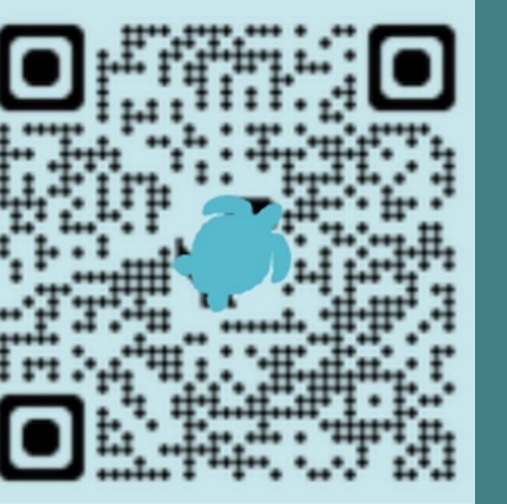




OLIVE RIDLEY PROJECT

Using Photo ID to document and monitor the prevalence of Fibropapilloma tumours in a population of juvenile green turtles



Joana Hancock, Jenni Choma, Leah Mainye, Martin Stelfox, Max Polyak and Stephanie Köhnik
Olive Ridley Project

INTRODUCTION

The prevalence of disease can be a cause of stress to some populations of marine turtles, with fibropapillomatosis (FP), an infectious disease induced by a herpesvirus being globally widespread, including in Kenya (Jones et al. 2016, 2021). The documentation of the incidence of the FP on sea turtles usually involves the capture and manipulation of individuals and is quite possibly under-documented in foraging grounds.

The Olive Ridley Project (ORP) has been conducting in-water monitoring sea turtles in southern Kenya since 2018. The team uses Photo ID, a non-invasive, low-cost, citizen-science-friendly approach that allows researchers to obtain discrete information about individuals' locations and health status at a given time. Here we demonstrate how tracking the evolution of this disease using Photo ID can be a useful, non-invasive method to understand its extent in foraging aggregations where turtles can be easily monitored underwater.

METHODS

This study was conducted in 13 divesites along a 20 Km stretch of a fringing reef between 8-15m of depth encompassing Diani Chale-Marine National Reserve and Tiwi beach on Kenya's south coast. Two sites (Leopard Beach and Swahili Beach) were the only two exceptions, as they covered areas of seagrass and macroalgae at approx. 12m of depth.

Sea turtles were photographed opportunistically during scuba diving surveys conducted by trained team members, between July 2018 and December 2022. Individual sea turtles were identified using the method described in Jean et al. (2010). All images were visually matched by two of the authors and uploaded to the Internet of Turtles (algorithm for confirmation).

Any sea turtle observed with signs of a suspected FP case was flagged for subsequent monitoring. Turtles were grouped in different age groups based on gross estimates of curved carapace length (Juveniles <65cm; Sub-Adults 65-90cm; Adults >90cm)

RESULTS

Documenting of FP cases

Tumours were observed in turtles of all size classes, with the majority of affected individuals being juvenile

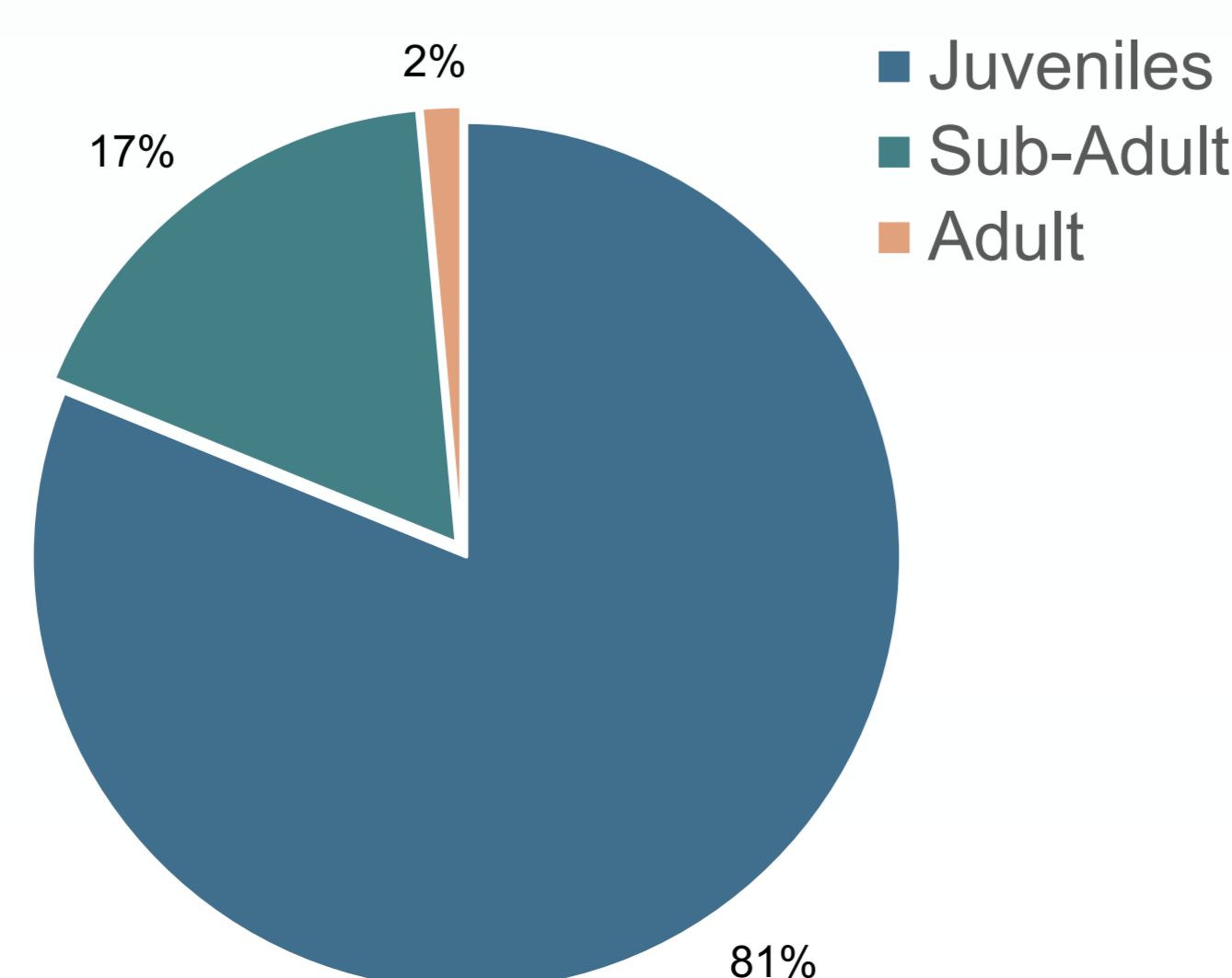
Total Individuals Identified:

n = 571

Total FP Cases :

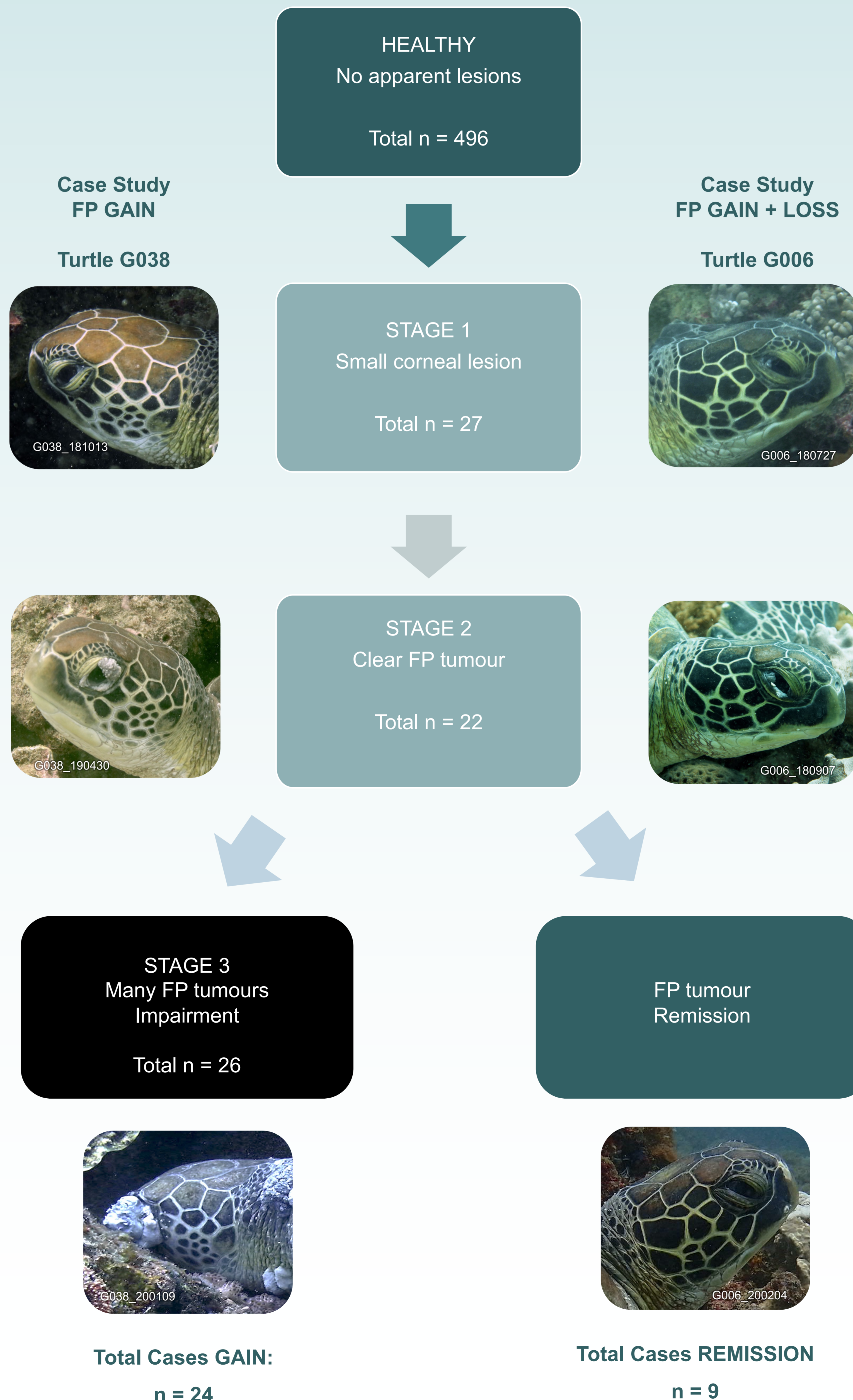
n = 75

13.1%



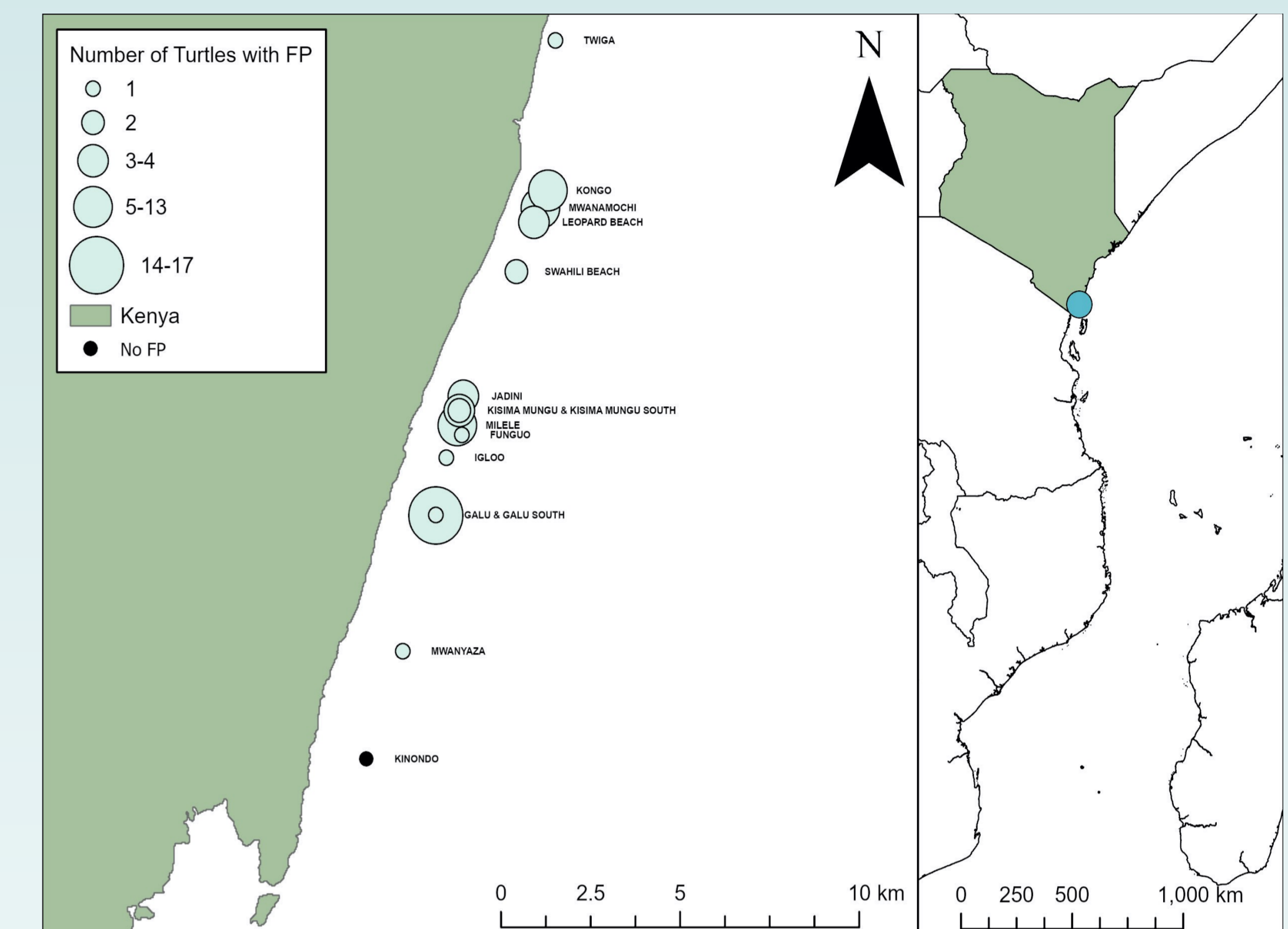
Monitoring of FP cases

Current cases at each stage, arrows show natural evolution of FP tumours (indicated by "n")



Spatial distribution of FP cases

Spatial distribution of FP confirmed cases along the study area shows high prevalence for Galu reef and Leopard Beach feeding area



Discussion

We show that the combination of targeted underwater surveys, citizen science and the use of Photo ID can be a low cost, non-invasive method useful in documenting the prevalence of the disease in neritic environments, in particular in areas with relatively good underwater conditions. Studies have indicated that juvenile green turtles appear to be most vulnerable to FP (Jones et al. 2016), a pattern that is also observed in our study site, albeit at a higher rate than at other sites in Kenya (2.4% in Watamu NMPR, Jones et al. 2021). The prevalence of this disease has been suggested to likely be a result of the significant time juvenile green turtles spend in neritic environments, which are heavily impacted by anthropogenic activities and degradation. Our results suggest that turtles occurring in feeding areas on the outer reef (Leopard Beach, Swahili Beach) close to the river mouth of Mwachema river, or close to channels connecting the outer reef to the seagrass lagoon (Galu) are more susceptible to infection. While the causes and transmission pathways of the FP disease are key to understanding the dynamics of the disease in sea turtle populations, these were not addressed here; however there are ongoing efforts being carried out in collaboration with relevant research groups in Kenya to address these, including genetic studies and evaluation of habitat quality.

Selected References

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A total of 35 individuals were resighted at least once, allowing the team to monitor the evolution of the tumour load (gain vs. loss)

