The Anatomy of Sea Turtles

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STANDARD MEASUREMENTS

Standard Measurements

Several different lengths are measured when describing turtle size (Fig. 47). Each measurement is taken in order to ensure that comparative data are available to share with other programs world-wide. Over-the-curve measurements are taken with a non-stretching tape measure while straightline measurements are taken with calipers. The following are the standard measurements and their landmarks.

*Standard Length* (SCL and CCL) are measured from the mid-point of the nuchal scute to the posterior-most tip of the carapace in cheloniids (Figs. 48-49). Standard carapace length is a straightline measurement from the anterior-most point on the midline of the nuchal scute to the posterior-most tip of the last marginal (supracaudal or postcentral) scute. Curved carapace length uses the same landmarks but is taken over the curve of the carapace with a tape measure. If the tape crosses epibionts, notation should be made describing this aberration in the measurement. In leatherbacks, SCL is measured from the middle of the nuchal notch to the posterior-most tip of the caudal peduncle. To measure the CCL of a leatherback, pull the tape tight between the middle of the nuchal notch and the terminal tip of the caudal peduncle, without forcing the tape along the ridge.

**Fig. 47.** Landmarks for standard measurements. Each is described in detail in the text.

**Fig. 48.** Straightline Standard Length: SCL.

**Fig. 49.** Over-the-Curve Standard Length: CCL.
Minimum Carapace Length (SCL\textsubscript{min} and CCL\textsubscript{min}), also known as notch-to-notch length, is measured from the mid-point of the nuchal scute to the notch where the two most posterior marginal scutes meet (Figs. 50-51).

Maximum Carapace Length (SCL\textsubscript{max} and CCL\textsubscript{max}), also sometimes called greatest length, is from the anterior-most part of the carapace to the posterior-most tip of the carapace on the same side (Figs. 52-53).

Fig. 50. Minimum Straightline Carapace Length (Notch-to-Notch): SCL\textsubscript{min}.

Fig. 51. Minimum Carapace Length Over-the-Curve (Notch-to-Notch): CCL\textsubscript{min}.

Fig. 52. Maximum Straightline Carapace Length: SCL\textsubscript{max}.

Fig. 53. Maximum Over-the-Curve Carapace Length: CCL\textsubscript{max}. 
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*Carapace Width (SCW and CCW)* is measured at the widest part of the carapace (not at specific scutes). In leatherbacks, carapace width is at measured the widest points, typically on the most lateral ridges. Care should be taken to ensure that the calipers and/or tape measure are perpendicular to the animal's long axis. The maximum width taken using a tape measure will not always fall on the same location as that measured with calipers (Figs. 54-55).

*Maximum Head Width (HW)* is measured using calipers at the widest part of the head (Fig. 56).

*Fig. 56. Maximum Head Width (HW)* is measured at the widest part with the calipers perpendicular to the long axis of the skull. This position varies with species so that, in some, it is near the jaw joint and in others, it is found more posteriorly.

*Maximum Head Length (HL)* is measured along the midline from the anterior-most part of the upper jaw to the posterior-most bone of the skull - the supraoccipital crest (Fig. 57). This bone is identified by feeling for the landmark (palpating).

*Fig. 57. Maximum Head Length (HL)* is measured from the posterior tip of the supraoccipital crest (found by palpating) to the anterior-most part of the head, often the rhamphotheca (beak) of the upper jaw.
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**Body Depth (BD)** is recorded with the animal propped on its side or by digging a trench for the caliper jaws under an adult animal on land. This measurement is taken with calipers at the point of maximum carapace height when the bottom jaw of the calipers is held parallel to the plastron (Fig. 58).

![Fig. 58. Body Depth (BD) measurements are taken at the body’s maximum height. On a live turtle, an average of at least 3 measurements should be taken between breaths because the depth changes during breathing.](image1)

When measuring the animal, be sure to look for tags or tag scars on the front and hind flippers and, in the leatherback, near the tail (Fig. 59).

![Fig. 59. Tag tear-out scar on a leatherback.](image2)

**Plastron Length (SPL)**, straightline or curved (CPL), is defined by the posterior-most part of the plastron hard structure to its anterior-most hard structure. These points may extend beyond the intergular or gular scute at the ventral base of the neck and the anal or interanal scute of the plastron (Figs. 60-61).

![Fig. 60. Plastron Length (SPL) is measured with calipers extended from the anterior-most end of the plastron to the posterior-most end. These landmarks may occur beyond the scutes.](image3)

**Plastron Length (CPL)** is measured with an aligned tape measure. This method gives a slightly longer measurement than one obtained with calipers.

![Fig. 61. Plastron Length (CPL) is measured with an aligned tape measure. This method gives a slightly longer measurement than one obtained with calipers.](image4)
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*Total Tail Length (TTL)* is measured from the posterior-most point of the plastron to the tail tip. The *Plastron-to-Vent Length (PVTL)*, a separate measurement, is from the middle of the cloaca, or vent, to the posterior-most tip of the plastron. The *Vent-to-Tip (VTTL)* measure is taken from the middle of the vent to the tip of the tail or it can be calculated by subtraction (Figs. 62-63).

*Fig. 62. Tail Length (TTL) is typically measured with a tape measure extending from the posterior-most part of the plastron to the tip of the tail. The tape measure is allowed to follow the curl in the tail. Caliper measures tend to be slightly shorter.*

*Circumference (CIRCUM)* is the greatest circumference taken perpendicular to the turtle's long axis (excluding the flippers; Figs. 64-65).

*Fig. 64. Circumference (CIRCUM) is taken with a tape measure. It can be measured with the turtle lying on its carapace.*

*Fig. 63. The Vent-to-Tip measurement (VTTL), shown here, is taken from the middle of the cloaca (vent) to the tip of the tail.*

*Fig. 65. Circumference also can be taken with the turtle on its plastron. For very large animals, it may be necessary to dig under the turtle in order to get the tape aligned properly. When the tape is stretched over epibionts, such as barnacles, this should be noted.*