



September 28, 2012

**VIA ELECTRONIC FILING AND POSTAL MAIL**

Office of Protected Resources  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, MD 20910

**RE: 90-Day Finding on a Petition to Delist the Green Turtle in Hawaii and Notice of Status Review (RIN 0648-XB089; NOAA-NMFS-2012-0154)**

To Whom It May Concern:

This letter is in response to the request for scientific and commercial information pertaining to the Hawai'i population of green sea turtle (*Chelonia mydas*). While it is understood that the ultimate goal of the Endangered Species Act is to recover imperiled species, we are concerned that the appeal to delist the green sea turtle, as stated in the petition filed by the Association of Hawaiian Civic Clubs, is premature.

The delisting of a species requires that the species has met specified recovery objectives, and that threats to long-term population viability are decreased and/or eliminated. While long-term studies have noted increases in nesting female abundance on breeding grounds (Balazs & Chaloupka, 2004; Chaloupka & Balazs, 2007), nester abundance derived from these studies are not yet equitable to stated recovery goals, nor have threats to sea turtles in the Hawaiian Islands been eliminated. There is also serious concern with respect to the species' long-term viability under alternative management, if delisting does occur. For these reasons, we provide the following comments with regards to green turtle population growth and stability in Hawai'i, and request that NMFS carefully and prudently consider and address these points in its Status Review.

**Adherence to Specified Recovery Criteria**

The petition filed by the Association of Hawai'i Civic Clubs (AOHCC) to delist the green turtle is based on over 30 years of females nesting data in the French Frigate Shoals, data which indicates that the nesting population is growing at an annual rate of approximately 5.4% (Chaloupka & Balazs, 2007). This increased population growth rate, as well as extrapolated population estimates, have generated a number of supporters who tout the "quick recovery of the green turtle population in Hawai'i" as a conservation "success story" (Hays, 2004). Yet while there is no denying the importance of increased female nester abundance, the failure of individuals, scientists and interest groups to distinguish between a "recovering population" and one that is "recovered" not only misinterprets the data, but further disregards the previously established recovery criteria for green turtle populations in the Pacific.



In 1998, NMFS and USFWS released the *Recovery Plan for the U.S. Pacific Populations of the Green Turtle (Chelonia mydas)*. The Plan reviewed the current status of the green turtle throughout its Pacific range and set forth clearly defined recovery criteria that must be met in order to consider delisting. Listed under recovery criteria, the Plan specifically states:

*“Each stock must average 5,000 (or a biologically reasonable estimate based on the goal of maintaining a stable population in perpetuity) females estimated to nest annually (FENA) over six years.”* (National Marine Fisheries Service & U.S. Fish and Wildlife Service, 1998)

In 2007, NMFS and USFWS released *Green Sea Turtle (Chelonia mydas) 5 Year Review: Summary and Evaluation*, which maintains that “the recovery actions identified in the [Recovery Plan] are appropriate and properly prioritized” (National Marine Fisheries Service & U.S. Fish and Wildlife Service, 2007).

The most recent survey of female green turtle nesters on East Island in French Frigate Shoals was completed in 2011, and recorded a total of 843 nesting females (Pilcher et al., 2012). As East Island is considered to provide a rookery for only 50% of green turtle nesting, the *total* number of nesters in 2011 could be estimated at 1,700. Suffice it to say, 1,700 is *not* equivalent to the necessary 5,000 annual nesters needed to satisfy delisting criteria.

Supporters of delisting ignore this obvious disparity, and instead fall back on the concept of a “*biologically reasonable estimate*”, as included in the recovery criteria wording. Reliance on “*biologically reasonable estimate*” to support the delisting of the current green turtle population in the Hawaiian Islands suffers, however, from two major flaws:

1. In the 2007 *5 Year Status Review* (see above), after extensive review of the best available and most up-to-date science, NMFS and USFWS re-assert that the recovery actions identified in the original *Recovery Plan* (e.g. average of 5,000 nesters annually) is appropriate. Why then, after *two* official reviews of the recovery criteria, is the “appropriateness” of accepted nesting abundance criteria still contested?
2. Although petitioners continue to question the validity of present recovery criteria, they themselves present no scientific basis demonstrating that *current* nester abundance (max 1,700 nesters) represents a “*biologically reasonable estimate... [to maintain] a stable population in perpetuity*” (as stipulated by the *5 Year Status Review*). Opposition to accepted recovery criteria thus appears scientifically baseless and unfounded, and driven more by personal sentiments than sound science.

Given the above, we suggest that NMFS and USFWS reaffirm the previously stated recovery criterion that requires an average of 5,000 annual nesters. If during the Status Review NMFS and USFWS conclude that the present recovery criteria is not, in fact, appropriate for this particular population of green turtles, it is requested that the aforementioned agencies provide sound, scientific evidence for determining what constitutes a “*biologically reasonable estimate*” of average annual nester abundance.

## Assessing the Recovery of the Hawai'i Green Turtle Population

Long-term (>25 years) female nester abundance studies conducted in the Hawaiian Islands demonstrate an overall increase in nesting females, an expected, given that the green turtle has enjoyed over 30 years of protection under the U.S. Endangered Species Act.

While it is exciting to note nester increases, special care should be taken to distinguish between a “recovering population” and one that is considered “recovered”. Under the Endangered Species Act, a species is considered “recovered” when it no longer requires federal protection, a situation that would prompt delisting. “Recovering”, on the other hand, implies a population that has not yet reached (or neared) its carrying capacity, and is not at a level of stability that warrants delisting.

Unfortunately, the idea that “recovered” and “recovering” are interchangeable has led to confusion with regards to the green turtle’s population status. Balazs & Chaloupka (2004) report, for example, that a 30-year study of the nesting abundance of the Hawaiian green turtle stock suggests the population is “well on the way to recovery” (Balazs & Chaloupka, 2004). In subsequent articles, however, Chaloupka and Balazs present figures that show nester abundance increasing at an exponential rate through 2005 (see Fig. 1 in Chaloupka & Balazs, 2007). These graphs, while depicting positive growth trends, provide no indication of a leveling trend, which would be expected with a population that is reaching, or has reached, its carrying capacity. The apparent exponential trend in nester data suggests that the population is still recovering, and may be well below its carrying capacity (Snover, 2008).

Snover (2008) points out additional shortcomings of stock assessments derived from Bayesian state-space surplus-production models (see Chaloupka & Balazs, 2007), and is especially critical of the fact that the models’ 95% credible intervals for stock carry capacity ( $K$ ) were quite large (Snover, 2008). Large spreads in confidence intervals typically indicate model weakness and, in the words of Snover, “raise a red flag that [the] modeling exercise does not provide enough information about the population to understand its dynamics” (Snover, 2008).

Recently (September 10, 2012), the Western Pacific Regional Fishery Management Council (WESPAC) submitted public comments on the 90-day finding (RIN 0648-XB089; NOAA-NMFS-2012-0154), stating that they believe the petition to delist the green sea turtle presents substantial scientific information that the Hawai'i population has recovered and is “no longer in danger of extinction” (Western Pacific Regional Fishery Management Council, 2012). The testimony includes nester abundance data recorded at East Island rookery from 1973-2010, and shows an increase in nester abundance overtime. What is most interesting, however, is that the underlying trend line is an “S-curve”, indicative of a rookery that is nearing stability (or carrying-capacity). It appears that a large portion of WESPAC’s testimony regarding the recovery of the Hawaii green turtle rests on this particular data set and the fact that the underlying trend is stabilizing (**Fig. 1**).

Noteworthy, however, is comparing WESPAC’s data set with that provided by the International Union for the Conservation of Nature (IUCN) (**Fig. 2**). Overall the IUCN uses identical nester data as WESPAC. Yet while WESPAC’s data shows trends from 1973-2010, the IUCN report includes additional data for the 2011 season, which interestingly enough, represented the largest number of nesting females on East Island since data collection began in the 1970s. By including 2011 nester abundance data, the stabilizing

trend included in WESPAC's testimony is replaced by a trend that does not appear to be reaching a stable level in the near future (Pilcher et al., 2012).

The point of comparing these two different data sets (1973 – 2010 versus 1973 – 2011) is to demonstrate that even one additional year of nester abundance data can result in vastly different conclusions with regards to the population's "recovery", and furthermore, to long-term management decisions.

With such significant discrepancies existing between data sets that differ by only a single year, it appears evident that scientists and managers lack sufficient data necessary to remove the Hawai'i green turtle population from the Endangered Species list.

Citing Wabnitz et al (2010), the petition also states that "some foraging grounds appear to be approaching or have reached carrying capacity". It should be kept in mind, however, that the Wabnitz study evaluated the green turtle population at a single site (Kaloko-Honokohā National Historic Park). Protected as part of the National Park system, this site is relatively free from the types of human disturbance and habitat alteration that characterize coastal areas and green turtle habitat outside park boundaries. The study is encouraging for the fact that it shows how green turtle populations can recover in protected areas, but we advise the petitioners to use caution when generalizing the findings of one study to describe the population dynamics of the green turtle on a whole.

We are concerned, given the above, that current modeling exercises and data series are, at present, too limited from which to conclude that Hawaii's green turtle has reached the point of delisting. We therefore suggest that NMFS and USFWS continue nester abundance studies, while additionally undertaking studies that include formal stock assessments, estimates of open ocean green turtle biomass, foraging ground green turtle population estimates, green turtle Population Viability Analysis (PVA) and studies that evaluate the carrying capacity of both foraging grounds and rookeries.

### **Sea Level Rise Threatens Green Turtle Nesting**

Increases in green turtle abundance in the Hawaiian Islands are largely attributed to the cessation of unregulated harvesting of adult turtles in coastal waters around the main Hawaiian Islands, as well as the end of habitat damage at main rookery sites from the early 1950s onward (Balazs & Chaloupka, 2004). Hawaii's green turtle stock, nevertheless, faces numerous threats, including habitat loss due to sea level rise, entanglement in recreational and commercial fishing gear, disturbance of basking/swimming/foraging turtles due to human activity, habitat alteration in foraging grounds due to coastal development and urbanization, pollution and contamination of key habitat areas and high incidence of fibropapillomatosis in certain foraging areas.

One threat that we do not believe has been given proper consideration is the effect of sea level rise on principle rookery habitats. While it is true that the majority of Hawai'i green turtles nest within the Papahānaumokuākea Marine National Monument, and are thus protected from direct human disturbance, principal rookery sites stand to be significantly impacted by even a median rise in sea level.

Over 90% of Hawai'i green turtle females nest in the French Frigate Shoals (FFS), and greater than 50% of those females nest on East Island (Balazs, 1976). The islands that comprise FFS, however, are low-lying, sandy areas sitting no more than 2 meters (6 feet) above sea level, characteristics that make them

particularly vulnerable to changes in sea level and ocean conditions. The complete submergence of Whaleskate Island in the late-1990s, once the second largest green turtle rookery site in the Hawaiian archipelago, attests to the area's susceptibility to changing environmental conditions (Balazs, 1976; Baker et al., 2006).

Studies modeling the effect of sea level rise on FFS habitat area concluded that a median rise in sea level (48 cm) could result in habitat loss of up to 28% throughout the entire FFS area, and over 15% habitat loss on East Island alone (Baker et al., 2006). While some may argue that 15% habitat loss does not represent a significant concern for nesting females, consider that 15% habitat loss on a 12 acre island translates to a loss of nearly *two acres*! The study's projected sea level rise scenarios, furthermore, treat the islands' current configurations as static, and the passive flooding scenarios presented do not take into account factors such as shoreline erosion, long-shore drift redistribution of sediments and net permanent loss of sand volume offshore (Baker et al., 2006). Habitat loss modeled by Baker thus represents only a *cautionary* scenario, as erosion, in particular, can severely disrupt nesting habitat, even if there is no "net" habitat loss (**Fig. 3**). To fully evaluate the longevity of principle nesting sites, and NMFS and USFW should therefore consider worst case sea level rise scenarios that treat the islands as dynamic, versus static, environments.

Baker (2006) also points out that when evaluating the influence of sea level on turtle nests, it is appropriate to also consider the spring tide projections, which occur on full and new moons. Given the Hawaiian green turtle's average 66 day incubation period (Niethammer et al., 1997), nests located below the spring tide level would be subject to periodic inundation, resulting in relatively high failure rates (Baker et al., 2006; Whitmore & Dutton, 1985).

Although alternate studies suggest that the islands are undergoing long-term accretion, which may somewhat mitigate habitat loss due to sea level rise (Webb & Kench, 2010), this in itself not very reassuring given that the long-term viability of the Hawai'i green turtle population seems wholly dependent on the ability of females to nest within the confines of the French Frigate Shoals.

Thus far, few proponents of delisting have acknowledged the potentially significant threat that sea level rise poses to the future stability of the Hawai'i green turtle population. This seems particularly shortsighted, given that over 90% of females nest on islands that stand to be significantly altered within the foreseeable future (by 2100). It is also important to note that green turtle foraging populations in the Main Hawaiian Islands are increasingly coming into contact with human populations. Sea level rise and habitat loss in the Northwest Hawaiian Islands, coupled with expanding human populations in the Main Hawaiian Islands, has the potential to essentially "squeeze" the green turtle population to the point where recovery is no longer a foreseeable objective.

### **Social and Management Considerations**

Motivation for the delisting of the green turtle in Hawai'i appears to largely stem from the desires of some members of the Native Hawaiian community to resume traditional hunting and consumption of turtles (as stated by the Association of Hawaiian Civic Clubs in *A Resolution 11-51*). While sympathetic to Native Hawaiian cultural practices and needs, Pacific Whale Foundation believes that more sustainable alternatives to outright delisting exist. Section 10 of the Endangered Species Act, for example, provides exemptions to the prohibition on the "take" of a listed species. Section 10 (e)



specifically grants Alaska Natives an exemption to the taking of any endangered or threatened species, provided that such taking is “primarily for subsistence purposes” (Endangered Species Act, Section 10).

It would seem a logical first step for the Association of Hawaiian Civic Clubs to revisit the Section 10 exemption policy and to apply (or possibly re-apply) for an exemption, versus pushing for outright delisting. Exemption under Section 10 would seem the most effective method to balance the cultural rights advocated by AOHCC, with the species’ long-term sustainability and conservation. Complete delisting, on the other hand, would strip the green turtle of all federal safeguards (including \$25,000 fine and up to a year in prison for killing, harming or harassing turtles).

In 1983, NMFS Southwest Fisheries Service evaluated the subsistence use of sea turtles in Hawai’i, noting that in 1975, the Governor of Hawaii expressed opposition to listing, citing the fact that State regulations banning commercial turtle fishing had been passed 14 months prior. State Regulation 16, while prohibiting commercial take, nevertheless still permitted the ocean-taking of turtles for “home use”. “Home use” was not limited to those persons with a nutritional need to take turtles, nor was it limited to Native Hawaiians or persons of part-Hawaiian ancestry (Balazs, 1983). Regulation 16, furthermore, allowed the accidental capture of turtles and the taking of turtles for sport, recreation and trophies (Balazs, 1983). Inadequacy of these state-level management tools, lack of effective enforcement and a high incidence of poaching resulted in continued declines of the green turtle population, a situation which prompted its listing under the ESA in 1978.

Currently, §13-124-3 of the Hawaii Administration Rules prohibit the take of indigenous wildlife (including the green turtle). The penalties and enforcement of this prohibition, however, are not clear. We are also concerned that once delisted, groups such as AOHCC will push for the ability to hunt turtles. State management of turtle hunting in the 1970’s was insufficient in maintaining a healthy and viable turtle population. Today’s budgetary constraints and funding at the state level raise justifiable concerns about how the state would effectively manage and enforce turtle harvesting, without seriously threatening the population. There is also concern that harvesters may confuse hawksbill turtles with green turtles. The hawksbill is a critically endangered species, with only about 20-30 nesting females in the entire Hawaiian Archipelago (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998). Thus, even a single case of mistaken species identity could significantly affect the hawksbill population.

Scientific findings indicate that the green turtle population cannot yet be considered a stable (or “recovered”) population. It is therefore discomfoting to read petitions that advocate species delisting not based on recovery status, but for the purpose of harvest. At this time we do not feel that the State of Hawai’i possesses the regulatory or enforcement mechanisms necessary to effectively manage its population of green turtles. We fear that delisting the species without an effective management plan in place, and without proper population size to buffer potential harvest quotas, will lead to the green turtle’s swift and speedy demise.

## **Conclusions**

The overall goal of the Endangered Species Act is to protect imperiled species to the point where protection is no longer needed, at which time the species is removed from the Endangered Species list. Pacific Whale Foundation understands the goals and intentions of the Endangered Species Act, but does



not support delisting decisions that are unwarranted (as we feel is the case with the Hawai'i green turtle).

The intention of this testimony is not to discount the hard work and dedication of scientists and managers, but rather to point out that significant gaps remain in our understanding of Hawai'i green turtle population dynamics and its response to increasing (and future) threats. Given these scientific shortcomings, we feel that delisting would be premature and counterproductive to 35+ years of effective management. If we are truly dedicated to the mission of the Endangered Species Act, and therefore to conserving the Hawai'i green turtle for generations to come, it seems more appropriate to err on the side of caution when considering the species' future. It is therefore our hope that NMFS and USFWS will recognize and thoroughly address the above concerns in its final Status Review, and from there, make a decision that will ensure the long-term viability of Hawaii's precious green turtle.

Sincerely,

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Conservation Manager

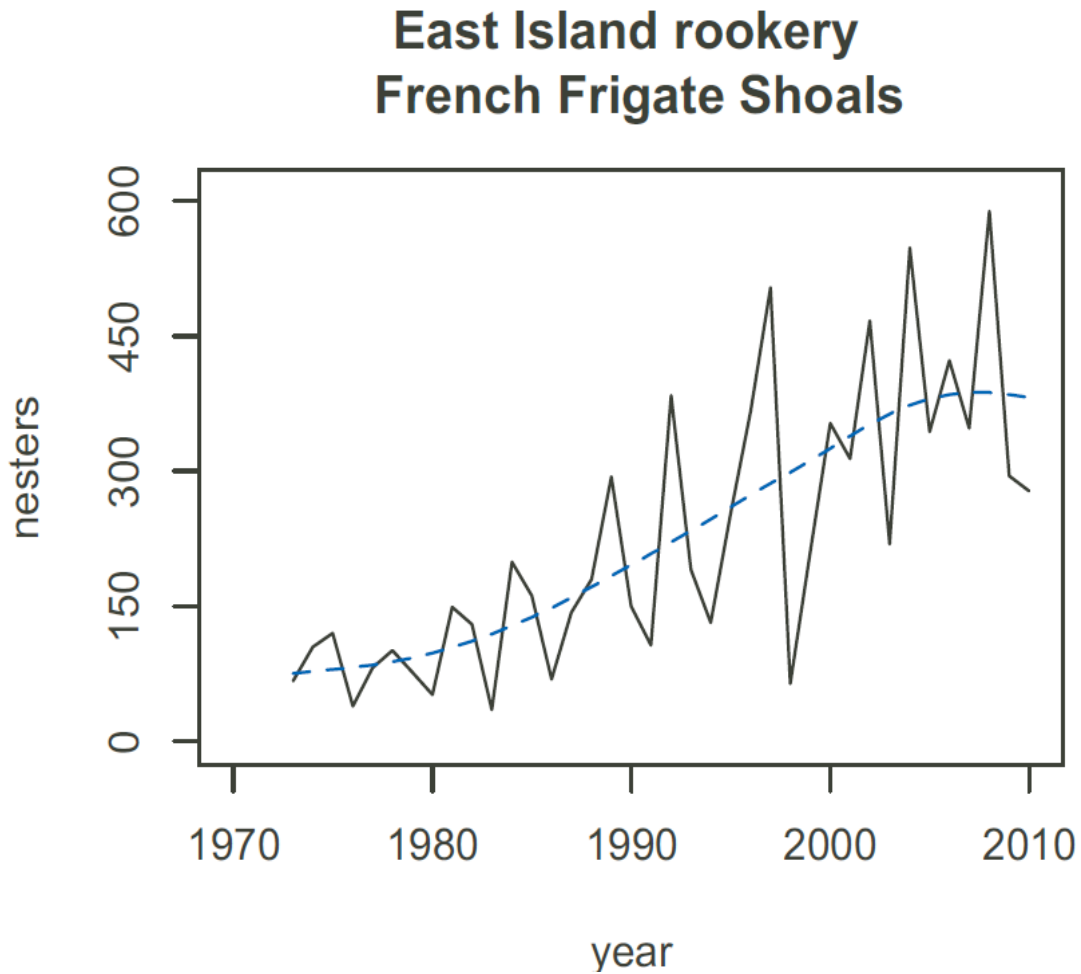
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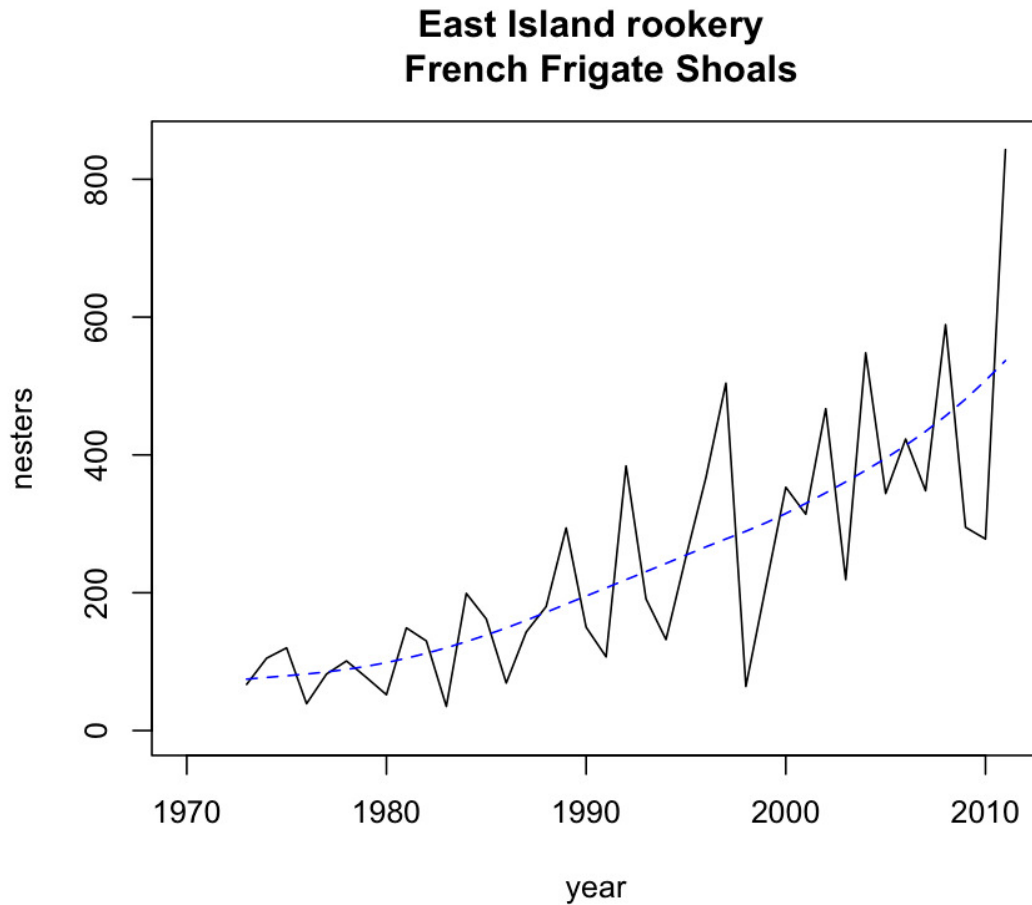


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### List of Figures



**Fig. 1** Time series and trend (dashed line) of annual number of green turtles recorded nesting at East Island rookery from 1973 – 2010, as included in the testimony of the Western Pacific Regional Fishery Management Council’s comments submitted with regards to the Hawaii green turtle status review. Note that the underlying trend appears to be stabilizing. (Western Pacific Regional Fishery Management Council, 2012).



**Fig. 2** Time series and trend (dashed line) of annual number of green turtles recorded nesting at East Island rookery from 1973 – 2011, as provided within the International Union for Conservation of Nature (IUCN)'s assessment of Hawaii's green turtle population. Note that the underlying trend does *not* appear to be stabilizing, and is instead exponentially increasing.



**Fig. 3** Are photographs taken of female nesting sea turtles in the Northwest Hawaiian Islands, many of which are low, flat coastal plains (seen in bottom left photo). Sea level rise and changes in ocean conditions could result in increased erosion of these islands, creating areas that are inhibitive of turtle nesting (see bottom right photo). (from NOAA Climate Watch Magazine: <http://www.climatewatch.noaa.gov/image/2010/rising-sea-levels-threaten-hawaiian-sea-turtles-nesting-sites>)