APPENDIX E: WATER QUALITY SAMPLING METHODOLOGY, WATER QUALITY CONSTANTS AND TOXICITY BENCHMARKS

Water Quality Sampling Methodology

The study consisted of a single water quality sampling event of 10 points with 6 in Florida and 4 in Mississippi. The sampling points were located in known or expected personal watercraft (PWC) use and non-use areas within the national seashore and were selected in consultation with the National Park Service (NPS) (table E-1). Depths of 0.5 m and 3.0 m below the surface were selected for the collection of water quality samples in order to measure parameters at the top and near the bottom of the water column. Parameters sampled at each point included benzene, toluene, ethylbenzene, xylene (BTEX), methyl tertiary-butyl ether, and polycyclic aromatic hydrocarbons (PAHs), which are associated with PWC emissions, along with dissolved oxygen, conductivity, and temperature.

TABLE E-1. WATER QUALITY SAMPLING POINTS

Stations	Single Event – Water Quality Sampling Locations
Florida District	
WQ 1a	East of Navarre Bridge – north of Eglin Air Force Base property (non PWC-use area)
WQ 1b	Off shore of Santa Rosa Island location (PWC-use area)
WQ 4a	East of Gulf Breeze Peninsula (non PWC-use area)
WQ 4b	Ft. Pickens Ferry Dock (PWC-use area)
WQ 6a	Perdido Key – north of Spanish Cove (non PWC-use area)
WQ 6b	Perdido Key – Robertson Island (PWC-use area)
Mississippi District	
WQ 7a	East End Petit Bois (non PWC-use area)
WQ 7b	Between Petit Bois and West Petit Bois Island (PWC-use area)
WQ 9a	Horn Island – near Ranger Dock (non PWC-use area)
WQ 9b	Horn Island – west end (PWC-use area)

WATER QUALITY MODELING INFORMATION

Constants

Several constants required to make the calculations were compiled from literature and agency announcements. Gasoline concentrations are provided for benzene and those PAHs for which concentrations were available in the literature. Constants used are:

- Gasoline emission rate for two-stroke PWC engines: 3 gal/hour at full throttle (CARB 1998). Any two stroke direct injection engines were lumped with regular two-stroke engines, which is a conservative approach, as direct injection technology is cleaner. The gasoline emission rate for two-stroke boat engines was estimated to be the same as for two-stroke PWC.

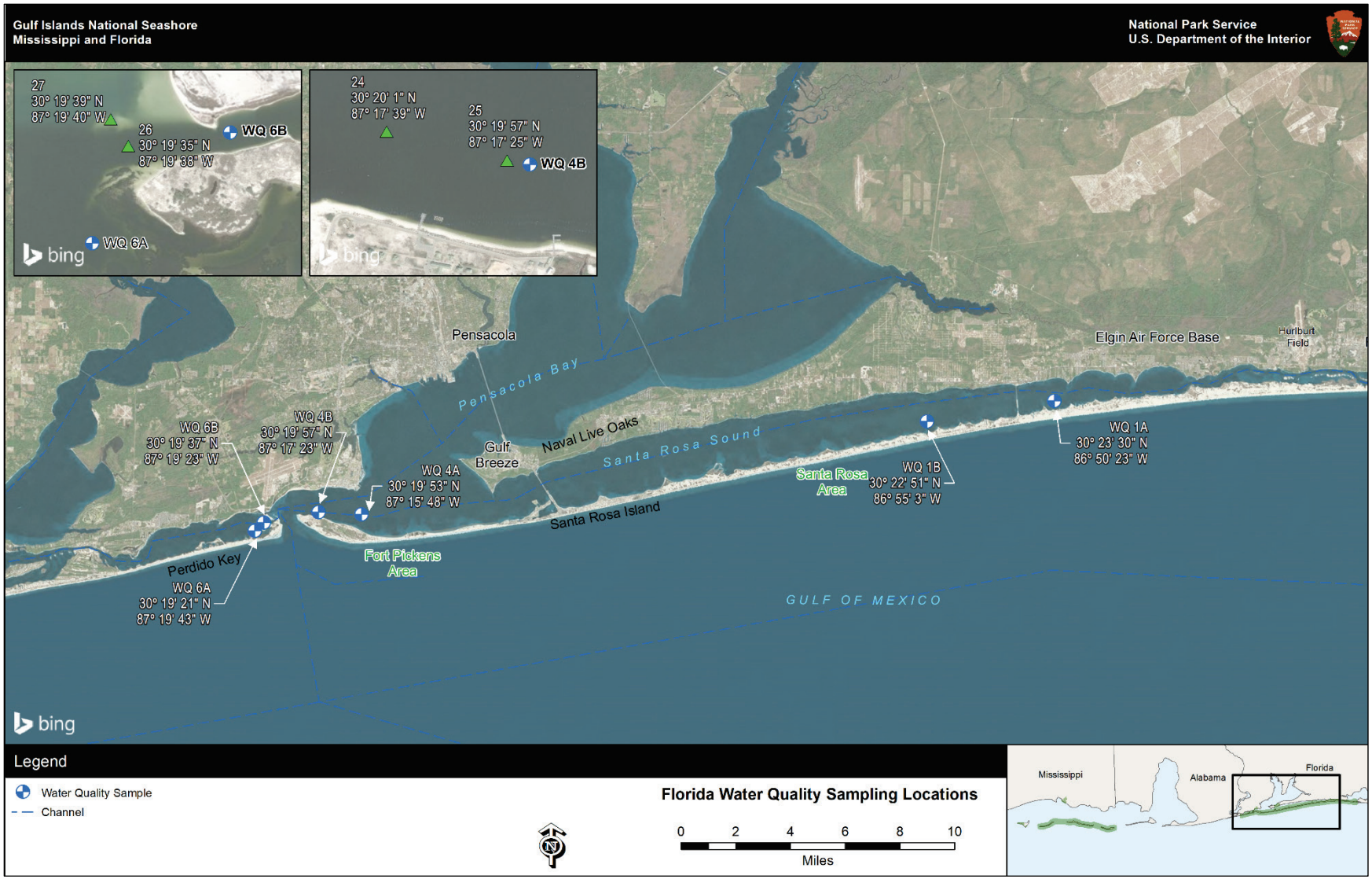


FIGURE E-1. WATER QUALITY SAMPLING LOCATIONS AT GULF ISLANDS NATIONAL SEASHORE

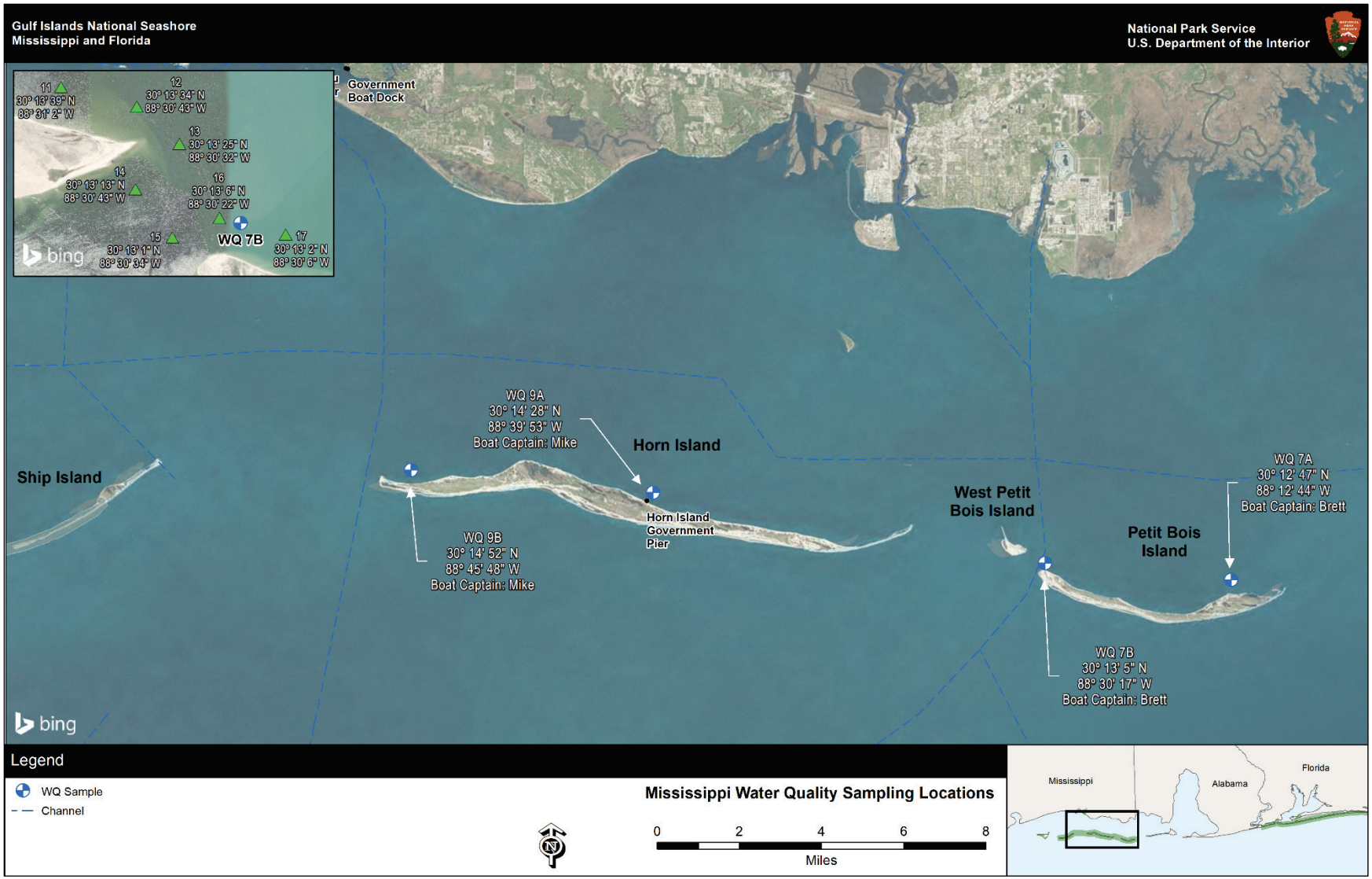


FIGURE E-2. WATER QUALITY SAMPLING LOCATIONS AT GULF ISLANDS NATIONAL SEASHORE (CONTINUED)

- Gasoline emission rate for four-stroke engines (PWC or boats) was estimated to be zero. This is because there is no discharge of the fuel and oil mixture through the exhaust port into the water as there is with a two-stroke model.
- 1 gallon= 3.78 liters (L)
- Specific gravity of gasoline: 739 grams per liter (g/L)
- 1 acre-foot = 1.234 × 106 L
- Concentration of chemicals of concern in gasoline – used the constants from the 2004 environment assessment (EA), except for benzene, as follows:
  - Concentration of benzo(a)pyrene (B[a]P) in gasoline: up to 2.8 milligrams per kilogram (mg/kg) (or 2.07 milligrams per liter (mg/L)) (Gustafson et al. 1997)
  - Concentration of naphthalene in gasoline: 0.5% or 0.5 g/100 g (or 3,695 mg/L) (Gustafson et al. 1997)
  - Concentration of 1-methyl naphthalene in gasoline: 0.78% or 0.78 g/100 g (or approximately 5,760 mg/L) (estimated from Gustafson et al. 1997)
  - Concentration of benzene in gasoline: 1.3% or 1.3 g/100 g (or 9,607 mg/L) (EPA 2012). Recently the US Environmental Protection Agency (EPA) took steps to limit the percent of benzene in gasoline beginning in 2011 (Mobile Source Air Toxics Final Rule, 72 FR 8428, 2/6/2007). This rule (72 FR 8428, February 26, 2007) contains a two-step approach to reducing the benzene content of gasoline. Beginning January 1, 2011, importers and most refineries were required to import or produce gasoline containing no more than 0.62% volume benzene on an annual average basis. This 0.62% volume benzene standard can be met by using credits. In addition, beginning July 1, 2012, importers and most refineries are required to import or produce gasoline with a maximum annual average gasoline benzene content of 1.3% volume. A refinery's or importer's actual annual average gasoline benzene level may not exceed this maximum average standard. Credits may not be used to meet the 1.3% volume standard. The more conservative required maximum annual average of 1.3% was used, as opposed to the annual average of 0.62%.
- Estimated emission of B(a)P in exhaust: used constant from 2004 EA: 1,080 µg/hr (White and Carroll 1998), using weighted average B(a)P emissions from two-cylinder, carbureted two-stroke liquid cooled snow mobile engine using gasoline and oil injected Arctic Extreme injection oil, 24–38 to 1 fuel to oil ratio. Weighted average based on percentage of time engine was in five modes of operation, from full throttle to idle).
- Estimated amount of B(a)P exhaust emissions retained in water phase = approximately 40% (based on value for B(a)P from Hare and Springier, quoted in North American Lake Management Society (1999)).

TOXICITY BENCHMARKS

A key part of the estimations is the water quality criterion, standard, or toxicological benchmark for each contaminant evaluated. There are no EPA water quality criteria for the protection of aquatic life for the PWC-related contaminants (EPA 1999). There are, however, a limited number of EPA criteria for the protection of human health (via ingestion of water and aquatic organisms or ingestion of aquatic organisms only). Chronic ecotoxicological and human health benchmarks for contaminants were acquired from various sources and compared to the benchmarks previously used in the 2004 EA. The following

benchmarks were selected for use in this environmental impact statement for the reasons given in the notes of table E-2.

TABLE E-2. TOXICITY BENCHMARKS

Chemical	Ecotoxicological Benchmark (µg/L)	Source	Justification	Human Health Benchmark (in µg/L)	Source	Justification
Benzo(a)pyrene	30	NOAA SQuiRTs 2015	Derived from marine surface water acute criterion[a]	0.018	EPA 2002	EPA 2002 Human Health AWQC-consumption of organism only[d]
Naphthalene	23.5	EPA 2001	Region 4 Chronic Salt Water Screening Benchmark[b]	--[e]	--[e]	--[e]
1-methyl naphthalene	19	USFWS 1987	Dungeness crab LC50[c]	--[e]	--[e]	--[e]
Benzene	109	EPA 2001	Region 4 Chronic Salt Water Screening Benchmark[b]	51	EPA 2002	EPA 2002 Human Health AWQC-consumption of organism only[d]

Notes:

a. 300 ug/L acute criterion reduced to 30 ug/L to approximate a chronic criterion. This value was selected over the previously used 0.018 ug/L from Suter and Tsao (1996) because it is a salt-water based value (not fresh water-based as was the previous value from Suter and Tsao) and was published since the last EA was completed.

b. These values were selected because they are salt water–based values for the EPA region in which the national seashore is located and therefore more appropriate than the previous fresh water-based values from Suter and Tsao (1966); note - these values are actually lower than the previously used values.

c. This is the same value as used in 2004; based on the LC50 for Dungeness crab of 1,900 ug/L - - the 100-fold safety factor is for 1) protection of potentially more sensitive species (factor of 10) (or, more often, for sensitive individuals within a population) and 2) extrapolation of a chronic value from an acute study (another factor of 10).

d. These are the current published criteria for ingestion of organism only (not water plus organism), which is appropriate for the national seashore. These are the same values as were used in the 2004 EA. Florida's benchmarks were not listed since they are higher than the EPA criteria; that is, EPA criteria are more protective than the Florida criteria. Note that there are draft revised criteria under review at EPA at this time, but they have not been officially adopted, so the current criteria were used.

e. -- indicates that no criteria or benchmarks were found.

WATER QUALITY IMPACT ANALYSIS METHODOLOGY

Steps 1 and 2: Estimation of Emissions of Pollutants (Chemicals of Concern)

The chemicals of concern included benzene, and three PAHs: benzo(a)pyrene, naphthalene, and 1-methyl naphthalene. Although addressed in previous assessments, methyl tertiary-butyl was not included in the analysis since it is no longer added to gasoline.

Numbers of PWC and other motorized boats were based on (1) shoreline counts done in 2013 and 2015 to gather data on the number of PWC using various areas of the national seashore, and (2) aerial photos taken in 2013 that captured both PWC and other motorized boat use. Use patterns of motorized watercraft, including numbers and hours used, were based on observations by national seashore staff. The numbers and distribution of PWC on a high-use day in 2013 are listed in appendix H, table H-1, and were used in the calculation for the water quality analyses.

The contaminant loading to water was calculated for a high-use day, assuming that full-throttle two-stroke use discharges 3 gallons (11.34 liters) of gasoline per hour into national seashore waters. Because four-stroke engines do not mix oil with fuel and are designed for complete combustion before discharge, they emit 97% less pollution overall compared to conventional two-stroke engines (KIMO 2002; Long 1997), resulting in a nominal discharge of oil or gas to the water. Therefore, emissions to water from four-stroke marine engines were assumed to be zero. Contaminant loadings used to calculate threshold water volumes under each action alternative are shown in table E-3.

TABLE E-3. CONTAMINANT LOADINGS (MG) FOR PWC DAILY PEAK USE CONDITIONS BY AREA

Pollutant	Perdido Key	Santa Rosa Island	Okaloosa Island	Mississippi District
Benzo(a)pyrene	6,347	4,411	1,207	1,817
Naphthalene	11,124,795	7,730,790	2,116,016	3,184,499
1-methyl naphthalene	17,342,035	12,051,245	3,298,579	4,964,198
Benzene	28,924,467	20,100,054	5,501,641	8,279,697

Data on national recreational boating trends, as well as trends in PWC use in the Florida and Mississippi counties surrounding the national seashore, were evaluated to discern any trends for future use levels of PWC and boats (appendix H). The NPS also reviewed historical visitation data, as depicted on figure 2 in the Visitor Use and Experience section of chapter 3. Annual visitation to the national seashore is currently at the same level as it was approximately 20 years ago and there is no indication of a long-term visitation trend in any direction. Based on these data, it was assumed there would be no substantial change in PWC use over the period of analysis. Finally, under alternative E, PWC emissions of fuel and other pollutants into the water would decrease after the phase out of older, two-stroke carbureted PWC, based on the 2010 EPA standards. This was accounted for in the calculation of future emissions for this alternative.

Steps 3 and 4: Calculation of Threshold Volume of Water (Using Criteria or Benchmarks) and Comparison to Available Volume of Water

The objective of the loading analysis was to determine if the national seashore would receive concentrations of selected compounds from gasoline or its combustion products that would result in an unacceptable risk to human health or the environment. Daily pollutant loadings from PWC were determined (table E-3), and the volume of water required to dilute the calculated emission loading to the concentration required to meet the water quality criterion or benchmark was calculated. This “threshold volume” was then compared to the “available volume” of water in the areas within the national seashore used by PWC. Pollutant loadings were only calculated for waters where full-throttle use would be allowed. Loadings to flat-wake zones were not calculated as they are negligible when compared to full-throttle use.

Appropriate benchmarks were acquired from the scientific literature. These are listed in table E-3. The volume of water available for dilution of pollutants was calculated by multiplying the acres of water open to full-throttle PWC use under each alternative by average depth within those areas, based on soundings on National Oceanic and Atmospheric Administration (NOAA) charts 11373, 11378, and 11385 (NOAA 2015). This means that if there is a larger flat-wake zone, and less water open for full-throttle PWC use, there is less water available for mixing. Conversely, if there is a reduced flat-wake zone, more water is available for mixing. The threshold volume of water was calculated in acre-feet (1 acre-foot =1 acre of water 1 foot deep).

Step 5: Consider Other Mechanisms and the Background Water Quality Data

Principal mechanisms that result in loss of pollutants from the water were qualitatively considered. Many organic pollutants that are initially dissolved in the water volatilize to the atmosphere, especially if they have high vapor pressures, are lighter than water, and mixing occurs at the air/water interface. Benzene, when released to the water, is subject to rapid volatilization, with a half-life for evaporation of about 5 hours (EPA 2001). Consequently, this evaporation rate is discussed for benzene in the analysis of the alternatives. Other compounds that have low vapor pressure, low solubility, and high octanol/water partition coefficients tend to adhere to organic material and clays and eventually adsorb onto bottom sediments. By considering movements of the organics through the water column, an assessment can be made as to whether criteria or benchmarks may be exceeded, even on a short-term basis.

Hydrocarbons also have the potential to accumulate in the sediment and solids on which marine organisms feed. As a result of bioaccumulation, long-term adverse health effects in the mammals and humans who use marine life as a food source are possible. BTEX compounds tend to transfer from water to air more rapidly than PAHs. PAHs, however, do not dissolve easily in water and tend to bond to PM and settle to the bottom sediments. Additional information on fate and transport of contaminants discharged to water can be found in the section “Potential Impacts on Water Quality from PWC Use” in the analysis. Water quality sampling was conducted in 2013 to assess levels of certain chemicals of concern in national seashore waters. These results are reported in chapter 3 and are used as context in the impact analysis.

Step 6: Analysis of Cumulative Effects – Calculation of Loading by All Watercraft

To assess cumulative impacts, inboard and outboard motorboat emissions were added to PWC emissions to get a more complete estimation of loading to the receiving water body. Based on national seashore input and the characteristics of the area and boating use in the area, assumptions about the length of a boat trip were as follows: trip length was assumed to be 2 hours (full throttle) in the Florida District except for the Okaloosa area, where the trip is assumed to be 1 hour at half throttle due to the speed restrictions in the narrow channel there. In Mississippi, a 1-hour trip (full throttle) was assumed for boats. To estimate what percentage of boats are two-stroke vs. four-stroke /no emissions to water, Florida boat registration statistics from the Florida Department of Highway Safety and Motor Vehicles (FLHSMV 2016) were examined. Boats are tabled by size class. The data for pleasure boats in the three counties that are included within the national seashore were collated and it was conservatively assumed that all boats under 20 feet are 50% two-stroke (the same as the assumed PWC percentage based on PWC models manufactured over the years), and all boats over 20 feet are either four-stroke or diesel (based on the team’s professional judgment) and therefore add essentially no emissions of the chemicals of concern to the water. Numbers of Class 1 (16 feet to 25 feet, 11 inch) sized boats were divided in half to perform this calculation. Based on this, it is estimated that there are about 33% two-strokes and 66% four-stroke /no emissions in the boat fleet for 2014. All outboard two-stroke engines were assumed to discharge 3 gallons (11.34 liters) of gasoline per hour at full throttle into national seashore waters). As previously described,

all four-stroke engines were assumed to have nominal discharge and this amount was assumed to be zero for the analysis.

APPENDIX F: SOUNDSCAPE TERMINOLOGY AND BACKGROUND ON PWC NOISE LEVEL MEASUREMENTS

For management and planning purposes, it is important to distinguish and define certain key terms. **Acoustic resources** are physical sound sources, including both natural sounds (wind, water, wildlife, vegetation) and cultural and historic sounds (battle reenactments, tribal ceremonies, quiet reverence). The **acoustic environment** is the combination of all the acoustic resources within a given area including natural sounds and human-caused sounds—as modified by the environment. The acoustic environment includes sound vibrations made by geological processes, biological activity, and even sounds that are inaudible to most humans, such as bat echolocation calls. **Soundscape** is the component of the acoustical environment that can be perceived and comprehended by the humans. The character and quality of the soundscape influence human perceptions of an area, providing a sense of place that differentiates it from other regions. **Noise** refers to sound which is unwanted, either because of its effects on humans and wildlife, or its interference with the perception or detection of other sounds. **Cultural soundscapes** include opportunities for appropriate transmission of cultural and historic sounds that are fundamental components of the purposes and values for which the parks were established.

Natural sounds are intrinsic elements of the environment and part of "the scenery and the natural and historic objects and the wild life" protected by the NPS Organic Act (NPS 2000). The acoustic resources are an important resource to protect. Each park has a unique acoustic environment with natural and cultural sounds that is vital to the visitor experience of many parks and provides valuable indicators of the health of various ecosystems. Natural sounds are necessary for ecological functioning and occur within and beyond the range of sounds that humans can perceive. Many mammals, insects, and birds decipher sounds to find desirable habitat and mates, avoid predators and protect young, establish territories, and to meet other survival needs (NPS 2010).

Human-caused sounds at the national seashore are primarily related to visitor access—including on-road motor vehicles, recreational boats, and personal watercraft (PWC). Aircraft overflights also influence the acoustic environment of the national seashore given the proximity to military air bases in Pensacola, as well as commercial air traffic and commercial marine vessels. Naval Air Station Pensacola is the home base of the US Navy Flight Demonstration Squadron the Blue Angels, conducts various military exercises and hosts an annual airshow. Given the geographic extent and diversity of the national seashore, the extent of human-caused components of the acoustic environment varies in different locations. The Mississippi District islands are accessible by boat only and thus do not experience on-road motor vehicle noise. According to the Gulf Islands National Seashore General Management Plan (NPS 2011a), acoustic conditions with minimal human influences are especially important in the designated wilderness at Horn and Petit Bois Islands to ensure a visitor experience that conveys the solitude and wild nature of a barrier island (NPS 2011a).

ACOUSTIC TERMINOLOGY

In air or water, sound is a pressure wave moving through a medium. Sound moves almost 5 times faster through water than air. When measuring sound frequency and amplitude should be considered. Frequency measures the cycles per second of a sound wave and is measured in Hertz (Hz). Air pressure fluctuations that occur from 20 to 20,000 times per second can be detected as audible sound by humans (US Army Garrison-Hawaii 2004). Different species have differing frequency ranges of what they can hear. Humans are most sensitive to frequencies between 1,000 Hz and 6,000 Hz.

The amplitude of sound is described by its sound pressure level. Because the range of sound pressure varies greatly, a logarithmic scale measured in decibels (dB) is used to relate measured sound pressure to

a reference pressure. Sound pressures described in decibels are often defined in terms of frequency-weighted scales. A-weighted sound pressure levels is the most common summary measurement of sound level across all frequencies audible to humans. It significantly discounts sounds below 1,000 Hz and above 6,000 Hz to approximate the variation in human hearing sensitivity. In community noise management of stationary and transportation noise sources in populated areas, airborne sound level measurements are usually expressed as an A-weighted average energy value over a specified time interval and are indicated with the abbreviation dBA. Several examples of sound pressure levels in the dBA scale are listed in table F-1. A 2002 measurement study found that at a distance of 50 feet, the maximum PWC noise level (L_{max}) ranged from 80.7 to 73.0 dBA depending on the specific model and operation speed/mode (HMMH 2002). The threshold of human hearing is approximately 0 dBA.

TABLE F-1. A-WEIGHTED DECIBEL LEVELS OF COMMON AIRBORNE SOUND SOURCES

Sound	Noise Level (dBA)	Effect
Shotgun firing, jet takeoff (at 100–200 feet)	130	Painful
Cannon fire at 150m (Vicksburg National Military Park)	126	
Turbo-prop at 200 feet, rock concert	110–140	Threshold of pain begins around 125 dB
Military jet, 100m above ground level (Yukon-Charley Rivers National Park)	120	
Thunderclap (near)	120	Threshold of sensation begins
Stereo (over 100 watts)	110–125	Regular exposure to sound over 100 dB of more than one-minute risks permanent hearing loss
Symphony orchestra, chainsaw, jackhammer	110	
Jet flyover (1,000 feet)	103	
Electric furnace, garbage truck, cement mixer	100	No more than 15 minutes of unprotected exposure recommended for sounds between 90–100 dB
Thunder (Arches National Park)	100	
Subway, motorcycle (at 25 feet)	88	Very annoying
Lawnmower/nearby thunder	85–90	85 dB is the level at which hearing damage (8 hours) begins
Recreational vehicles	70–90	
Diesel truck (40 mph at 50 feet)	84	80 dB or higher is annoying, interferes with conversation, constant exposure may cause damage
Snowcoach at 30 m (Yellowstone National Park)	80	
Dishwasher, washing machine	75–78	70 dB or higher is intrusive, interferes with telephone conversation
Vacuum cleaner	70	
Automobile (45 mph at 100 feet)	60	Comfortable hearing levels are less than 60 dB
Conversational speech at 5 m (Whitman Mission National Historic Site	60	
Croaking raven (100 feet), conversation	50–65	
Quiet office	50–60	
Refrigerator humming, Crickets at 5 m (Zion National Park)	40	Quiet

Sound	Noise Level (dBA)	Effect
Daytime natural ambient in Everglades National Park (summer)	36	
Leaves rustling (Canyonlands National Park)	20	Very quiet
Normal breathing, Volcano crater (Haleakala National Park)	10	Barely audible

Source: NIDCD 2010; Wood 2016

Because sound is described in a logarithmic scale (i.e., dBA), sound levels cannot be added by ordinary arithmetic. In fact, an increase of 3 dB represents a doubling of sound energy, so two PWC traveling side-by-side would be 3 dB louder than one. Decibels are often related to perceived loudness, and in some frequency bands a 10-dBA increase can result in sounds that seem twice as loud, while a 20-dBA increase can result in sounds that seem four times as loud (DOT 2011).

Sound energy from a fixed-point source decreases 6 dBA per doubling of the distance from the sources due to divergence. A stationary source that is 75 dBA at 50 feet would be 69 dBA at 100 feet discounting other factors such as atmospheric conditions and ground cover effects. Sound energy from a line source (such as roadway traffic) decreases 3 dBA per doubling of distance due to divergence. The movement of sound is also affected by ground cover (acoustically hard surfaces such as water or pavement are reflective, compared to soft cover such as dense vegetation), and atmospheric conditions (including temperature) (DOT 2011).

Key acoustic terms used in this section and/or the soundscapes impact discussion in chapter 4 include the following:

- **Natural Ambient Sound Level**. The sound level of all natural sounds in a given area, excluding all human-caused sounds including transportation, mechanical, and electrical.
- **Maximum Sound Level (L_{max})**. The maximum instantaneous sound level during the analysis period. In the case of PWC or other motorized vehicle measurements, L_{max} refers to the maximum sound level during one vehicle pass-by.
- **Sound Exposure Level**. Sound exposure level is an indicator describing the cumulative sound energy exposure during a specific time period, such as from a pass-by event (as opposed to the peak level represented by L_{max}).
- **Equivalent Sound Level (L_{eq})**. This term refers to the logarithmic average (i.e., on an energy basis) of sound pressure levels over a specific time period. "Energy averaged" sound levels are generally much higher than arithmetic averages because they are logarithmic values. Typically, L_{eq} values are calculated for a specific period (e.g., 1-hour and 12-hour periods); L_{eq} values are computed from all the 1-second L_{eq} values for the specific period. L_{eq} must be used carefully in quantifying sound levels because occasional loud sound events may heavily influence/increase the L_{eq} value, even though sound levels for that period of time are typically lower.
- **Exceedance Percentile**. This metric represents the sound pressure level (L), in dB, exceeded x% of the time for the specified measurement period. For instance, L_{90} is the sound pressure level exceeded 90% of the time. L_{50} is the middle value where half the sound levels in a set are above and half below (e.g., the median ambient sound level).

- **Audibility**. Audibility is the ability of animals with normal hearing (including humans) to hear a given sound. The main factors that affect audibility are the hearing ability of the animal, other simultaneous interfering sounds or stimuli, and the frequency content and amplitude of the sound.
- **Noise-free Interval**. Noise-free interval refers to the length of the interval between noise events during which only natural sounds are audible.

PWC Airborne Sound Levels

Measurements of two-stroke PWC pass-by airborne noise (e.g., travel of sound through air, as opposed to water) levels at multiple speeds were made at Glen Canyon National Recreation Area in 2001 (HMMH 2002). L_{max} and sound exposure level were calculated for each pass-by and are summarized in table F-2. The L_{max} at 50 feet was 80.7 dBA for a Kawasaki 1100cc traveling at 48.6 mph. At speeds above approximately 25 mph, L_{max} levels were generally correlated with speed (when making comparisons of the same model PWC at different speeds) The same Kawasaki 1100cc model PWC reached 77.7 dBA L_{max} at 37.5 mph and 73.0 dBA L_{max} at 22.5 mph. Speed was not an important factor at lower speeds—for example, the Kawasaki 1100cc reached the same L_{max} (73.0 dBA) at 22.5 mph and 9 mph. The sound levels were comparable to those reported in other studies (e.g., 76–81 dBA L_{max} at 50 feet in Noise Unlimited Inc. (1995).

TABLE F-2. PWC AIRBORNE SOUND LEVELS

Category	Description	Number of Pass-bys[a]	Speed (mph)	Throttle or rpm	SEL at 50 Feet (dBA)	L_{max} at 50 Feet (dBA)	L_{max} at 82 Feet (dBA)
PWC	Kawasaki 1100cc (Utah State Police)	5	48.6	6700	85.0	80.7	76.4
PWC	Kawasaki 1100cc (Utah State Police)	2	37.5	5600	84.6	77.7	73.4
PWC	Kawasaki 1100cc (Utah State Police)	2	9	3000	82.8	73.0	68.7
PWC	Kawasaki 1100cc (Utah State Police)	2	22.5	--	81.2	73.0	68.7
PWC	Sea-Doo Bombardier (Rental)	5	38	full throttle	82.4	73.8	69.5
PWC	Sea-Doo Bombardier (Rental)	6	25	half throttle	79.2	71.9	67.6
PWC	2001 Sea-Doo Bombardier (Visitor)	2	60	--	83.9	79.5	75.2
PWC	2001 Sea-Doo Bombardier (Visitor)	2	30	--	83.5	77.5	73.2
PWC	Other PWC	1	26	--	80.3	73.6	69.3
PWC	Other PWC	1	17	--	79.2	73.0	68.7

Source: HMMH 2002

L_{max} = maximum sound level; rpm = revolutions per minute; SEL = sound exposure level

a. For vehicles with more than one pass-by, similar speeds and throttle settings are grouped, and the table shows average speed and throttle settings, and energy-averaged L_{max} values

The Glen Canyon study also showed variability in two-stroke PWC noise levels based on the specific model type. For example, the 2001 Sea-Doo Bombardier had a L_{max} of 79.5 dBA at 50 feet when traveling

at 60 mph. This is slightly less than Kawasaki 1100cc at 48.6 mph (80.7 dBA)—presumably the Kawasaki 1100cc traveling at 60 mph would result in substantially higher noise levels than the 2001 Sea-Doo Bombardier.

Overall, the Glen Canyon study concluded PWC and typical outboard motorboat sound exposure level and L_{max} pass-by levels were similar. One distinguishing feature of PWC was that they exhibited more tonal characteristics (peaks in 125 Hertz (Hz) to 400 Hz bands). PWC had less sound energy in the lower frequencies (less than 100 Hz) in comparison to motorboats. These measurements are consistent with the general observation that PWC can create higher-pitched "whine" noises that are different from motorboats (even though the total sound energy may be the similar).

Another characteristic of PWC noise is rapid fluctuations in sound levels, especially while going over waves or performing maneuvers. The Glen Canyon study found fluctuations in PWC noise of 10-15 decibels (dB) over periods of less than one minute during times when PWC noise was the dominant component at acoustic monitoring sites. Fluctuations of 3–5 dB can occur within less than a second, with the largest fluctuations while the PWC is accelerating. A sudden 180-degree turn by a PWC was found to cause a 10 dB spike in noise levels. Fluctuations with a small outboard motorboat were generally less than 2 dB.

APPENDIX G: DESCRIPTION OF THREATENED AND ENDANGERED SPECIES AND SPECIES OF SPECIAL MANAGEMENT CONCERN

FEDERALLY LISTED SPECIES

Terrestrial Mammals

Perdido Key Beach Mouse (*Peromyscus polionotus tryssyllepsis*). The Perdido Key beach mouse is only known to occur along an approximately 15-mile stretch of dunes in Escambia County, Florida and Baldwin County, Alabama (FFWCC 2014a). This species is known to occur in the Perdido Key region of Gulf Islands National Seashore and does not occur in the Mississippi District (NPS 2004a). Critical habitat for the Perdido Key beach mouse has been designated at Perdido Key (71 FR 60238).

Marine Mammals

West Indian Manatee (*Trichechus manatus*). The West Indian manatee inhabits freshwater, brackish, and marine habitats and eats submerged, emergent, and floating vegetation. West Indian manatees make seasonal migrations along the northern Gulf of Mexico from Florida as far west as Texas (STM 2014). Manatees prefer waters that are about 1 to 2 meters (3 to 7 feet) deep. Along the coast, manatees tend to travel in water that is about 3 to 5 meters (10 to 16 feet) deep, and they are rarely seen in areas over 6 meters (20 feet) deep (STM 2018). Although the nearest critical habitat for the West Indian manatee is near Crystal River, Florida, where manatees often spend the winter months, this species is frequently present in both the Florida and Mississippi Districts of the national seashore during summer months (USFWS 2008a; DISL 2017).

Birds

Bald Eagle (*Haliaeetus leucocephalus*). Bald eagles occur most commonly in areas close to coastal areas, bays, rivers, lakes, or other bodies of water that provide concentrations of food sources, including fish, waterfowl, and wading birds. Usually the bald eagle nests in tall trees (mostly live pines) that provide clear views of surrounding area. In the Southeast, bald eagles typically nest between September and May. In the Mississippi District of the national seashore, bald eagles are known to nest on Horn, Petit Bois, and East Ship Islands in the slash pine habitats. In Florida, there are no known nesting locations, but bald eagles are often observed in the area (NPS 2004a).

Piping Plover (*Charadrius melodus*). Piping plovers typically use sand beaches, mixed sand and gravel beaches, and exposed sandy tidal flats (USFWS 2013a). Within the Florida District, piping plovers are known to winter in tidal flat areas on Perdido Key and on the north side of Santa Rosa Island (NPS 2004a). Areas used by piping plovers are ephemeral habitats that due to their nature change over time. Hurricanes and episodic storm events increase overwash processes that transport sediment (sand) across barrier islands and form inlets and sand and mud flats. Washover areas are created by the flow of water through the primary dune line with deposition of sand on the barrier flats, marsh, or into a lagoon, depending on the storm magnitude and the width of the beach. Washover passes are used by migrating and wintering piping plovers for feeding and roosting (Parsons 2016).

Critical wintering habitat for piping plovers has been designated within both the Florida and Mississippi Districts of the national seashore (66 FR 36137). Physical and biological features of piping plover critical wintering habitat include intertidal sand and/or mud flats with no or very sparse emergent vegetation (66 FR 36065). Within the Mississippi District, critical wintering habitat has been designated on Petit Bois, Cat, Horn, East Ship, and West Ship Islands (USFWS 2001).

Red Knot (*Calidris canutus rufa*). The red knot is a mainly migratory species that uses coastal beaches and marine intertidal areas as stopover feeding locations or staging areas on the way to and from their wintering grounds in South America and breeding areas in the Arctic. This migratory species can be found seasonally, foraging on beaches, mud and sand flats, and salt marshes (USFWS 2013b). The red knot could be present on beaches or flats in either district of the national seashore during stopover.

Wood Stork (*Mycteria americana*). The wood stork could make infrequent stops in either district but is not normally present at the national seashore. A 2012 survey conducted for the Gulf Coast Network Breeding Bird Monitoring Annual Report did not find any transient or nesting wood storks in either district of the national seashore (Granger 2013).

Reptiles

American Alligator (*Alligator mississippiensis*). The American alligator was previously listed as an endangered species at the federal level due to overharvesting, but has been considered fully recovered by the US Fish and Wildlife Service (USFWS) since 1987. However, the American alligator is now listed as "threatened due to similarity of appearance," given its close resemblance to other species protected under the ESA such as the American crocodile (*Crocodylus acutus*). The American alligator is present in both the Florida and Mississippi Districts of the national seashore. In the Florida District, the American alligator is present in wetlands in the Fort Pickens and Naval Live Oaks areas. The national seashore occasionally receives reports of alligators sighted on the beach. The American alligator is capable of swimming in marine waters, as evidenced by its presence at the Mississippi District islands where it inhabits wetlands and brackish lagoons (Hopkins 2003). The national seashore does not have any monitoring data for this species (NPS 2004a).

Green Sea Turtle (*Chelonia mydas*). The green turtle is closely associated with submerged aquatic vegetation (SAV) beds and floating *Sargassum*. Primary nesting beaches occur in the southeastern United States and are concentrated in Florida. Nesting season in the United States is generally from June through September (USFWS 2012a). Green sea turtles typically nest on sandy beaches and nests have been documented in the Florida District of the national seashore. Additionally, green sea turtles are known to feed in the seagrass beds in the Perdido Key area and the Santa Rosa area (NPS 2004a).

Hawksbill Sea Turtle (*Eretmochelys imbricate*). The hawksbill sea turtle is typically found in shallow coastal waters and nests on sandy beaches, typically between April and November, varying with locality (USFWS 2012b). No hawksbill sea turtle nests have been documented within the national seashore, but individuals may be present in national seashore waters.

Kemp's Ridley Sea Turtle (*Lepidochelys kempii*). Kemp's ridley sea turtles spend their juvenile stages offshore and are closely associated with *Sargassum*. Adults are found mainly in the Gulf of Mexico nest almost exclusively along the beaches of Tamaulipas, Mexico from April to July (USFWS 2012c). Although rare, the Kemp's ridley sea turtle have been known to nest within the Florida District of the national seashore (NPS 2014c).

Leatherback Sea Turtle (*Dermochelys coriacea*). Leatherback sea turtles nest on sandy beaches from March through July. Their main nesting grounds in the continental United States are along the southern Atlantic coast of Florida (USFWS 2012d). The first leatherback sea turtle nest at the national seashore was discovered in the Florida District in 2000, but this species remains rare at the national seashore (NPS 2014c). A nesting attempt was documented by park staff in 2015.

Loggerhead Sea Turtle (*Caretta caretta*). This species nests in the southeastern United States from Virginia to Texas with about 80% of nesting occurring in six Florida counties. Nesting season in the

United States occurs from April through September and peaks in June and July (USFWS 2012e). The loggerhead is the most common sea turtle species at the national seashore and frequently nests in both districts (NPS 2014c). In the Florida District, loggerhead sea turtle nests have been documented on the beaches of Perdido Key, Fort Pickens, and Santa Rosa areas (Sea Turtle Conservancy 2015). Loggerhead nests have been recorded on East Ship, Horn, Petit Bois, and Cat Islands in the Mississippi District (NPS n.d.b). Critical nesting habitat for loggerhead sea turtles has been designated along the Gulf fronting beaches of Perdido Key, Horn Island, and Petit Bois Island (79 FR 39756). Loggerhead sea turtles mate along migration routes and females return to lay their eggs on or near the same beach where they hatched. Females may nest several times per breeding season and can lay nearly 200 eggs per nest. After the 55- to 75-day incubation period hatchlings emerge from the nest, usually at night, and quickly move out to sea (STB 2014). Within the national seashore, nests are marked and monitored by staff biologists and volunteers (NPS 2004a).

Fish

Gulf Sturgeon (*Acipenser oxyrinchus desotoi*). Gulf sturgeon distribution ranges from Florida to Louisiana. This is an anadromous species that spends most of its adult life in the Gulf of Mexico or nearshore bays and estuaries, but returns to riverine habitat each spring to spawn (NMFS 2014b). Critical habitat for the gulf sturgeon has been designated in both the Florida and Mississippi Districts of the national seashore. In the Florida District, gulf sturgeon critical habitat includes nearshore waters within one nautical mile of the mainland from Pensacola Pass to Apalachicola Bay and the Perdido Key area and Santa Rosa area. Gulf sturgeon critical habitat within the Mississippi District includes areas within one nautical mile offshore of the Mississippi District islands. The passes (Ship Island Pass, Dog Keys Pass, Horn Island Pass, and Petit Bois Pass) are also designated critical habitat (USFWS 2003; NPS 2004a).

Saltmarsh Topminnow (*Fundulus jenkinsi*). The saltmarsh topminnow is native to the north central Gulf Coast of the United States where it inhabits estuaries, salt marshes, and coastal streams, and is closely associated with *Spartina* marshes. This species is likely to occur in suitable habitats within both the Florida and Mississippi Districts of the national seashore.

STATE-LISTED SPECIES

American Oystercatcher (*Haematopus palliates*). The American oystercatcher is confined to a narrow band of coastal habitat extending from New England to Florida and along the Gulf Coast. On rare occasions, this species has been known to nest within the Florida District and is likely to be seasonally present along beaches throughout the national seashore.

Black Skimmer (*Rynchops niger*). Primary habitat for the black skimmer is coastal waters, including beaches, bays, estuaries, and sandbars, as well as tidal creeks that are used for foraging. This species nests in colonies on beaches, sand bars, dredge spoil islands, and occasionally on gravel rooftops (FFWCC 2014b). Within the national seashore, black skimmers share colony sites with least terns. Like the least tern, the black skimmer locates and relocates colonies based on environmental changes and disturbances. Black skimmer nests have been previously documented in the Santa Rosa area and Fort Pickens (NPS 2004a). Black skimmers have also been known to nest and winter in the Mississippi District.

Brown Pelican (*Pelecanus occidentalis*). Brown pelicans are found in coastal habitats from Florida to Texas (USFWS 2008b) and are known to occur throughout the national seashore in both the Florida and Mississippi Districts.

Least Tern (*Sternula antillarum*). The range of the least tern extends along the entire Atlantic and Gulf Coasts of the United States The least tern nests in colonies on broad expanses of open sand and is highly

vulnerable to human disturbance. In the Florida District, least tern nesting colonies have been previously documented in Perdido Key, Fort Pickens, and Santa Rosa. Least tern nesting colonies have been documented on East and West Ship, Horn, and Cat Islands within the Mississippi District (NPS 2004a). Breeding typically occurs in early May (FFWCC 2014c).

Little Blue Heron (*Egretta caerulea*). The little blue heron is found primarily in freshwater habitats in marshes, ponds, lakes, meadows, mudflats, lagoons, streams, mangrove lagoons, and other bodies of calm shallow water. It nests in trees and shrubs to about 4 meters above ground or water, often with other herons, egrets, and ibises. The little blue heron is likely to be only seasonally present at the national seashore. On rare occasions, this species has been documented in the Naval Live Oaks area of the Florida District, but no known nesting activity has occurred within the national seashore (NPS 2004a).

Marian's Marsh Wren (*Cistothorus palustris marianae*). Marian's marsh wren inhabits tidal marshes along the Florida Gulf Coast and is especially prefers nesting in areas with high densities of *Juncus roemarianus* and *Spartina alternaflora* (FFWCC 2011). This species is likely to be at least seasonally present in the Florida District of the national seashore.

Peregrine Falcon (*Falco peregrinus*). The peregrine falcon has nearly a global distribution and is known to be a wintering resident in the Mississippi District of the national seashore. It is present on all Mississippi District islands from fall to spring (NPS 2004a).

Reddish Egret (*Egretta rufescens*). The reddish egret is a wading bird that is generally found in shallow estuarine habitats, including barren sand or mud tidal flats, salt ponds, lagoons, and open red mangrove and black mangrove communities. It occasionally feeds in other habitats including coastal beaches, sparsely vegetated freshwater marshes, and the shores of lakes and reservoirs (NPS 2004a). The reddish egret is considered a migrant species along the Florida panhandle and is likely only occasionally present at the national seashore (Nature Serve Explorer 2014). The national seashore has identified this species as an uncommon and occasional migratory species (NPS 2004a). This species was not documented as being present in the latest species inventory survey of the national seashore (Granger 2013).

Southeastern Snowy Plover (*Charadrius nivosus*). The southeastern snowy plover inhabits beaches, dry mud or salt flats, and the sandy shores of rivers, lakes, and ponds. The southeastern snowy plover nests on the ground of broad open beaches where vegetation is sparse or absent. Nests are often subject to flooding, and the plover faces threats from loss of habitat due to beach development. This species is a year-round resident of the national seashore and occurs in both the Florida and Mississippi Districts. Within the Florida District, nests have been observed on Perdido Key, Santa Rosa Island, and in the Fort Pickens area. The southeastern snowy plover also nests on all Mississippi District islands within the national seashore (NPS 2004a).

Tricolored Heron (*Egretta tricolor*). The tricolored heron occurs year-round along the entire Gulf Coast of the United States. The tricolored heron is found in coastal marsh habitats and nests in woody thickets near saltwater and commonly nests near other egrets (Nature Serve Explorer 2014). The tricolored heron is classified as an uncommon species, meaning that several individual or less per day, are present throughout the national seashore (USGS 2013).

APPENDIX H: PERSONAL WATERCRAFT AND BOATING USE ASSUMPTIONS USED IN THE ANALYSIS

NUMBERS OF PERSONAL WATERCRAFT AND BOATS (NON-PERSONAL WATERCRAFT) IN USE

Personal watercraft (PWC) use estimates are based on counts taken during surveys conducted in 2013 (NPS 2013b) and 2015 (NPS 2015a). The 2013 counts did not include the 18-mile area between Navarre and Destin. Another count was completed in 2015 in Destin (Okaloosa area) to estimate use in that area and at two of the other stations (PC 01 and PC 06). Tables 13 and 14 in chapter 3 summarize the results of those counts. Based on observations from staff involved in the counts and also on aerial photos taken in 2013, there is little PWC use in the oceanside (Gulfside) waters.

Based on the PWC count data, assumptions were made about what would be a "high-use" day (i.e., peak use on one day, usually a summer holiday weekend day); what is an average high-use day (typical for weekends and holidays during the summer season); and an average use day (all other days of use). The 2013 data were collected only on weekend high-use days (because of logistical issues encountered during the counts). For Destin, only one day was counted on a relatively busy Thursday before a July 4 weekend, and so that number is used to represent both a high-use and average high-use day. The data collected for PC 06 and PC 01 in 2015 were on a weekday, and were the only average use day counts done, so these counts were used to "prorate" an average use day for all locations. The final row of table H-1 shows the sums of all PWC counting locations in the Florida district.

Boat numbers were estimated using ratios of motorized boats to PWC based on aerial photos taken in the national seashore in 2013. Based on the aerials, there are approximately 5 boats to 1 PWC in the Florida District, and 30 boats to 1 PWC in the Mississippi District. Table H-1 summarizes the numbers of PWC and boats assumed for the analyses on a daily basis.

TABLE H-1. PERSONAL WATERCRAFT AND BOAT USE ASSUMPTIONS BY AREA

	High-Use (Peak) Day		Average High-Use Day		Average-Use Day	
Vessel Type	PWC	Boats	PWC	Boats	PWC	Boats
Mississippi	38	1,140	14	420	5	150
Florida						
Perdido Key (Big Lagoon)	177	885	92	460	30	150
Santa Rosa	123	615	86	430	28	140
Okaloosa-Destin	202	1,010	202	1,010	67	335
Total for Florida	502	2510	380	1,900	125	625

Duration of a typical PWC trip was estimated based on staff observation and the characteristics of the area. A typical PWC trip was estimated to be 3 hours in duration in the Florida District, except for the Okaloosa area, which is a narrow channel with restricted speed, feeding into a limited and congested area around Destin. Because of this, a typical PWC or boat trip was assumed to be 1 hour at half throttle. A typical PWC trip in the Mississippi District was estimated at 4 hours, based on the larger area available in that area and the general desire to reach the islands from the mainland.

Based on analysis of data available online for Kawasaki, Sea Doo, and Yamaha (provided by the manufacturer), it was estimated that today's PWC fleet at Gulf Islands National Seashore is about 50% four-stroke and 50% two-stroke, including all two-stroke direct-injection engines (Ostrosky pers. comm. 2015; Jetski.com 2015a; Jetski.com 2015b; Pwctexas.com 2015; Personalwatercraft.com 2015; NADA Guides 2015; Topspeed.com 2015). The assumption of 50% two-stroke PWC is also generally consistent with 2018 PWC registration data, which show 55.8% of PWC with a model year before 2010 (NMMA 2018). It is also likely that there is even a higher percentage of four-stroke PWC operating in park waters because four-stroke PWC have been manufactured since 2003 and only 24% of the PWC registered in the surrounding counties are older than 2003. Over time, the proportion of four-stroke PWC would increase as the older two-stroke models are retired from service. Registration data show this trend of turnover, with 2010 or newer model year PWC increasing from 23% of the total registered PWC in 2014 to 44.2% in 2018. These data are for the three counties closest to national seashore waters in Mississippi and Florida as a whole and may not directly line up with use occurring just at the national seashore. Instead these data give a relative measure of conditions in the area.

SEASONAL, ANNUAL, AND DAILY USE ASSUMPTIONS

The primary season for PWC and boat use is from Memorial Day to Labor Day. In that period, it is assumed that there are 30 average high-use days (holidays and weekend days), leaving about 70 average use days. According to national seashore staff, the period from Memorial Day to Labor Day represents about 95% of the entire annual PWC and boating use.

The counts of PWC use in 2013 (NPS 2013b) were examined to determine the peak time of day for PWC use. The count data indicate that the majority (approximately 60%) of the daily use occurs from 12:30 to 4:30 p.m.

FUTURE USE ASSUMPTIONS

The team examined available data on national recreational boating trends (not just PWC), as well as trends in PWC use in the Florida and Mississippi counties surrounding the national seashore, to determine what assumption should be made regarding any trend in use over the period of analysis. According to nationwide trends reported for all boating (United States Coast Guard 2017), use was increasing until around 2002, then use was relatively level until 2007/2008, followed by a very slight downward trend. Between 2011 and 2017, registrations leveled off, with registrations staying around the same level from 2011 through 2017. Florida vessel registration data for small vessels, including PWC, have shown the same trend – relatively flat for many years, with a slight decrease until 2014. Between 2014 and 2018, there was a nearly 17% increase in PWC registrations. While registrations have increased in the surrounding counties, this does not necessarily translate to an increase in use at the national seashore as people could be using a number of different areas (FLHSMV 2016, 2018). Given the lack of a clear trend over recent years, no future trend was discernible, and it was assumed that PWC use would be about the same over the period of analysis.

PERSONAL WATERCRAFT USE UNDER DIFFERENT ALTERNATIVE RESTRICTIONS

In general, it was assumed that the number of PWC used would not vary by alternative, but that location of PWC use would change to adapt to the restrictions under each alternative- that is, restrictions such as flat-wake areas would result in PWC crossing those areas but recreating in other areas of the national seashore in the same general vicinity. There is one exception to this assumption: in alternative E, the proposed prohibition of PWC from landing on many beaches and the closure of submerged aquatic

vegetation habitat to PWC use. These restrictions are expected to result in would result in PWC avoiding park waters and using areas outside the national seashore in the Okaloosa/Destin area. Based on typical PWC use and distance involved from launch sites, those PWC users would be expected to use other areas of the adjacent Chochtawhatchee Bay and not travel toward Navarre just to stay in park waters. Therefore, under alternative E, PWC use is assumed to be zero for the Okaloosa area in the national seashore.

The following assumptions were made regarding PWC use at the national seashore under all action alternatives:

1. Current PWC use levels within Gulf Islands National Seashore are expected to remain relatively stable for the life of this plan.
2. Implementation of US Environmental Protection Agency emission standards would not affect the level of PWC use at the national seashore.
3. The majority of PWC activity within the national seashore would occur in the Florida District.
4. Adequate enforcement would ensure that most PWC users comply with all applicable regulations and restrictions under each of the considered alternatives. However, some occasional violations of the flat-wake zone by PWC would be expected to occur and are discussed qualitatively in the analysis.

APPENDIX I: ADDITIONAL SOCIOECONOMIC CHARACTERISTICS

DEMOGRAPHIC CHARACTERISTICS

The following provides a summary of race/ethnicity and other select characteristics of geographies within the region of influence (ROI). To facilitate the discussion, information for the individual counties within the ROI is presented by the state in which they are located and a summary of this data is presented in table I-1. Note that all 2016 data presented below are taken from 5-year, 2012–2016 American Community Survey estimate data from the US Census and is presented as "2016 data" for ease of reading.

TABLE I-1. 2012–2016 5-YEAR ESTIMATES OF DEMOGRAPHIC CHARACTERISTICS WITHIN THE REGION OF INFLUENCE

		Indicator						
		2016 Population	2010 Population	% Change 2010 to 2016	Minority[b]	Per Capita Income (in $2016)	Land Area[c] (square miles)	Persons per square mile
Florida	Escambia County	309,574	297,619	4.00%	31.40%	$24,532	676.9	457
	Okaloosa County	195,798	180,822	8.30%	21.10%	$29,603	938.9	209
	Santa Rosa County	163,903	151,372	8.30%	14.00%	$28,219	1,025.80	160
	Florida	19,934,451	18,801,332[a]	6.00%	24.10%	$27,598	56,498.20	353
Mississippi	Harrison County	198,570	187,105	6.10%	31.10%	$22,517	589.1	337
	Jackson County	140,850	139,668	0.80%	28.10%	$24,350	747.7	188
	Mississippi	2,989,192	2,967,297	0.70%	41.00%	$21,651	47,680.20	63
Alabama	Mobile County	414,291	412,999 a	0.30%	40.40%	$23,318	1,259.60	329
	Baldwin County	199,510	182,265	9.50%	13.60%	$28,069	1,653.50	121
	Alabama	4,841,164	4,779,753 a	1.30%	31.30%	$24,736	51,661.90	94

Source: US Census Bureau 2016a, 2016b

Note:

a. Revised count used

b. A minority is defined as all those who identify themselves as a race other than non-Hispanic white alone.

c. Headwaters Economics 2018

STATE OF FLORIDA

The three counties in Florida within the ROI comprise the eastern portion of the national seashore. The largest municipality in the three-county area adjacent to the Florida District is Pensacola, which is located north of Santa Rosa Island. Pensacola is part of the Pensacola-Ferry Pass-Brent, Florida Metropolitan Statistical Area, which reported a population of 473,477 in 2016 (US Census Bureau 2016b). The Crestview-Fort Walton Beach-Destin, Florida Metropolitan Statistical Area, located on the Gulf of Mexico and east of the national seashore, had approximately 257,326 residents in 2016 (US Census Bureau 2016b). In total, the three-county area (Escambia, Santa Rosa and Okaloosa counties) had a combined population of approximately 669,275 residents in 2016 (US Census Bureau 2016b).

Escambia County is the westernmost county in Florida, and shares a border with Alabama. In 2016, the county had a population of slightly more than 300,000 residents, an increase of 4% from 2010 (US Census Bureau 2016a, 2016b). Much of the county's population resides in the southern portion of the county in proximity to Pensacola and the national seashore. The county is approximately 676 square miles with 457 people per square mile. The 2016 per capita income of $24,532 is lower than other Florida counties within the ROI. The 2016 5-year population estimates for municipalities in the county and within proximity to the national seashore include: Pensacola (53,250), Bellview (22,259), Brent (22,319), Ensley (22,101), Ferry Pass (33,060), Myrtle Grove (16,547), Warrington (12,894), and West Pensacola (20,382) (US Census Bureau 2016b).

Santa Rosa County is located east of Escambia County. In 2016, the county had a population of 163,903, an increase of 8.3% from the 2010 decennial Census (US Census Bureau 2016a, 2016b). The county has the lowest percentage of those who identify themselves as being of a minority and/or of Hispanic or Latino origin of Florida counties within the ROI. With a land area of 1,025.8 square miles, there were 160 people per square mile in 2016. The per capita income of $28,219 is higher than the Escambia County and state average and slightly less than that of Okaloosa County. Municipalities in proximity to the national seashore include Gulf Breeze and Navarre. The 2016 5-year population estimates in these municipalities were 6,205 and 33,473 respectively (US Census Bureau 2016b). Okaloosa County is the easternmost county within the ROI. The 2016 population of 195,798 was an increase of 8.3% from the 2010 decennial Census (US Census Bureau 2016a, 2016b). In 2016, Okaloosa County had the greatest per capita income of Florida counties within the ROI. With a land area of approximately 938 square miles, there were 209 people per square mile in 2016 (US Census Bureau 2016b).

FLORIDA GATEWAY COMMUNITIES

There are three visitor centers located in the Florida District – one in Pensacola, one at Fort Pickens, and one in Gulf Breeze. Because of their proximity to landside access points at the national seashore, it is anticipated that Pensacola and Gulf Breeze experience economic benefits from spending associated with visitation to the national seashore. Fort Pickens lacks landside access. As a result, these municipalities are considered gateway communities whose economy depends, in part, on visitation to the national seashore. Social and economic characteristics of these municipalities are summarized below.

At the time of the 2010 decennial Census, Pensacola had a population of 51,923. Since that time, the population has increased slightly by approximately 2.6% to 53,250 people (US Census Bureau 2016a, 2016b). The per capita income of $28,083 is greater than the Escambia County and the state of Florida average (US Census Bureau 2016b). Gulf Breeze is a relatively small municipality in Santa Rosa County on the Fairpoint Peninsula across the bay from Pensacola. At the time of the 2010 decennial Census, the municipality had a population of 5,763 (US Census Bureau 2016a). The population increased by approximately 7.7% between 2010 and 2016. The per capita income is $55,603, notably higher than the Escambia County and the state of Florida average (US Census Bureau 2016b).

STATE OF MISSISSIPPI

The Mississippi portion of the ROI, which includes Jackson and Harrison counties, is located in the southeastern part of the state and shares a border with Alabama. In 2016, the population of the Gulfport Biloxi Pascagoula Metropolitan Statistical Area was 385,448 and the combined population of Jackson and Harrison counties was approximately 339,420. Principal cities within the area include Biloxi, Gulfport, and Pascagoula, all of which are located on the Gulf of Mexico in proximity to the national seashore (US Census Bureau 2016b).

Jackson County is the easternmost county in Mississippi. In 2016, the population of Jackson County was 140,850, an increase of less than 1% over the 2010 decennial Census (US Census Bureau 2016a, 2016b). The county has a land area of 747.7 square miles, which translates to approximately 188 people per square mile. At $24,350, the per capita income in the county was greater than that of Harrison County and the state as a whole. The 2016 populations for municipalities in the county and within proximity to the national seashore include: Pascagoula (22,163), Gautier (18,541), Moss Point (13,652), Gulf Park Estates (6,904), Gulf Hills (8,326), and St. Martin (8,245) (US Census Bureau 2016b).

Located west of Jackson County, Harrison County includes Gulfport and Biloxi, two of the largest cities in Mississippi. These two municipalities share the county seat. At 198,570, the Harrison County population increased approximately 6.1% between 2010 and 2016. In 2016, the per capita income was just less than that of Jackson County ($22,517). At 337 people per square mile, Harrison County is denser than Jackson County and the state of Mississippi overall. The 2016 population estimates for municipalities in the county and within proximity to the national seashore include: Biloxi (45,271), Ocean Springs (17,547), D'Iberville (10,829), Pass Christian (5,302), Gulfport (71,265), and Long Beach (15,450) (US Census Bureau 2016b).

Mississippi Gateway Communities

The Davis Bayou visitor center (Mississippi District), is located in Ocean Springs in Jackson County. The 2016 population estimates report that the Ocean Springs population has increased by approximately 105 people between 2010 and 2016 (US Census Bureau 2016a, 2016b). The per capita income is $32,332, notably higher than Jackson County and the state of Mississippi overall (US Census Bureau 2016b).

STATE OF ALABAMA

The Alabama portion of the ROI is located in the southern part of the state and shares a border with Florida and Mississippi. Mobile and Baldwin counties are included within Alabama's portion of the ROI, and make up the Mobile-Daphne-Fairhope Combined Statistical Area. In 2016, the area had a combined population of approximately 613,801. Principle cities within the area include Mobile, Daphne, Fairhope, and Foley, all of which are in proximity to the national seashore.

Baldwin is the easternmost county in Alabama. In 2016 the population of Baldwin County was estimated at 199,510, an increase of approximately 9.5% over the 2010 decennial Census (US Census Bureau 2016b). The percentage of those who identify themselves as being a minority is notably less than the state average. The county has a land area of 1,653.5 square miles, which translates to approximately 121 people per square mile. At $28,069, the per capita income in the county is slightly higher than the state average. Located west of Baldwin County, Mobile County includes the city of Mobile which is the third largest city in Alabama. At 414,291 persons Mobile County's population increased less than 1% between 2010 and 2016. In 2016, the per capita income was $23,318, just less than that of the state of Alabama ($24,736). At 329 people per square mile, Mobile County is notably denser than Baldwin County and the state of Alabama overall.

Alabama Gateway Communities

Alabama does not have any visitor centers associated with the national seashore; however, communities in the vicinity of the national seashore in Alabama are anticipated to experience economic benefits from the national seashore. There are two communities in Baldwin County, Gulf Shores and Orange Beach that are situated just west of Perdido Key. The population of Orange Beach increased by approximately 350 between 2010 and 2016 (US Census Bureau 2016a, 2016b). The per capita income of Orange Beach is $40,932, which is notably higher than Baldwin County and the State of Alabama overall (US Census Bureau 2016b). The city of Gulf Shores is located west of Orange Beach on the southern coast of

Alabama. Between 2010 and 2016, the population of this city increased by approximately 1,511 people (US Census Bureau 2016a, 2016b). The per capita income is $31,814, which is higher than the state, and slightly higher than the county.

EMPLOYMENT CHARACTERISTICS

Employment by industry for the ROI is presented in table I-2. The educational services and health care and social assistance sector is one of the primary employment sectors in all ROI geographies in Florida, Mississippi, and Alabama. Slightly less than 25.0% of Mobile County, Alabama, is employed in this sector, the highest of all ROI counties. At approximately 18%, Harrison County, Mississippi, has a greater percent of its labor force employed in the arts, entertainment, and recreation, and accommodation and food services sector than all other geographies within the ROI. This sector represents between 8.3% and 18% of employment within ROI geographies. Escambia County represents the greatest percent of labor force working in retail (16.4%). Overall, the retail trade sector represents more than 10.0% of employment in all geographies within the ROI. Manufacturing in Mississippi counties within the ROI is higher than counties in Alabama, and notably higher than in Florida counties within the ROI. The information, wholesale trade, and agriculture, forestry, fishing and hunting, and mining sectors represent a small share of total employment in each county within the ROI (US Census Bureau 2016b).

EMPLOYMENT CHARACTERISTICS IN GATEWAY COMMUNITIES (FLORIDA AND MISSISSIPPI)

Figure I-2 provides a summary of unemployment rates for counties within the ROI, the states of Alabama, Florida, and Mississippi, and the nation. With the exception of Mobile County, unemployment rates in Alabama and Florida counties within the ROI and both states follow a pattern similar to that of the nation, while Mississippi counties within the ROI and the entire state of Mississippi generally have had unemployment rates higher than other areas of comparison. This is particularly notable in 2005 when unemployment in Harrison and Jackson counties (Mississippi) was at or greater than 10.0% when Alabama and Florida counties within the ROI demonstrated an unemployment rate of less than 4.5%. However, by 2007, unemployment rates in Harrison and Jackson counties decreased significantly to more closely resemble unemployment rates in other areas of comparison. In general, Mobile County, Alabama trends more closely with that of Jackson County, Mississippi.

As demonstrated in figure I-2, with the onset of the economic recession in 2008 through 2012, counties within the ROI, the states of Alabama, Florida, and Mississippi, and the nation generally followed the same upward and downward fluctuation. Highest rates of unemployment for all geographies can be seen in 2010, with Mobile County having a notably higher unemployment rate compared to other counties (11.3%). All geographies demonstrate a decrease in unemployment since 2011 (US Bureau of Labor Statistics 2018). In 2017, unemployment rates were below 6% for all geographies.

In 2016, Gulf Breeze, Florida, Ocean Springs, Mississippi, and Orange Beach, Alabama had an unemployment rate similar to that of other counties and states within the ROI, and the nation (5.3%, 6.1%, and 5.7%, respectively). The unemployment rate in Gulf Shores, Alabama, and Pensacola, Florida in 2016 (10.4% and 8.9%, respectively) was notably higher than that of other areas within the ROI and ROI gateway community counterparts (US Census Bureau 2016b).

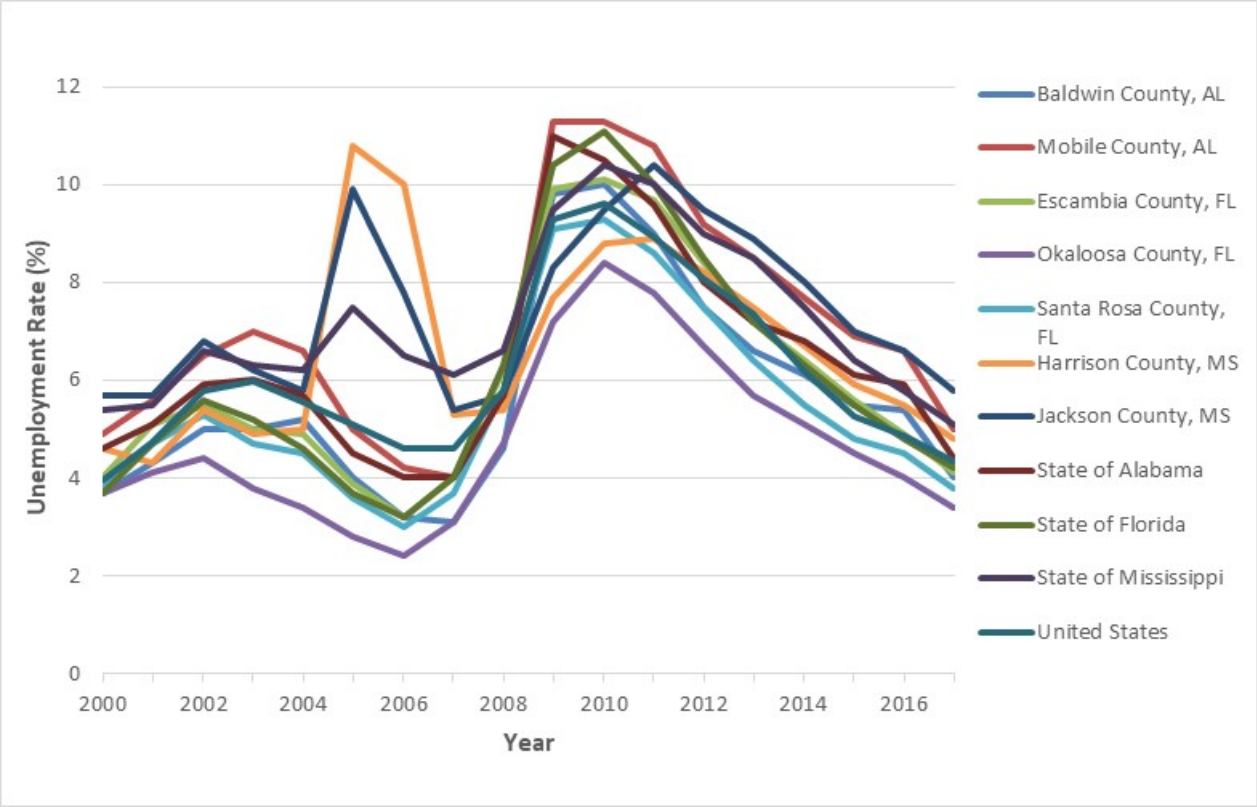
TABLE I-2. 2012–2016 5-YEAR EMPLOYMENT BY INDUSTRY ESTIMATES WITHIN THE REGION OF INFLUENCE

Employment by Industry	Florida				Mississippi			Alabama		
	Escambia County	Okaloosa County	Santa Rosa County	Florida	Harrison County	Jackson County	Mississippi	Mobile County	Baldwin County	Alabama
Civilian employed population 16 years and over	131,454	85,253	68,524	8,755,427	83,295	59,309	1,212,650	171,733	87,753	2,042,025
Agriculture, forestry, fishing and hunting, and mining	0.9%	0.5%	1.5%	1.1%	1.0%	1.3%	3.0%	1.1%	1.4%	1.6%
Construction	5.4%	7.1%	7.5%	6.8%	8.0%	7.3%	6.6%	6.8%	7.7%	6.4%
Manufacturing	4.9%	5.1%	5.7%	5.2%	6.3%	**18.1%**	**13.4%**	**12.3**%	9.2%	**14.0**%
Wholesale trade	1.9%	1.4%	1.7%	2.8%	2.1%	1.6%	2.5%	3.0%	3.0%	2.5%
Retail trade	**16.4%**	**13.1%**	**13.3%**	**13.3%**	**12.1%**	10.5%	**11.9%**	**12.6**%	**15.0**%	**12.0**%
Transportation and warehousing, and utilities	4.7%	4.5%	5.6%	5.1%	5.0%	4.8%	5.7%	5.4%	4.9%	5.3%
Information	1.7%	0.9%	1.4%	2.0%	1.1%	1.1%	1.3%	1.7%	1.4%	1.7%
Finance and insurance, and real estate and rental leasing	8.2%	7.0%	6.3%	7.7%	4.8%	3.8%	4.7%	5.1%	6.9%	5.6%
Professional, scientific, and management, and administrative and waste management services	10.3%	12.2%	**11.2%**	**12.8%**	7.6%	6.4%	6.6%	9.6%	10.3%	9.3%
Educational services, and health care and social assistance	**22.2%**	**16.5%**	**22%**	**21.1%**	**19.9%**	**20.2%**	**24.4%**	**24.3**%	**19.6**%	**22.5**%
Arts, entertainment, and recreation, and accommodation and food services	**11.6%**	**14.3%**	9.3%	12.3%	**18.0%**	**16.2%**	9.6%	9.1%	**10.5**%	8.3%
Other services, except public administration	5.6%	6.2%	5.9%	5.3%	4.3%	3.8%	4.7%	5.3%	5.2%	5.2%

Employment by Industry	Florida				Mississippi			Alabama		
	Escambia County	Okaloosa County	Santa Rosa County	Florida	Harrison County	Jackson County	Mississippi	Mobile County	Baldwin County	Alabama
Public administration	6%	11.1%	8.7%	4.5%	9.7%	4.8%	5.5%	3.8%	4.8%	5.6%

Source: US Census Bureau 2016b.

Note: Bold indicates the top three employment sectors in each area.



Source: US Bureau of Labor Statistics 2018.

FIGURE I-1. 2000–2017 UNEMPLOYMENT RATES WITHIN THE REGION OF INFLUENCE (PERCENT)

APPENDIX J: DRAFT ENVIRONMENTAL IMPACT STATEMENT PUBLIC COMMENT RESPONSE

1. **Concern Statement**: Commenters suggested placing buoys in the water to clearly mark Personal Watercraft (PWC) flat-wake zones and closures. One commenter questioned how these boundaries will be enforced.

Response: Alternative E of the draft *Gulf Islands National Seashore Personal Watercraft Use Plan / Environmental Impact Statement* (plan/EIS) states that all seagrass beds located within 300 yards of the shoreline may be demarcated by perimeter signs or reference buoys as sensitive resource areas. However, after further discussion and analysis of placing additional markers or buoys as noted in the comments, the National Park Service (NPS) has determined that it is not practicable or environmentally desirable to place buoys along the entire approximately 100 miles of the national seashore shoreline. The amount of manpower necessary to install and maintain the buoys and their anchors would be very labor intensive and costly. Installation of the buoys would require anchors that would be screwed into the seafloor or set in place with 600-pound anchor blocks, which during installation and also storm events could disturb the seafloor sediments, water resources, benthic organisms, seagrass roots, essential fish habitat (EFH), and potentially undiscovered archaeological sites. In addition, the visual impacts of buoys would hamper the viewshed and the visitor's experience of visiting the national seashore. Based on these impacts, the NPS has removed the use of permanent buoys from alternative E. An element has also been added to the preferred alternative (alternative D) that allows for the use of temporary floating buoys (that do not anchor to the seafloor) as directed by law enforcement to mark the boundary of the flat-wake zone on high visitation days, if necessary.

Flat-wake zones and closures will continue to be enforced as they are currently. National seashore law enforcement rangers engage visitors on personal watercraft (PWC) within the flat-wake zone or areas closed to PWC use. They use the standard range of enforcement actions, typically starting with a verbal informational contact along with a park informational pamphlet regarding PWC usage in the national seashore since many non-compliant visitors are unaware of the PWC flat-wake zone regulations. Depending on the situation, the contact could be elevated to a verbal warning, written warning, collateral citation, and if necessary, mandatory appearance citation. They also have arrest authority if needed, but successful compliance is typically gained through verbal informational contacts or verbal warnings. Citations can and will be issued if PWC users are operating without due care or operating on plane in close proximity to other visitors.

2. **Concern Statement**: Commenters disagreed with the proposed PWC area restrictions, noting that restricting such vast tracts of water would create navigation hazards and prevent access to commercial establishments on Pensacola Beach.

Response: The NPS is unaware of any navigational hazards that would occur as a result of this plan/EIS, and the commenter does not provide any examples of navigational hazards. With the exception of alternative E, none of the action alternatives include new PWC closures in national seashore waters. The full PWC closures proposed under alternative E still allow PWC access to the Pensacola Beach area and all commercial establishments there. Therefore, PWC access around Pensacola Beach is still allowed under all action alternatives, but PWC would be required to travel at flat-wake speed within the flat-wake zones specified under each alternative: 100 feet from the shoreline under alternative B, 300 yards from the shoreline under alternatives C and E, and 150 yards from the shoreline under alternative D (the preferred alternative). For more information regarding PWC flat-wake zones, please see the response to Concern Statement #14.

3. **Concern Statement**: Commenters stated that the benefits of prohibiting PWC from beaching on Horn and Petit Bois Islands are not demonstrated by the analysis in the draft plan/EIS.

Response: The PWC landing restrictions for Horn and Petit Bois Islands under alternatives D and E were proposed primarily to reduce impacts on wilderness character on those islands. Under alternative D and E, noise from PWC would still be audible in wilderness, which would impact the "natural" quality of wilderness (see page 33 of the final plan/EIS). However, because PWC would be prohibited from beaching on Horn or Petit Bois Islands, "Opportunities for solitude and unconfined recreation would increase" as stated in the draft plan/EIS (pages 129–130) of the final plan/EIS). In other words, PWC would not be allowed to beach within the wilderness area, so visitors would maintain the ability to experience solitude and unconfined recreation, one of the qualities of wilderness character. The quality of solitude or a primitive and unconfined type of recreation is degraded by settings or management actions that increase visitor encounters, signs of modern civilization, and recreation facilities. The EIS analysis assumed that observing PWC on wilderness beaches would fall under the category of signs of modern civilization and adversely impacts wilderness character; therefore, prohibiting PWC from beaching in wilderness would have beneficial impacts to the wilderness qualities of solitude or an unconfined type of recreation, as stated in the draft plan/EIS. The text in the final plan/EIS has been revised to clarify these beneficial impacts.

4. **Concern Statement**: One commenter suggested that the prohibition of PWC landings on Horn and Petit Bois Islands under alternative D could put wilderness campers in danger. More specifically, in adverse weather conditions, a PWC that is anchored off shore is much less likely to stay in place than a beached craft during heavy surf conditions.

Response: Park law enforcement personnel would allow PWC users to beach their craft on Horn and Petit Bois Islands in instances where adverse weather conditions endanger visitor safety.

5. **Concern Statement**: One commenter suggested the draft plan/EIS justifies the proposed prohibition on beaching PWC on the wilderness islands (Horn and Petit Bois Islands) by comparing noise levels to a pristine condition that does not exist on these wilderness islands. An incremental impact to wilderness from the soundscape from the existing condition is not demonstrated in the draft plan/EIS to justify these closures.

Response: Guidance under the NPS NEPA Handbook states that, "Analyzing impacts means considering how the condition of a resource would change, either negatively or positively, as a result of implementing each of the alternatives under consideration." The change being considered is the change from the existing condition, which is not "pristine." For example, the analysis of soundscapes (page 69 of the final plan/EIS) details the change from the existing condition and that change is used to determine the impacts of the alternative. To clarify this approach, text has been added to the analysis of Acoustic Environment and Wilderness impacts under "Methods and Assumptions" that states that the analysis of direct and indirect impacts to these resources evaluates the change from the alternative relative to existing conditions."

The intrusion of sound on the environment or the presence of motorized vessels in or near wilderness directly impacts wilderness quality, regardless of the existing condition. The preferred alternative addresses noise intrusion into wilderness through the implementation of flat-wake zones. Limitations on beaching are not related to noise in wilderness (see pages 129–130 of the final plan/EIS, which notes there would still be noise), but rather to remove motorized vessels from wilderness beaches. In short, this element was not related or tied to the noise analysis.

6. **Concern Statement**: One commenter suggested that the draft plan/EIS contradicts itself regarding areas of high PWC use within national seashore boundaries. The commenter stated that, based on

land-based PWC observational surveys cited in the draft plan/EIS, PWC use is highest off Perdido Key and Santa Rosa Island. However, aerial surveys in the draft plan/EIS indicate that Pensacola Beach, Navarre Beach, and Crab Island have higher PWC use than these areas. The commenter suggested that it appears that PWC use surrounding Pensacola Beach, Navarre Beach, and Crab Island were not considered in the impact analyses, even though these waters are within NPS jurisdiction.

Response: The volume of PWC use and identification of high-use areas at the national seashore, as stated in the final plan/EIS, were informed by two separate survey efforts: a land-based PWC survey (Volkert 2015) and an aerial count of all watercraft at the national seashore (NPS 2013b). The land-based PWC survey was conducted on four dates during the summer of 2013 and additional land-based surveys were conducted on four dates in 2015 to capture use in the Okaloosa/Choctawhatchee Bay (Crab Island) area that was not included in the previous counts. Land-based PWC observations were recorded from a total of 12 stations located throughout the national seashore (Volkert 2015). Aerial counts were conducted across the entire national seashore on two dates during the summer of 2013. The objective of the land-based PWC survey was to gauge the number and behavior of PWC observed on a given day, while aerial observations served to capture where all watercraft use (including boating) was occurring, as a snapshot in time.

The land-based PWC survey found that the highest concentrations of PWC in the Florida District occurred at Crab Island, Perdido Key/Big Lagoon, and Santa Rosa Sound as shown in tables 12 and 13 in the final plan/EIS. Similarly, the aerial surveys observed boats and PWC concentrating mainly on the northern shores of the Florida islands, with the highest concentrations occurring at Crab Island, Perdido Key/Big Lagoon, and in Santa Rosa Sound (north of Pensacola Beach and Navarre Beach), as shown in figure 3A of the final plan/EIS. Therefore, although the land-based and aerial surveys were conducted on different dates, both surveys observed similar patterns of PWC use with regard to concentration in specific areas of the national seashore.

Based on the PWC survey results as shown in tables 12–13 and figure 3A of the final plan/EIS, and as described above, the final plan/EIS does not contradict itself regarding areas of high PWC use within national seashore boundaries. Impacts of PWC use were considered throughout the national seashore for all resource topics, and the final plan/EIS states that impacts may be greatest in areas where PWC use is highest. However, the use of different terminology to describe specific locations where PWC were documented during the two survey efforts (e.g., looking at a larger geographic area such as Santa Rosa Sound vs. site specific areas such as Pensacola Beach and Navarre Beach) could be confusing for readers. Therefore, text from the draft plan/EIS has been revised to use consistent terminology to clearly describe locations identified as high PWC use areas, as shown tables 12–13 and figure 3A of the final plan/EIS.

7. **Concern Statement**: One commenter suggested that PWC regulations should be focused on Navarre Beach, Pensacola Beach, Crab Island, and Fort McRee, because PWC use is highest and most concentrated during weekends at these locations.

Response: PWC have access to most of the waters in the national seashore and therefore have the potential to impact park resources in any of these areas. Therefore, PWC regulations are needed to protect resources (including visitor experience) in all areas of the national seashore and not just areas that are popular with PWC users. However, law enforcement staff at the national seashore currently focus their attention in areas of high visitor use and areas where resources could be threatened.

8. **Concern Statement**: One commenter expressed concern that the number of PWC stated in the draft plan/EIS is not accurate and that the data should include all PWC registered in Alabama, portions of

Mississippi, and the Florida panhandle, as well as an estimate that includes the number of PWC from other states.

Response: The PWC registration data referenced in the EIS were used to determine the approximate age of the PWC that could be operating in park waters and was not intended to determine the number of PWC that visit the national seashore. The NPS does not have data on the state or county that PWC users come from to visit the national seashore, so the draft plan/EIS used registration data from the Florida and Mississippi counties that are adjacent to the national seashore boundaries to estimate the age of PWC in use in the national seashore. As stated in the final plan/EIS, the NPS conducted on-the-ground PWC counts and used aerial imagery to estimate the amount and location of PWC use in the national seashore.

9. **Concern Statement**: Commenters suggested that the draft plan/EIS used outdated information to form the conclusion that two-stroke PWC are still being operated at the national seashore, stating that virtually all the PWC operating at the national seashore have four-stroke engines.

Response: As stated in appendix H (page H-2), "Based on analysis of data available online for Kawasaki, Sea Doo and Yamaha (provided by the manufacturer), it was estimated that today's PWC fleet at Gulf Islands National Seashore is about 50% four-stroke and 50% two-stroke, including all two-stroke direct injection." This assumption was derived by looking at two different data sources: one set of data provided by the major national PWC manufacturers and one data set composed of county-level PWC registration information.

First, the planning team reviewed data obtained from the PWC manufacturers Yamaha, Bombardier Recreational Products (manufacturer of Sea Doo), and Kawasaki (Ostrosky pers. comm. 2015; Jetski.com 2015a; Jetski.com 2015b; Pwctexas.com 2015; Personalwatercraft.com 2015; NADA Guides 2015; Topspeed.com 2015). These data indicate the number of two-stroke and four-stroke PWC that were manufactured between the years 2003 and 2011. Information solely from the manufacturers showed an approximate split of 47% four-stroke engines and 53% two-stroke engines.

Next, the planning team looked at the registration data from the National Marine Manufacturers Association (NMMA), which show the model year of PWC registered in Escambia, Okaloosa, Santa Rosa, Harrison, and Jackson counties. However, the NMMA registration data only include the model year (1977 through 2018) and not the type of PWC engine (two-stroke vs. four-stroke). Therefore, the planning team had to make some assumptions about engine type based on the year the PWC was manufactured. The registration data show that in 2018, 55% of PWC registered were those with a model year prior to 2010 (NMMA 2018), and therefore were likely two-stroke engines (and the remaining 45% being four-stroke engines). However, it is very likely that there is a higher percentage of four-stroke PWC operating in park waters because four-stroke PWC have only been manufactured since 2003 and only 24% of the PWC registered in the surrounding counties are older than 2003. Over time the proportion of four-stroke PWC would increase as the older two-stroke models are retired from service. The registration data show this trend of turnover of PWC, with 2010 or newer model year PWC increasing from 23% of the total registered PWC in 2014 to 44.2% in 2018. These data are for the counties closest to the national seashore boundaries in Mississippi and Florida as a whole and may not directly represent the types of PWC being operated in the national seashore but instead give a relative measure of conditions in the area.

Based on these two sources of data and trends toward four-stroke engines, the planning team assumed a split of 50% two-stroke and 50% four-stroke engines. These data also show that the information in the EIS is current and two-stroke engines are likely being operated at the national seashore based on the number and types of PWC registered in the surrounding counties. These were the best available data at the time of the draft plan/EIS publication.

10. **Concern Statement**: One commenter suggested that the water quality samples that were taken to measure the impact of PWC emissions on waters within the national seashore were insufficient and not inclusive. The commenter suggested that the water quality samples should have been taken over several days at several sites. The commenter stated that the insufficient sample size and the lack of repeated data collection call into question the scientific merit and methodology of data underlying the impact analysis of water quality in the draft plan/EIS.

Response: Water quality sampling was conducted to provide a data set of the hydrochemical conditions from a single sampling event that could be used to compare water quality from PWC-use and non PWC-use areas to existing water quality criteria. Data collected from the single sampling event represent a snapshot of water quality conditions at the national seashore at a single point in time. Water quality samples were collected at six sites in the Florida District and four sites in the Mississippi District. In each district, sampling sites were strategically located in areas of known or expected PWC-use with an equal number of sites (control sites) located in non PWC-use areas for comparison. Water quality sampling sites in PWC-use areas were coordinated with PWC counting stations to provide for easy correlation between observed PWC-use and measured water contaminant concentrations.

The sampling was intentionally conducted at a time when PWC use at the national seashore would be approximately at its highest (during Memorial Day weekend) and thus, PWC-derived water contaminants would be at or near their greatest concentrations.

The water quality sampling was designed to provide data at levels sufficient to inform the analysis of water quality impacts in the EIS and was not intended to serve as a long-term monitoring program. Results of the water quality sampling provided the information needed to adequately analyze water quality impacts in the draft plan/EIS and no additional sampling is warranted at this time.

11. **Concern Statement**: Commenters suggested that the draft plan/EIS does not provide sufficient rationale for the proposed two-year phase out of two-stroke PWC, noting that Lake Mead National Recreation Area afforded PWC users a ten-year phase out period to meet the 2006 EPA emission standards. Some commenters suggested that PWC, even those with two-stroke engines, impact water quality and air quality less than two-stroke and diesel boats, particularly in a large open body of water. Commenters also suggest that the draft plan/EIS and administrative record fail to provide evidence of observable and unacceptable impacts from allowing the declining number of pre-2010 PWC owners to continue using their PWC at the national seashore. Lastly, commenters suggested that the eventual prohibition of two-stroke engines is unnecessary, because locally registered PWC are already gradually changing to 2010 and newer model years.

Response: Following publication of the draft plan/EIS, after a thorough review of the environmental analysis of the preferred alternative the NPS decided that the requirement for PWC to meet the 2010 EPA emissions standards was not necessary, due to the low level of impacts to water and air quality attributable to PWC use at the national seashore and the fact that older two-stroke PWC are naturally being replaced by newer, cleaner PWC. As described on pages 45–47 of the final plan/EIS and shown in table 22, discharge of pollutants from PWC use under the preferred alternative would have very little effect on water quality at the national seashore. The air quality modeling and analysis on pages 54–55 of the final plan/EIS (see also tables 26–28) shows that PWC use is not a meaningful contributor to air pollution and that the phase out of older PWC would not result in a measurable change to airborne pollutant concentrations, as shown on tables 26–28 of the final plan/EIS. As seen in the 2018 PWC registration data depicted on table 11 of the final plan/EIS, approximately 45% of the registered PWC in the counties surrounding the national seashore are 2010 or newer and approximately 76% of PWC are 2003 or newer (when four-stroke PWC came on the market). These percentages are considerably higher than they were in 2014, indicating that the PWC fleet is naturally transitioning to newer, cleaner, and

quieter PWC and will continue to do so. Therefore, the requirement for PWC to meet the 2010 EPA emissions standards is not necessary and has been removed from the preferred alternative.

12. **Concern Statement**: Commenters stated the air quality and water quality impact analysis in the draft plan/EIS was based on a qualitative approach, using relative terms without any basis or context. Commenters stated that the draft plan/EIS does not clearly articulate how the 2010 EPA standards would benefit these resources at the national seashore.

Response: Impact analysis for both water quality and air quality included quantitative calculations as a basis for estimating potential impacts of PWC use under each of the alternatives. Tables 26–31 of the final plan/EIS contain the quantitative results of air quality impact modeling for each of the alternatives in addition to the quantitative estimates of cumulative air quality impacts. These pollutant emission values were used to determine the level of impact to air quality for each of the alternatives. A detailed methodology of the qualitative air quality modeling conducted can be found in the document, *Gulf Islands National Seashore Air Quality Analysis Technical Support Document* (ARS 2018), located on NPSs Planning, Environment, and Public Comment (PEPC) website, alongside the draft plan/EIS.

Impacts to water quality under the alternatives were quantitatively analyzed based on the anticipated duration of daily PWC use, the amount of pollutants discharged by PWC use, and the volume of water available in various segments of the national seashore for the dilution of PWC pollutants (tables 18–25). A detailed description of the methodology used to quantitatively analyze water quality impacts associated with each of the alternatives, along with a full disclosure of assumptions used, are provided under the *Water Quality, Methods and Assumptions* heading in chapter 4 and in appendix E of the final plan/EIS. Based on this quantitative analysis of water quality impacts associated with each alternative, a qualitative determination was made about the relative impact of each alternative on water quality at the national seashore compared to existing conditions. The impact of each alternative was then considered in the context of other past, present, and reasonably foreseeable future actions (including the use of other motorized watercraft) to determine its contribution to the overall cumulative impact on water quality at the national seashore.

The 2010 EPA emission standards requirement was considered in the overall determination for alternatives C, D, and E in the draft plan/EIS because implementation of these standards would reduce emissions by phasing out older, two-stroke carbureted PWC. As noted in appendix E of the final plan/EIS, four-stroke engines do not mix oil with fuel and are designed for complete combustion before discharge, resulting in 97% less pollution overall compared to conventional two-stroke engines. The 2010 EPA emission standards requirement has been removed from alternatives C and D of the final plan/EIS, as explained in the response to Concern Statement #11. For alternative E, which retains the 2010 EPA emission standards, the final plan/EIS does note that beneficial impacts would occur including reducing the emissions of PM_{10}/$PM_{2.5}$ compared to existing conditions (e.g., 89% reduction from 0.19 tons per year to 0.02 tons per year for PM_{10}) (page 56 of the final plan/EIS).

13. **Concern Statement**: Commenters suggested that peak PWC use was observed via the aerial survey on a non-holiday weekend, even though the draft plan/EIS claims peak PWC use occurs over Labor Day weekend. Commenters suggest the aerial surveys yielded higher PWC counts than land-based observational surveys, but the draft plan/EIS used the land-based surveys to determine PWC use impact on park resources.

Response: The numbers of PWC that were used in the impact analysis are described in appendix H and shown on table H-1. The peak use number of PWC was based on the highest number of PWC observed on any one day during the 2013 count, whether or not the highest number of PWC occurred on a holiday. This led to the assumption of 502 for the peak number of PWC in the Florida District and 38 PWC for a peak use day in Mississippi. The 2013 aerial count determined that there were 514 PWC in the Florida

District and 18 PWC on the non-holiday count. Therefore, the peak PWC use numbers used in the impact analysis are consistent with the land-based PWC surveys and the aerial PWC counts. Using 514 PWC instead of 502 PWC would not result any measurable differences in the level of impact of PWC use at the national seashore. Therefore, the NPS is confident that the assumption of the level of PWC use and the corresponding impact analyses in the EIS are accurate.

14. **Concern Statement**: One commenter questioned the scientific basis that supports a 150-yard flat-wake zone for the protection of wildlife, noting that based on personal observation a 50-yard flat-wake zone would be sufficient to protect wildlife.

Response: As stated on page 80 of the final plan/EIS, "PWC use can potentially impact many groups of species present in areas where PWC are operated. The most vulnerable group of species to such impacts are birds. Birds are likely to leave their habitat or 'flush' due to noise or visual disturbances associated with PWC use (Burger 1998, 2002; Burger and Leonard 2000; Rodgers and Schwikert 2002). These disturbances may disrupt feeding, nesting, or reproductive behavior."

As stated in the final plan/EIS (page 86), the proposed 150-yard (450-foot) flat-wake zone under alternative D for the Florida District is slightly less than the recommended buffer distance to avoid flushing for most bird species, which is 150 meters (approximately 500 feet) (Rodgers and Schwikert 2002). That study concluded that bird species exposed to both PWC and outboard powered vessels require the greatest buffer distance, and that buffer distances of 180 meters for wading birds, 140 meters for terns and gulls, 100 meters for plovers and sandpipers, and 150 meters for Ospreys would minimize their disturbance. Therefore, as stated on page 86 of the final plan/EIS, "because the flat-wake zones would be nearly the recommended buffer distance, this slight increase in PWC engine noise near shorelines where birds may be present may not have a noticeable difference in impacts on birds compared to existing conditions." Further, NPS is currently coordinating with the US Fish and Wildlife Service (USFWS) regarding measures that should be taken to minimize impacts to protected species. The NPS will complete the Endangered Species Act (ESA) consultation process to the satisfaction of the USFWS prior to signing a Record of Decision (ROD) for this project.

15. **Concern Statement**: Commenters suggested closing national seashore waters until nesting and habitat areas and sites inhabited by sensitive bird species are clearly marked with enforceable signage and a plan is created to enforce these closures and disseminate this information to PWC operators. Commenters suggested that the EIS should contain explicit triggers to determine PWC closures, as well as areas that are closed to pedestrians. Commenters expressed concern that remote areas are rarely patrolled and do not usually have clearly marked nesting and critical species habitat. Commenters noted that even with established closure triggers, an increase in staff would be necessary to post and patrol closed areas.

Response: The purpose/scope of the PWC plan/EIS is to evaluate PWC use at the national seashore to ensure the protection of natural and cultural resources, provide a variety of visitor use experiences, minimize conflicts among various users, and promote the safety of all visitors, consistent with the national seashore's enabling legislation, mission, purpose, and goals. Although closing areas to visitors to protect sensitive species, increased law enforcement, marking sensitive bird species nests, and other management measures suggested by commenters contribute to natural resource protection, these measures are not accomplished through this plan, but through daily park management as these protections are specific to all uses occurring in the national seashore, not just PWC use. The national seashore will continue to consider these resource protection management measures, both as related to PWC use and as to all other visitor uses. Furthermore, closing national seashore waters to PWC use until enforcement and education plans are developed was not considered because national seashore already has law enforcement present who disseminate educational materials. Furthermore, there have not been any reports that PWC

use in park waters has directly adversely impacted sensitive wildlife at the national seashore, which would be the threshold for which closing a particular area to PWC use.

Although this plan/EIS does not include specific closures or other species management measures, the preferred alternative includes flat-wake zone distances that are consistent with recommended buffer distances to protect sensitive bird species from disturbance. The plan/EIS (p. x6 does state, "The national seashore would maintain the seasonal bird closures, as directed in the Superintendent's Compendium (NPS 2019). These closures include nesting closures for osprey and eagles. Closures for shorebirds, including piping plovers, establish buffers around the nesting, loafing, and foraging areas. Closures encompass both land and water, and prohibit any public use within the buffers. Please refer to the 2019 Superintendent's Compendium (NPS 2019) for a full list of restrictions." Furthermore, the NPS is currently coordinating with the USFWS and National Oceanic and Atmospheric Administration (NOAA) regarding measures that should be taken to minimize impacts to protected species. The NPS will complete the ESA consultation process to the satisfaction of the USFWS and NOAA prior to signing a ROD for this project.

16. **Concern Statement**: One commenter noted that allowing PWC at the national seashore has negative impacts on park resources, wildlife, and other visitors to the national seashore and violates the NPS's mandate to fully protect resources. Therefore, they suggest that alternative A is the only suitable option.

Response: As stated in NPS *Management Policies 2006*, virtually every form of human activity that occurs in a park has some degree of effect on park resources. It is up to the NPS decision-maker to determine if a particular activity would result in unacceptable impacts to park resources and whether that activity should occur in the national seashore. As part of the response to the 2010 District Court opinion on the previous environmental assessment (EA) for PWC use at Gulf Islands, the NPS prepared this environmental impact statement (EIS) and conducted a more robust scientific analysis of the impacts of PWC use in the national seashore. Although the impact analysis in the EIS indicated that park resources would be affected as a result of continued PWC use, those impacts would not rise to an unacceptable level. Park resources would continue to exist in a condition that would allow visitors to enjoy them now and into the future.

17. **Concern Statement**: Commenters suggested the preferred alternative for PWC management does not provide enough protection to imperiled coastal birds and their habitat needs. Commenters expressed concern for threatened and endangered species and suggested unrestricted or poorly enforced PWC access poses a serious threat to the health and productivity of threatened and endangered birds at the national seashore. Commenters recommended a more robust analysis of land-based impacts from PWC use and human disturbance, considering that the national seashore provides critical foraging and breeding habitat for birds, as well as vital foraging and roosting habitat for year-round residents and critical stopover habitat for trans-Gulf migrants and wintering species.

Response: As discussed under the response to Concern Statement #15, this plan/EIS addresses the management of PWC and does not include specific-species protection measures. However, the PWC management measures proposed, including flat-wake zones, would protect species from direct interactions with PWC as well as minimize indirect impacts from PWC noise and movement. There are many uses at the national seashore, both land- and water-based, that have the potential to impact species and these are more holistically addressed through daily park species management. NPS is currently coordinating with the USFWS regarding measures, such as installing habitat closures and interpretive signs, which can be taken to minimize impacts to protected species from all park uses. Seasonal closures for shorebirds, osprey, and eagles, currently in place at the national seashore, would remain in effect under all alternatives, as noted in the final plan/EIS (page 6).

The final plan/EIS (page 80), does take into consideration land-based impacts and states, "Direct impacts on terrestrial habitats can occur only during landings, particularly when PWC are dragged ashore, or in the unlikely event of a collision with land." The final plan/EIS also notes under which alternatives beneficial impacts would occur due to restrictions on PWC landings. The preferred alternative (alternative D) in the plan/EIS would not allow access to areas that are already not accessible to PWC, boats, or other visitors. In fact, it would eliminate the presence of PWC on Horn and Petit Bois Islands by restricting beaching of PWC. This clarification has been added to the final plan/EIS (page 86).

The final plan/EIS (pages 79–80) notes that birds are the most vulnerable group of species to impacts from PWC use at the national seashore. The EIS goes on to state that noise and visual disturbances associated with PWC use may disrupt feeding, nesting, or reproductive behavior, and describes which groups of species are most likely to be affected. Impacts to coastal birds were analyzed under each alternative (chapter 4, Wildlife and Wildlife Habitat) based on the distance from shore at which PWC would be allowed to operate compared to the distance at which flushing is likely to occur.

This same analysis was applied to federally- and state-listed birds in chapter 4, Threatened and Endangered Species and Species of Special Management Concern. Potential impacts of PWC use on these species are summarized in final plan/EIS table 37 and described in greater detail under each alternative. The final plan/EIS (page 89) describes how different species would be affected differently and notes that larger wading species such as little blue heron, and those species which spend substantial amounts of time near the shoreline such as American oystercatcher and black skimmer, would likely be most affected. For the preferred alternative, the final plan/EIS concludes that PWC use would not be likely to adversely affect any federally-listed bird species because flat-wake zones would be sufficient to avoid flushing due to noise from PWC engines, based on the distances at which each species has been shown to flush as a result of PWC use (table 41). The final plan/EIS also takes into account seasonal impacts for migratory species, such as piping plover and red knot, which are only present at the national seashore during part of the year, as well as the likelihood of impacts to specific species based on their frequency or likelihood of occurrence at the national seashore. The analysis of threatened and endangered species found that for the preferred alternative (alternative D) impacts would include noise and visual disturbances due to the presence of PWC. Noise would be the most common impact and could affect all assessed species to some extent, but impacts would be temporary and localized. Impacts would be most intense in the Florida District near Perdido Key, Santa Rosa Island, and Crab Island where PWC activity is high. Impacts on special-status species due to PWC use under alternative D would not be expected to result in take of any listed species, and all impacts would be temporary, with conditions quickly returning to baseline. Adverse impacts on special-status species would be limited by vessel restrictions prescribed by the Superintendent's Compendium and may further reduced by seasonal bird closures. The NPS is in the process of consulting with the USFWS and will obtain concurrence from them regarding the impacts to listed species that could occur under the preferred alternative.

Text has been added to the conclusion of alternative D in the final plan/EIS under Threatened and Endangered Species to state that the impacts would not threaten the health or productivity of the species. A similar impact analysis for wildlife and wildlife habitat for other species can be found on page 87 of the draft plan/EIS, and text was added to the final plan/EIS in that section to clarify the health and productivity of these species would not be threatened under the preferred alternative. Impact determinations for ESA-listed species under alternative D (table 41 of the final plan/EIS) will be changed to May Affect, Not Likely to Adversely Affect in the final plan/EIS, based on input from the USFWS and the NOAA National Marine Fisheries Service during ongoing ESA Section 7 consultations.

18. **Concern Statement**: Commenters stated that the draft plan/EIS described specific impacts to wildlife that could result from PWC use but failed to provide any data or information justifying those impacts and does not credibly explain why the acknowledged impacts to wildlife are acceptable and do not constitute "impairment."

Response: Per Section 1.4 of NPS Management Policies 2006, impairment is defined as "an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values." Pursuant to the NPS Guidance for Non-Impairment Determinations and the NPS National Environmental Policy Act (NEPA) Process, the NPS will review the resource impacts described in the final plan/EIS and make a non-impairment determination for the selected alternative. This determination will be appended to the ROD, per the aforementioned NPS non-impairment guidance.

19. **Concern Statement**: Commenters cited the Big Lagoon estuary as a critical area for manatees and dolphins, and cited recent disturbance at Sand Island in Alabama as an example of unrestricted public water access resulting in human disturbance affecting wildlife.

Response: Ongoing impacts to dolphins and manatees associated with boat traffic, ship channel dredging and maintenance activities, and other activities described under the cumulative impacts section (pages 86–87 of the final plan/EIS) would continue under the preferred alternative. However, these impacts are not anticipated to increase substantially under the preferred alternative from existing conditions, due to the minimal likelihood of PWC collisions and the existence of flat-wake zones. No PWC collisions with marine mammals have been documented at the national seashore in the last 20 years (Nicholas pers. comm. 2018). Collisions with dolphins and manatees are very unlikely due to the shallow draft of PWC, the absence of a propeller in a PWC, and the ability of both dolphins and PWC users to rapidly change course to avoid collision (page 86 of the final plan/EIS). The preferred alternative does not allow PWC to access any new areas in national seashore waters. Under alternative D, PWC use would continue to be restricted within the lagoons of Perdido Key within Big Lagoon, so there would be no potential for PWC collisions with dolphins or manatees in these areas. Temporary disturbances to marine mammals due to PWC noise would increase slightly compared to existing conditions, because PWC would be allowed to operate at full throttle throughout a greater portion of the national seashore (between 300 yards and 0.5 mile from Mississippi shorelines and between 150 yards and 300 yards from Florida shorelines). Effects of underwater noise from PWC engines could include panic responses (increased changes in swim speed and direction and changes in respiration) resulting in stress to individual animals and potential disruption of feeding or other behaviors (pages 79–80 and 86 of the final plan/EIS). However, based on the current levels of noise and disturbances due to boating and other recreational activities under existing conditions, increased noise due the reduction of flat-wake zones for PWC would not represent a major change that would be likely to result in overall changes to the health or productivity of the species, as noted in table 41 of the final plan/EIS.

20. **Concern Statement**: One commenter noted that the idea that PWC are driven fast in very shallow water is not true and suggested that the NPS should not assume PWC operators would risk damage to their PWC by operating above flat-wake speed in shallow areas.

Response: The plan/EIS does not state an assumption that PWC would risk damage to their vessels by operating at high speeds in shallow areas.

However, keeping PWC at flat-wake speed close to the shorelines is necessary for the protection of many different park resources and values, including submerged aquatic vegetation (SAV), visitor safety, wildlife, and visitor experience.

21. **Concern Statement**: One commenter suggested that the NPS showed bias against PWC use within its analysis of visitor perception of PWC use. The commenter suggested the draft plan/EIS reduces the number of citizens who favor PWC use to a mere "some," suggesting the number is fewer in comparison to those who oppose PWC use.

Response: The NPS NEPA Handbook states, "If you can meaningfully and accurately quantify the magnitude of this impact, this is the best way to present the information. If you have little confidence in an absolute number, you may want to use a range of reasonable impacts; rather than conveying false confidence, documents should give the decision-maker and the public a true picture of how well you can predict an impact. You must support qualitative and quantitative impact analyses with the scientific literature and/or other experts' testimony. Such references should be cited liberally in the impact section." (Section 4.5.G.1) To the extent that impacts can be quantified, they have been quantified in the draft plan/EIS. When they cannot, they have been discussed qualitatively, which includes the use of qualifiers such as "some." The term "some" is appropriate for this NEPA analysis because it indicates that there are a variety of interests between visitor groups, without giving more weight to one visitor group over another. Further, the draft plan/EIS states that "Although some visitors enjoy using PWC, some research suggests that PWC are viewed by some segments of the public as a nuisance due to their noise, speed, and overall environmental effects; others believe PWC are no different from other watercraft and that people have a right to enjoy the activity." The usage of "some" for both user types is an equal qualifier.

22. **Concern Statement**: Commenters supported increased education for visitors about PWC use and suggested rental businesses require training videos and engage in more outreach and education. Commenters suggested increasing public education on topics such as how to avoid damaging sea grass and marine life.

Response: According to the revised appendix C of the final plan/EIS, the NPS will post information on the national seashore website and social media outlets regarding PWC flat-wake zones and closures. This information could take the form of maps, text descriptions of restrictions, or other means that most effectively communicates PWC regulations to the public. National seashore staff will develop and distribute an informational handout related to PWC use and resource protection. The national seashore will share information in public interpretive programs about minimizing impacts to seagrasses and wildlife, particularly associated with PWC and boats. Park staff may periodically contact PWC rental companies to share information about shorebirds and seagrasses, as well as information regarding PWC use regulations in the national seashore.

23. **Concern Statement**: Commenters suggested further restrictions to recreational opportunities would negatively affect the local and state-wide tourism industry and reduce the number of visitors to the national seashore. They suggest that actions proposed in the draft plan/EIS unfairly targets lower income visitors who cannot afford new PWC models and therefore limit their recreational opportunities. Commenters stated that the financial burden to upgrade to a newer PWC model in the proposed time frame would create an economic strain on residents, and current and future visitors to the national seashore. Further, commenters suggested that the analysis in the draft EIS does not provide any evidence as to how PWC owners would purchase new vessels to meet the 2010 EPA emission standards.

Response: As described above in the response to Concern Statement #6, the NPS decided that the requirement for PWC to meet the 2010 EPA emissions standards was not necessary and removed this requirement from the preferred alternative. Therefore, there would be no need for PWC owners to purchase new vessels to recreate in the national seashore, and there would be no adverse economic impacts on these users from the implementation of the preferred alternative. In addition, the preferred alternative does not contain any restrictions on recreational opportunities that would negatively affect tourism or visitation levels at the park. However, the requirement to meet the 2010 EPA standards still remains in alternative E. The impact analysis in alternative E has been revised to clarify impacts PWC owners may face if a newer-model PWC needs to be purchased.

24. **Concern Statement**: One commenter stated that the NPS recognizes the negative impacts of PWC use on visitor experience, yet the preferred alternative includes continued PWC use with reduced flat-

wake zones which would likely increase adverse impacts on visitor experience. The commenter referred to a previous NPS determination that PWC use has a significant potential to impact visitor experience at the national seashore.

Response: The commenter refers to a quote from the 2001 "Determination of Appropriateness of Personal Watercraft Use at Gulf Islands National Seashore" (NPS 2001) which states that "PWC use has a significant potential to impact the enjoyment of park values and purposes by other visitors at Gulf Islands National Seashore, including direct conflicts with fishermen, swimmers, and non-motorized boaters." This determination was reevaluated in the 2004 Gulf Islands National Seashore PWC Use Environmental Assessment (NPS 2004a), and further reevaluated under this plan/EIS. This updated soundscape and visitor experience analysis replaces any previous impact analysis at the national seashore from 2001 or 2004. It demonstrates that conditions have changed since the 2001 determination was made, including the advent of four-stroke PWC technology and the use of flat-wake zones, both of which help reduce the impacts of PWC noise on visitor experience and other park resources. Also, the NPS used up-to-date noise modeling techniques to better understand and describe the impacts of PWC use under the alternatives. As described in the plan/EIS, reduced flat-wake zone distances under the preferred alternative could result in an increase in PWC noise over existing conditions, which could affect visitors in certain areas of the national seashore. However, PWC noise levels described in the 2001 determination were from two-stroke PWC measured at 82 to 100 feet from the visitor (NPS 2001)[1], resulting in much higher noise levels than would occur with the implementation of the flat-wake zones under the preferred alternative, even assuming all PWC would be two-stroke models, which is not the case with the current PWC fleet. Therefore, as described in the plan/EIS, PWC noise under the preferred alternative would be lower than noise levels described in the 2001 determination and would be less likely to impact visitor experience. Please refer to the "Visitor Use and Experience" section in chapter 4 of the final plan/EIS for the NPS's analysis of impacts from PWC use on visitor experience, considering both PWC users and non-PWC users.

25. **Concern Statement**: Commenters stated that boats cause just as much, if not more, damage to national seashore resources due to the large number of boats compared to PWC, the presence of exposed propellers on boats, and extensive educational and outreach efforts discouraging PWC users from entering shallow waters. Commenters felt that the focus on PWC rather than boats discriminated against PWC users and that PWC should fall under the same rules and regulations as other boats in public waterways.

Response: The scope of this EIS and range of alternatives considered are limited to management actions regarding PWC use only. The cumulative impact analysis in the EIS includes a discussion of the large number of motorboats that use park waters and how the level and types of impacts (such as to seagrasses and marine mammals) from motorboats can be different from impacts of PWC. Impacts of boats on SAV are described in chapter 4 of the final plan/EIS (pages 72–73). The final plan/EIS notes that, relative to PWC, recreational boating contributes a larger portion of adverse cumulative impacts on SAV at the national seashore due to scarring from boat propellers (pages 72–73).

26. **Concern Statement**: Commenters questioned the use of meteorological data from the Fort Walton Beach airport and from Tallahassee, which are irrelevant for coastline air quality conditions. Commenters stated that the draft plan/EIS does not provide specific air quality monitoring data for the

1 Note that the 2001 Determination of Appropriateness was based on PWC noise measurement data from early PWC models in the 1990s (reporting noise levels at 82 feet of up to 105 dBA) and these information sources have been replaced by the more robust 2002 technical evaluation of PWC noise at Glen Canyon, which show two-stroke PWC at 82 feet in the range of 70 to 76 dBA Lmax (see the HMMH Technical Report on Noise: Personal Watercraft and Boating Activities At Glen Canyon National Recreation Area, October 2002).

national seashore and the analysis failed to establish credible benchmarks for air pollution. They allege the analysis does not consider the unique hazards associated with each pollutant.

Response: The air quality modeling tool used in the impact analysis uses two different types of meteorological data: surface meteorological data and upper air meteorological data. There are many more stations with available surface meteorological data where the coastal conditions are most relevant. The surface meteorological data used were from the Destin-Ft. Walton Beach Airport, which is representative of coastal conditions at the national seashore. The upper air meteorological data source was Tallahassee, Florida, which was the closest upper air station available. Five years of hourly meteorological data were used (2012–2016) (ARS 2018).

The commenter is correct that national seashore-specific air quality monitoring data are unavailable; however, the latest available regional air quality monitoring data were reported and used in the analysis. The draft plan/EIS discussed qualitatively that existing air quality at the national seashore would be better than in the more developed areas where monitors are available. The use of urban monitors as the "background concentration" in the various air quality analyses is conservative (a higher background concentration means the background plus the project total concentration is closer to the National Ambient Air Quality Standards (NAAQS)). Obtaining national seashore-specific monitoring data would take years and would not change the conclusions regarding the incremental impact of PWC on air quality.

The air quality analysis took into consideration existing pollutant concentrations, the incremental impact of PWC and boat use, and total (cumulative) pollutant concentrations. The NAAQS were considered as a guideline, but potential changes in air quality at concentrations below the NAAQS were also considered using the "percent below NAAQS" metric (recognizing NPS's responsibility to protect air quality in parks). Pollutant emissions and concentrations were also compared between the alternatives.

With respect to "unique hazards" of air pollutants, the plan/ EIS disclosed the available information on PWC emissions of criteria pollutants on how these emissions could affect air quality at the national seashore based on EPA models and air impact modeling procedures, demonstrating a hard look at the issue of air quality. It is not clear from the comment what additional unique hazards the commenter would like to see evaluated.

27. **Concern Statement**: One commenter stated that there are no recorded impacts to water quality, wilderness, SAV, wildlife, or visitor experience that would necessitate closures or restrictions under the proposed alternatives.

Response: The plan/EIS documents numerous potential impacts to water quality, wilderness, submerged seagrasses, wildlife, and visitor experience as a result of PWC use under all of the alternatives. Potential impacts disclosed in the final plan/EIS include:

Water Quality: Adverse impacts to water quality from the use of PWC (or any motorized boat) are related to the discharge of unburned gasoline and gasoline additives, combustion byproducts, and the spilling of such components during refueling (pages 38–39 of the final plan/EIS). There are no restrictions or closures in alternative D associated with water quality impacts at the national seashore.

Wilderness: PWC use adjacent to these wilderness areas would adversely impact the natural quality of wilderness as PWC noise would be audible from wilderness areas on Horn and Petit Bois Islands. The final plan/EIS demonstrates that the closer PWC use is to wilderness boundaries, the louder the noise levels are, which results in greater impacts to wilderness character. Table 34 in the final plan/EIS indicates the noise level of PWC at various distances from shorelines and shows that as the distance decreases, noise levels increase. Additionally, the presence (landing) of PWC in wilderness would be a visual impact to the natural quality of wilderness (page 129 of the final plan/EIS). Flat-

wake zone distances and prohibitions on beaching PWC on the wilderness islands are necessary for the protection of wilderness character.

Submerged Aquatic Vegetation (SAV): The final plan/EIS (pages 72–73) includes a discussion of scientific studies that indicate that PWC use has the potential to impact shallow-water seagrass. Therefore, the preferred alternative includes flat-wake zones to keep PWC from damaging SAV in shallower areas in the national seashore. Please refer to the response to Concern Statement #28 for a description of potential impacts to SAV under the alternatives.

Wildlife: As stated on page 80 of the final plan/EIS, "PWC use can potentially impact many groups of species present in areas where PWC are operated. The most vulnerable group of species to such impacts are birds. Birds are likely to leave their habitat or "flush" due to noise or visual disturbances associated with PWC use (Burger 1998, 2002; Burger and Leonard 2000; Rodgers and Schwikert 2002). These disturbances may disrupt feeding, nesting, or reproductive behavior." The final plan/EIS notes that flat-wake zones would be in place in order to limit impacts from collisions with wildlife, noise generated by PWC engines operating at full throttle, and disturbances associated with the use of PWC in close proximity to wildlife.

Visitor Experience: The final plan/EIS (pages 116–118) details the potential adverse impacts to visitor experience resulting from PWC use, including visual and noise disturbances for those visitors seeking a natural and quiet landscape. Flat-wake zones included in the preferred alternative are necessary to reduce noise levels from PWC use, which would protect the visitor experience and the natural soundscape of the national seashore.

28. **Concern Statement**: Commenters suggested that the draft plan/EIS does not show a demonstrable impact from PWC use to seagrass or how its health is at any risk from PWC use. Commenters suggested that the sole source for these claims was not a scientific study and did not result in any findings that showed PWC use causing damage to seagrass.

Response: An overview of potential impacts on SAV from PWC use is provided in chapter 4 of the final plan/EIS (pages 72–73). The description of potential impacts of PWC use on SAV was based on an extensive review of multiple studies, which area cited and listed in the final plan/EIS. These studies also include a number of caveats, such as noting that impacts are site-specific and depend on multiple factors including physical and biological characteristics of SAV including height of the SAV, the amount of PWC use and manner of operation, and water depth.

Although studies specific to PWC-related impacts on SAV are limited, there is sufficient evidence to suggest that PWC use can result in damage to SAV if PWC come into direct contact with SAV or its associated sediments by running aground, pulling SAV plant material into the engine intakes, or blowing away sediments. Supporting evidence from multiple sources is cited in the Submerged Aquatic Vegetation section in chapter 4 of the final plan/EIS (pages 72–73). These sources indicate the damage to SAV is more likely in shallower water depths, especially if PWC are performing acrobatic maneuvers. Therefore, the implementation of flat-wake zones as described in the preferred alternative is necessary for the protection of shallow-water SAV. However, flat-wake zones serve multiple purposes with respect to PWC management, and are not exclusively designed for the protection of SAV.

29. **Concern Statement**: One commenter suggested the seagrass maps in the draft plan/EIS are unclear and do not account for the ongoing restorative efforts and evolving seagrass locations.

Response: As noted in chapter 3 of the final plan/EIS (page 19), SAV communities are dynamic and SAV coverage and density can vary greatly seasonally, across sites, and over time. SAV coverage shown on maps in appendix D of the draft plan/EIS is based the most recent inventory of SAV at the national

seashore, conducted in October 2011. Ongoing SAV restoration efforts were considered in the draft plan/EIS as a beneficial cumulative effect. While it is not possible to create a map of SAV coverage shown in real time, the maps presented in the draft plan/EIS (appendix D) represent the best available data and provide a reasonable basis for analysis of impacts to SAV under the alternatives.

30. **Concern Statement**: One commenter expressed concern for severe damage to seagrass beds from blowouts caused by PWC operating at full throttle in areas outside of flat-wake zones, as described in the 2001 "Determination of Appropriateness of Personal Watercraft Use at Gulf Islands National Seashore." The commenter also suggested that because the national seashore's preferred alternative would decrease flat-wake zones, serious damage to SAV along the shoreline would occur.

Response: 'The Determination of Appropriateness of Personal Watercraft Use at Gulf Islands National Seashore" (NPS 2001) referenced by the commenter was reevaluated in the draft plan/EIS. Impacts to SAV from full-throttle PWC use stated in the "Determination of Appropriateness" are based on anecdotal information by one or two observers, according to a 2001 study (Port Hacking 2001). While these observations of SAV damage may be accurate, the CEQ regulations require the use of "high quality" information during the NEPA process. Therefore, the project team gathered and reviewed scientific literature on the effects of PWC on SAV to better inform the impact analysis in this EIS.

As stated in the final plan/EIS (page 71), "Studies have also shown that in a water depth of 3 feet or more, PWC showed little negative impact to seagrass beds (Continental Shelf Associates 1997; MDNR 2002)." The Maryland study (MDNR 2002) determined that there was little to no direct impact to SAV from a high volume of PWC use in water depths of 24 to 36 inches. The 1997 study in Florida (Continental Shelf Associates 1997) determined that PWC use in water depths of 2 feet or more did not detrimentally affect seagrass beds.

The NPS reviewed bathymetric data to determine the approximate water depths adjacent to park shorelines. The average horizontal distance from shorelines in the Florida district to the 3-foot depth contour is 150 yards, which means that the depth of the water within 150 yards of the shorelines in the Florida district of the national seashore is generally 3 feet or less. In Mississippi, the average horizontal distance to the 4-foot depth contour is 300 yards, which means that the depth of water within 300 yards is generally 4 feet or less (3-foot bathymetric data were not available for Mississippi). Therefore, the flat-wake zones in the preferred alternative of 150 yards from the shorelines in Florida and 300 yards from the shorelines in Mississippi would reduce impacts to the majority of SAV in the national seashore.

The NPS acknowledges that the flat-wake zone distances under the preferred alternative would expose additional SAV habitat areas to potential impacts from PWC use. Reduction of flat-wake zones under the preferred alternative from 300 yards to 150 yards in the Florida District would result in an increase of 454 acres of shallow-water SAV habitat open to full-throttle PWC use compared to existing conditions. Reduction of flat-wake zones under the preferred alternative from 0.5 mile to 300 yards in the Mississippi District would result in an increase of 176 acres of shallow-water SAV habitat open to full-throttle PWC use compared to existing conditions. Although this would allow full throttle PWC use in a greater amount of shallow-water SAV habitat, impacts to SAV would be minimal because PWC do not have propellers, which can cause physical damage to SAV, and are mostly above water when traveling at full speed. This is consistent with the findings from the PWC studies in 1997 and 2002 mentioned above. Impacts could occur as a result of sudden starts in shallow-water SAV habitat, which can cause "blowouts." However, such impacts would be localized and would not be anticipated to result in noticeable impacts to large areas of SAV.

31. **Concern Statement**: One commenter suggested the acoustic environment impact analysis in the draft plan/EIS does not include the full scope of potential impacts to visitors; the commenter cited the content of public comments on the 2000 Final National Personal Watercraft Rule. These comments

included concerns of fluctuating PWC engine tone and pitch and localized noises associated with PWC use in one general area, rather than across the national seashore.

Response: The potential for localized impacts of different numbers of PWC operating at the same time was considered in the L_{max} and L_{eq} analyses within the acoustic environment impact analysis for the draft plan/EIS. These analyses show the PWC noise levels at different distances from an observer depending on the PWC type (two-stroke or four-stroke), number of PWC and type of activity (pass-by parallel to shore vs play behavior with higher speeds and maneuvers). Differences in PWC operation restrictions (such as flat-wake zones) are also assessed.

Fluctuating tone and pitch are most relevant for PWC play behavior with higher speed maneuvers as well as higher noise levels overall due to the higher speeds. While a specific analysis of fluctuating tones was not included in the draft plan/EIS, the available information on this topic was considered by NPS in the literature review (NPS 2015c). The final plan/EIS has been revised to include an analysis of fluctuating PWC engine tone and pitch, and can be found of page 65 of the final plan/EIS.

It is important to note that PWC characteristics have changed substantially since the 2000 Final PWC Rule and the Glen Canyon study (HMMH 2002) referenced in appendix F of the final plan/EIS. As documented in the draft plan/EIS, two-stroke PWC which are typically associated with a higher pitch "whine" are no longer manufactured.

32. **Concern Statement**: One commenter suggested the acoustic environment impact analysis in the draft plan/EIS does not provide supporting evidence that PWC use would create an incremental impact against the existing soundscape, which includes other motorized boating vessels and military operations. The commenter suggested that because the draft plan/EIS only cites 36 CFR 3.15 (maximum noise levels for vessels), the acoustic analysis does not sufficiently account for existing noise standards, including ISO 14509 and advances in hull design technology. The commenter claimed the analysis does not specify if or how PWC sound contributions would be perceived within the national seashore as opposed to a pristine setting. The commenter suggested that the draft plan/EIS does not provide recorded evidence that noise from PWC affects visitors or fauna, noting the exclusion of the 2010 model year constraint as a factor in protecting wilderness values.

Response: The plan/EIS does not only cite 36 CFR 3.15 (see "Noise Standards" under "Elements Common to All Action Alternatives," page 8 of the final plan/EIS), but also includes a wide variety of information that was considered, including PWC noise measurement data and estimated noise reductions from four-stroke engines and technology improvements.

Additive effects of PWC in relation to existing sound levels are presented in the final plan/EIS. The Affected Environment section for Acoustic Environment, particularly pages 17–19 of the final plan/EIS, describes the variety of noises observed at the national seashore, including military and commercial aircraft, road vehicles, watercraft, and motors (including generators in the campground and unknown motor sounds). Additionally, chapter 4 describes the PWC noise level, the total noise level (PWC + Ambient), and the PWC increment (the increase in the total due to PWC) (see table 34 of the final plan/EIS). Lastly, appendix F (Soundscape Terminology and Background on PWC Noise Level Measurements) includes the elements that were considered in the Acoustic Environment analysis, including the varying sound levels of different PWC models (table F-1).

Effects from noise on visitors and wildlife were also considered in the plan/EIS. Although the plan/EIS did not provide actual observed occurrences where noise impacted wildlife, the draft plan/EIS thoroughly considered and described them. Because there is voluminous peer-reviewed literature on the impacts of noise on wildlife, it was not necessary for the national seashore to conduct studies on this topic. The final plan/EIS details, based on available literature, the range of potential impact to wildlife from PWC use

(pages 79–81 of the final plan/EIS). Specifically for the preferred alternative, the plan/EIS concludes that, overall, potential impacts on wildlife and wildlife habitat under alternative D would be slightly greater than those under existing conditions due to the reduced size of flat-wake zones, but substantially reduced compared to alternative B. Direct and indirect impacts on wildlife and wildlife habitat under alternative D would not be expected to cause measurable population declines of any native species within the national seashore or result in destruction or substantial degradation of wildlife habitats including at (EFH) compared to existing conditions. Under alternative D, wildlife and wildlife habitat at the national seashore would remain in close to current conditions (pages 86–87 of the final plan/EIS).

Likewise, while there are no recorded incidents where noise has negatively impacted visitors at the national seashore, the plan/EIS details, based on available literature, the range of potential impacts from noise (pages 59–65 and 110 of the final plan/EIS). Specifically for the preferred alternative, it states that the smaller flat-wake zones would result in adverse impacts for both boating users (motorized and non-motorized) and non-boating users in the Florida District as a result of a reduced barrier between PWC users and other visitors (pages 116–117 of the final plan/EIS). The final plan/EIS has been clarified in this section to note that the reduction in flat-wake zone distances would result in an increase in noise disturbance.

As discussed in Concern Statement #11, after a thorough review of the environmental analysis of the preferred alternative in the draft plan/EIS, the NPS decided that the requirement for PWC to meet the 2010 EPA emissions standards was not necessary, and has been removed from the preferred alternative. However, the 2010 EPA emission standard requirement is still included under alternative E in the final plan/EIS. The commenter is correct that the 2010 EPA emission standard was not a primary factor for protecting wilderness values. However, the noise reduction associated with eliminating pre-2010 PWC models would protect wilderness values because PWC noise from 2010 and later models would be lower than that of earlier models.

33. **Concern Statement**: Commenters suggested that a decreased flat-wake zone from existing conditions would increase noise levels from PWC within wilderness and threaten the character of wilderness areas within the national seashore.

Response: As stated in the final plan/EIS, the NPS recognizes that a decrease in the flat-wake zone from existing conditions would result in increased noise levels from PWC use adjacent to wilderness. The draft plan/EIS states, “The difference in PWC sound level attenuation over this difference in size of flat-wake zones is approximately 10 A-weighted decibel (dBA), which may be perceived by a listener as a doubling of loudness. In other words, for an observer on the shore of the wilderness islands, the potential impact of PWC activity under alternative D could generally be perceived as twice as loud as under existing conditions.” In addition to noting the doubling in loudness in the soundscape analysis (page 69 of the final plan/EIS), the draft plan/EIS also states in regards to wilderness that natural quality would be adversely impacted because PWC noise would be audible from wilderness areas on Horn and Petit Bois Islands and the area would not fully represent an area free from modern civilization (page 129 of the final plan/EIS). Despite these impacts, the draft plan/EIS also puts these impacts in context of PWC use in the area of the wilderness islands. As observed on May 26, 2013 (Memorial Day), the highest number of observed PWC at Horn and Petit Bois Islands was 24 and 5, respectively. On non-holiday weekends, the highest total number of PWC observed at Horn and Petit Bois Islands combined was 9 (August 4, 2013). Even though there would be impacts resulting from noise intrusion from the reduced flat-wake zone around wilderness islands, the impacts to qualities of wilderness character would be minimal due to the low level of PWC use around the Mississippi District islands (as shown on pages 25– 26 of the final plan/EIS) and the closure of wilderness shorelines to PWC landings. Also, the continued transition to newer, quieter PWC models over time would result in reduced impacts to wilderness over the long term.

34. **Concern Statement**: One commenter suggested that the draft plan/EIS states that alternative D would have the highest degree of impacts "from the reduced flat-wake zones on water quality, air quality, the acoustic environment, SAV, wildlife and wildlife habitat, threatened and endangered species, and wilderness." The commenter suggested that alternative D should not be implemented, particularly because it is "admittedly more damaging to critical park resources than are other available alternatives."

Response: The section from which the commenter cites is in the "Unavoidable Adverse Impacts" section on page 131 of the draft plan/EIS. The draft plan/EIS does state that alternative D would have the "highest degree of impact from flat-wake zones." However, that statement was comparing the impacts among alternatives C, D, and E only. Alternative B (as described previously on page 133 of the draft plan/EIS) would actually have the highest degree of impact from flat-wake zones when considering all alternatives. Also, impacts to water quality and air quality under alternative D would be the same as or lower than the other action alternatives. The NPS has revised this section of the final plan/EIS so that this is more easily understood.

Regarding the implementation of alternative D, Section 1.4.3 of NPS Management Policies 2006 states that "NPS managers must always seek ways to avoid, or to minimize to the greatest extent practicable, adverse impacts on park resources and values." This means that NPS managers must take reasonable, affirmative steps toward avoiding or minimizing adverse impacts, but it does not constrain the NPS's "management discretion to allow impacts…that the NPS deems necessary and appropriate" to promote the enjoyment or conservation of the national seashore. In this case, the NPS believes that the level of impacts associated with alternative D are minimal and that appropriate protective measures are in place to allow PWC use to continue without unacceptable impacts occurring to park resources.

35. **Concern Statement**: In its 2000 Final National Personal Watercraft Rule, NPS stated that PWC use would be prohibited across the National Park System, "unless the NPS determines that PWC use is appropriate for a specific area based on that area's enabling legislation, resources and values, other visitor uses and overall management objectives." Clearly, PWC use in Gulf Islands National Seashore fails to meet these standards.

Response: NPS *Management Policies 2006*, Section 8.2.3.3 states that PWC use "may be allowed within a park by special regulation if it has first been determined through park planning to be an appropriate use that will not result in unacceptable impacts." Any decision to allow continued PWC use at the national seashore will be consistent with Section 8.2.3.3 and will meet the requirements of the 2000 NPS PWC rule. This will be explained in the ROD for this project.

APPENDIX K: RECIPIENTS, PREPARERS, REFERENCES, GLOSSARY, AND INDEX

Upon publication of the Notice of Availability of the final *Gulf Islands National Seashore Personal Watercraft Use Plan / Environmental Impact Statement* in the Federal Register, notice will be provided to interested individuals, organizations, and media via email or postcard announcing the availability of the plan for public viewing. The plan will be available on the NPS Planning, Environment, and Public Comment (PEPC) website (http://parkplanning.nps.gov/guis-PWC-EIS). Copies of the final plan/EIS will be provided to consulting agencies, and a copy for the final plan/EIS will be sent to the US Environmental Protection Agency (EPA). A limited number of hard copies will be available for viewing at park headquarters.

LIST OF PREPARERS AND CONTRIBUTORS

National Park Service – Project Team

Staff Member	Position
Daniel Brown	Gulf Islands National Seashore, Park Superintendent
Steven A. McCoy	Gulf Islands National Seashore, Park Deputy Superintendent
Cassity Bromley	Gulf Islands National Seashore, Chief of Science and Resources Management
Kelly Irick	Gulf Islands National Seashore, Ecologist
Jolene Williams	Gulf Islands National Seashore, Environmental Protection Specialist
Deanna (Dede) Mladucky	Gulf Islands National Seashore, Chief Ranger
Matt Johnson	Gulf Islands National Seashore, Marine Ecologist
Doug Wetmore	Environmental Quality Division, Project Manager
Steven Wright	Southeast Regional Office, Regional Environmental Protection Specialist and Project Liaison

Contractors

Staff Member	Position/Responsibility
The Louis Berger Group, Inc.	
Lori Fox, AICP	Project Manager
Jeff Gutierrez	Deputy Project Manager, Visitor Use and Experience
Joe Dalrymple	Wildlife and Wildlife Habitat, Threatened and Endangered Species, Submerged Aquatic Vegetation
Tom Shinskey	Water Quality
Melissa Cameron	Visitor Use and Experience
Chris Dixon	Socioeconomics
Leo Tidd	Acoustic Environment, Air Quality
Nancy VanDyke	Water Quality
Katie Chipman	Wilderness

Staff Member	Position/Responsibility
Erin Hudson	Archeological Resources
Megan Blue-Sky	GIS, Mapping
Linda Green	GIS, Mapping
Air Resource Systems	
James Wu	Air Quality Modeling
The Final Word	
Juanita Barboa	Technical Editing
Sherrie Bell	Technical Editing, Section 508 Compliance formatting

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GLOSSARY

polycyclic aromatic hydrocarbons (PAHs)—A group of chemicals that occur naturally in coal, crude oil and gasoline. PAHs also are present in products made from fossil fuels.

personal watercraft (PWC)—As defined in 36 CFR 1.4(a) (2000), refers to a vessel, usually less than 16 feet in length, which uses an inboard, internal combustion engine powering a water jet pump as its primary source of propulsion. The vessel is intended to be operated by a person or persons sitting, standing, or kneeling on the vessel, rather than within the confines of the hull. The length is measured from end to end over the deck excluding sheer, meaning a straight line measurement of the overall length from the foremost part of the vessel to the aftermost part of the vessel, measured parallel to the centerline. Bow sprits, bumpkins, rudders, outboard motor brackets, and similar fittings or attachments, are not included in the measurement. Length is stated in feet and inches.

riparian—Relating to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater.

special-status species—Plant and animal species federally or state listed as endangered or threatened, or otherwise judged to be in need of protection.

species of concern—Species for which credible scientific evidence exists to substantiate a threat to continued population viability.

threatened species—Any species that is likely to become endangered within the foreseeable future throughout all or a part of its range, as listed by the USFWS in the Federal Register.

ACRONYMS

BTEX	benzene, toluene, ethylbenzene, xylene
CEQ	Council on Environmental Quality
CO	carbon monoxide
dB	decibel
dBA	A-weighted decibel
EA	environmental assessment
EFH	essential fish habitat
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDEP	Florida Department of Environmental Protection
GIS	geographic information system
GIWW	Gulf Intracoastal Waterway
Hz	Hertz
mg/L	milligrams per liter
mph	miles per hour
MsCIP	Mississippi Coastal Improvement Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRDA	Natural Resource Damage Assessment
OFW	Outstanding Florida Waters
PAH	polycyclic aromatic hydrocarbon
PEPC	Planning, Environment, and Public Comment
PFD	personal flotation device
PM	particulate matter
PWC	personal watercraft
plan/EIS	*Gulf Islands National Seashore Personal Watercraft Use Plan / Environmental Impact Statement*
ROD	Record of Decision
ROI	region of influence
SAV	submerged aquatic vegetation
SEL	single event noise exposure level
USFWS	U.S. Fish and Wildlife Service
µS/cm	microsiemens per centimeter

INDEX

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

(2019)