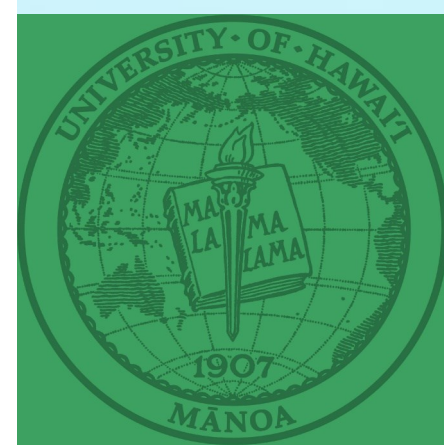




# Monitoring of Green (*Chelonia mydas*) and Hawksbill (*Eretmochelys imbricata*) Sea Turtles at a Near Shore Foraging Area in the Commonwealth of the Northern Mariana Islands, Western Pacific using an Indigenous Approach



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**ABSTRACT:** A priority action in recovery plans for U.S. Pacific populations of green and hawksbill turtles is to identify primary foraging areas for these species. Ninety-eight green turtles (*Chelonia mydas*), and six hawksbill turtles (*Eretmochelys imbricata*), were indigenously hand-captured near the islands of Saipan, Rota and Tinian, Commonwealth of the Northern Mariana Islands (CNMI) (Figure 1) from August 2006 to 2009. Upon capture, turtles were measured, weighed, double tagged (metal flipper tags and PIT tags), skin biopsied, and photographed. Turtles had a mean curved carapace length (CCL) of 53.5 cm  $\pm$  9.9 SD ( $n = 104$ ) (Figure 3), mean curved carapace width (CCW) of 48.9 cm  $\pm$  9.1 SD ( $n = 104$ ) (Figure 4), minimum straight carapace length (SCL) of 33.6 cm ( $n = 76$ ), and maximum straight carapace length of 74.1 cm ( $n = 76$ ) (Figure 5), and mean weight of 20.7 kg  $\pm$  13.2 SD ( $n = 78$ ) (Figure 6). Juvenile size class (CCL < 70 cm; SCL < 65) accounted for 91.3% of turtles captured, while the remaining 8.7% were sub-adults (CCL 70-86 cm; SCL 65-80 cm). These results are a preliminary description of hawksbill turtle population structure and size class composition for green and hawksbill turtles in CNMI regional waters and the first study within CNMI to report on hand-captures producing actual (non-estimated) morphometric data. The use of the traditional capture approach reflects the inherent value of traditional ecological knowledge that is beneficial for sea turtle research and management in Micronesia and promotes conservation of indigenous knowledge.

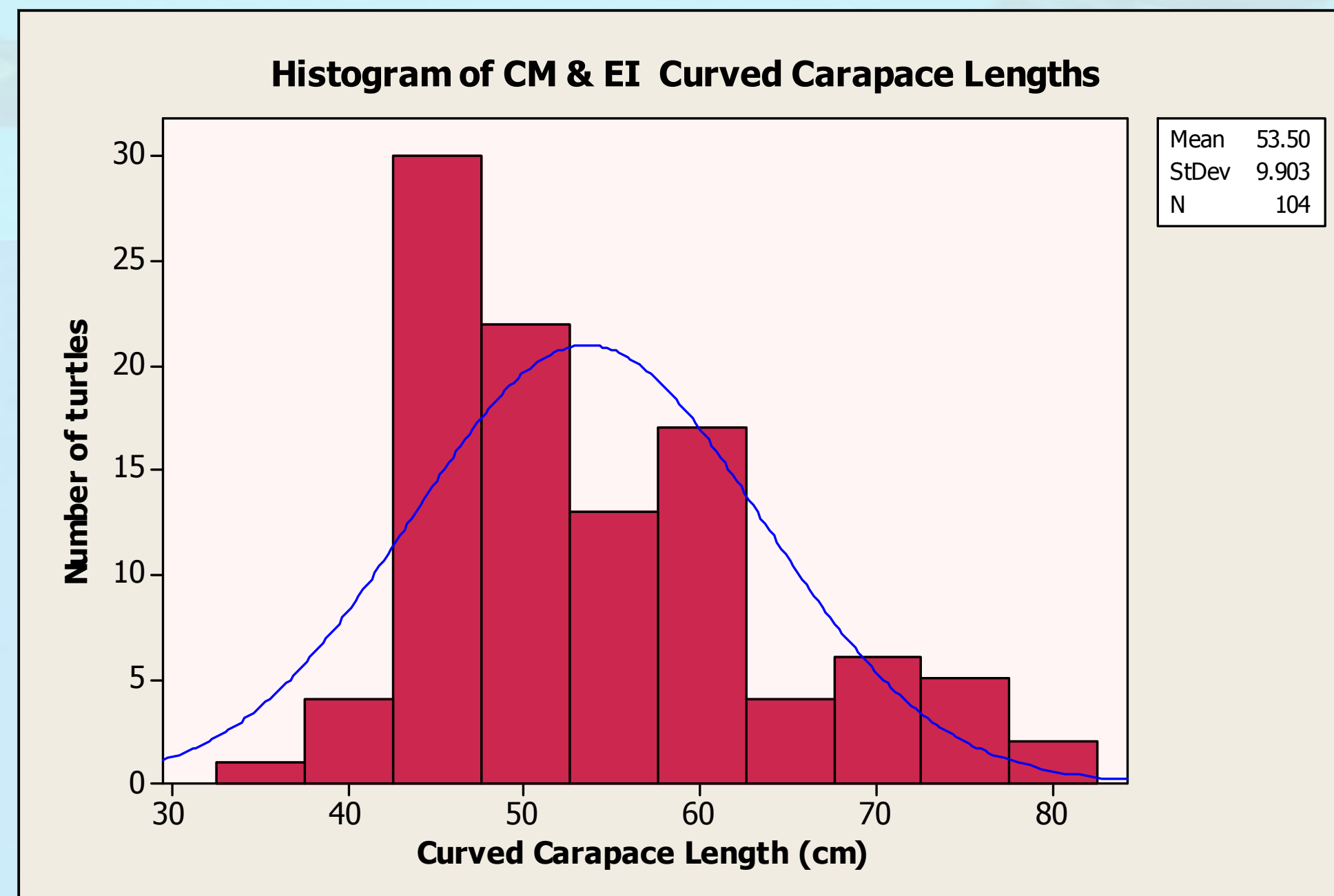


FIGURE 3. Histogram of green and hawksbill turtle curved carapace lengths

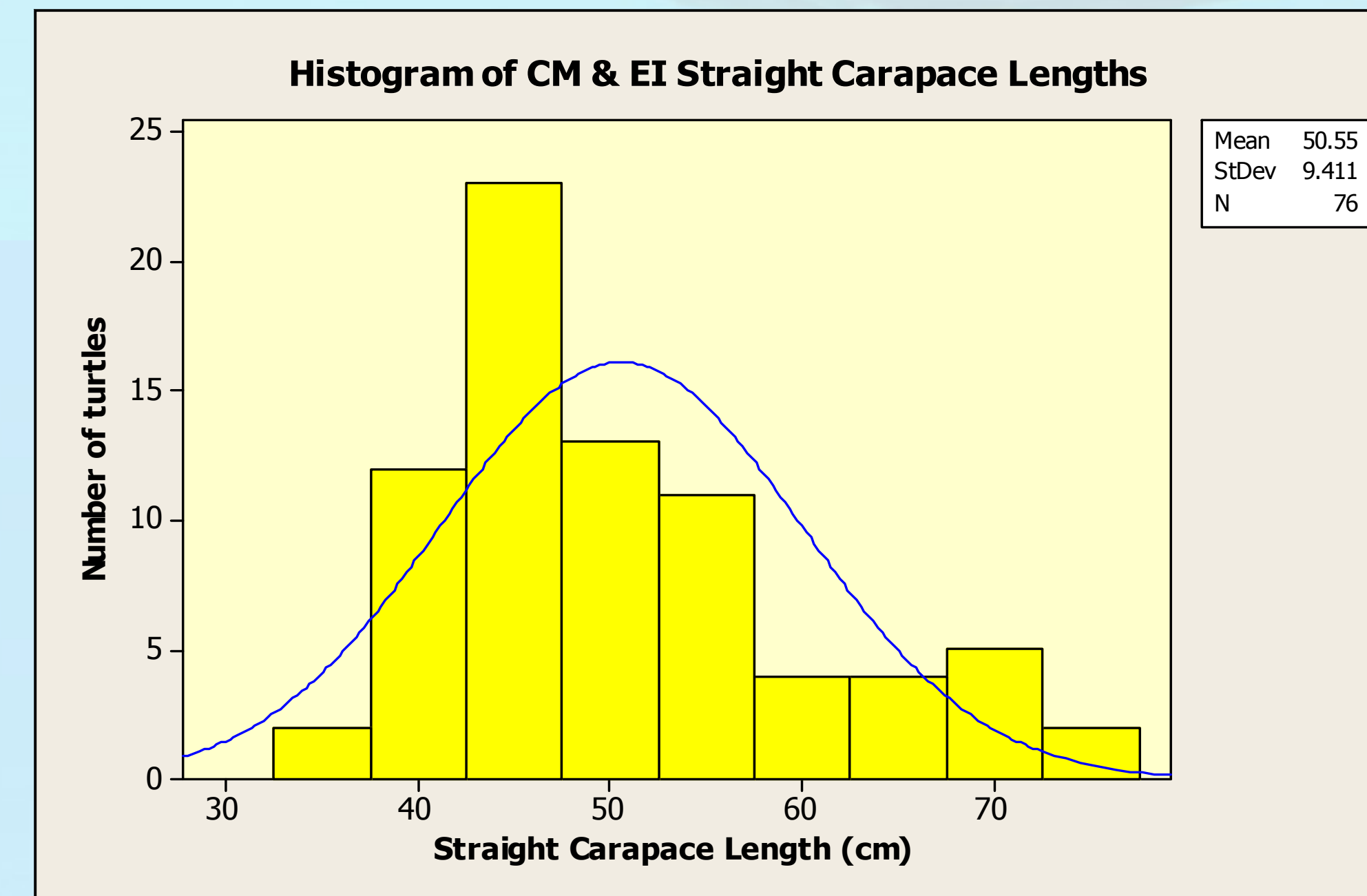


FIGURE 5. Histogram of green and hawksbill turtle straight carapace lengths

**BACKGROUND:** In the Western Pacific Ocean, hawksbill and green turtles have declined substantially due to human exploitation. Hawksbill turtles are exploited because their bodies are made into curios and the shells are used for ornamental products (e.g., jewelry), while green turtles are prized for their meat and eggs as it is considered a delicacy and was traditionally caught to be shared at village celebrations. Severe overharvest has also been attributed to the loss of traditional restrictions that had limited the numbers of turtles taken by island residents, loss of the spiritual significance of sea turtles, and inadequate regulations and enforcement. As a result, the Pacific hawksbill turtle is listed as Endangered and the Pacific green turtle is listed as Threatened under the Endangered Species Act. Because these species are endangered, a priority action in their recovery plans is to identify primary foraging areas for these species.

**METHODS:** One commonly used technique to track individuals and evaluate changes in their biology (e.g., growth rates, health status, etc.) is mark-recapture. In this study we utilized an indigenous hand-capture approach (Figure 7) to perform surveys in a near shore foraging area and mark individuals. Indigenous hand-capture technique refers to traditional free-diving and hand-capture skills learned from a cultural knowledge base to capture turtles. After a turtle is captured (if no tags are present), inconel tags are applied to both front flippers (Figure 2A). Then, the straight and curved carapace lengths (notch to tip) are measured from the anterior point at midline (nuchal scute) to the posterior tip of the supracaudals. Likewise, straight and curved carapace widths are measured at the widest point (Figure 2 C&D). A skin biopsy (4 mm) is taken from one of the hind flippers for genetic analysis (Figure 2 D). Next, the turtle's flippers are scanned for passive integrated transponder (PIT) tags, and if none are found, then a single PIT tag is injected subcutaneously into one of the hind flippers (Figure 8 E&F). Finally, body mass is determined to the nearest kg (Figure 8 G). Digital photos are then taken of the left and right side of the head (facial scales), the entire dorsal body view, the entire ventral body view, and any unusual or distinguishing marks (e.g., old wounds; Figure 8 H).

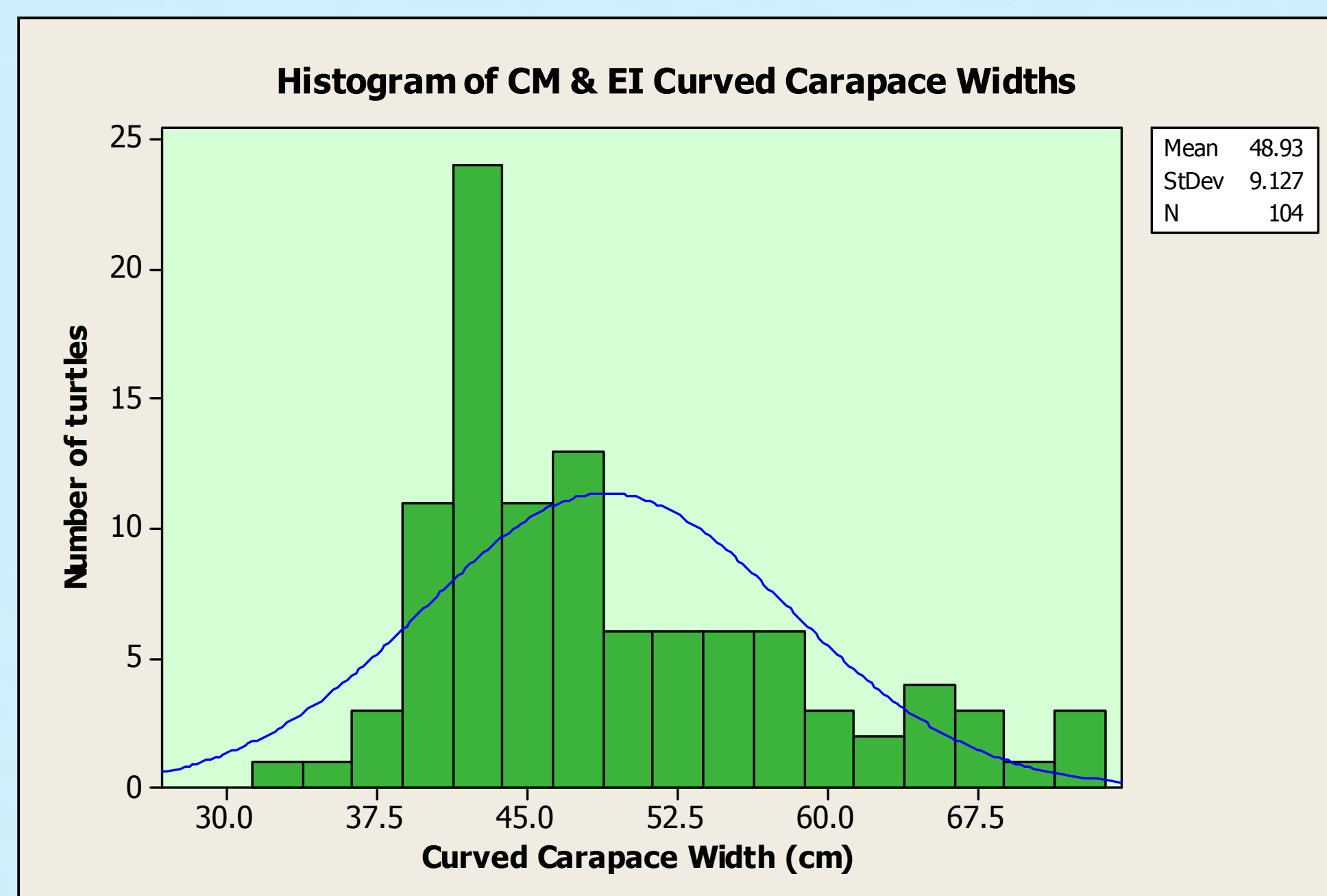


FIGURE 4. Histogram of green and hawksbill turtle curved carapace widths

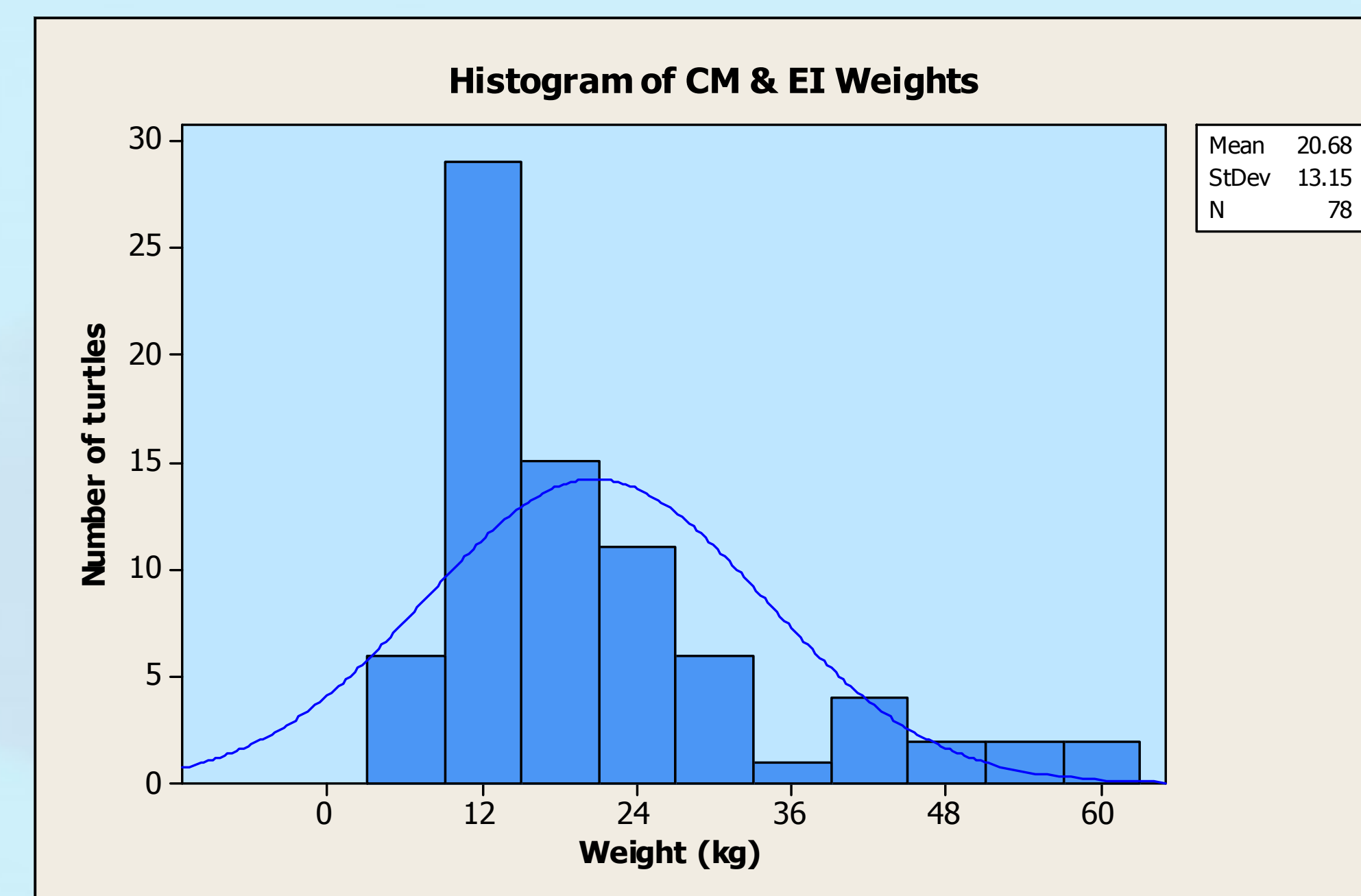


FIGURE 6. Histogram of green and hawksbill turtle weights

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**GOALS & OBJECTIVES:** The goal of this project is to create a baseline for immature foraging hawksbill and green sea turtle populations in Saipan, Tinian, and Rota CNMI using mark-recapture. Based upon this goal, the objectives of the study are to: 1) provide a preliminary description for hawksbill turtle population structure and size class composition in a coastal foraging area of Saipan; 2) determine size class composition for green turtles in coastal foraging areas of Saipan, Tinian, and Rota; and, 3) describe an indigenous method for capturing sea turtles in near shore waters.



FIGURE 7. Jessy Hapdei hand capturing green turtle in Rota, CNMI

**SIGNIFICANCE:** CNMI not only harbors an important sea turtle sub-population in the Western Pacific, but also has been a location of unknown levels of human exploitation. To determine areas that require protection from exploitation, we first need to locate primary foraging areas or habitats of high concentration and use by turtles. It is a priority for hawksbills because there are almost no quantitative estimates of the number, size or age class of foraging turtles in Western Pacific waters. As for greens, it is a priority because the pelagic range of juveniles in the Western Pacific region is unknown. This study has provided resource managers with valuable information on the population structure and size class of immature hawksbill and green turtles that forage in near shore waters of the CNMI. The results will also allow managers to identify habitat locations highly frequented by immature foraging turtles, and thus identify areas that may be at the greatest risk from human exploitation in Saipan, Rota, and Tinian, CNMI.

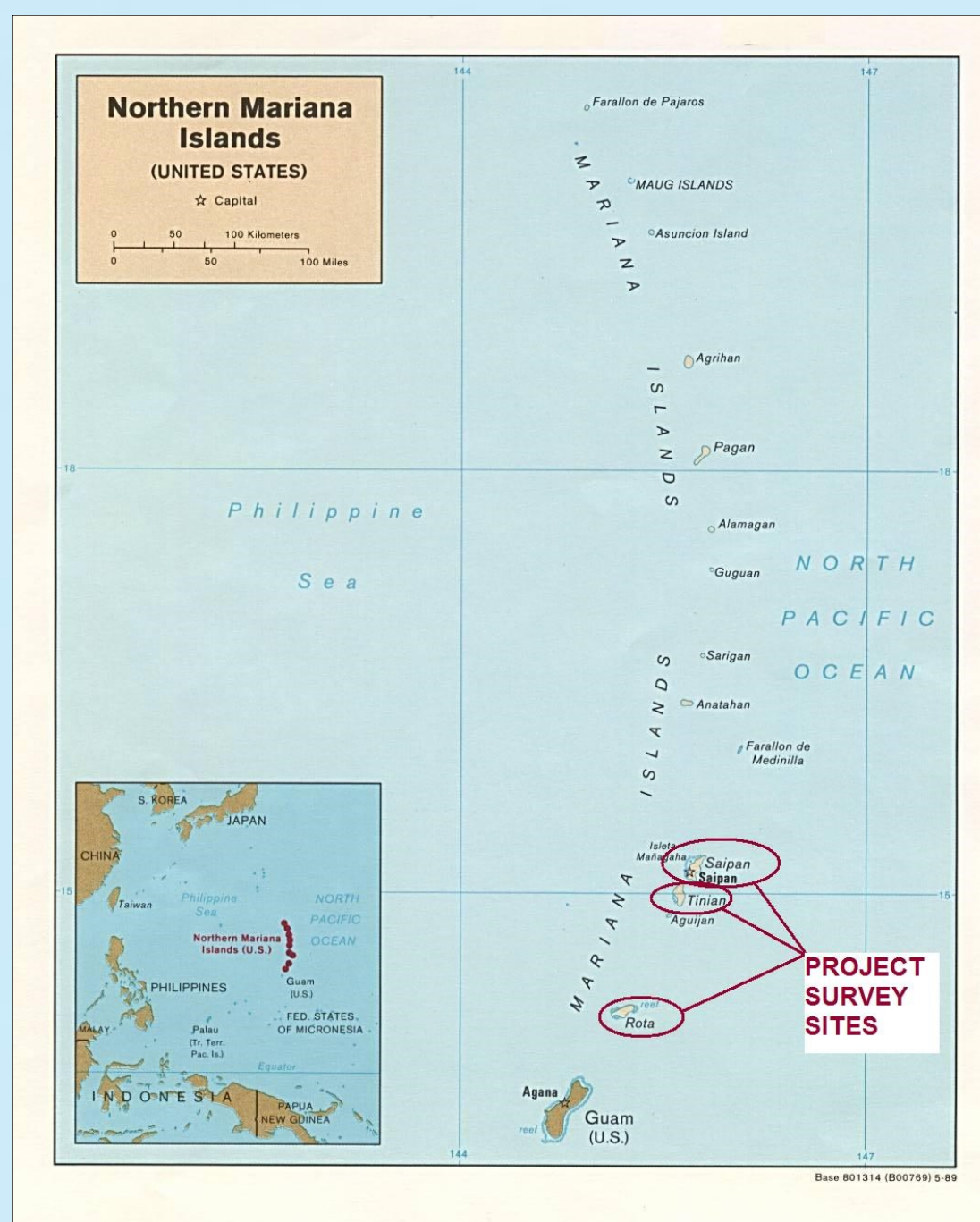


FIGURE 1. Map of the Marianas Archipelago. This map is adapted from [http://gesource.ac.uk/worldguid/html/981\\_map.html](http://gesource.ac.uk/worldguid/html/981_map.html)



FIGURE 2. A. Applying inconel flipper tag, B. Measuring curved carapace width, C. Measuring straight carapace length, D. Biopsying genetic tissue sample



FIGURE 8. E. Applying PIT tag, F. Scanning for PIT tag detection, G. Weighing turtle on digital scale, H. Photographing facial scales



