Multi-year Survival in the Wild of a Loggerhead Turtle Missing its Lower Jaw

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In this article we recount the recapture history of another notable loggerhead turtle observed in Amvrakikos Gulf, an important loggerhead foraging area in NW Greece, following from the story of *Alaniaris* an adult male turtle that has been observed over 18 years in the study area (Rees & Margaritoulis 2024). ARCHELON has been carrying out a capture-mark-recapture programme in Amvrakikos Gulf since 2002 (Rees et al. 2013). Loggerhead turtles in the Gulf have been found to mainly originate from Greek breeding sites but also come from further afield (Rees et al. 2017). Their size ranges from ~46 cm though to ~91 cm straight carapace length notch to tip ($SCL_{n\text{-}t}$; Bolten 1999). This indicates the area is used by large juvenile and adult turtles that have shifted away from oceanic conditions to inhabit coastal waters less than 2 m deep (Rees et al. 2013).

ARCHELON's study area covers approximately 4 kilometres square in the northeast part of the Gulf (39.02°N, 21.06°E), around the estuaries of the rivers Arachthos and Vovos (Fig. 1). Turtles are captured using the rodeo technique (Ehrhart & Ogren 1999), where researchers jump from a small dinghy into shallow water to seize the turtles. The turtles are then hauled onto the dinghy to be flipper tagged (Monel type No. 681; National Band & Tag Co., USA) in both front flippers and have a passive integrated transponder (PIT) tag inserted into the front left flipper. We recorded tail length, from innermost part of the notch between the supracaudal scutes to the tip of the outstretched tail; with negative values recorded if the tail does not extend past the end of the carapace, and carapace length ($SCL_{n\text{-}t}$). Turtles are photographed and a GPS position at the capture location is recorded before release.

The subject of this article was initially captured and tagged in 2019 and given an ID tag Y6939. It was subsequently recaptured in a further four years with the most recent being the summer of 2025,

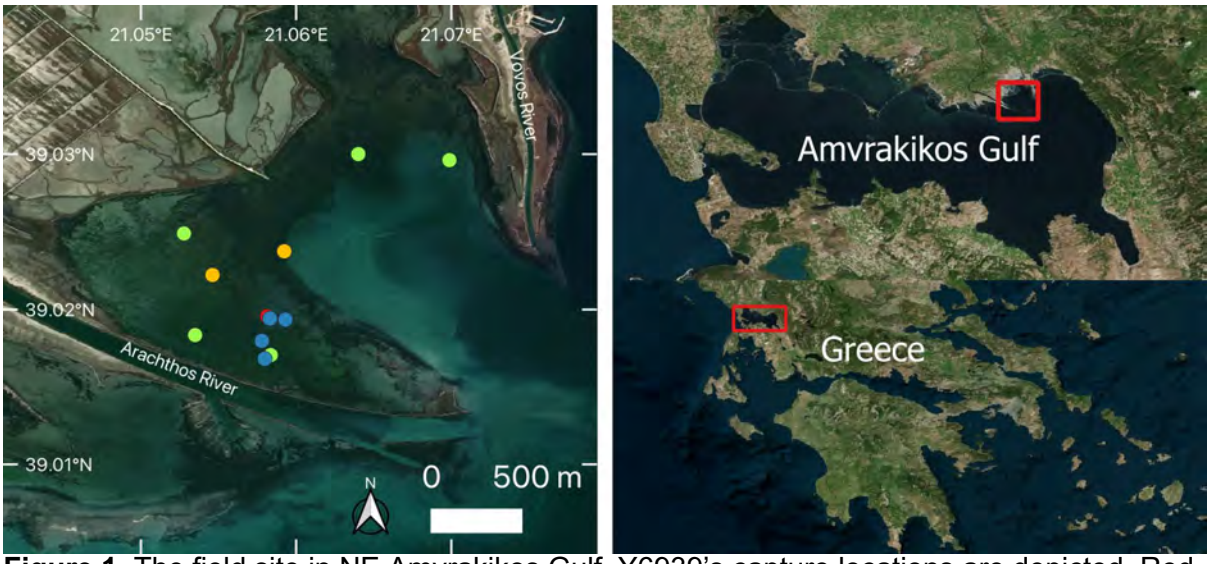

Figure 1. The field site in NE Amvrakikos Gulf. Y6939's capture locations are depicted. Red = 2019, orange = 2021, green = 2022, blue = 2023. The capture location in 2025 was not recorded.

Figure 2. Views of *Y6939*, a loggerhead turtle inhabiting Amvrakikos Gulf surviving without lower jaw and with additional damage to the left side of its head. Left series of images are from 2019, right series of images are from 2025. A blade of sea grass can be seen hanging from the turtle's mouth in the images from 2025.

Table 1. Recapture events, carapace and tail length measurements, and tagging history of Y6939 (2019 – 2025). SCL_{n-t} = mean straight carapace length notch to tip (cm) per year. TLC = length of tail from the notch between the supracaudal scutes to the tip of the outstretched tail (negative if the tail tip does not extend past the end of the carapace) (cm). * = tag removed. **error in field records.

Year (# captures)	SCL_{n-t}	TLC	External tags	PIT	Comment
2019 (n = 1)	60.5	-1.5	Y6939 Y6940	0007C7E7B3	Moderate barnacle load. First capture/tagging.
2021 (n = 2)	61.0	3.5**	Y6939 Y6940	0007C7E7B3	Light barnacle load.
2022 (n = 5)	60.9	-1.5	Y6939 Y6940	0007C7E7B3	Light barnacle load.
2023 (n = 4)	61.1	-1.5	Y6939* Y7523 Y6940	0007C7E7B3	Light barnacle load.
2025 (n = 1)	61.8	-1	Y7523 Y7977	0007C7E7B3	Light barnacle load. Y6940 missing and replaced

for a recapture history spanning 6 years (Table 1). Upon first capture the turtle's carapace length was 60.5 SCL_{n-t} and it had a tail that did not extend past the end of its carapace indicating this was a large juvenile and possibly female. It presented as healthy, with no evidence of emaciation, which would be indicated by a thin neck and clear presence of the skull's occipital process under the skin. The turtle did, however, display a moderate barnacle load, including barnacles in the mouth on the underside of the upper jaw. The barnacles in the mouth were evident as the turtle lacked a lower jaw. The turtle also presented damage to the left side of the head, underneath the eye, in addition to the absence of its lower jaw (Fig. 2). No open wounds were present where the severed jaw would have been attached. We concluded that the turtle had sustained some form of traumatic injury that resulted in the loss of its lower jaw and other damage to the head, but as the turtle appeared healed and healthy we decided not to send it to ARCHELON's Rescue Centre, but to release it, as normal. The turtle has been recaptured multiple times (Fig. 1, Table 1) in a similar condition in subsequent years but lacked the same barnacle load as when first captured (Fig 2., Table 1). The turtle has been recorded growing, with its SCL_{n-t} increasing on average 0.2 cm per year (Fig. 3, Table 1) and the tail has shown no signs of elongation (Table 1).

It is remarkable the turtle has maintained apparent good body condition

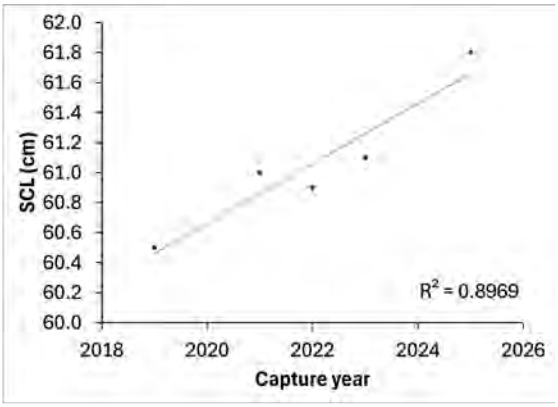

Figure 3. *Y6939*'s increasing carapace length over time. Points represent mean carapace length (SCL_{n-t}) per year. Linear trend line shown.

over the seven-year period (2019-2025) it has been observed, which must indicate it is able to successfully feed. The loggerhead turtle's usual food is crustaceans and other shellfish, which require crushing before swallowing, so this turtle must be specialising on consuming a different food type. Perhaps the turtle is eating sea cucumbers. That behaviour has been observed in several turtles in Laganas Bay, Greece (Papafitsoros 2023). The change in barnacle load is interesting. One cause may be that the turtle, when first caught, was only recently recovered from its injuries and the barnacles had proliferated on it whilst it went through recovery (Herbert & Jacobson 1995). Another option may be that the turtle on first capture had only recently recruited to Amvrakikos Gulf from another foraging area where barnacle infestations are more prevalent and it subsequently lost its load

on acclimating to the gulf conditions. It could, indeed, be a combination of both scenarios or something else entirely.

The successful healing of such a severe amputation without human intervention highlights the remarkable resilience of sea turtles in coping with wounds and trauma. In Amvrakikos Gulf, individuals with missing, or partially missing, flippers are also observed (ARCHELON, unpublished data). While flipper loss may not pose as immediate a threat as the loss of a lower jaw, it can have long-term consequences, particularly for female turtles, as the inability to dig egg chambers prevents successful nesting (Dretakis et al. 2023). There is therefore potential that, through overcoming its limitations, this jawless turtle may still be able to fulfil its ecological role and contribute to the continuation of the population. Future captures of the turtle will give us a better understanding of its maturity status, confirm whether it is male or female and support a belief that against very tough odds, turtles can survive and act as emblems of resilience and hope.

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