



# Mark and Recapture: Learning about Pennsylvania Black Bears and Their Management

## Student Worksheet

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Directions:** Using information from the Black Bear Management PowerPoint and the Black Bear Wildlife Note, answer the questions.

### Multiple Choice

1. What agency manages Pennsylvania black bears? A. Pennsylvania Fish and Boat Commission B. Pennsylvania Department of Conservation and Natural Resources C. Pennsylvania Game Commission
2. A \_\_\_\_\_ trap is used to catch black bears. A. Clover B. Corral C. Culvert
3. To determine the age of the bear, a small premolar tooth is removed. A. True B. False
4. Trapping and processing a black bear has a lasting effect on black bears. A. True B. False

### Fill in the Blank

Choose from these words:

alert	carnivorous	Regulated hunting	dusk and dawn	night
vegetarian	cinnamon	fall foods	purple	habitat

5. Not all black bears are black. Some Pennsylvania bears may be a cinnamon color.
6. Bears are most active at dawn and dusk, but they may become nocturnal to avoid human activity.
7. Bears are omnivores, but a large portion of their diet is vegetarian.
8. The availability of fall foods causes the onset of hibernation to vary from year to year.
9. During hibernation, bears are alert and capable of fleeing or defending the den.
10. Regulated hunting is the method used to manage black bear populations in Pennsylvania.





# Mark and Recapture: Role Playing a State Game Warden Tagging a Black Bear

## Student Worksheet

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Directions:** Use the instructions and materials provided (bear headband, set of paper “bear and ear-tags”, string, ruler, and 2 paperclips/stapler) to process your pseudo caught bear and fill out the field data sheet.

**Instructions:** Congratulations! You caught your first bear today. While the bear is tranquilized, you will need to process the bear and record the information collected on the field data sheet. You get to decide some of the information, such as gender and bait used. The string represents chest tape. In real-life, bear biologists estimate the bear’s weight by measuring the girth of the bear, just behind its shoulders, using a tape measurer. That length is then entered into a formula to estimate the bears weight. For this activity, you will measure your string and use the bear weight chart to determine the bear’s estimated weight.

The last thing you will need to do is ear-tag the bear. If cubs were present you would ear-tag them as well, but for this activity they are not. Prior to placing the ear-tag in the ear, you will need to record the ear-tag numbers on your data sheet. The lower number will go in the left ear. To ear-tag the bear, attach each ear-tag to the bear’s ear using a paper clip (numbers should be on the outside of the bear’s ear). In real-life, on an adult bear, a tooth (first premolar) is pulled to be sent to a lab to age the bear. After the bear has been processed and tagged, it is monitored until it “wakes-up”. If this bear was a nuisance bear, it will be release at the nearest State Game Land. If the bear was caught for research, it will be released on site. Bears tagged after the last day of the Statewide Firearms Season until the day prior to next year’s Statewide Firearms season, will be used to help estimate the Pennsylvania Bear Population.

Girth (in.)	Live Weight (lbs.)	Girth (in.)	Live Weight (lbs.)
1	140	7	290
2	160	8	310
3	190	9	340
4	210	10	360
5	240	11	390
6	260	12	420

### (Pseudo) Black Bear Capture Field Data Sheet

Collector:

Date:

Gender:

Cubs Present?

Type of Bait Used

Est. Weight:

Ear Tag?  Left Tag:

Right Tag:

Release Site Location:

Notes:



# Mark and Recapture: Estimating a Black Bear Population

## Student Worksheet

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Directions: Using the information below, answer the questions.

### Capture Period Data (current year)

Number of Black Bears Ear-tagged	703
Number of Black Bears with Ear-tags in Harvest	75
Total Number of Black Bears Harvested in the Current Year	2020

### Lincoln-Peterson Equation:

$$\frac{R \text{ (Marked Recaptures)}}{T \text{ (Total in Second Sample)}} = \frac{M \text{ (Marked Initially)}}{N \text{ (Total Population)}}$$

### Correction for Continuity Method:

$$\frac{R \text{ (Marked Recaptures)} + 1}{T \text{ (Total in Second Sample)} + 1} = \frac{M \text{ (Marked Initially)} + 1}{N \text{ (Total Population)} + 1} - 1$$

$$N = \frac{(M+1) * (T+1)}{(R+1)} - 1$$

1. Using the information above, what is the estimated bear population using the Lincoln-Peterson Method? Show your work.

$$N = \frac{M * T}{R}$$

$$N = \frac{703 * 2020}{75}$$

$$N = (703 * 2020) / 75$$

$$N = 18,934$$

The estimated black bear population using the Lincoln-Peterson method is 18, 934 black bears.

2. Using the information above, what is the estimated bear population using the Correction for Continuity Method? Show your work.

$$N = \frac{(M+1) * (T+1)}{R+1} - 1$$

$$N = \frac{(703+1) * (2020+1)}{(75+1)} - 1$$

$$N = (703 + 1) * (2020 + 1) - 1 / (75 + 1)$$

$$N = 18,720$$

The estimated black bear population using the Correction for Continuity method is 18, 720 black bears.