Assessment of Hawaiian Green Turtles Utilizing Coastal Foraging Pastures at Palaau, Molokai

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Project Description

Long-term studies of green turtles in coastal marine habitats of the Hawaiian Islands have been underway since the late 1970's. The overall objective of this research is to obtain comprehensive conservation and management data relating to growth rates, health status, food sources, spacial distribution, foraging strategies, population trends, reproductive migrations, and underwater behaviors. Systematic monitoring for 27 consecutive seasons (1973-99) at the principal Hawaiian green turtle breeding site of French Frigate Shoals has documented a significant increase in nesting females. Palaau, centered at 21°06'N, 157°07'W along the south shore of Molokai, is one of many resident areas where green turtles aggregate in the Hawaiian Islands to feed and rest. Since 1982, turtles ranging from 35cm in straight carapace length to mature adults have been captured unharmed at this location as by-catch in a bull-pen net (Balazs et al., 1987, 1998). The basis of this fishing technique is similar to pound nets used on the U.S. Atlantic coast, and fish weirs constructed in the South Pacific, Philippines and Taiwan. The four panels of small-mesh net that make up the bull-pen are set in shallow water <2m deep to form a trap that fish and turtles enter, but are unable to exit. The bull-pen consisted of 975m of net until July 1988 when it was shortened to 610m.

Analyses

Catch per unit effort (number of turtles captured per kilometer/hour of net deployed), and the associated coefficient of variance, were calculated for the 18 years of bull-pen fishing (Table 1). The annual mean CPE ranged from 0.12 (1983) to 2.89 (1989), with an overall CPE of 0.97 turtles/kmhr and a CV of 0.68. An analysis of variance using the SAS system detected a significant increase in CPE over the 1982-99 study period (Figure 1).

TRENDS software used for power analyses indicated that a minimum rate of annual change of 6% in the Palaau green turtle aggregation could be detected using the bull-pen methodology employed for 18 years. A minimum of 11 years would be needed to detect an annual change of 25%.

Literature Cited

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Balazs, G.H., R.G. Forsyth, and A.K H. Kam. 1987. Preliminary assessment of habitat utilization by Hawaiian green turtles in their resident foraging pastures. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-71, 107 p.

Table 1. Annual CPE Data for 18 Years of Bull-Pen Fishing Involving 74 Days that Resulted in the Capture of 1,685 Turtles

Year	XCPE	STD	STDERR	N	CV	MIN	MAX
1982	0.26	0.27	0.12	5	107.37	0.04	0.68
1983	0.12	0.13	0.06	4	102.77	0.02	0.30
1984	0.16	0.14	0.04	11	84.48	0.04	0.43
1985	0.51	0.43	0.12	14	85.35	0.04	1.62
1986	0.46	0.39	0.22	3	85.07	0.04	0.81
1987	0.43	0.30	0.17	3	70.00	0.13	0.73
1988	2.14	1.18	0.84	2	55.44	1.30	2.97
1989	2.89	1.47	1.04	2	51.05	1.84	3.93
1990	1.14	0.73	0.32	5	63.80	0.07	1.87
1991	0.90	0.58	0.29	4	64.12	0.14	1.54
1992	1.30	0.97	0.56	3	74.94	0.20	2.07
1993	1.16	0.09	0.05	3	7.84	1.07	1.25
1994	0.79	0.05	0.03	2	6.15	0.75	0.82
1995	0.92	0.72	0.51	2	78.57	0.41	1.43
1996	0.91	0.60	0.30	4	66.07	0.34	1.50
1997	0.98	0.16	0.11	2	16.44	0.87	1.09
1998	1.16	0.10	0.07	2	8.32	1.09	1.23
1999	1.26	0.58	0.33	3	46.39	0.68	1.84

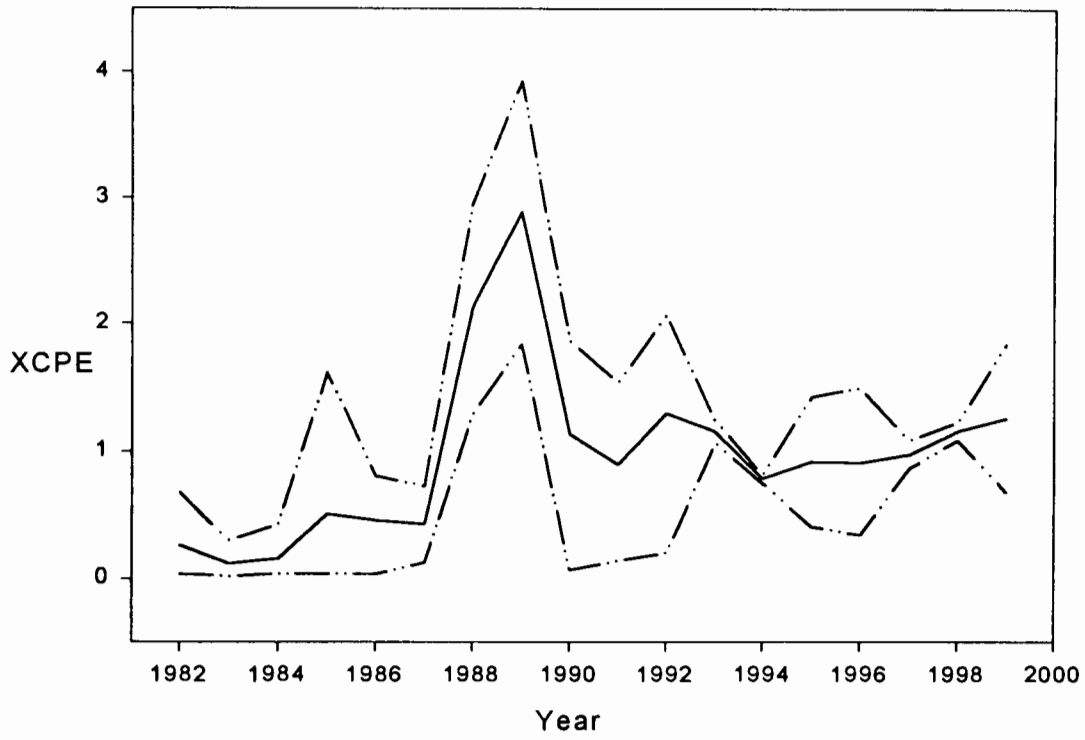

Figure 1. A significant increase has occurred in catch per unit effort of green turtles during bull-pen fishing conducted at Palaau, Molokai from 1982-1999.

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PROCEEDINGS OF A WORKSHOP ON ASSESSING ABUNDANCE AND TRENDS FOR IN-WATER SEA TURTLE POPULATIONS

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