

## How Big is that Track?

Central to tracking is knowing how large a footprint is. This is a simple question until you think about it. One animal moving on a progressively softer surface will leave progressively larger tracks. What is the size of the animal's track?

Try this experiment. Place your hand on a hard surface, a table for instance. Feel the contact area of your hand with that surface. Imagine that contact area as your first contact with a mud surface. As your hand goes deeper into the mud, your hand print enlarges. Your hand can create an infinite number of track sizes, the deeper it goes into the mud.

Mountain lion and grizzly bear researchers jointly recognized the problem of variable track size and tried to develop means of overcoming it. During their lion research, Fjelline and Mansfield (1989) developed a method for measuring tracks, we call the **minimum outline method**.

Remember the first contact area of your hand with the surface. If your hand went no deeper into that surface, your hand print would have only one size - the **MINIMUM OUTLINE**. If your hand sank deeper into the surface it would create a series of variable outlines as the mud flowed around the curved surface of your hand and fingers. All footprints have a minimum outline, but only prints that sink into a surface have variable outlines. Therefore, minimum outlines are the only constant and consistent size in tracking.

To measure the minimum outline, study the bottom of a print to determine where the rounded pad turns upward. The break point where the pad turns upward would be the minimum outline edge. Use this edge to measure tracks. While the variable outline of a footprint may only be several

millimeters wider than the minimum outline, those few millimeters have a large visual effect. The human eye sees area and area increases with the square of a linear measurement. In short, a few millimeters of width adds a lot of area to a footprint.

Minimum outline size does not change for different surfaces (assuming you have a clear track) and therefore provides cross-surface comparison, for example from snow to sand. While an animal may leave many sizes of footprints depending on surface, slope and speed, there is only one minimum outline for every print.

Assigning the break point is a subjective judgement and no two people will always mark it at exactly the same point. However, experimentation has shown that an individual tracker can reduce personal variation in measurements and that groups of trackers trained in minimum outline methods will become more consistent in their measurement of tracks. Quality measurements are the trackers goal and using minimum outline methods greatly reduces over-exaggeration and variability of track size.

Whenever someone tells you they have measured an especially large track, determine if they understand the effect of sinking into a surface. Be very cautious of any measurements where the measurer does not specify that an effort has been made to control for the foot sinking into the surface.

To report the track size for an **individual** animal, it is best to measure several different tracks and average them. A good report would also include a measure of variation (e.g. standard deviation). To do a good job of describing track size for a **species**, minimum outline measurements of several individuals should be averaged and variation measurements reported for both individuals and the species.

For your personal research and learning effort, develop a minimum outline set of measurements for species that you can easily access. Remember to measure different ages, and sexes. Even doing this for common pets, cats and dogs, would be worthwhile. I am not aware of any such data sets for household pets.

Be the first on your block and send a copy to **TRACKS**. Also, once you have several measurements of different age animals, you can develop growth curves for footprint size.

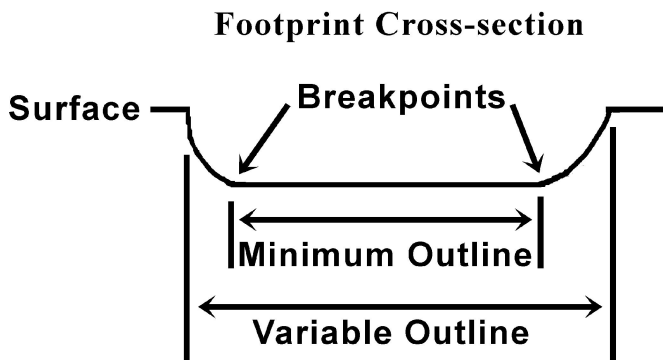
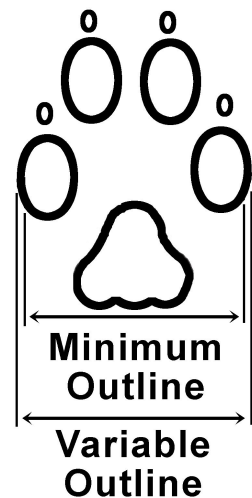
A parting thought, be careful of any data set that lists only one measurement for a species. If it is an average, how many tracks and animals were averaged? What were their ages? What were their sexes? What was the variation in the data set? A range of measurements would be better, but the same questions still apply. Trackers must do quality work now days! You can help by developing good data sets and quality data sets take time to develop.

REFERENCE: Fjelline, D.P. and T.M. Mansfield. 1989. Method to standardize the procedure for measuring mountain lion tracks. In Smith, R.H. (Ed.). Proceeding of the third mountain lion workshop. 1988, Dec.6-8. Prescott, AZ. Arizona Game and Fish Department.

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### Area Exaggeration



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