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Characterization of a Green Turtle (*Chelonia mydas*) Foraging Aggregation along the Pacific Coast of Southern Mexico

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***Abstract.*—The primary foraging areas of Green Turtle (*Chelonia mydas*) in the Mexican Pacific are located near the Baja California Peninsula, although foraging areas also have been documented along the southern coast of the country. The goal of this study was to determine demographic characteristics, catch per unit of effort (CPUE), condition index (CI), and food preferences of Green Turtles in Chacahua Lagoon, Oaxaca, Mexico. This is the first study of its kind involving a foraging aggregation along the Pacific Coast of southern Mexico. Between June 2009 and May 2010, we captured 16 Green Turtles with entanglement nets and had 25 total captures. Individuals that we captured more than once spent up to six months in the lagoon. Based on size, we classified 14 turtles as adults and two as juveniles. We could not determine the sex of all turtles. The mean monthly CPUE was 0.095 turtles/100 m net/12 h, which was one to two orders of magnitude lower than those reported for Baja California foraging areas. The mean CI was 1.38, similar to that reported for other Eastern Pacific foraging sites. Eight turtles exhibited injuries, mainly on the carapace and likely from outboard engine boats. Samples of esophageal and oral cavity contents that we collected from some turtles revealed that they consumed *Gracillariopsis lemaneiformis*, a macroalgae species distributed in several patches throughout the lagoon. Our study provides data on a foraging aggregation of Green Turtles that may be used to guide conservation efforts and research in an under-studied region.**

Key Words.—Condition index; conservation; entanglement net; macroalgae; Oaxaca; size distribution.

Introduction

The Green Turtle (*Chelonia mydas*) is widely distributed in tropical and subtropical areas of the world. The species is currently listed as endangered by the International Union for Conservation of Nature (IUCN), and many of its populations continue to decline (International Union for Conservation of Nature. 2014. The IUCN Red List of Threatened Species. Version 2014.2. Available from http://www.iucnredlist.org [Accessed 24 April 2017]). In the Eastern Pacific, Green Turtles inhabit coastal waters from the U.S. West Coast (Eguchi et al. 2012) to South America (Denkinger et al. 2013); their primary nesting beaches are located in Michoacán and the Revillagigedo Archipelago, Mexico, and on the Galapagos Islands, Ecuador. In Mexico, Green Turtles nest sporadically in other areas along the Pacific Coast, including the state of Oaxaca (Márquez 1996). After the breeding season ends, East Pacific Green Turtles typically migrate to shallow bays and lagoons where they feed on sea grasses, macroalgae, and invertebrates (Seminoff et al. 2002a; Amorocho and Reina 2007; Lemons et al. 2011).

The primary foraging areas of Green Turtles in the Mexican Pacific are located on the Baja California Peninsula (BCP), where several studies have examined population structure, abundance, diet, growth rate, mortality, and other population characteristics (Seminoff et al. 2002a, 2002b; Koch et al. 2006, 2007; Labrada-Martagón 2010). In addition, several foraging aggregations have been reported in southern Mexico in the Superior, Inferior, and Mar Muerto lagoons on the Isthmus of Tehuantepec and in the Pastoría Lagoon, Oaxaca (Márquez et al. 1982; Márquez 1996; Karam-Martínez et al. 2014), but no population studies have been carried out on any of these aggregations. Thus, the goal of the present study was to document demographic characteristics, catch per unit of effort (CPUE), condition index (CI), and food preferences of Green Turtles from the foraging aggregation in the Chacahua

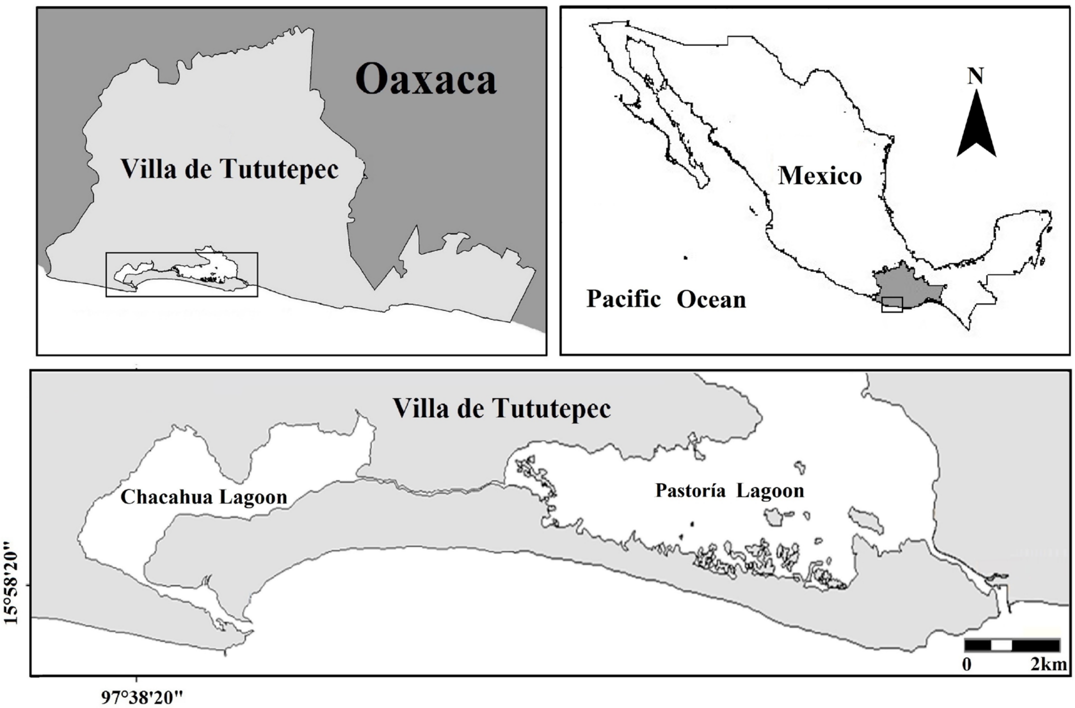

Figure 1. Location of the study site, Chacahua Lagoon, Oaxaca, on the Pacific Coast of southern Mexico.

Lagoon, Oaxaca, Mexico, to increase our knowledge of this species along the Pacific coast of southern Mexico.

Materials and Methods

Study site.—The Chacahua Lagoon is located in the Lagunas de Chacahua National Park in the municipality of Villa de Tututepec de Melchor Ocampo on the west coast of Oaxaca, Mexico (Fig. 1). The lagoon is approximately 600 ha and is connected to the Pastoría Lagoon by a narrow channel. Chacahua had an average depth of 1.80 m in 1997–1998 (Pantaleón-López et al. 2005) and in 2007–2008 (J. Alberto Montoya-Márquez, unpubl. report).

Data collection and analysis.—We conducted multi-day sampling trips once a month between June 2009 and May 2010 (n = 11). During each excursion, we set entanglement nets composed of 0.80–0.95 mm diameter monofilament with a length of 200–450 m, a height of 4 m, and a mesh size of 60–70 cm (knot to knot). We tied anchors to the ends and stretched the net. We decided to employ a larger mesh size than the one suggested (40–50 cm stretch) by Ehrhart and Ogren (1999) based on our previous experience in Pastoría Lagoon (Karam-Martínez et al. 2014) in which we employed nets with mesh size of 30–60 cm stretch, and found that several large-sized Green Turtles swam parallel to the net, even touched it, but did not become entangled.

We left the entanglement nets in place for 34–66 continuous hours. The field crew took 8-h shifts to guard the nets constantly from outboard motor boats. To prevent injuries to sea turtles or other organisms, the field crew navigated along the nets checking them visually each hour, and examining the mesh carefully by pulling the upper line every 2 h. When the boat navigated to our land base for personnel changes, one person guarded the nets from a wooden dinghy (approximately 1 h each time). For some monthly sampling excursions, we left the entanglement nets in one location for the entire duration of sampling. During other excursions, we moved nets between nearby patches of macroalgae (< 1.2 km distance between sites) during the course of the sampling period.

Upon capture, we kept turtles onboard the boat or in a shaded area on the beach. We used a flexible tape to measure the curved carapace length notch to tip (CCL) and the curved carapace width (CCW; Bolten 1999) and we used a spring scale to weigh each individual to the nearest 0.1 kg. To facilitate comparison with other studies, we transformed the CCL measurements into straight carapace lengths (SCL) using the equation SCL = (CCL-2.2464)/1.0363, which Seminoff et al. (2003) developed based on measurements of Green Turtles in Baja California (BC). We also tried another transformation equation, SCL = (0.919×CCL)+1.9645, from Velez-Zuazo et al. (2014) obtained from Green Turtles from El Ñuro, Perú. The transformed values from both equations were very similar (differences from 0.1 to 0.5 cm).

We used the mean size of nesting Green Turtles to distinguish maturity stages (Nichols 2003; Seminoff et al. 2003; Carrión-Cortez et al. 2010). As we lack the genetic data required to identify the specific nesting beach used by the turtles captured in Chacahua, we used the smallest mean size documented among all potential nesting beaches (Javier Alvarado and Alfredo Figueroa, unpubl. report; Juárez-Cerón et al. 2003; Zárate et al. 2003) to distinguish adults and juveniles. Thus, we classified turtles with SCL < 77 cm as juveniles and those with SCL ≥ 77 cm as adults based on the mean nesting size at Michoacán (Javier Alvarado and Alfredo Figueroa, unpubl. report). Sea turtles do not reach maturity at a uniform or minimum size (Meylan et al. 2011), so size is not a guaranteed indicator of maturity (Miller 1997); however, in the absence of specialized techniques like radioimmunoassay or laparoscopy, we relied on external morphology to provide a general description of life stages present in the study area. We used one morphological feature to identify adult male turtles: the muscular tail extends well beyond the carapace, whereas females have short tails that project only slightly beyond the edge of the marginal scutes (Wibbels 1999). This method, however, is not reliable for distinguishing adult females from large juvenile males as not all turtles reach maturity at a uniform size (Wibbels 1999; Meylan et al. 2011).

Following other studies on East Pacific Green Turtles, we used the calculated SCL to identify size classes. We generated a frequency histogram using the SCL data to identify the most abundant size class in the study area. To construct the histogram, we used the rule by Sturges (1926) to estimate the number of intervals (k). We calculated interval width as (maximum value - minimum value)/k. We calculated Green Turtle CPUE for each month, defining a unit of effort as setting 100 m of entanglement net for 12 h (Seminoff et al. 2003; Koch et al. 2007) using CPUE = number of captures/[(net soak time in hours/12)×(length of net in meters/100)].

We calculated the CI using the equation CI = (weight/SCL^3)×10,000 (modified by Koch et al. 2007 from Bjorndal et al. 2000). Koch et al. (2007) and Velez-Zuazo et al. (2014) calculated the CI only for initial captures and recaptures that occurred 10–11 mo later to reduce measurement error and the effect of seasonal differences. Because all of our recaptures occurred within 180 d of the initial capture, we only used data from initial captures. We tagged the right anterior flipper of each turtle with an Inconel tag and observed the general condition of each animal, documenting and photographing any anomalies.

We initially attempted stomach pumping to obtain food samples, following the steps described by Forbes (1999). Because of the difficulty of using this technique with East Pacific Green Turtles (Amorocho and Reina 2007) and the stress caused to the animals, we decided to use the less invasive option of opportunistically collecting fluid that was expelled from the esophagus and oral cavity when handling turtles. These samples were fixed with 4% formaldehyde (i.e., 10% formalin) for species identification (Seminoff et al. 2002a). We released all turtles near their site of capture.

Assisted by local residents on our field crew, we used direct observation to identify the macroalgae patches frequented by the turtles. We collected samples of these patches, storing them in plastic bags and fixing them with 4% formaldehyde for species identification. We used the taxonomic keys published by Dawson (1954, 1962), Abbot and Hollenberg (1992), and Fischer et al. (1995), as well as the online database (Guiry and Guiry. 2011. Algaebase. Worldwide Electronic Publication, National University of Ireland, Galway. Available from http://www.algaebase.org [Accessed 09 August 2011]) to identify species of algae.

Results

We did not capture any turtles during the first 20 h of our first sampling excursion (June 2009). We noted that the turtles approached the net but either did not become ensnared or if they did, they were able to escape as we tried to maneuver them onto the boat. The capture technique was improved by local residents on our field crew who recommended setting the net loosely and reducing the ballast. As a result of these modifications, we were able to capture 16 Green Turtles during the study period (June 2009 to May 2010). We captured four turtles multiple times (two to five times each), resulting in a total of 25 captures. The length of time between recaptures of individual turtles suggested they may reside in the lagoon for up to six months at a time, with recapture intervals of 2–180 d.

Our in-water sampling totaled 304.2 units of effort (1 unit = 100 m of net set for 12 h) and the average monthly CPUE was 0.095 ± (SE) 0.028 Green Turtles/unit effort (range = 0–0.294). Mean (± SD) morphological measures at initial capture were as follows: CCL = 85.6 ± 4.0 cm (range = 80.0–93.8 cm); calculated SCL = 80.5 ± 3.9 cm (range = 75.0–88.3 cm); CCW = 79.9 ± 5.6 cm (range = 73.8–90.5 cm); and weight = 71.5 ± 9.2 kg (range = 56.7–86.2 kg). We estimated five size classes with an interval width of 2.66 cm. All turtles were > 75 cm SCL, with the highest frequency of turtles in the 80.4–83.1 cm size class (Fig. 2). We classified only two individuals as juveniles (< 77 cm SCL) and the remaining 14 turtles as adults. Seven of the adult turtles showed the muscular elongated tail characteristic of males.

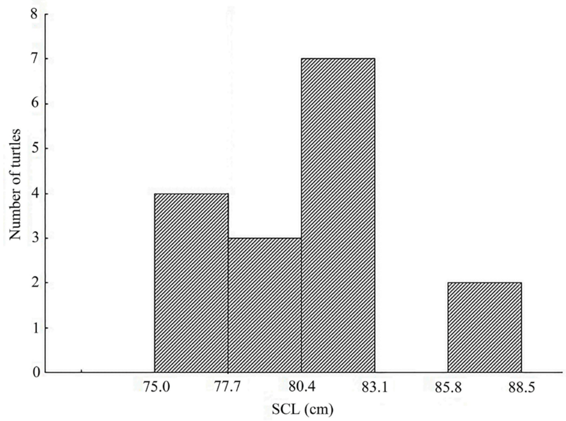

Figure 2. Frequency distribution of straight carapace length (SCL) for Green Turtles (*Chelonia mydas*) captured in Chacahua Lagoon, Oaxaca, Mexico, in 2009–2010.

The mean (± SE) CI was 1.38 ± 0.046 (range = 1.04–1.69). During the investigation, half of the turtles (n = 8) presented evidence of healed or healing past injuries, primarily to the carapace but also on the head and neck (Fig. 3). Six of the seven oral and esophageal fluid samples contained fragments of the red algae *Gracilariopsis lemaneiformis*; four also included the green algae *Ulva compressa* and *Chaetomorpha* sp. The macroalgae patches near the Chacahua capture sites consisted mostly of *G. lemaneiformis*, and to a lesser extent *U. compressa* and *Chaetomorpha* sp.

Discussion

Reviews by Márquez (1990, 1996) and research by Karam-Martínez et al. (2014) provide general information on the existence of marine turtle feeding sites on the Isthmus of Tehuantepec, Oaxaca, Mexico; however, we present the first population study of a Green Turtle feeding aggregation on the Pacific coast of southern Mexico. Our one-year study had relatively small sample size, but we provide the first description of Green Turtle population characteristics in this understudied region and an important starting point for future research. Our mean CPUE (0.095) was one to two orders of magnitude lower than the values reported for multiyear studies at two other BCP feeding sites: 0.4 (range = 0.23–0.66) in Bahía de los Ángeles (Seminoff et al. 2003) and 1.5 (range = 0.76–2.19) in Bahía Magdalena (Koch et al. 2007). Long-term research is necessary to determine whether the low CPUE is a true reflection of turtle abundance at this site. Future studies should incorporate the use of tags, as mark-recapture analysis is the only method available for quantitative analysis of abundance between sites and over time (López-Castro et al. 2010). The characteristics of the nets and the setting procedures used in the present study were effective and can be used as a reference for future research in the region.

We recaptured individual turtles several times over the course of field work (intervals from 2–180 d); conceivably, these turtles may have left the area between captures, or they may have remained in the foraging area during this time. Seminoff et al. (2003) interpreted the recapture of Green Turtles in Bahía de los Ángeles, BC (during the same year and during consecutive years), as indicating that individuals remain in the foraging area for prolonged periods of time. Based on recapture data from five sites on the BCP, López-Castro et al. (2010) inferred that Green Turtles remained in these foraging areas throughout the year (intervals from one month to five years). Therefore, we hypothesize that the Green Turtles in the Chacahua Lagoon remained there for several months or perhaps longer; however, further monitoring is required to confirm this.

The size distribution of the Chacahua Green Turtles differed from that described in other feeding zones of the Eastern Pacific in terms of the size range represented and the size class with highest turtle frequency (Table 1). We documented turtles in the size range of 75.0–88.3 cm SCL, with the highest frequency of turtles occurring in the 80.4–83.1 cm size class. It is possible that net location affected size class capture, but we believe this is not the case, given the relatively close proximity of

Table 1. Size distribution of Green Turtles (*Chelonia mydas*) at sites in the Eastern Pacific. Abbreviations are BC = Baja California, BCS = Baja California Sur, and SCL = straight carapace length.

Locality	Study Period	n	SCL range (cm)	Number of classes	Size class	Dominant size class	Reference
Bahía de los Ángeles, BC, Mexico	1995–2002	200	46–100	12	4.9	75–80	Seminoff et al. 2003
Bahía Magdalena, BCS, Mexico	2000–2003	212	35–90	12	5	45–55	Koch et al. 2007
Gorgona Island, Colombia	2003–2004	86	37.0–72.9	7	5	55–70	Amorocho and Reina 2007
San Ignacio-Navachiste-Macapule Lagoon System, Sinaloa, Mexico	2005	–	26–110	–	–	51–70	Zavala et al. 2010
Chacahua Lagoon, Oaxaca, Mexico	2009–2010	16	75.0–88.3	5	2.7	80.4–83	Present study

Figure 3. Evidence of carapace injuries sustained by Green Turtles (*Chelonia mydas*) captured in Chacahua, Oaxaca, Mexico, in 2009–2010. (Photographed by Isabel Raymundo-González).

all net locations. At other sites in the East Pacific, the size range is wider and the most frequent sizes are small (40.0–55.0 cm SCL) and medium (55.0–70.0 cm SCL). The only other site with a trend toward larger sizes (> 70 cm SCL) is found in Bahía de los Ángeles, BC, México (Table 1). The size distribution reported in our study is not likely the result of a bias for larger turtles due to the mesh size of our nets (60–70 cm). Velez-Zuazo et al. (2014) captured turtles with CCL = 44.9–84.5 cm (41.2–79.4 cm SCL) using nets with a mesh size of 60–65 cm in Paracas, Perú. Moreover, we captured an Olive Ridley (*Lepidochelys olivacea*) measuring 65.3 cm CCL (converted to 62.6 cm SCL based on Whiting et al. 2007). During the period of study we only sighted large Green Turtles. The size range of the Green Turtles reported here is characteristic of large juveniles and adults.

Juveniles and adults coexist at many feeding sites of Green Turtle in the East Pacific (López-Mendilaharsu et al. 2005; Carrión-Cortez et al. 2010; Zavala et al. 2010; Velez-Zuazo et al. 2014). At some sites, juveniles predominate (Koch et al. 2007; López-Castro et al. 2010), while at other sites large juveniles and adults make up the majority of turtles (Seminoff et al. 2003). In Gorgona, Colombia, only juveniles are present (Sampson et al. 2014), as is the case at numerous sites in the Caribbean and Florida (Meylan et al. 2011). Globally, no study reports the presence of large adults and the complete absence of juveniles. López-Castro et al. (2010) explain the higher percentage of large juveniles and adults at the site of El Pardito in the Gulf of California as being due to the high percentage of turtles that visit the Gulf of California on their way back to more northern feeding zones after the reproductive season.

The presence of only large juveniles and adults in our study area suggests that Chacahua Lagoon is a migratory stopover area for Green Turtles. Two other circumstances reinforce this notion: first, in several of the studies mentioned above, researchers have detected differential habitat use within the study area, and juveniles are found in shallow protected areas, while large juveniles and adults are found in deep, high-energy oceanic zones (López-Mendilaharsu 2002; Seminoff et al. 2003; Koch et al. 2007; López-Castro 2010). Despite the fact that Chacahua and Pastoría are shallow coastal lagoons, only larger turtles have been captured there (present study and Karam-Martínez et al. 2014). Second, Green Turtles breed and nest occasionally along the coast of Oaxaca (Comisión Nacional de

Table 2. Condition index values for Green Turtles (*Chelonia mydas*) at East Pacific localities.

Locality	Mean	Range	n	Reference
Bahía de los Ángeles, Baja California, México	1.42	1.03–2.19	102	Seminoff et al. 2003
Bahía Magdalena, Baja California Sur, México	1.35	1.03–1.70	212	Koch et al. 2007
Five sites along the Baja California Peninsula, México	1.2–1.4	0.67–2.30	1169	López–Castro et al. 2010
Three sites along the Pacific Coast of Baja California Peninsula	1.25–1.5	1.34–1.67	97	Labrada–Martagón et al. 2010
Ojo de Liebre Lagoon, Baja California Sur, México	1.48	1.25–2.06	21	Rodríguez–Barón et al. 2011
Gorgona National Park, Colombia	1.38	0.80–2.46	745	Sampson et al. 2014
Chacahua Lagoon, Oaxaca, México	1.38	1.04–1.69	16	Present study

Áreas Naturales Protegidas. 2009. Ficha técnica tortuga verde. Available from http://www.conanp.gob.mx/pdf_especies/tortuga_verde.pdf [Accessed April 2016]). For example, during the 2009–2010 nesting season, 13 nests were reported on beaches in the Lagunas de Chacahua National Park (Hugo Navarro-Solano, unpubl. report). Additional research is needed to test the hypothesis of the migratory stopover area and to identify the origin of the Green Turtles that aggregate in the Pastoría and Chacahua Lagoons, including mark-recapture efforts in lagoons and on nesting beaches, satellite telemetry of post-nesting females, and genetic analyses. Additionally, stable isotope analysis would be useful for understanding where turtles have been foraging and thus, where there is connectivity between habitats (Lemons et al. 2011). Studies involving mark-recapture, molecular genetics, and satellite telemetry have demonstrated the association between Green Turtle nesting and foraging areas. Turtles that nest in Michoacán tend to migrate to Baja California and to the south, primarily to Guatemala and El Salvador (Alvarado and Figueroa 1992), whereas individuals from the Revillagigedo Archipelago, Mexico, have an affinity for the west coast of the U.S. (Juárez-Cerón et al. 2003). Some turtles from the Galapagos Islands, Ecuador, travel to neritic foraging areas in Central and South America (Green 1984; Amorocho et al. 2012); however, not all individuals exhibit this pattern. For example, Seminoff et al. (2008) identified three post-nesting migration strategies in the Galapagos: (1) ocean migration to Central America; (2) residence in the Galapagos; and (3) movement to oceanic waters south of the islands. In Costa Rica, Blanco et al. (2012) found that, while some nesting females feed near their breeding areas, others migrate further away.

During our investigation, it was not possible to definitively determine the sex of captured juvenile turtles or those classified as adults that did not exhibit secondary sexual characteristics. To provide reliable estimates of sex ratio for this population, we must first establish the minimum size at sexual maturity via laparoscopy (Meylan et al. 2011) and then determine sex based on blood serum testosterone levels measured using radioimmunoassay (RIA; Wibbels 1999) or with enzyme-linked immunosorbent assay (ELISA; Allen et al. 2015) calibrated using the laparoscopied turtles (Meylan et al. 2011). Allen et al. (2015) recently described a female bias in sex ratio (2.83F:1M) for the foraging aggregation of Green Turtles in San Diego, California, USA, and the authors emphasized that sex ratio assessment is important for wildlife management, particularly endangered populations and species that show temperature-dependent sex determination or are subject to sex-specific threats.

The CI (1.38) reported here is similar or slightly lower than that published for other feeding sites of Green Turtles in the East Pacific (Table 2), the value is in the Very Good range, following the body condition categorization criteria developed for Green Turtles in Queensland, Australia (Flint et al. 2009). Seminoff et al. (2003) reported that the CI for turtles in the Bahía de los Ángeles (1995–2002) was significantly higher than that reported by Caldwell in 1962 for the same site. This may be due to the CI being negatively correlated with population density, as Bjorndal et al. (2000) reported for a Green Turtle development area in the Caribbean. It is possible that the CIs for the sites in Table 2, including the present study, may reflect low population density and, thus, food availability. Labrada-Martagón et al. (2010) urge caution when relying on metrics like CI, as our interpretation is complicated by differences in season, sex, age, or gonadal development. They recommend that CI estimation take into consideration biotic and abiotic factors as well. Thus, further research is necessary before drawing conclusions regarding the condition of the Chacahua Green Turtles, particularly because overestimation of their body condition could lead to the development of inadequate conservation programs (Labrada-Martagón et al. 2010). Another conservation concern for Green Turtles in Chacahua Lagoon is the high incidence of injuries (50%); based on field observations and conversations with local residents, at least some of these injuries may be attributed to outboard motor boats moving at high speeds, particularly in the narrow channel connecting Chacahua with Pastoría Lagoons. Denkinger et al. (2013) reported a lower incidence of injuries caused by boats (16–20%) at a foraging area near Puerto Baquerizo Moreno in the Galapagos Marine Reserve. Speed limits were not regulated in the

Galapagos Marine Reserve in 2011 (Denkinger et al. 2013) or in Chacahua in 2010. Today, the management program of Lagunas de Chacahua National Park (Diario Oficial de la Federación. 2013. Acuerdo por el que se da a conocer el resumen del Programa de Manejo del Área Natural Protegida con el carácter de Parque Nacional Lagunas de Chacahua. Available from http://dof.gob.mx/nota_detalle.php?codigo=5321567&fecha=11/11/2013 [Accessed 11 July 2017]) established a speed limit of four knots (7.4 km/h), though Hazel et al. (2007) observed that Green Turtles cannot avoid boat collisions unless boats travel less than 4 km/h.

Unlike Atlantic Green Turtles, East Pacific Green Turtles possess a crop, a specialized muscular structure between their esophagus and stomach (Wyneken 2001). This anatomical distinction makes it impossible to use a hose to reach the stomach without risking harm to the animal (Amorocho and Reina 2007). Thus, in studies of East Pacific Green Turtles, researchers have assessed diet using an esophageal lavage to collect recently ingested food from the esophagus and the anterior stomach region (Forbes 1999). In our study, we only collected the oral and esophageal fluid expelled by the turtles. This technique was used as a complement to esophageal lavage by Amorocho and Reina (2007) and is mentioned by Forbes (1999). This method permits insight into diet, but does not provide data appropriate for quantitative analysis. There is inherent bias in the technique as these alimentary samples may include only those dietary items that are hard to swallow and the contents of the final bites taken by turtles before capture. Our approach confirms the consumption of *G. lemaneiformis*, *U. compressa*, and *Chaetomorpha* sp. by turtles in the Chacahua Lagoon, but this does not constitute a complete description of their diet. The turtles are likely also consuming other items that may include other species of macroalgae, vascular plants, and animals (Amorocho and Reina 2007; Carrión-Cortez et al. 2010; Lemons et al. 2011; Rodríguez-Barónet al. 2011). However, the frequency of turtle sightings and captures near macroalgae patches and the high CI indicate that Green Turtles congregate to feed in the Chacahua Lagoon.

Based on field observations at Chacahua Lagoon, *G. lemaneiformis* was the most conspicuous macroalgae species and also the most common macroalgae in the esophageal contents. This species of macroalgae has been reported as a food item for Green Turtles on the BCP (Hilbert et al. 2002; Seminoff et al. 2002a; Rodríguez-Barón 2010). This is the first report of *U. compressa* as a Green Turtle food item, although other species of the same genus have been reported in Hawaii: *U. fasciata*, *U. reticulate*, and *U. rigida* (Russell and Balazs 2000). *Chaetomorpha* sp. may have been ingested incidentally as it grows between *G. lemaneiformis* patches. Rodríguez-Barón (2010) report *Chaetomorpha californica* as an epiphyte of the dietary components *Gracilaria vermiculophylla* and *G. textorii* on the west coast of Baja California Sur, Mexico.

In the future, it will be important to study other coastal lagoons in southern Mexico to gather information on Green Turtle presence and aggregation characteristics that may help refine conservation programs and improve the recovery of this protected species. Local residents played an important role in all stages of this investigation, leading us to the sites frequented by turtles, helping us to improve our capture techniques, and participating as members of our field crew. The involvement of local communities in the conservation of the sea turtles that use the Pacific coastal lagoons of southern Mexico as foraging sites is of the utmost importance.

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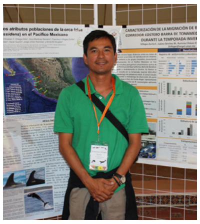

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