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Using Paired-Laser Photogrammetry for Measuring Manta Ray (*Manta birostris*) Sizes. Are Maui's Mantas Horizontally Challenged?

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Paired-laser photogrammetry was used to measure the disc width (DW) of 78 manta rays (*Manta birostris*) from a nearshore Maui population. The mean ratio of DW to disc length (DL) for 43 of these individuals was 2.30 (N=43, SD=0.10). The mean ratio for mature males (determined by the claspers extending beyond the pelvic fins) was not significantly different than that for immature males (t (14)=0.59, p=0.56) indicating that the DW to DL proportion remains constant throughout development. DL measurements were more reliable and more easily obtained than DW measurements using paired-laser photogrammetry. Given this, DL measurements were used and converted to the more conventional DW measurement equivalent using the ratio of 2.30. Female DW ranged from 2.42 m to 3.70 m (mean=3.22 m, N=40). The maximum female DW in this population is 25% smaller than the maximum reported for a female in Indonesia (White et al., 2006), and as much as 59% smaller than that reported in other parts of the world (Last & Stevens, 1994). Male DW ranged from 1.98 m to 3.18 m (mean=2.80 m, N=33). The maximum male DW in this population is 22% smaller than the maximum DW reported for a male in Indonesia (White et al., 2006). Males were sexually mature at a DW greater than 2.79 m, (N=20), 27% smaller than what has been reported for males in Indonesia. These results support paired-laser photogrammetry as a non-invasive and precise method for sizing manta rays in the field and suggest that manta rays in Maui mature and grow to a much smaller body size than what is observed in Indonesia and other populations worldwide. The absence of killer whales in Hawaii, a reported predator of manta rays, may alleviate natural selection pressures for large body size as a beneficial trait in predatory defense.