

DISTRIBUTION AND MOVEMENTS OF SEA TURTLES AT INSULAR FORAGING GROUNDS IN THE WESTERN PACIFIC OCEAN: INSIGHTS FROM 10 YEARS OF IN-WATER SURVEYS AND 200 SATELLITE TAGS*

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The Mariana Islands in the Western Pacific Ocean are home to endangered populations of foraging green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) sea turtles, yet systematic studies for both species are scarce in this region. We provide the first integrated description of distribution and movement behavior for sea turtles in the Mariana Archipelago (Guam and the Commonwealth of the Northern Mariana Islands) based on ten years of in-water surveys and 200 satellite telemetry deployments. Boat-based surveys recorded 1,096 turtle encounters around Guam, Tinian, and Saipan, comprising 871 green, 100 hawksbill, and 125 unidentified turtles. Green turtles outnumbered hawksbills by roughly nine to one. Captures totalled 281 turtles, of which 234 were greens and 47 were hawksbills. Satellite tags were deployed on 200 individuals, including 164 greens and 36 hawksbills. Most captured turtles were juveniles with straight carapace length less than 55 cm. Relative abundance from encounters per unit effort (EPUE) highlighted consistent nearshore hotspots. Green turtle EPUE was highest at sites such as Gab Gab and Dadi Beach on Guam and along multiple coastal sections of Saipan. Hawksbill EPUE peaked at Inner Glass Breakwater and Double Reef on Guam and along northwest Tinian. EPUE maps from this study delineate distinct areas of concentration for each species. Satellite tracking showed small home ranges and strong site fidelity for both species. Core use areas generally for green and hawksbill sea turtles measured a few tenths of a square kilometer and overall home ranges were commonly about two square kilometers. We classified individual movements into four movement patterns (MP). The great majority remained within a single foraging area (MP1). A smaller subset used multiple distinct foraging areas within the same island (MP2). Two turtles exhibited inter-island movements (MP3). Three turtles, all hawksbills, departed the Marianas entirely (MP4). Of the MP4 cases, two hawksbills, including one adult female (72.3 cm straight carapace length: SCL) and one presumed subadult (61.7 cm SCL) migrated about 2,100 km southeast to Ant Atoll (Pohnpei) in the Federated States of Micronesia. The third subadult (58.4 cm SCL) hawksbill migrated to the Republic of the Marshall Islands, a journey of approximately 2,500 km. Excluding migratory periods, habitat use for all green and hawksbill turtles was neritic with most dives shallower than 15 m, but with recorded dive depths extending to 100 m. Average experienced temperatures were warm,

30–32 °C, and both species spent most time in water shallower than 30 m. With 200 satellite tags deployed and a decade of building local research collaborations, we identified that the Mariana Archipelago functions primarily as developmental habitat for range-restricted juvenile green and hawksbill turtles that reside in shallow coastal waters for years. EPUE maps and telemetry together identify discrete nearshore habitats that are likely sensitive to local stressors and therefore high priorities for marine spatial planning and management. This project was a monumental effort which yielded the greatest understanding of foraging behavior for these two endangered (US ESA) species in the Pacific Islands Region.

ENVIRONMENTAL AND HUMAN INFLUENCES ON GREEN SEA TURTLE HABITAT USE IN THE RARE BRACKISH RIVER, OKINAWA, JAPAN

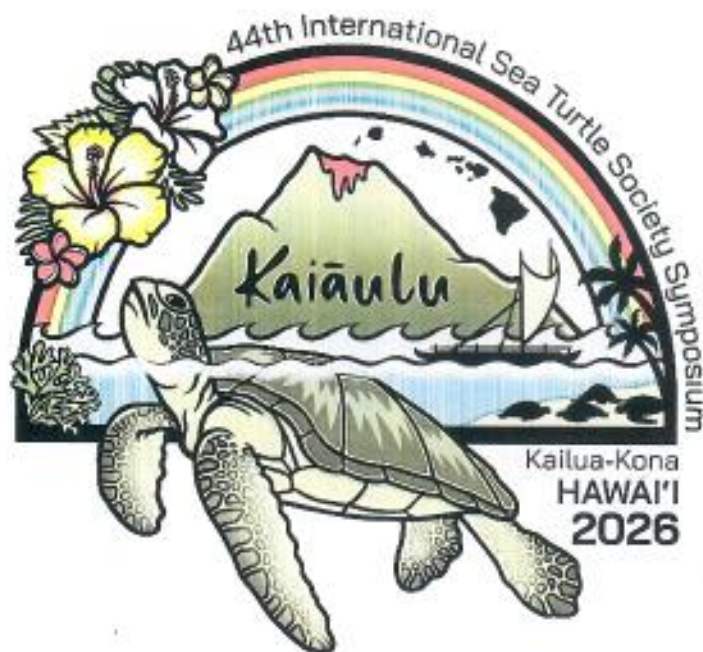
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Shiokawa River, located on the Motobu Peninsula of Okinawa, Japan, is one of only two known salt water rivers globally, and it has been designated as a Natural Monument of Japan. Shiokawa is scientifically classified as an anchialine spring. This unique brackish ecosystem, with seawater gushing out from underground springs, has long been known by local people as a site where green sea turtles (*Chelonia mydas*) ascend the river. However, scientific understanding of the environmental ecology in such habitats remains extremely limited. Investigating sea turtle behavior in this unique salt river is critical for species conservation and provides insight into ecological interactions in rare brackish habitats worldwide. From September 2024 to August 2025, we conducted observations of sea turtle sightings and environmental information along the Shiokawa River, from sunrise to sunset across different tidal stages. Water temperature in Shiokawa remained stable throughout the year. Sea turtle sightings were concentrated in the early morning and late afternoon, suggesting that habitat use may be influenced not by temperature fluctuations, but by tidal accessibility and reduced human disturbance. These patterns suggest that Shiokawa's role as a sea turtle habitat is shaped more by its unique physical features and patterns of human use. The consistent water temperature quiet conditions during early morning and late afternoon hours, may provide favorable conditions for resting or foraging. Based on individually identified sea turtles, at least seven individuals ascended the river during the study period. Furthermore, photographic records confirmed that at least one individual sea turtle has used the river mouth repeatedly since 2023, indicating strong site fidelity. This study provides the first record of sea turtle behavior in a salt river, and underscores the importance of integrating community-based monitoring to support conservation of these exceptional habitats. These findings demonstrate that even small and rare salt water rivers can provide essential ecological resources for sea turtle. By combining systematic observation with community engagement, this study contributes not only to species conservation but also to a broader understanding of globally rare brackish river ecosystems. Continued monitoring and sustained collaboration with residents are needed to understand long-term habitat use and to support conservation efforts.

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