

Annual 2020 Hawai'i Hawksbill Turtle Network Meeting¹

Summary Report

The Annual Hawai'i Hawksbill Turtle Network Meeting convened on April 14, 2020 via Google Hangouts with 25 state-wide participants and partners in attendance. Following introductions there was an overview of current research activities and progress with presentations from Drs. Alexander Gaos (NOAA PIFSC Marine Turtle Biology and Assessment Program, MTBAP) and Jennifer Lynch (National Institute of Science and Technology (NIST) & Center for Marine Debris Research). The abstracts of these presentations are included in this report. Following the informative research updates which included revised population assessment information (e.g., positive nesting trend), updates from the 2019 monitoring season were shared. Overall this was a very productive meeting with lots of valuable information exchanged. The network continued to express concern regarding the size (~14 nesting females/yr) and relative attention and funding being applied to what is likely the most endangered sea turtle population in US Pacific waters.

Research Updates

Title: Evaluating current and future conservation scenarios of hawksbill turtles in Hawai'i

Alexander R. Gaos (presenter), Summer L. Martin, Lauren Kurpita, Erin L. LaCasella, Irene K. Kelly, Hannah Bernard, Luke Sundquist, Cheryl S. King, Joy H. Browning, Tomo Eguchi, Peter Dutton, T. Todd Jones.

Abstract: Hawksbill turtles (*Eretmochelys imbricata*) are extremely rare in Hawai'i, where the species remains poorly understood. Researchers began monitoring hawksbill nesting beaches in Hawai'i in the late 1980s and since that time, the overwhelming majority of nesting (>90%) has been recorded on Hawai'i Island. Although research on green turtles (*Chelonia mydas*) in Hawai'i has indicated a strong population increase since protections were enacted in the early 1970s, a similar increase has not been discernable for hawksbills. Varying levels of monitoring effort at the disparate hawksbill nesting beaches across the archipelago, combined with relatively low nesting levels (i.e., limited sample sizes), has precluded previous efforts to evaluate the status and population trend for Hawaiian hawksbills. Using data gathered on monitoring effort, we conducted a population trend analysis that accounts for varying levels of effort at specific beach sites within three nesting beach complexes on Hawai'i Island (i.e., we modeled the number of nests as a function of beach site, complex, year, overnight effort, and daytime effort). Although overall counts of females and nests have remained relatively unchanged, our analysis indicates a positive trend for the population over the past 15 years. These findings coincide with a reduction in monitoring effort beginning in 2013, and a shift in monitoring focus between two primary nesting beaches, which combined could mask an increase in the total number of females/nests documented each year. The findings of a positive population trend are supported by the fact that the percentage of neophyte nesters documented each year was actually higher during the most

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recent 15 years of monitoring (56.3%) compared to the first 15 years of monitoring (39.6%). Despite these findings, the hawksbill nesting population in Hawai'i is extremely small (<15 nesting females documented annually) and even if trending upward, overall numbers remain perilously low.

Furthermore, hawksbill nesting occurs at three disparate nesting beach complexes on Hawai'i Island. Each complex is composed of a primary nesting beach (Pohue, Kamehameha and Apua) and several peripheral nesting beaches. Although individual turtles have been observed laying nests at multiple beaches within each complex, only one turtle has ever been documented nesting across complexes, indicating strong nesting site fidelity by females. These findings are supported by our preliminary mitochondrial DNA stock structure analysis, which indicates strong genetic stock structure among the three nesting complexes. The genetic structure among complexes also implies that if hawksbills were to be eradicated from individual complexes, these areas would likely not be recolonized on ecological timeframes that are relevant to conservation management. Given this scenario, each complex warrants independent management attention and indicates that rather than one small nesting population, Hawai'i hosts at least three extremely small, independent nesting populations. Our research further heightens the already precarious state of hawksbills nesting on the Hawaiian Islands.

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Title: Too much of a bad thing: high quantities of plastic ingested by hawksbill sea turtles in the Central Pacific

Melissa R. Jung, George H. Balazs, T. Todd Jones, Thierry M. Work, Alexander R. Gaos,
Jennifer M. Lynch (presenter)

Abstract: For all sea turtle populations, plastic debris ingestion has been recognized as a concerning and increasing anthropogenic threat that needs continual monitoring and research. All seven species have been documented to ingest plastic debris, but hawksbill sea turtles, listed as Critically Endangered on the International Union of Conservation of Nature (IUCN) Red List, ranked the highest for plastic ingestion amounts in a recent global meta-analysis with the Central Pacific and Southwest Atlantic as hotspots. Despite many hawksbill sea turtle populations declining and the urgent need to monitor plastic ingestion in this species, only 13 studies, including 86 individuals, have documented plastic ingestion by hawksbill sea turtles around the world with only two sea turtles representing the Central Pacific hotspot region and most individuals being older, neritic phase sea turtles. This limited information leaves large data gaps regionally and globally that need to be filled to determine geographical areas and life stages that deserve specific attention for conservation of the species. We examined gastrointestinal tracts of 15 hawksbills from the Central Pacific. The color, type, and size were recorded for each piece.

The number of plastics from each turtle was counted, weighed, and standardized by turtle weight (kg). White (70.8%) was the most common color and fragments (87.6%) were the most common type ingested. Debris sizes ranged from 0.5 mm sheet to 0.1 cm rubber band. The percent frequency of occurrence of ingestion was 66.7% with an average of 9.13 pieces/turtle, 0.256 g/turtle, and 1.76 g/kg of turtle (calculations include non-detects). Combined with the ingestion amounts from the two previous hawksbills examined, an average of 3.0 g/kg was observed, confirming a recent global meta-analysis revealing that hawksbills in the Central Pacific are the most at risk across species and locations. Within this population, small post-hatchling pelagic turtles (3.64 g/kg, 4-9 cm SCL) and pelagic juvenile turtles (4.38 g/kg, 28-41cm SCL) had greater concentrations per body weight of ingested plastic compared to larger neritic turtles (0.010 g/kg, 46-71 cm SCL). Increased monitoring of rare hawksbill sea turtles is crucial along with determining if the amounts of plastic ingested are harmful or not. Efforts within hawksbill populations should focus on younger pelagic-phase turtles, in particular post-hatchlings in hotspot regions like the Central Pacific.

Title: Sea turtles across the North Pacific are exposed to perfluoroalkyl acid contaminants

Cathryn Wood, George H. Balazs, Marc Rice, Thierry M. Work, T. Todd Jones, Eleanor Sterling, Tammy M. Summers, John Brooker, Lauren Kurpita, Cheryl King, and **Jennifer M. Lynch (presenter)**

Abstract: Perfluorinated alkyl substances (PFASs) are globally distributed, highly persistent, and toxic environmental contaminants. We assessed geographical and species differences in PFAS concentrations in blood and eggs of green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) turtles across longitudes in the North Pacific. Fifteen compounds were quantified via liquid chromatography tandem mass spectrometry from 62 green turtle and six hawksbill plasma samples from Hawai'i, Palmyra Atoll, and the Northern Marianas Islands. Additionally, plasma from 14 green turtles severely afflicted with the tumor-forming disease, fibropapillomatosis, and egg contents from 12 hawksbill nests in Hawai'i were analyzed. Perfluorooctane sulfonate (PFOS) predominated in green turtle plasma; perfluorononanoic acid predominated in hawksbill plasma and eggs. Concentrations were greater in hawksbill than green turtle plasma ($p < 0.05$), likely due to trophic differences. Green turtle plasma PFOS concentrations (ng/g) were highest in Hawai'i (1.14), followed by the Marianas (0.524) and Palmyra (0.155), relating to human population estimates on these islands. PFASs were maternally transferred to hawksbill eggs, with concentrations decreasing in successive clutches within a nesting season. Concentrations of perfluoroundecanoic and perfluorotridecanoic acids were significantly correlated with reduced emergence success, so their impact on development should be assessed. Results suggest PFASs play little to no role in fibropapillomatosis. This study provides valuable insight on the exposure to and possible effects of PFASs in sea turtles across the Pacific.

2019 Updates

The annual 2019 updates includes information and data compiled during the year by monitoring projects and in most cases specific to the 2019 nesting season. Projects also provided 2018 year summaries for perspective.

Hawai'i

The Hawai'i Island Hawksbill Project (HIHP) field monitoring season ran April 28 through December 12, 2019. During this time they documented 12 nesting females of which 7 were remigrants and 5 were neophytes. This includes a few known individuals such as #T74 (first tagged in 2007) and Misty #T135 the well-known turtle that forages in west Maui. There might have also been an additional 7 females nesting that were unseen but suspected as their tracks didn't align with any renesting schedules (hence potentially 19 females). There were 49 nests documented, 26 of which were laid at Pohue.

There were a few citizen science hawksbill reports that helped gather information that supported HIHP in their monitoring activities, including one report of a potential nests (eggs seen) at Waialea, Kona but the nest was not confirmed.

In 2018, there were 11 females documented, but also very limited monitoring efforts due to volcanic eruptions during 2018. The large volcanic 'crack' that a few nesting females have fallen into in the past is being monitored consistently and naupaka has been planted in effort to provide a barrier (although it's slow growing). This crack cannot be filled or fenced in so planting of native vegetation is the best mitigation measure at this point.

Maui

Hawai'i Wildlife Fund (HWF) reported no documented hawksbill turtle nests or females during the 2019 nesting season. Historically, no known nesting activity on Maui also occurred in 2003, 2007, and 2013. During 2019, one green turtle nested at Ho'okipa and laid 5 nests in very close proximity to each other. Dawn Patrol (which is now managed and overseen by HWF) logged over 3,000 volunteer hours.

HWF is working to get a state MoU to allow for staff/volunteers to camp at state beach parks to oversee hatching events. They were not allowed to monitor hatching events at Ho'okipa which occurred at night after the park was closed.

In 2018, one neophyte hawksbill turtle nested on Maui at Palau'ea beach that laid 5 nests (the turtle was tagged by HWF and satellite tagged by NOAA). Nests required intensive monitoring to protect them from beach erosion and inundation due to high surf. In 2018, Dawn Patrol logged over 4000 volunteer hours.

HWF field office on Hawai'i Island has been working with HIHP on developing hawksbill-specific signage. This product is ready to be printed and installed. HIHP is supportive of this sign at Waipi'o, but expressed concern about posting the sign at Kāwā until there is community support for signage given the sensitive relationship with this community and the need to keep them engaged in hawksbill reporting/conservation activities.

Molokai

Communication continues with the Halawa community in effort to provide training and guidance to help facilitate a community-based monitoring project with Halawa residents, Molokai students, and island-based partners. Science and technical support is being provided by A. Gaos, NOAA MTBAP.

In-water database

Cheryl King (HiHawksbills.org) has been maintain an in-water database to compile reports of hawksbills seen in waters of the main Hawaiian Islands since 1998. At the last meeting on 3/28/19, there were 174 individual turtles documented in the database. As of this meeting on 4/14/20, there are 220 hawksbills documented, which is an increase of 46 turtles! Of these 220 turtles, 9 are confirmed to be deceased. Additionally, of the 220 turtles, 16 are males and 27 are adult females, with the rest being juveniles and subadults or of undeterminable size. Only 7 of these 27 adult females are known to be tagged (3 Hawai'i Island nesters, 1 Maui nester and the others are from in-water tagging work with NOAA). The big question remains, "where are these adult females nesting?" The Hawai'i hawksbill turtle network will continue to work with Cheryl to help identify nesting females they encounter that might be in the catalog, and continue to promote community reporting of hawksbills seen within the Hawaiian archipelago.

Threats/stranding program

Sea turtle population threats are identified and documented via PIFSC MTBAP of animals recovered by the state-wide sea turtle stranding and salvage network. During 2019, there were two hawksbill hatchling stranding incidents on the windward side of Oahu (at Kailua and Lanikai beaches) in September and November. This is typical of fall/winter hatchling strandings events on Oahu. Additionally, there were 5 strandings during 2019 and 3 strandings reported in late March and April 2020.

Date	Location	Size	Notes/Cause of stranding
4-12-19	Haleiwa, Oahu	CCL = 39cm	Alive. Euthanized; Sex = F; Hook found in esophagus. Edema in lungs.
5-11-19	Waianae Boat Harbor, Oahu	CCL = 53cm	pending necropsy
8-01-19	Ala Wai Canal, Oahu	CCL = 43cm	Drowned in crab trap
11-06-19	Yokohama, Oahu	CCL = 42cm	pending necropsy; recovered floating in the water
12-24-19	Manele Small Boat Harbor, Lanai	CCL=43cm	pending necropsy
3-29-20	Bellows, Oahu	CCL= 79cm	pending necropsy
4-10-20	Kawaihae Harbor, Kona	CCL = 38cm	pending necropsy
4-11-20	Waiau Power Plant, Oahu	CCL = 35cm	pending necropsy

The manuscript summarizing three decades of stranding data (through 2018, of 77 individuals not including hatchlings) will be submitted for publication soon. Impacts from nearshore fisheries continues to be the primary threat to hawksbill turtles. Additionally, stranded hawksbill turtles continue to be biased towards females (female to male sex ratio of 4.2:1), which may be indicative of the population as a whole.

Other updates

USFWS updates included a reminder that permits will be standardized moving forward with all satellite telemetry activities covered under NOAA PIFSC permits and not under individual programs. Additionally, a grant has been awarded by the FWS Partners program to HIHP and TNC to support a habitat improvement activities at Kamehame beach which will help increase monitoring efforts, implement predator control measures and remove invasive vegetation. This is a very important step forward for both the population and HIHP's monitoring efforts, and the network was very pleased to hear this great news!

Funding remains a significant concern for all programs, and there still exists a need to leverage additional funding for all island-based monitoring programs.

PIRO's communication program recently drafted a comprehensive webstory about the population in effort to raise awareness, provide educational outreach, and draw attention to conservation and monitoring challenges, goals and activities of the HIHP. The webstory was also highlighted in Chris Oliver's Weekly Email to NOAA on April 23rd.

[Saving an Endangered Turtle Population: One Program's Quest](#)

With an [interactive story map](#)

Meeting Participants (*conveners)

NOAA PIRO – Irene Kelly*, Jeff Walters, Ron Dean, Joel Moribe, Nicole Davis

NOAA PIFSC – Alexander Gaos, Shandell Brunson

USFWS – Joy Browning*, Eldridge Naboa

NOAA NIST – Jennifer Lynch, Katherine Shaw

DLNR – Ryan Jenkinson, Kendra Babcock, Kristen Kelly, Mimi Olry, Clifford Kow,
Susannah Welch, Skippy Hau, Kehau Kimokeo

Hawai'i Island Hawksbill Project (HIHP) – Lauren Kurpita, Codi Backen

Hawai'i Wildlife Fund (HWF) – Hannah Bernard

HIhawksbills.org – Cheryl King

Pulama Lanai – Christina Donehower (invited but unable to attend)