Hawaiian Green Turtle

Chelonia mydas (Hawaiian subpopulation)

ABSTRACT

Hawaiian Green Turtle *Chelonia mydas Hawaiian subpopulation* has most recently been assessed for *The IUCN Red List of Threatened Species* in 2018. *Chelonia mydas Hawaiian subpopulation* is listed as Least Concern.

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THE RED LIST ASSESSMENT

Chaloupka, M.Y. & Pilcher, N.J. 2019. *Chelonia mydas (Hawaiian subpopulation). The IUCN Red...*

LAST ASSESSED

20 August 2018

SCOPE OF ASSESSMENT

Global

Assessment in detail

POPULATION TREND

Increasing

NUMBER OF MATURE INDIVIDUALS

6,550

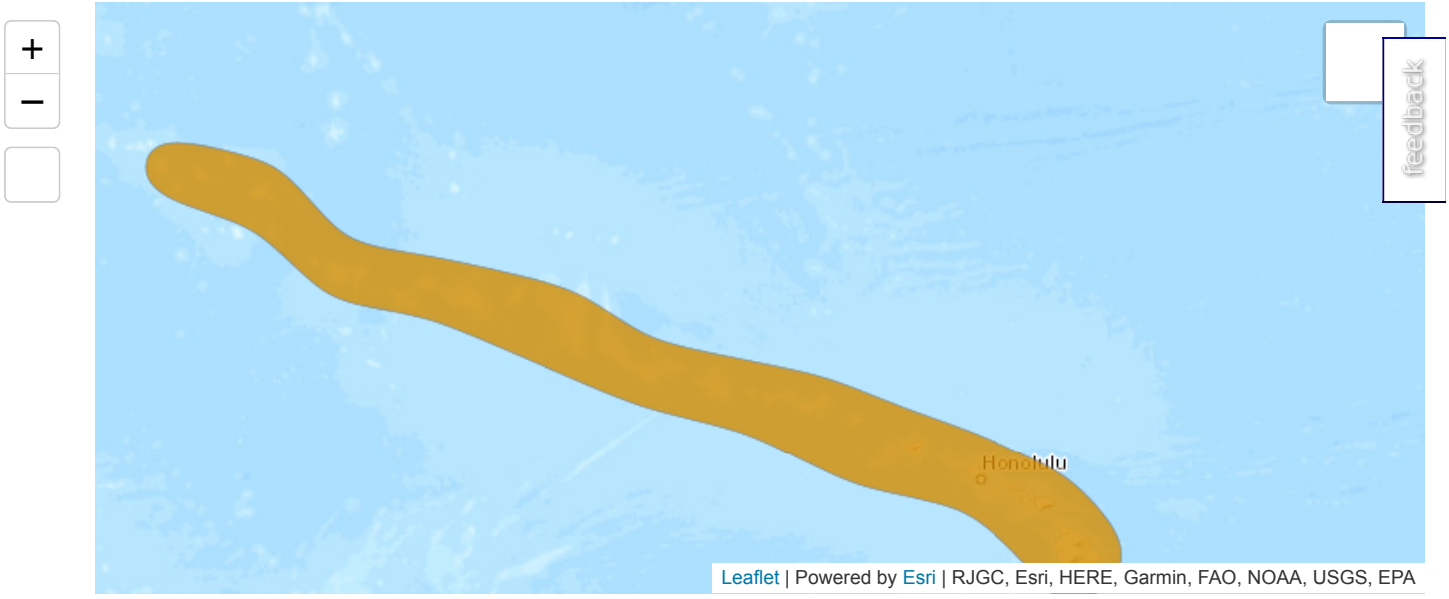
Population in detail

HABITAT AND ECOLOGY

Marine Neritic, Marine Oceanic, Marine Intertidal, Marine Coastal/Supratidal

Habitat and ecology in detail

GEOGRAPHIC RANGE



EXTANT (RESIDENT)

IUCN 2012. Chelonia mydas Hawaiian subpopulation. The IUCN Red List of Threatened Species. Version 2024-1

Geographic range in detail

Taxonomy

Taxonomy

KINGDOM
Animalia

PHYLUM
Chordata

CLASS
Reptilia

ORDER
Testudines

FAMILY
Cheloniidae

GENUS
Chelonia

Taxonomy in detail

Assessment Information

IUCN RED LIST CATEGORY AND CRITERIA
Least Concern
ver 3.1

DATE ASSESSED
20 August 2018

YEAR PUBLISHED

2019

Assessment Information in detail

YEAR LAST SEEN

PREVIOUSLY PUBLISHED RED LIST ASSESSMENTS

- 2012 — Least Concern (LC)

REGIONAL ASSESSMENTS

ASSESSOR(S)

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REVIEWER(S)

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PARTNER(S) / INSTITUTION(S)

AUTHORITY / AUTHORITIES

IUCN SSC Marine Turtle Specialist Group

JUSTIFICATION

Justification:
The Hawaiian Green Turtle subpopulation is genetically isolated and restricted to the Hawaiian Island region of the Central North Pacific (Figure 1 in the Supplementary Information; Dutton *et al*. 2008), and was designated a Distinct Population Segment under a recent US NOAA National Marine Fisheries Service global status assessment (Seminoff *et al*. 2015). Analysis of published peer-reviewed literature indicates that this endemic and genetically isolated Hawaiian Green Turtle stock – interchangeably referred to as the Central North Pacific subpopulation – is either approaching or has reached full recovery to pre-exploitation levels and anthropogenic hazards are not restricting population recovery (Balazs and Chaloupka 2004a, Chaloupka and Balazs 2007). The previous assessment of this subpopulation determined that its status is Least Concern; this update requires no change to this subpopulation's status.

Criterion A. Reduction in population size
This Red List assessment used annual nester counts at one key rookery in the French Frigate Shoals (FFS) as the index of abundance for this subpopulation. This index of abundance continues to increase at 5.4% per year with fluctuations from year to year (Figure 2 in the Supplementary Information), which are normal for nesting sea turtle populations because they are non-annual breeders (Hughes 1982); the proportion of nesting females in any given year is dependent on quality and quantity of foraging grounds in the preceding years (Limpus and Nicholls 1988) and climatic effects such as El Niño events (Limpus and Nicholls 2000). For these reasons, the inter-annual abundance trend increases then decreases due to fewer breeders in some years (for instance in 1982/83, 1997/98, and 2015/16), following which abundance of nesters increases. However, the increasing trend over time is clear (Figure 2 in the Supplementary Information).

The assessment of Hawaiian Green Turtle population abundance is based on monitoring the number of female nesters at East Island, FFS, in the Northwestern Hawaiian Islands (NWHI; Figure 1 in the Supplementary Information). This 43-year data series is one of the longest nesting abundance records for sea turtles worldwide and longer than one Green Turtle generation length (often a restricting limit when determining population trends using IUCN Red List Criteria). Using the 42-year nesting series, a robustly growing population trend of 5.44% (95% CI: 4.8-6.1) per annum was estimated based on a Gompertz state-space population dynamics model that accounted for regional ocean-climate effects driving breeding propensity and weighted by annual sampling effort (Figure 2 in the Supplementary Information). These nesting trends on FFS represent only *c*. 50% of all nesting in Hawaii and the numbers of mature animals nesting on East Island alone exceed thresholds for threatened status under Red List Criteria.

Historically Green Turtles were subject to a degree of harvest around the Main Hawaiian Islands (MHI) and the NWHI by Hawaiian people and outsiders (Kittinger *et al*. 2013). In the past 100 years (approximately three Green Turtle generations; see Seminoff *et al*. 2015 and references therein) the Hawaiian Green Turtle population was exploited for its meat (Witzell 1994, Chaloupka and Balazs 2007) and was depleted to around 20% of pre-exploitation abundance. However, exploitation stopped in the 1970s. In 2004 it was estimated that Hawaiian Green Turtles were at 83% of their pre-exploitation numbers (Balazs and Chaloupka 2004a), representing a population decline of ~17% to that point. Since then, the population has continued to grow at 5.44% per annum, and in several places within the Hawaiian islands it is likely the turtles have reached carrying capacity (Chaloupka and Balazs 2007, Wabnitz *et al*. 2010; but see Snover 2008).

While the Hawaiian Green Turtle subpopulation is still subject to a small degree of anthropogenic threat, the causes for the population decline are understood, and most of these have been addressed, reversed and/or ceased

Given the number of adult females is >2,500, the long-term population trend is and has been increasing for decades at ~5.44% per annum (Balazs and Chaloupka 2004a, Chaloupka and Balazs in prep.), the Hawaiian Green Turtle subpopulation is classified as Least Concern under IUCN Red List Criteria.

Criterion B. Geographic range
Extent of occurrence (EOO) for the Hawaiian Green Turtle was defined as the area contained within the shortest continuous boundary which encompassed all known occurrence for the Hawaiian

Green Turtle, which includes the Main Hawaiian Islands (MHI) extending all the way up to the NWHI. The minimum convex polygon around the MHI alone comprises some 41,000 km², and thus the Hawaiian Green Turtle EOO is >20,000 km².

Area of occupancy (AOO) was defined as the nesting habitat, which is critical to turtle reproduction and the smallest area essential to the survival of the population. There are ~226 km² of nesting habitat currently used throughout the archipelago, using the 2 x 2 km IUCN minimum grid size, as described in the previous assessment (Pilcher and Chaloupka, 2012). This estimate was derived by taking the total linear distance of each current known nesting beach for Hawaiian Green Turtles in the archipelago (113 linear total km of beach length for nesting site locations provided by Parker and Balazs 2015), dividing by 2 to derive the number of grids, and multiplying by 4 (for each 2 x 2 km square grid). While this could trigger a Vulnerable assessment under criterion B2, there is no continuing decline or fluctuation in AOO or the population; therefore, this subpopulation is also classified as Least Concern under this criterion.

Criteria C and D. Population size of mature individuals
The number of mature female Green Turtles is ~4,000 (Balazs *et al*. 2015). This figure is also supported by more recent analyses by Chaloupka and Balazs (in prep) which modelled the number of nesters at East Island based on annual capture-mark-recapture histories (black dots, Figure 2 in the Supplementary Information). The annual nester estimated are based on observed nesters corrected for detection probability (as standard for any capture-mark-recapture based method), because the capture-mark-recapture estimates are based on approximated a few weeks sampling each season (and this is highly variable) to get the annual estimate (whole of season). Hence those estimates are derived with variable precision (measurement error).

The modelled trend in Figure 2 (see the Supplementary Information) is a density-dependent population model (Gompertz model) fitted to the dots accounting for the sampling error in deriving those dots and the process error (environmental variability) related to regional ocean-climate factors driving the actual nester abundant each season.

Females comprise ~61% of all adult-sized turtles (Balazs *et al*. 2015), suggesting the number of mature individuals (including males) at ~6,550. While this is lower than the 10,000 mature individuals threshold for a Vulnerable listing, there is no continuing decline, and there are no extreme fluctuations in EOO, AOO, or number of mature individuals, making this subpopulation Least Concern under both criteria.

Criterion E. Quantitative analysis of the probability of extinction
A formal quantitative analysis of the probability of extinction of Hawaiian Green Turtles has not been conducted. Chaloupka and Balazs (2007) earlier suggested that nesters might be nearing carrying capacity at nearly 500 nesters per annum at East Island, but the inclusion of more recent nesting data indicate the population is growing at a rate of 5.44% per annum (Chaloupka and Balazs in prep.) and recent years have supported over 700 nesters. Tiwari *et al*. (2010) concluded the beach at East Island was well below carrying capacity and was capable of supporting an even larger nesting population.

Supplementary Information

Geographic Range

NATIVE

Extant (resident)

United States (Hawaiian Is.)

NUMBER OF LOCATIONS

UPPER ELEVATION LIMIT

1 metres

LOWER ELEVATION LIMIT

0 metres

UPPER DEPTH LIMIT

0 metres

LOWER DEPTH LIMIT

40 metres

Geographic Range in detail

Population

CURRENT POPULATION TREND

Increasing

NUMBER OF MATURE INDIVIDUALS

6,550

POPULATION SEVERELY FRAGMENTED

No

CONTINUING DECLINE OF MATURE INDIVIDUALS

No

Population in detail

Habitat and Ecology

SYSTEM

Terrestrial, Marine

HABITAT TYPE

Marine Neritic, Marine Oceanic, Marine Intertidal, Marine Coastal/Supratidal

GENERATION LENGTH (YEARS)

CONGREGATORY

MOVEMENT PATTERNS

CONTINUING DECLINE IN AREA, EXTENT AND/OR QUALITY OF HABITAT

Habitat and Ecology in detail

Threats

Biological resource use

- Fishing & harvesting aquatic resources

Other options

- Other threat

Threats in detail

Use and Trade

Food - human

Local: ✓

National: ✓

International: ✗

Use and Trade in detail

Conservation Actions

In-place research and monitoring

- Systematic monitoring scheme : Yes

In-place land/water protection

- Area based regional management plan : Yes
- Occurs in at least one protected area : Yes

In-place education

- Included in international legislation : Yes
- Subject to any international management / trade controls : Yes

Conservation Actions in detail

Bibliography

Red List Bibliography

EXTERNAL DATA

Images and External Links

Images and External Links in detail

CITES Legislation from Species+

DATA SOURCE

The information below is from the Species+ website.

CITES Legislation from Species+ in detail

Studies and Actions from Conservation Evidence

DATA SOURCE

The information below is from the Conservation Evidence website.

Studies and Actions from Conservation Evidence in detail

THE RED LIST PARTNERSHIP

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Red List Committee
Citing The IUCN Red List
Frequently Asked Questions
The IUCN Green Status of Species
Regional Red List Assessments
Red List Partnership
Background & History
Barometer of Life

ASSESSMENT PROCESS

IUCN Species Information Service (SIS)
Raw Data to Red List
Red List Authorities
Reasons for Changing Category
Assessment Petitions
Measuring Recovery with the IUCN Green Status of Species
The Species Threat Abatement and Restoration (STAR) Metric
Supporting Information

Planned Red List Updates
Red List Index (RLI)

RESOURCES AND PUBLICATIONS

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IUCN 2024. The IUCN Red List of Threatened Species. Version 2024-1. <https://www.iucnredlist.org>
ISSN 2307-8235