

Kemp's ridley sea turtle

Biology and Ecology:

The Kemp's ridley sea turtle (*Lepidochelys kempii*) is a federally listed endangered species. It is the smallest of the sea turtles; adults reach maturity at about 10-15 years of age. Kemp's ridley turtles nest mostly during the daytime, often in groups called "arribadas." An individual Kemp's ridley may nest as many as three times a season (USFWS and NMFS, 1992), with an average of 2.5 clutches per season. Clutch size averages around 100 eggs. Hatchlings emerge after about 50 days of incubation, during either the night or day. Kemp's ridleys are found in the Gulf of Mexico, the Atlantic Ocean, and some adjoining estuarine areas. Nesting occurs primarily near Rancho Nuevo, Tamaulipas, Mexico. Each year, some nests are also found at scattered locations between southern Texas and Veracruz, Mexico. Very rarely, Kemp's ridleys nest at other locations in the U.S. outside of Texas. More Kemp's ridley nests are consistently found at PAIS than at any other location in the United States, making the park the most important nesting beach in the United States for this species.

At the national seashore, some Kemp's ridley turtles nest every year and many are found stranded (washed ashore, alive or dead) (Shaver, 1997, 1998a, 1998b, 1999a, 1999b; Shaver and Caillouet, 1998). Additionally, Kemp's ridley turtles sometimes inhabit nearshore Gulf of Mexico waters at PAIS for foraging or migration.

Historic nesting frequency of this sea turtle on the south Texas coast is poorly known, as only six Kemp's ridley turtles were documented there prior to 1979 (Shaver and Caillouet, 1998). A total of 157 Kemp's ridley nests have been documented along the Texas coast between 1979 and 2003, 82 of them at PAIS. Kemp's ridley is a native nester at PAIS (Hildebrand, 1963, 1981, 1983; Shaver, 1998a; Shaver and Caillouet, 1998). Since 1978, an international, experimental project involving the NPS, the USFWS, the National Marine Fisheries Service (NMFS)/National Oceanic and Atmospheric Administration, and others has attempted to establish a secondary nesting colony of Kemp's ridley turtles at PAIS. Eggs were collected in Mexico, transported to PAIS, and placed into an incubation facility there. Hatchlings were released on the beach, allowed to enter the surf, and were recaptured. They were then shipped to the NMFS Laboratory in Galveston, Texas for 9-11 months of rearing in captivity (head-starting) and the yearling turtles were subsequently released into the Gulf of Mexico. It was hoped that these procedures would cause the turtles to be imprinted to PAIS and return there to nest when they were sexually mature. Since 1996, some turtles from this project have been documented returning to PAIS and the nearby vicinity to lay eggs (Shaver, 1997, 1998a, 1999a, 1999b; Shaver and Caillouet, 1998).

In 1986, the NPS initiated a program to detect, monitor, and protect sea turtle nests at PAIS. Detection involves patrols to look for nesting activity, public education, and investigation of reports from patrollers, beach workers, and the public. Patrollers (NPS staff members and volunteers) use ATVs to search the park and adjacent state beaches to the north of the park for sea turtle tracks and nesting Kemp's ridley turtles each day from April through mid-July. From 1979 to 2003, 82 Kemp's ridley nests were confirmed at in the park, but additional nests were likely missed, especially when patrols were not conducted or were less comprehensive. During 2002, three Kemp's ridley nests were found at hatching, including one within the patrol route at PAIS, confirming that some Kemp's ridley nests are missed at egg laying despite patrols and public education. The 82 Kemp's ridley nests were distributed along the entire Gulf beachfront length of PAIS.

104

On the Texas coast

During 2004, one Kemp's ridley nest was found at hatching on Mustang Island. These observations

The date of the nesting season varies slightly each year. In Mexico, Kemp's ridley nests have been recorded as early as March and as late as August. The 82 nests documented at PAIS from 1979 to 2003 were found during the months of April, May, June, and July. ¹⁰⁴

Critical Habitat:

No critical habitat has been designated for this species. There is an existing Recovery Plan for the Kemp's ridley that defines specific tasks that have been assigned to the park to aid in the recovery efforts of this species.

Potential Effects of Proposed Project:

There may be times when eggs, nesting turtles, hatchlings, and stranded turtles could be directly vulnerable to activities within the project action area.

Operation of all vehicles (including oil and gas heavy equipment) on the beach can crush nesting turtles, stranded turtles, hatchlings, and some eggs, producing an immediate, lethal impact (Mann, 1977; NMFS and USFWS, 1991a, 1991b, 1992-1993; Ernest et al., 1998).



Visitors are permitted to operate their vehicles along most of the Gulf beachfront at PAIS, with driving occurring from the water's edge to the dunes. In the areas where beach driving is permitted, sea turtles that nest and hatchlings that emerge from undetected nests cross at least one vehicular roadway and hence could be vulnerable to crushing from vehicles. During 2003, three turtles were documented nesting in the vehicular roadway at PAIS, including two within visible ruts.

No nesting sea turtles, hatchlings, or eggs have been documented as struck or killed by vehicles at PAIS. However, during 2002, a passing vehicle struck a Kemp's ridley turtle that had laid eggs on the Matagorda Peninsula outside PAIS. Visitors put her back into the water, but they noted that she was injured; two weeks later a dead adult Kemp's ridley washed ashore about five miles away. During 2002, beach visitors also found and reported three Kemp's ridley nests at hatching--one at PAIS, one on North Padre Island north of the national seashore, and one on Mustang Island. No hatchlings were killed at the park, but 14 were crushed and killed by passing vehicles at the two nest sites outside PAIS. ^{hatching} ~~at~~ The Kemp's ridley nest found on Mustang Island during 2004. Two hatchlings were killed by passing vehicles.

Eggs could be crushed in undetected nests. Eggs located close to the surface would be most vulnerable to crushing. Each year, a portion of the nests found had the uppermost eggs within only an inch or two of the surface. Patrollers and monitors locate nests primarily by searching for the tracks left in the sand by the nesting females. However, the nesting turtles do not always leave visible tracks on the beach, particularly in areas with very hard packed sand, very soft and blowing sand, and thick seaweed. For example, at the first nest discovered at PAIS during 2003, the female barely left any trace of tracks on the hard-packed sand at the nest site, 0.5 miles south of the end of

the paved road. Patrol ~~if~~ that arrived while the turtle was ~~not~~ing noted that they would not have found her tracks and that the nest would not have been found if visitors had not spotted her crawling on the beach. Vehicles could also remove sea turtle tracks, making it impossible for the NPS to find a nest for investigation and protection.

^{four} The ~~three~~ Kemp's ridley nests found at hatching were located in the dunes. In contrast, ^{and other 41 nests found here during 2004} the other 35 Kemp's ridley nests found on the Texas coast during 2002 were documented along the entire beach width, from the high tide line to the dunes. One would expect the beach distribution of undetected and detected nests to be similar, but that was not the case. It is possible that other nests went undetected at lower beach positions and did not survive to hatching because of beach driving, human disturbance, predation, or high tides occurring on the beach.



Turtle hatchlings and smaller stranded sea turtles could become trapped in the ruts for short or long periods of time causing them to weaken, invert, or succumb due to predation, disorientation, crushing, or dehydration (Hosier et al., 1981; Fletemeyer, 1996; Ernest et al., 1998). Deeper and more steeply sloped ruts cause the greatest impact. Hosier et al. (1981) found that 10-15 cm deep tracks may serve as a significant impediment to loggerhead hatchlings. The smaller the turtle the more that it will be impacted by rut size. Vehicles can also compact the sand, making it more difficult or impossible for nesting turtles to excavate a nest cavity leading to increased false crawls and nests with shallow egg chambers (Fletemeyer, 1996). Compaction could also make it more difficult for hatchlings to emerge from an undetected nest. Data on the level of compaction from beach driving necessary to inhibit or prevent nesting, or inhibit or prevent hatchling emergence is not available. Operation of vehicles on the beach also can cause indirect impacts that can adversely affect nesting and incubation habitat (Mann, 1977; NMFS and USFWS, 1991a, 1991b, 1992-1993; Ernest et al., 1998). Project vehicles can produce deeper ruts in the sand, which could affect movements of nesting females and hatchlings, however conservation measures will reduce this potential.

Hatchlings became trapped in, and immediately adjacent to, ruts caused by beach grading at the nest found on North Padre Island, north of PAIS, during 2002. Twelve of these hatchlings were crushed and killed by passing vehicles.

To reduce direct impacts that can occur from rutting, ruts will be backfilled. Since backfilling ruts and leveling of the beach surface may cause direct and indirect impacts (including compaction of sand, covering or removal of sea turtle tracks, and crushing of nests and turtles), the NPS and USFWS will periodically review existing methods used to fill ruts. The available data do not show that sand in these backfilled areas is compacted enough to inhibit nesting. To further ensure that nesting sea turtles, hatchlings, tracks, and nests are protected during backfilling, a trained monitor will survey the area before backfilling taking place.

Vibrations and noise caused by moving vehicles on the beach could frighten nesting turtles, causing them to abandon their nesting attempt (false crawl) (NMFS and USFWS 1991a, 1991b, 1992; Ernest et al., 1998). Vibrations could also harm incubating eggs. It is difficult to assess these impacts as scientific data about them are lacking for the Kemps' ridley. The available data indicate that there is not a strong negative correlation between vibrations or noise and nesting events. That is not surprising, because when a nesting turtle begins laying her eggs, she enters into a temporary trance in which she is oblivious to vibrations and noise. People driving on the beach who spot nesting sea turtles often approach them without disturbing the nesting activity.

Vehicle lights can also cause direct and indirect impacts on nesting turtles leading to false crawls and can disorient hatchlings so that they crawl in the wrong direction rather than enter the sea, thereby becoming directly vulnerable to crushing, predation, and dehydration (NMFS and USFWS 1991a, 1991b; Fletemeyer, 1996). Since use of heavy oil and gas equipment is not permitted at night during the sea turtle nesting season, this light issue is confined to night driving by four-wheel drive pickup trucks associated with oil and gas production and two-wheel and four-wheel drive vehicles driven by the public. Nesting Kemp's ridley turtles will most likely not be affected, as they are primarily daytime nesters. (That is not necessarily true of the other species of sea turtle that nest primarily at night--green, loggerhead, hawksbill, and leatherback. However, based on documented nesting, the total number of those other species of sea turtles nesting at PAIS within the action area of the project would be less than three over a 15-year span. The risk of loss to nesting turtles of these species therefore is very small. That would also apply to those hatchlings that emerge at night or early in the morning from the few *in situ* nests that may be missed by the daily patrols conducted by the NPS staff and volunteers.)

Conservation Measures:

Currently the NPS removes all sea turtle eggs that are located from the beach and transfers them to the incubation facility at PAIS. Hatching success is usually elevated substantially for eggs that are transferred to this facility rather than left on the beach *in situ*. The NPS also protects nesting turtles while they are on the beach and removes stranded turtles for rehabilitation or study.

In consultation with BNP and the USFWS, the NPS also has developed more than 80 required mitigation and conservation measures for oil and gas drilling operations within PAIS. Those measures are listed in Table 3 in the Dunn-Peach # 1 Environmental Assessment and in Table 8 in this document. The NPS will require all of those measures for both the Dunn-Peach and Dunn-Manzano drilling operations. The required mitigation measures include the following: Vehicles will travel in caravans whenever possible, and truck numbers will be limited by implementing measures to decrease the amount of time that vehicles are traversing the beach during the sea turtle nesting season. More space will be allowed at the pad for storing drilling by-products, which will aid in the scheduling of disposal trucks and allow the use of larger trucks, which in turn will reduce the number of trucks and the number of trips along the beach. That will further reduce the potential for affecting nesting turtles or hatchlings through vibrations and noise. As a beneficial side effect, observers and vehicle operators will provide additional observations and assist the NPS with its efforts to detect, investigate, monitor, and protect nesting sea turtles, nests, hatchlings, and stranded turtles.

To reduce the direct impacts that could occur from crushing or covering of nests or turtles, all vehicle operators will attend a training class held by the NPS. An NPS patroller will conduct a morning patrol before large vehicles traversing the beach, and BNP will be notified when to allow large vehicles to drive along the beach. Monitors trained by NPS personnel will travel in front of heavy equipment and trucks and drive at a reduced speed (15 m.p.h. maximum) to look for and help ensure that sea turtles, nests, and their tracks are protected. Monitors will use ATVs during the sea turtle nesting and hatchling emergence season (April 1 through October 15) since it is much easier to see faint Kemp's ridley and other sea turtle tracks from ATVs. Vehicles will travel above the wet portion of the beach, thereby reducing the risk of crushing stranded sea turtles.

Other mitigation measures will preserve nighttime darkness. Those measures include the use of directional and shielded lighting on the drilling rigs; the prohibition of lighting on production facilities within the required setback of 500 feet from the dunes and other light-sensitive areas; and a prohibition on nighttime driving of heavy equipment and trucks.

Despite the numerous mitigation and conservation measures listed in Table 3 in the Dunn-Peach # 1 Environmental Assessment and in Table 8 of this document, it is still possible that a turtle nest or hatchlings may go undetected and be impacted by oil-and-gas-related traffic. To further reduce that risk, the NPS will implement a "Protected Season" to provide additional protection to nesting sea turtles, nests, and hatchlings during the peak nesting season.

The NPS analyzed the following time periods for the Protected Season:

Table 4. Possible time periods for the Protected Season

60 Day	75 Day	90 Day	120 Day
April 7 – June 6	April 7 – June 21	April 7 – July 6	April 7 – August 7
April 16 – June 15	April 16 – June 30	April 16 – July 15	
May 1 – June 29	May 1 – July 14	May 1 – July 29	

Each time period includes the following percentages of nesting sea turtles and hatching nests for each listed species of sea turtles:

Table 5. Percentage of nesting sea turtles and hatching nests during each time period

	Kemps ridley		Loggerhead		Green		Hawksbill	
	Nesting Turtles	Hatching Nests	Nesting Turtles	Hatching Nests	Nesting Turtles	Hatching Nests	Nesting Turtles	Hatching Nests
60 Day								
4/7 - 6/6	80%	6%	0%	0%	9%	0%	0%	0%
4/16 - 6/15	87%	13%	23%	0%	36%	0%	100%	0%
5/1 - 6/29	75%	30%	50%	0%	36%	0%	100%	0%
75 Day								
4/7 - 6/21	93%	20%	23%	0%	36%	0%	100%	0%
4/16 - 6/30	92%	32%	53%	0%	36%	0%	100%	0%
5/1 - 7/14	78%	66%	80%	8%	64%	0%	100%	0%
90 Day								
4/7 - 7/6	97%	50%	60%	4%	45%	0%	100%	0%
4/16 - 7/15	94%	67%	80%	8%	64%	0%	100%	0%
5/1 - 7/29	78%	84%	93%	12%	100%	22%	100%	0%

Based on the above data, the NPS selected a Protected Season of 75 days beginning on April 16 and ending on June 30. That Protected Season will protect 92% of the nesting Kemp's ridleys turtles, will cover the traditional high nesting weeks in late May and early June, and will provide additional protection to the other sea turtle species that nest at PAIS.

BNP may conduct drilling operations during the Protected Season only under the following operational conditions:

Table 6. Conditions under which BNP may conduct drilling operations during the Protected Season

Number	Operational Conditions
1	The well to be drilled by BNP is of such depth or complexity that in BNP's estimation operations associated with the mobilization for and drilling, testing, and completion of the well will last for a period of time in excess of 240 days provided that the drilling operation begins close to the end of the Protected Season. BNP must demonstrate and document to the NPS the reason why the drilling operation cannot be completed within the 240 days instead of merely stating that the operation cannot be completed. Drill operations will be scheduled in such a manner that will not cause the drilling operation to extend into the Protected Season.
2	BNP commences operations associated with drilling a well prior to the Protected Season with an expectation that such drilling operations will be completed prior to such season, but delays associated with such operation prohibit completion of the well prior to the Protected Season. Delays that may give rise to the need to conduct operations within this timeframe shall include, but shall not be limited to weather delays, delays in drilling due to downhole drilling difficulties or unforeseen circumstances encountered while drilling, any delays associated with governmental action prohibiting operations, delays attributable to the actions of third parties such as riots, terrorism, strikes, vandalism, or similar action that disrupts BNP's authorized activities.
3	BNP is prohibited by the NPS or any other federal or state governmental agency from conducting operations for any period of time in excess of 14 consecutive days outside of the Protected Season if the reason that BNP is not allowed to operate is not the fault of BNP.
4	BNP is unable to schedule a drilling rig capable of drilling the well in question and meeting all requirements of BNP's Plan of Operations at any time other than the Protected Season. BNP will demonstrate and document to the NPS the reason that a drilling rig needed for the operation cannot be obtained prior to the Protected Season.
5	The NPS fails to issue a permit granting BNP authorization to conduct drilling operations associated with a Plan of Operations submitted by BNP and accepted as substantially complete by NPS within six (6) months of the date the Plan of Operations is accepted as substantially complete by NPS. BNP will provide the necessary Plan of Operations to the NPS prior to April 1 of a given year in order to ensure that enough time exists for the issuance of a permit.
6	The oil and gas lease(s) covering the drilling operation will terminate unless BNP conducts drilling operations during the Protected Season, and such lease termination is not the result of avoidable delays by BNP in prosecuting operations authorized by such lease.

Furthermore, BNP may conduct drilling operations during the Protected Season only if the company performs the additional mitigation measures listed in Table 6 in the Dunn-Peach # 1 Environmental Assessment. Those additional mitigation measures include a reduced speed limit (10 m.p.h. maximum) for heavy equipment and trucks, the use of an

additional ATV escort w each convoy, and the employment of an onsite "Beach Manager." The implementation of the Protected Season will further reduce the impact of oil-and-gas-related activities on all sea turtle species, while continuing to allow private owners reasonable access to their minerals.

Conclusion:

There has been vehicle traffic, from both visitors and heavy equipment operators, on the Gulf of Mexico shoreline for over twenty years with no documented case of a crushing of a nesting sea turtle within the park. The risk to a sea turtle in the action area of this project is reduced when looking at past nesting activity. The average number of nests per year over a five-year span between 1999 and 2003, for the first 6.9 miles of south beach, is 2.4. Current nesting activity does not seem to indicate that compaction of sand from vehicles is causing a negative effect.

During 2002, 40 Kemp's ridley nests were documented in the United States, with 22 of those occurring within PAIS. Based on nesting data collected over the past 20 years for the action area and given that most nests are found and removed from the beach by park staff, the potential impact of vibrations to eggs and crushing of nests appears to be minimal. The chance that hatchlings could be killed by vehicle use at night along the stretch of beach within the action area of the project is minimal. In addition, impacts to sea turtles at PAIS will be reduced by the implementation of a Protected Season that will cover the park's peak sea turtle nesting season. Therefore, we believe that the proposed project, with mitigation and conservation measures implemented, is not likely to adversely affect the Kemp's ridley sea turtle.

Loggerhead sea turtle

Biology and Ecology:

The loggerhead sea turtle (*Caretta caretta*) is federally listed as a threatened species. It occurs in temperate and tropical waters of both hemispheres. The species inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian oceans. Historic nesting frequency on the Texas coast is poorly known. Hildebrand (1981) suggested that nesting likely occurred within the last 300 years, but the earliest loggerhead nest that he was able to confirm for the Texas coast was found in 1977.

Adult loggerhead turtles reach maturity in 25 to 30 years. Loggerheads are nocturnal nesters, although some daytime nesting occurs. They nest from one to seven times within a nesting season (average of approximately 4.1 clutches); clutch size averages 100-125 eggs along the southeastern U.S. coast (NMFS and USFWS, 1991b).

Hatchling emergence typically occurs at night. In the Gulf of Mexico, there are distinct nesting populations on the coast of the Florida panhandle and the Yucatan Peninsula. Scattered nests can be found occasionally along other areas of the U.S. Gulf coast including the Chandeleur Islands, Louisiana in the north and to the U.S./Mexico border in the south.

At PAIS, loggerhead turtles sometimes inhabit nearshore Gulf of Mexico waters for foraging or migration. Additionally, a few occasionally nest at the national seashore and many more are found stranded there (Shaver, 1998b, 1999b).

As mentioned above in the Kemp's ridley section, an NPS program was initiated in 1986 to detect, monitor, and protect Kemp's ridley nests at PAIS. This on-going program has expanded to include not only the Kemp's ridley, but also the other four species of sea

turtles that occur along Texas coast. Detection for the following four species of sea turtles involves patrols to look for nesting activity, public education, and investigation of reports from patrollers, beach workers, in park contractors, and the public. Patrollers (NPS staff members and volunteers) use ATVs to search PAIS and the adjacent northern area of State beach for sea turtle tracks and nesting turtles. Each day, from April through mid-July, they repeatedly patrol the entire Gulf beachfront of the national seashore during daylight hours. The patrol season and procedures are designed primarily to detect nesting by Kemp's ridley turtles, but the other sea turtle nests have also been documented as a part of the patrols and reports from the public.

43
From 1979-2003, 22 loggerhead nests were documented at PAIS (at various locations scattered along the coast of the national seashore), but additional nests were likely missed, especially when patrols are reduced and less comprehensive after the mid-July Kemp's ridley patrol season ends. Loggerhead nests were found on North Padre Island from mid-May through early August, although nesting has been documented in the southeastern U.S. from late-April through early September.

Daily runs to the Port Mansfield Channel and back are made from mid-July through August to look for signs of nesting activity, but these patrols are subject to funding and staff availability.

They will not be made after this year, so I would suggest deleting this.

Critical Habitat:

No critical habitat has been designated for this species at this park. There is no specific Recovery Plan task assigned to PAIS for this or the remaining three species of sea turtles occurring at the park, however park staff and volunteers conduct, support and assist in the daily patrols for this species to protect, document, and monitor nesting occurrence.

Potential Effects of Proposed Project:

There is the small chance that this sea turtle can be directly impacted by vehicle use on the beach, including crushing of stranded and nesting turtles, hatchlings, and undiscovered nests. Impacts that are more indirect like noise, vibration to nests or hatchlings, and vehicle and project area lighting can cause similar changes in behavior and therefore affect the species. Please see impacts associated with the Kemp's ridley (above) for broader discussion of related project impacts.

Conservation Measures:

The National Park Service is required by statutes and policy to employ measures to protect, assess, and monitor species occurrence and richness within the park boundary. This obligation is conducted through law enforcement presence and action, management of all endangered species and their habitat found within park boundaries, and development of land use and management practices that promote the continued existence of the plants and animals until removal from the Threatened and Endangered species list. We also attempt to assist State and other Federal agencies in their responsibilities to protect those species found on lands adjacent to park property. We do this through visitor education and public awareness messages and involvement in adjacent land management issues that may affect park resources.

The conservation efforts related to this sea turtle, and the following three species of sea turtle, are conducted to promote and enhance their recovery. Please consider the

measures employed for use in the Kemp's ridley sea turtle effort as measures used to assist this and other species of sea turtles.

Conclusion:

Given the minimal potential to negatively impact this species in the action area (there are few possibilities to directly impact this species), and even less possibility in the proposed project area, the overall conclusion for this Biological Assessment is that the proposed project, with mitigation and conservation measures implemented, is not likely to adversely affect the loggerhead sea turtle.

Green sea turtle

Biology and Ecology:

The green sea turtle (*Chelonia mydas*) is federally listed as threatened in all of its range except the waters of Florida and the Pacific coast of Mexico, where it is endangered. It is circum-global in tropical and sub-tropical waters. A green turtle fishery, operating almost exclusively within inshore waters (bays, estuaries, passes), began in Texas in the mid-1800s. By the early 1900's, the catch declined to such an extent that the turtle fishing and processing industry collapsed (Hildebrand, 1981). Although historic nesting by green turtles on the Texas coast is suspected, the first confirmed nest was not documented there until 1987 (Shaver, 2000).

Adult green turtles reach maturity at 30 to 50 years of age. Female green turtles nest at night. From one to seven clutches are deposited within a breeding season (the average number is usually two to three clutches) (NMFS and USFWS, 1991a). Average clutch size is usually 110-115 eggs. Hatchling emergence occurs at night. In this region, nesting sites include southern Florida and scattered locations in Mexico, although nesting occasionally occurs in south Texas.

At PAIS, juvenile green sea turtles inhabit waters of the nearshore Gulf of Mexico, the Laguna Madre, and the Mansfield Channel. Additionally, a few green turtles occasionally nest within the national seashore and many are found stranded there each year (Shaver, 1989, 1998b, 2000)

As mentioned above, this species is monitored for nesting activity during the late summer as funding and staff is available. From 1979-2003, 11 green turtle nests were documented at the park, all in roughly the southern two-thirds of the park (Shaver, 1989, 2000). However, additional nests were likely missed especially when patrols were not conducted or were less comprehensive. The 11 green turtle nests were found during June and July, although nesting occurs from May through September in this region.

Critical Habitat:

No critical habitat has been designated for this species at this park. Please see loggerhead section above for more information.

Potential Effects of Proposed Project:

There is the very small chance that this sea turtle can be directly impacted by vehicle use on the beach, including crushing of stranded and nesting turtles and hatchlings and undiscovered nests. Impacts that are more indirect like noise, vibration to nests or hatchlings, and vehicle and project area lighting can cause similar changes in behavior, and therefore affect the species. Please see impacts associated with the Kemp's ridley (above) for broader discussion of related project impacts.

Conservation Measures:

The National Park Service is required by statutes and policy to employ measures to protect, assess, and monitor species occurrence and richness within the park boundary. This obligation is conducted through law enforcement presence and action, management of all endangered species and their habitat found within park boundaries, and development of land use and management practices that promote the continued existence of the plants and animals until removal from the Threatened and Endangered species list. We also attempt to assist State and other Federal agencies in their responsibilities to protect those species found on lands adjacent to park property. We do this through visitor education and public awareness messages and involvement in adjacent land management issues that may affect park resources.

The conservation efforts related to this sea turtle, and the following species of sea turtle, are conducted to promote and enhance their recovery. Please consider the measures employed for use in the Kemp's ridley sea turtle effort as measures used to assist this and other species of sea turtle, as they are conducted concurrently with the same monies, diligence and staff time. Please see measures employed for use on the Kemp's ridley sea turtle as measures applicable to this species.

Conclusion:

Given the small potential to negatively impact this species in the action area (there are few possibilities to directly impact this species), and even less possibility in the proposed project area, the overall conclusion for this Biological Assessment is that the proposed project, with mitigation and conservation measures implemented, is not likely to adversely affect the green sea turtle.

Atlantic Hawksbill sea turtle**Biology and Ecology:**

The hawksbill (*Eretmochelys imbricata*) is federally listed as endangered. It occurs in tropical and subtropical seas of the Atlantic, Pacific, and Indian oceans. Young hawksbills occur with some regularity in Texas waters, since northern currents carry them from nesting beaches in Mexico (Hildebrand, 1981). Historic nesting by this species on the Texas coast is unknown.

Female hawksbill turtles nest mostly during the night, but rare daytime nesting is known. They nest an average of 4.5 times per season (up to 12 clutches); clutch size averages approximately 140 eggs (NMFS and USFWS, 1993). Hatchling emergence occurs at night. Hawksbills nest on scattered islands and beaches between 25 degrees North and South latitude including beaches in southeastern Florida and the states of Campeche and Yucatan in Mexico. Nesting does not regularly occur on the Texas coast.

At PAIS, young hawksbills occasionally inhabit waters of the nearshore Gulf of Mexico and Mansfield Channel. Additionally, many are found stranded in the park each year, but nesting very rarely occurs here (Shaver, 1998b, 1999b).

As mentioned above, this species is monitored for nesting activity during the late summer (Mid-July thru August) as funding and staff is available. Only one hawksbill nest has been recorded on the Texas coast (Shaver, 1999b), although it is possible that additional nests were missed, especially when patrols were not conducted or were less

comprehensive. The single confirmed nest was located at the southern end of the national seashore in June 1998. The nesting season for hawksbills varies geographically and may extend from April through October in the Caribbean and Gulf coast of Mexico.

Critical Habitat:

No critical habitat has been designated for this species for this park. Please see loggerhead section above for more information.

Potential Effects of Proposed Project:

There is the remote chance that this sea turtle can be directly impacted by vehicle use on the beach, including crushing of stranded and nesting turtles and hatchlings and undiscovered nests. Impacts that are more indirect like noise, vibration to nests or hatchlings, and vehicle and project area lighting can cause similar changes in behavior and therefore affect the species. Please see impacts associated with the Kemp's ridley (above) for broader discussion of related project impacts.

Conservation Measures:

Please see those measures employed for use on the loggerhead sea turtle as those measures also apply to this species.

Conclusion:

Given the remote potential to negatively impact this species in the action area (there are few possibilities to directly impact this species), and even less possibility in the proposed project area, the overall conclusion for this Biological Assessment is that the proposed project, with mitigation and conservation measures implemented, is not likely to adversely affect the Atlantic hawksbill sea turtle.

Leatherback sea turtle

Biology and Ecology:

The leatherback sea turtle (*Dermochelys coriacea*) is federally listed as an endangered species. It ranges throughout the tropical waters of the Atlantic, Pacific, and Indian oceans, but has also been recorded from the North Atlantic, North Pacific, South Atlantic, and South Pacific. The leatherback is the largest and most pelagic sea turtle species and is normally found in the deeper waters of the Gulf of Mexico where it may undertake extensive migrations.

Nesting occurs primarily at night and diurnal nesting occurs only occasionally. They nest five to seven times per year, with an average clutch size of 110-116 eggs (NMFS and USFWS, 1992). Hatchling emergence typically occurs at night. Leatherback nesting grounds are distributed circum-globally. Leatherbacks infrequently strand at PAIS (Shaver, 1998b).

Hildebrand (1963, 1981) reported leatherback nesting at Little Shell on PAIS, including one documented nesting in 1928 and at least one observed nesting in the mid 1930's. No leatherback nests have been confirmed on the Texas coast since that time.

As mentioned above, this species is monitored for nesting activity during the late summer as funding and staff is available. No leatherback nests have been recorded

within the park during recent years, although it is possible that a few were missed, especially when patrols were not conducted or were less comprehensive. In the U.S. and Caribbean, nesting begins in February and continues through July.

Critical Habitat:

No critical habitat has been designated for this species at this park.

Potential Effects of Proposed Project:

There is an unlikely chance that this sea turtle can be directly impacted by vehicle use on the beach, including crushing of stranded turtles and more indirect impacts like noise, vibration issues and effects on nesting attempts, and vehicle and project area lighting. Some changes in behavior can be expected from human interaction with this species, but actual occurrence in the park is rare. Please see impacts associated with the Kemp's ridley (above) for broader discussion of related project impacts.

Conservation Measures:

Please see those measures employed for use on the loggerhead sea turtle, as those measures also apply to this species.

Conclusion:

Given the very remote potential to negatively impact this species in the action area (there are few possibilities to directly impact this species), and even less possibility in the proposed project area, the overall conclusion for this Biological Assessment is that the proposed project, with mitigation and conservation measures implemented, is not likely to adversely affect the leatherback sea turtle.