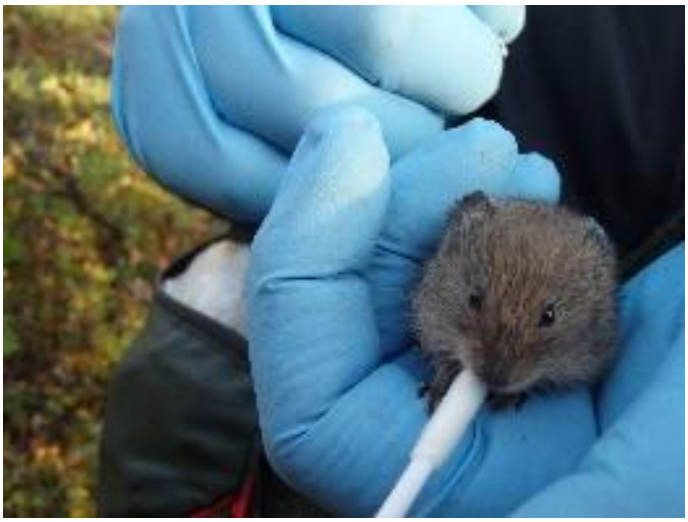
The wrangler grips the animal's scruff and tail and places the animal on their shoulder. Placement of the on the shoulder provides the animal a stable platform and reduces kicking and wriggling. The animal is oriented nearly vertical to the tagger with its spine elongated. This position aligns the needle for proper needle placement between the animal's shoulder blades. The needle is inserted parallel to the animal's spine to prevent injuries. Once the animal is on the wrangler's shoulder, the tagger may ask the wrangler to adjust their hands or the animal or to give the tagger unobstructed access to the animal's shoulder blades for tagging.

The tagger will use their non-dominant hand to grip the animal's scruff and their dominant hand to insert the tag subcutaneously between the animals' shoulder blades.

The tagger will pull up on the scruff to make a "tent" of skin over the animal's shoulder blades into which to insert the tag. After the animal is tagged, the tagger places the needle in a safe place*, then gently palpates the animal's back to locate the tag. If the tag is partially inserted, the tagger gently squeezes the tag into the subcutaneous space. After tagging, the tagger scans the animal with a reader and confirms the tag code before the animal is released. The code is read aloud and the number of characters are verified. Additional samples, such as DNA mouth swabs or ectoparasites are collected and photos are taken before the animal is released. After tagging, confirmation of the tag code and sample collection is completed, the animal is released on the ground. Data is updated in Park Observer and notebooks.

Safety Note*: The tagger always keeps the needle pointing in a safe direction away from people and animals. The tagger is aware of the needle point at all times. Immediately after tagging, the tagger places the needle on a clean plastic bag on the ground before processing the animal to prevent accidental needle sticks.





Step 14: The animal is gently released on the ground.



Step 15: After release, the bag is weighed. After the bag is weighed and weight is recorded, debris is dumped into a trash bag.



Step 16, 17, 18: Crew members check data fields in their notebooks for completeness and accuracy. The trap is re-set after the treadle is checked. The trap is placed in its original location the trap cover is replaced on top.

Mortality and specimen tags are completed, if necessary. Mortality and specimen data are updated in Park Observer and field data notebooks.



i. **Mortalities and samples:** To process a mort or a sample during a trap check, such as a DNA swab follow these steps:

a. Fill out the data fields on the sample or mortality tags (copy the data from the fields in the data notebook).

b. **If a mortality**:

   i. Scan the animal with a reader for a tag number.
   ii. Weigh the animal by the tail with the Pesola.
   iii. Collect samples (DNA swabs, ectoparasites, fecal pellets), if needed.
   iv. Place the mortality specimen and mortality tag in a snack or sandwich bag and seal the bag.
   v. Fill out the mortality tag. Place the mortality specimen freezer container in camp after the trapping session is over.



c. **If a sample**, such as a DNA swab (note: sample collection is supplementary and not an official part of the monitoring protocol):

   i. Open the swab container and unscrew the nunc tube lid.
   ii. Swab the animal's mouth, lips, tongue on both sides of the swab. Allow the animal to chew on the swab and try to rotate the swab so all surfaces are covered.
   iii. Place the tip of the swab in the Longmire buffer in the nunc tube.
   iv. Pull up the stalk of the swabs so the swab is near the top of the nunc tube. Bend the stalk sideways over the edge of the nunc tube. Snap off or cut the stalk of the DNA swab at a level below the top of the nunc tube.
   v. Tightly screw on the lid of the nunc tube.

vi. Use a Sharpie to label the nunc tube with the tag code, date, plot, trap location and voler's initials.
vii. Fill out the data tag. Place the sealed nunc tube and data tag in a snack or sandwich bag and seal.
viii. Place in a pocket of the processing kit and put in the samples container in camp after the trapping session is over.




SOP 6.3 - Post-Trap Check Instructions

Once a trapping session (e.g. 0600, 1300, 2000) is completed, crew members prepare for the next session: wash and bleach wipe hands, dump trash, restock kits, correct or update data, process mortalities and samples, charge iPads, change batteries in readers, walkie talkies and cameras, turn off equipment. Here are the preparation tasks that are completed.

i. **Dump trash:** Dump trash from traps, used nitrile gloves and other debris into the large garbage bag in the science Knack box. Taggers need to place used needles in the sharps container.

ii. **Wash hands:** Remove and discard of used nitrile gloves and bleach wipe or wash hands with soap.

iii. **Restock kits:** Replenish the following if needed (especially if equipment is dropped, lost or broken):

1. nestlets and bait
2. nitrile gloves
3. plastic bags (gallon, sandwich, snack)
4. taggers: needles, tags, iodine, nitrile gloves (if needed)
5. mortality kits
6. swabbing kits
7. metal tags (if needed to replace a lost tag at a trap location)
8. flagging (if needed)
9. traps and trap covers (if needed)

10. pencils/markers (if needed)
11. new batteries in readers, walkie talkies or cameras (if needed)
12. any equipment that is lost or broken (e.g. Pesola, notebook, etc.)
13. grab headlamps for 2000 check

iv. **Process mortalities (morts):** Ensure mortality tag is completed and accurate (sex, species ID, etc.). The data fields on the mortality tag should match the data entered the field notebook and Park Observer records. Check the tag code with reader and be sure you weighed the animal by the tail. Once your data tag is complete, place it in a snack or sandwich bag with the animal, seal the bag and place it in the plastic mort container. The container is placed away from camp and under sod to keep cool until specimens are hiked to the freezer. Trash and mortalities are hiked out at least once per day during the trapping week. This keeps camp clean to prevent attracting wildlife. Mortality and other specimens are placed in a freezer at the DENA resources headquarters.



v. **Process DNA swabs:** Check all swabs or sample data tags for completeness and accuracy. The data fields on the sample tag should match the data entered the field notebook and Park Observer records. Swab tubes are labeled and the caps tightened to ensure they are secure (if the buffer leaks, it can erase the writing on the tube). The tube is labeled on the side with the date, time, plot and trap location, tag code, 4 letter species code and initials. The tube and data tag are placed in the plastic sandwich bag and sealed. The sealed bag is placed in the swab container at camp. The buffer preserves the DNA so the tubes do not have to be frozen but keep them cool and out of direct sunlight to preserve the quality of the DNA.

vi. **Wash hands:** Once all trap, animal, mort and sample handling is completed, all observers wash hands with biodegradable soap, hand sanitizer and/or bleach wipes.

vii. **Check, update and edit data in notebooks and iPads:** Crew members proof data in notebook and iPads for completeness and accuracy. Data collection issues are discussed immediately after the trap check. Any questionable captures or data records such as incomplete tag codes, questions on species identification or sex, documentation of poor body condition, issues with equipment, etc. are clarified and corrected in the records in the data notebook. Mortality and sample records are edited and updated. Data issues or discrepancies are detailed in field notes. Field notes are updated.

viii. **Photo backups of field data notebooks and field notes are taken with the iPads**

ix. **Park Observer data is backed up via email:** See SOP 8 for steps.

See SOPs 2 (Field Notebook and iPad Setup) and 7 (Data Collection) for more details and next steps on collecting small mammals data in the field.