



Final Economic Analysis of the Personal
Watercraft Rule at Gulf Islands National
Seashore

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prepared for:

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National Resource Stewardship and Science
Directorate (NRSS), Social Science Program

1201 Oakridge Drive

Fort Collins, CO 80525

prepared by:

Industrial Economics, Incorporated

2067 Massachusetts Avenue

Cambridge, MA 02140

617-354-0074

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LIST OF ACRONYMS AND ABBREVIATIONS

CBA	=	Cost-benefit analysis
CFR	=	Code of Federal Regulations
CUSP	=	Continually Updated Shoreline Product
dBA	=	A-weighted decibels
DWH	=	Deepwater Horizon
EA	=	Environmental Assessment
EO	=	Executive Order
EPA	=	United States Environmental Protection Agency
ESA	=	Endangered Species Act
FERC	=	Federal Energy Regulatory Commission
FFWCC	=	Florida Fish and Wildlife Conservation Commission
FEIS	=	Final Environmental Impact Statement
GDP	=	Gross domestic product
IEc	=	Industrial Economics, Inc.
IRMA	=	Integrated Resource Management Applications
LWCF	=	United States Land and Water Conservation Fund
NAICS	=	North American Industry Classification System
NMMA	=	National Marine Manufacturers Association
NOAA	=	National Oceanic and Atmospheric Administration
NOEP	=	National Ocean Economics Program
NPS	=	United States National Park Service
NRSS	=	National Resource Stewardship and Science Directorate
OMB	=	United States Office of Management and Budget
PFD	=	Personal flotation device
PWC	=	Personal watercraft
RFA	=	Regulatory Flexibility Act

RIA	=	Regulatory Impact Analysis
SAV	=	Submerged aquatic vegetation
SBA	=	United States Small Business Administration
SBREFA	=	Small Business Regulatory Enforcement Fairness Act of 1996
SCORP	=	Statewide Comprehensive Outdoor Recreation Plan
USCG	=	United States Coast Guard
USD	=	United States Dollars

EXECUTIVE SUMMARY

Gulf Islands National Seashore (“the national seashore”) stretches across approximately 160 miles of coastline in Florida and Mississippi. Approximately 80 percent of the national seashore is submerged; the terrestrial portion primarily spans barrier islands. The national seashore’s boundaries include a diversity of habitats, including scrub shrub, freshwater and saltwater marsh, oak hammocks, and beach dunes. Hundreds of animal species are supported by these habitats, including 19 federally listed threatened and endangered species (NPS 2014).

Given the shoreline nature of the national seashore and the high portion of water to total acreage, many visitors access or enjoy the national seashore via water vessel, including personal watercraft (PWC). Historically, all water vessels at the national seashore have been subject to similar management restrictions through rules stipulated in the Superintendent’s Compendium as well as other National Park Service (NPS) rules codified in the Code of Federal Regulations (CFR) Title 36, Chapter 1, Part 3.

In 2000, the NPS issued 36 CFR 3.9, which prohibited PWC use at all National Park System areas unless authorized by special regulation. The rule only permitted 21 park areas, including Gulf Islands National Seashore, to promulgate special regulations allowing PWC use. Following a planning process that included development of an environmental assessment to evaluate a range of alternatives, NPS published 36 CFR 7.12 for management of PWC use at the national seashore. Since 2006, PWC use at the national seashore has been managed pursuant to this special regulation, which allows PWC use with restrictions.

ES.1 PURPOSE OF THIS ANALYSIS

The NPS is issuing a rule to revise its regulations regarding PWC use at Gulf Islands National Seashore. As compared to special regulation 36 CFR 7.12, the rule includes changes related to flat-wake zones and area closures.¹ This report evaluates the costs and benefits of the rule in accordance with Executive Order (E.O.) 12866, “Regulatory Planning and Review,” which requires Federal agencies to assess the potential costs and benefits of proposed regulatory actions. It also addresses the requirements of the Regulatory Flexibility Act/Small Business Regulatory Enforcement Fairness Act (RFA/SBREFA), which requires Federal agencies to consider the potential impacts of regulatory actions on small entities.

¹ The rule aligns with Alternative D identified in the FEIS along with one element from Alternative C (PWCs may land on Horn and Petit Bois islands) (NPS 2019a).

A draft version of this economic analysis (dated January 2021) was developed alongside the proposed rule. This final version remains unchanged from the original, apart from minor editorial changes, for the following reasons: 1) there were no changes to the scope of the rule between the proposed and final versions and 2) there were no public comments submitted that affected the economic analysis.

ES.2 NEED FOR THE RULE

E.O. 12866 indicates that Federal agencies should only promulgate regulations that address a compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In this case, the purpose of the rule is to update the regulatory requirements on PWC use at the national seashore under special regulation 35 CFR 7.12. In 2008, Bluewater Network and others sued the NPS claiming that the environmental assessment associated with 36 CFR 7.12 violated the National Environmental Policy Act (NEPA), the NPS Organic Act, and the Administrative Procedure Act. In 2010, the U.S. District Court for the District of Columbia ruled that the environmental assessment was inadequate and remanded the case to the NPS to provide additional support for its conclusions. In response, NPS developed and released in June 2019 a more comprehensive Final Environmental Impact Statement (FEIS) and is now issuing a rule to revise the regulatory requirements under 36 CFR 7.12.

ES.3 DESCRIPTION OF THE RULE

The below sections list the restrictions on PWC use included in the rule and describe how they affect PWC management relative to the baseline. The baseline for this analysis reflects all requirements governing current PWC management at the national seashore including Special Regulation 36 CFR 7.12, the Superintendent's Compendium, and 36 CFR Part 3.

ES.3.1 PWC FLAT-WAKE ZONES

PWCs may not operate at greater than flat-wake speed in the following locations:

- 150 yards from all shorelines in the Florida District.
- 300 yards from all shorelines in the Mississippi District.

This represents a reduction in flat-wake zones relative to the current special regulation and other PWC management rules at the national seashore, which currently stipulates flat-wake zones 0.5 miles from the West Ship Island pier, West Ship Island, and designated wilderness islands as well as 300 yards from all other shorelines.

ES.3.2 AREAS CLOSED TO PWC USE

PWCs may not operate in two areas of the national seashore:

- Lakes, ponds, lagoons and inlets of West Petit Bois Island.
- Within 200 feet of the ferry pier at Fort Pickens.

While these area closures are being added to the special regulation via the rule, they do not reflect changes in management conditions for PWCs at the national seashore because they are currently listed as restrictions in the Superintendent's Compendium. Therefore, relative to the baseline, there are no incremental costs or benefits associated with this element of the rule.

ES.4 SUMMARY OF FINDINGS

Exhibit ES-1 provides the direction and potential magnitude of incremental costs and benefits of the rule relative to the baseline.

EXHIBIT ES-1. INCREMENTAL COSTS AND BENEFITS OF THE RULE

CATEGORY OF POTENTIAL CHANGES IN THE RULE	NUMBER OF POTENTIALLY AFFECTED VISITORS	DIRECTION OF POTENTIAL EFFECT
PWC visitor trips and experience around shorelines where flat-wake zones decrease	13,724 visitors/year in FL; <311-481 visitors/year in MS	Minor Benefit
Non-PWC visitor numbers and experience around shorelines where flat-wake zones decrease	3.5-3.8 million visitors/year in FL; <1 million visitors/year in MS	Minor Cost
Ecological effects: SAV, wildlife and habitat, threatened and endangered species	N/A	Minor Cost
Ecological effects: water quality	N/A	Negligible Effects
Public safety	3.5-3.8 million visitors/year in FL; <1 million visitors/year in MS	Negligible Effects
Regional economic impacts	N/A	Negligible Effects
Notes: This analysis characterizes effects as "minor" if the number of affected entities is very limited, the magnitude of the effect per affected entity is small, or both. Negligible effects denote categories where the analysis indicates that changes attributable to the rule are unlikely.		

Potential incremental costs are expected to be minor and are associated with the following:

- Reduced value of non-PWC trips (i.e., other types of beach visitation) to select shorelines where flat-wake zones decrease and noise levels increase; and
- Ecological effects around shorelines due to increased area over which PWCs may operate at full-throttle speeds.

Potential incremental benefits are likely expected to be minor and are associated with the following:

- Increased value of PWC trips around shorelines where flat-wake restrictions are reduced.

Evidence suggests that the costs and benefits resulting from the flat-wake zones reduction are likely to be experienced by both PWC and non-PWC visitors at the national seashore, but the magnitude of the effects is most likely very limited. The increase in value per trip

to PWC users is not substantiated in the economics literature, but less than 0.3 percent of visitors at the national seashore would experience this gain. While evidence does exist to suggest that beachgoers along shorelines may experience a net cost due to increased noise from PWCs traveling at higher speed closer to shorelines—and the population experiencing the increased noise is significantly greater than the PWC user population—the likelihood and level of this effect at the national seashore are uncertain. The reason for this is twofold: first, PWC users constitute a very small fraction of visitors and therefore the contribution to overall noise is limited and, second, the change in noise from PWCs due to the reduction in the distance of the flat-wake zone is uncertain because it depends on where, when, and how many PWCs are in the water at any point in time.

Overall, very limited changes in the management of a very small fraction of national seashore visitors is unlikely to result in appreciable social welfare gains or losses. Moreover, the regional economy is unlikely to experience impacts given the low probability that the number of trips to the national seashore will change. We also have little reason to believe that public safety and water quality will be altered across the national seashore by changes in PWC management offered by the rule. Furthermore, data limitations, including limited existing economics literature related to the recreation values associated with PWC use, preclude our ability to monetize the costs and benefits of the rule.

ES.5 ANALYSIS OF ALTERNATIVES

The NPS considered two regulatory alternatives that contain alternate versions of the elements contained in the rule. Alternative 1 corresponds to Alternative B in the FEIS and Alternative 2 corresponds to Alternative E in the FEIS (NPS 2019a).² Exhibit ES-2 describes the stringency of Alternatives 1 and 2 relative to the rule. In general, Alternative 1 represents a less restrictive rule for PWCs than the rule. Alternative 2 represents a more stringent rule for PWCs than the rule, including the addition of air pollutant emissions standards not present in the rule or Alternative 1.

EXHIBIT ES-2. STRINGENCY OF ALTERNATIVES 1 AND 2 RELATIVE TO THE RULE

RULE ELEMENTS	ALTERNATIVE 1	ALTERNATIVE 2
Flat-wake zones	Less restrictive	More restrictive
Area closures	Same	More restrictive
Landing restrictions	Same	More restrictive
Emissions standards	Same	More restrictive

Under Alternative 1, PWC visitors may experience further increases in the value of their trip relative to the rule due to smaller flat-wake zones. This also means that non-PWC

² NPS determined these alternatives included in the FEIS would be the relevant ones to analyze as regulatory alternatives during a call with IEc on February 27, 2019.

visitors recreating in the same areas may experience further reduced values of trips due to the potential for an increase in PWC noise near shorelines relative to the rule. The landing restrictions and area closures for PWCs under Alternative 1 are consistent with the baseline and therefore the rule as well.

Under Alternative 2, PWC visitors experience less of a benefit to trip quality due to more restrictive flat-wake zones relative to the rule, whereas non-PWC visitors experience less cost due to the noise associated with PWCs near shorelines relative to the rule. The addition of U.S. Environmental Protection Agency (EPA) emissions standards is likely to impose minor costs on PWC owners, including PWC rental companies, that may expedite their schedule for replacing older PWCs in order to comply with the standards.

ES.6 EVALUATION OF IMPACTS RELATIVE TO ALTERNATIVE BASELINE ASSUMPTION

A ban on PWCs at the national seashore is the legal outcome absent a special regulation, as required by 36 CFR 3.9. Accordingly, we consider the impacts of the rule relative to PWC Ban conditions at the national seashore under an alternate baseline scenario in Appendix B. Our analysis of the anticipated incremental costs and benefits of the rule relative to a PWC Ban Baseline finds that, while PWC visitors may benefit from increased access to the national seashore, non-PWC visitors may experience reduced quality of visits due to increased noise. We also anticipate potential increased public safety risks and degraded water quality and habitat conditions, though these effects are most likely minor. Finally, while impacts on the overall level of economic activity are likely minor, individual recreation- and tourism-related businesses, particularly the PWC rental companies, may benefit from increased activity under the rule relative to the PWC Ban Baseline.

ES.7 RESULTS OF REGULATORY FLEXIBILITY ACT THRESHOLD ANALYSIS

Pursuant to the RFA/SBREFEA, this report includes a threshold analysis in Appendix A that considers the extent to which potential economic impacts associated with the rule may be borne by small entities. The analysis finds that the rule will not have a significant impact on a substantial number of small businesses and that a full regulatory flexibility analysis is not warranted. The rule largely maintains the existing management of PWCs at the national seashore with limited changes and does not directly regulate any businesses but rather the management of PWC users within the national seashore. As the rule is not expected to change the level of visitation to the region for purposes of beach recreation, we do not expect that regional businesses that provide services to PWC users (e.g., PWC rental companies) or to other beach recreationists will be affected by the rulemaking. The analysis did not identify that the rule would generate any direct compliance costs to small entities or changes in recreational activity levels that would affect spending patterns in the regional economy.

ES.8 INFORMATION LIMITATIONS AND KEY UNCERTAINTIES

Our analysis relies on limited data to predict the number of affected visitors, behavior changes among PWC and non-PWC visitors, and the change in value of trips associated with altered recreation conditions at the national seashore. Our ability to quantify the costs and benefits is largely limited by a sparse economics literature regarding values associated with PWC recreation, including the consumer surplus to PWC riders from trips and the disutility to nearby non-PWC riders from PWC noise. The availability of studies that demonstrate the economic values of recreation trips associated with PWC users potentially would enable us to transfer those values to this context in order to evaluate the potential costs and benefits more thoroughly.

We are also constrained by visitation data that does not provide a definitive count on the number of PWC visitors per year at the national seashore. The available information identifies that the number of PWC visitors at the national seashore is a small fraction of the overall total visitor population, however.

In summary, while our analysis is limited by incomplete data, it is unlikely that our main findings would change even with the data sources named above.

CHAPTER 1 | INTRODUCTION

Gulf Islands National Seashore (“the national seashore”) stretches across approximately 160 miles of coastline in Florida and Mississippi. Approximately 80 percent of the national seashore is submerged; the terrestrial portion primarily spans barrier islands. The national seashore’s boundaries include a diversity of habitats, including scrub shrub, freshwater and saltwater marsh, oak hammocks, and beach dunes. Hundreds of animal species are supported by these habitats, including 19 federally listed threatened and endangered species (NPS 2014).

Given the shoreline nature of the national seashore and the high portion of water to total acreage, many visitors access or enjoy the national seashore via water vessel, including personal watercraft (PWC). Historically, all water vessels at the national seashore have been subject to similar management restrictions through rules stipulated in the Superintendent’s Compendium as well as other National Park Service (NPS) rules codified in the Code of Federal Regulations (CFR) Title 36, Chapter 1, Part 3.

In 2000, the NPS issued 36 CFR 3.9, which prohibited PWC use at all National Park System areas unless authorized by special regulation. The rule only permitted 21 park areas, including Gulf Islands National Seashore, to promulgate special regulations allowing PWC use. Following a planning process that included development of an environmental assessment to evaluate a range of alternatives, NPS published 36 CFR 7.12 for management of PWC use at the national seashore. Since 2006, PWC use at the national seashore has been managed pursuant to this special regulation, which allows PWC use with restrictions.

1.1 PURPOSE OF THIS ANALYSIS

The NPS is issuing a rule to revise its regulations regarding PWC use at Gulf Islands National Seashore. As compared to special regulation 36 CFR 7.12, the rule includes changes related to flat-wake zones and area closures.³ This report evaluates the costs and benefits of the rule in accordance with Executive Order (E.O.) 12866, “Regulatory Planning and Review,” which requires Federal agencies to assess the potential costs and benefits of proposed regulatory actions. It also addresses the requirements of the Regulatory Flexibility Act/Small Business Regulatory Enforcement Fairness Act (RFA/SBREFA), which requires Federal agencies to consider the potential impacts of regulatory actions on small entities.

³ The rule aligns with Alternative D identified in the FEIS along with one element from Alternative C (PWCs may land on Horn and Petit Bois islands) (NPS 2019a).

A draft version of this economic analysis was developed alongside the proposed rule (dated January 2021). This final version remains unchanged from the original, apart from minor editorial changes, because: 1) there were no changes to the scope of the rule between the proposed and final versions and 2) there were no public comments submitted that affected the economic analysis.

1.2 NEED FOR THE RULE

E.O. 12866 indicates that Federal agencies should only promulgate regulations that address a compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In this case, the purpose of the rule is to revise the regulatory requirements on PWC use at the national seashore under special regulation 35 CFR 7.12. In 2008, Bluewater Network and others sued the NPS claiming that the environmental assessment associated with 36 CFR 7.12 violated the National Environmental Policy Act (NEPA), the NPS Organic Act, and the Administrative Procedure Act. In 2010, the U.S. District Court for the District of Columbia ruled that the environmental assessment was inadequate and remanded the case to the NPS to provide additional support for its conclusions. In response, NPS developed and released in June 2019 a more comprehensive FEIS and is revising the regulatory requirements under 36 CFR 7.12.

1.3 DESCRIPTION OF THE RULE

The below sections list the restrictions on PWC use included in the rule and describe how they affect PWC management relative to the baseline. The baseline for this analysis reflects all requirements governing current PWC management at the national seashore including Special Regulation 36 CFR 7.12, the Superintendent's Compendium, and 36 CFR Part 3.

1.3.1 PWC FLAT-WAKE ZONES

PWCs may not operate at greater than flat-wake speed in the following locations:

- 150 yards from all shorelines in the Florida District.
- 300 yards from all shorelines in the Mississippi District.

This represents a reduction in flat-wake zones relative to the current special regulation, which includes flat-wake zones 0.5 miles from the West Ship Island pier, West Ship Island, and designated wilderness islands as well as 300 yards from all other shorelines.

1.3.2 AREAS CLOSED TO PWC USE

PWCs may not operate in two areas of the national seashore:

- Lakes, ponds, lagoons and inlets of West Petit Bois Island.
- Within 200 feet of the ferry pier at Fort Pickens.

While these area closures are being added to the special regulation via the rule, they do not reflect changes in management requirements for PWCs at the national seashore because they are currently listed as restrictions in the Superintendent's Compendium. Therefore, relative to the baseline, there are no incremental costs or benefits associated with this element of the rule.

1.4 REGULATORY ALTERNATIVES

The NPS considered two regulatory alternatives that contain alternate versions of the elements contained in the rule. Alternative 1 corresponds to Alternative B in the FEIS and Alternative 2 corresponds to Alternative E in the FEIS (NPS 2019a).⁴ The rule elements for these two alternatives are summarized in Exhibit 1-1. Overall, Alternative 1 includes less restrictive flat-wake zones than the rule, while Alternative 2 includes more restrictive flat-wake zones, additional area closures, more landing restrictions, and the addition of emissions requirements. The main body of this report is focused on the rule while Chapter 5 evaluates the costs and benefits of the two alternatives.

⁴ NPS determined these alternatives included in the FEIS would be the relevant ones to analyze as regulatory alternatives during a call with IEC on February 27, 2019.

EXHIBIT 1-1. SUMMARY OF PWC FEATURES OF BASELINE, RULE, AND ALTERNATIVES

FEATURES	BASELINE	RULE	ALTERNATIVE 1	ALTERNATIVE 2
Flat-wake zones	0.5 miles (2,640 feet) from shoreline of wilderness islands (Horn Island and Petit Bois) 0.5 miles (2,640 feet) from shoreline or within 0.5 miles from either side of the pier at Ship Island 300 yards (900 feet) from all other shorelines	150 yards from all shorelines in Florida 300 yards from all shorelines in Mississippi	500 feet around Davis Bayou launch ramps, West Ship Island Pier, Horn Island Pier, and Fort Pickens fishing and ferry piers Posted areas on the north side of Perdido Key (at the east end) near the Fort McRee site 100 feet from all other shorelines	300 yards from all shorelines
Area closures	Within 200 feet of any fishing pier, old pier remains, and passenger ferry piers at Fort Pickens Lakes, ponds, lagoons, inlets of Cat, Ship, West Petit Bois, Horn, and Petit Bois Islands; the lagoons of Perdido Key within Big Lagoon (Spanish and Langley) Seasonal closures implemented to protect wildlife and habitat according to the Superintendent's Compendium Temporary or permanent limits or restrictions as determined by the Superintendent	Same as Baseline	Same as Baseline	Same as Baseline, with addition of specific areas where SAV habitat and cultural resources are at risk (see Exhibit 5-4 for a map and list of all area closures)
Landing restrictions	Landing prohibited above the mean high tide line on Horn and Petit Bois Islands May land at any other point along the shoreline except in area closures Temporary or permanent limits or restrictions as determined by the Superintendent	Same as Baseline	Same as Baseline	PWCs may not land <i>except</i> in these locations - Mississippi: southern shores of West Ship Island and East Ship Island; West Petit Bois Island - Florida: southern shores of Perdido Key and Santa Rosa Island
Emissions standards	None	Same as Baseline	Same as Baseline	All PWCs must meet 2010 U.S. EPA emissions standards within 2 years of publication of the final rule

Source: IEC summary of the FEIS (NPS 2019a) as well as text of the rule.

Notes: "Baseline" reflects all requirements governing current PWC management at the national seashore including Special Regulation 36 CFR 7.12, the Superintendent's Compendium, and 36 CFR Part 3. Appendix B examines the alternative baseline scenario whereby all PWCs are banned.

1.5 STRUCTURE OF THE REPORT

This remainder of this report is organized as follows:

- Chapter 2 discusses the framework for the cost-benefit analysis;
- Chapter 3 describes the baseline conditions against which all costs and benefits are compared;
- Chapter 4 presents the cost-benefit analysis of the rule;
- Chapter 5 presents the analysis of the regulatory alternatives;
- Appendix A presents an analysis of the potential impacts of the rule on small entities (RFA/SBREFA threshold analysis); and
- Appendix B presents the cost-benefit analysis of the rule under an alternate baseline.

CHAPTER 2 | FRAMEWORK FOR THE COST-BENEFIT ANALYSIS

The purpose of this analysis is to identify and evaluate the potential economic costs and benefits associated with the rule governing PWC use at the national seashore. This chapter presents the framework applied to evaluate the potential economic impacts. This analysis examines the impacts of differences in the management of PWCs relative to current conditions under the special regulation.

2.1 ANALYSIS APPROACH

2.1.1 GEOGRAPHIC AND TEMPORAL SCOPE OF THE ANALYSIS

The geographic scope of the analysis includes both the area over which the rule generates impacts and the area over which those impacts (direct or indirect) may be experienced. The impacts of the rule are generated due to specified changes in the management of PWCs within Gulf Islands National Seashore. The analysis additionally considers the extent to which the changes in management of PWCs within the national seashore may affect broader regional economic activity levels. For example, any changes in visitation to the national seashore may affect revenues at regional business that provide goods and services to beach visitors (e.g., PWC rental companies).

This analysis constitutes a qualitative assessment of costs and benefits and, therefore, it does not include estimated present value and annualized impacts over a particular timeframe. However, the conclusions of this analysis reflect a ten-year time horizon as we anticipate that current trends in PWC use at the national seashore will likely continue over this timeframe. Beyond that timeframe, external factors influencing the analysis, including levels of visitation and other changes in management of activities at the national seashore, are increasingly uncertain.

2.1.2 SCOPE OF IMPACTS

Under guidance from the Office of Management and Budget (OMB) and in compliance with E.O. 12866, Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of proposed regulatory actions, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of the regulations. OMB defines opportunity cost as “the preferred measure of cost of the resources used, or the benefits foregone, as a result of the regulatory action” (OMB 2003).

A primary goal of regulatory analysis is to estimate the total societal costs and benefits, or the opportunity costs to society of compliance with a proposed regulation. Economists

generally characterize opportunity costs in terms of changes in producer and consumer surplus (i.e., social welfare impacts) in affected markets.⁵ The objective of cost-benefit analysis is to measure the costs imposed on society (losses in social welfare) and the benefits to society (gains in social welfare). These measures are described as incremental costs and benefits and represent the economic impacts that are attributable to the rule.

For purposes of comparison, social welfare costs and benefits for a proposed action would ideally be presented in monetary (i.e., dollar) units. However, E.O. 12866 recognizes that in some cases it may be infeasible to monetize all the potential costs and benefits associated with a proposed regulatory change. In such cases, OMB *Circular A-4* allows Federal agencies to present relevant quantitative information in physical units or to present information qualitatively. Given data limitations, this analysis reflects a qualitative assessment (with some quantitative information on the affected population) of the rule and alternatives.

The analysis of economic costs and benefits presented in this analysis focuses on the effects of the rule on consumer surplus associated with changes in the quality of beach recreation experience at the national seashore (both for PWC users and other visitors). Effects on consumer surplus for PWC users constitute the *direct costs* of the rule as they result directly from the regulated entities complying with the requirements. Changes in consumer surplus for other beach visitors are considered *indirect costs* as they reflect unintended effects of the rule.

The analysis additionally considers how the changes in management of PWCs may affect economic values associated with potential effects on ecological resources, including water quality and sensitive species and habitats, at the national seashore.

The rule is not expected to result in any changes in direct compliance costs (i.e., administrative, operational, or capital costs borne by regulated entities to comply with the rule); or in costs to Federal and state government agencies to administer the rule.

2.1.3 DISTRIBUTIONAL EFFECTS

Measurements of changes in economic efficiency (i.e., cost-benefit analysis) focus on the net impact of regulatory actions, without consideration of how certain economic sectors or segments of the population are affected. Thus, a discussion of efficiency effects alone may disregard important distributional considerations; for example, given current economic conditions, regulatory decision makers are deeply attuned to the impact of new regulatory actions on jobs. This analysis considers the potential for distributional effects, including impacts on small entities (Appendix A) and regional economic impacts.

Regional economic impact analysis can provide an assessment of the potential localized effects of regulatory changes. Specifically, regional economic impact analysis produces a

⁵ Producer surplus is the difference between the market price of a good and the marginal cost of production, while consumer surplus is the difference between what consumers are willing to pay for the good and the market price. For additional information on the definition of "surplus" and an explanation of consumer and producer surplus in the context of regulatory analysis, see Gramlich (1990) and EPA (2014).

quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreationists) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreationists). These economic data provide a quantitative estimate of the magnitude of employment and revenue shifts in the local economy. However, given the limited nature of incremental impacts likely to result from this rule, measurable regional impacts are not anticipated.

2.2 CONSIDERING UNCERTAINTY

Circular A-4 (OMB 2003) advises Federal agencies to consider key sources of uncertainty at the earliest possible stages of an economic analysis. While this analysis constitutes a qualitative assessment of potential impacts, we include a section highlighting key information limitations and uncertainties, describing the likely significance of these uncertainties with respect to the conclusions of the analysis.

2.3 BASELINE SELECTION CONSIDERATIONS

Circular A-4 (OMB 2003) establishes best practices for assessing the costs, benefits, and distributional effects of Federal regulations and was subject to independent peer review prior to its publication. It defines the baseline as “the best assessment of the way the world would look absent the proposed action.” The guidelines also note that “When more than one baseline is reasonable and the choice of baseline will significantly affect estimated benefits and costs, you should consider measuring benefits and costs against alternative baselines.”

Baseline conditions at the national seashore absent the rule are uncertain given the confluence of two rules and the intentions of NPS. Two separate baselines are defensible for this analysis:

- ***Current Conditions Baseline (under 36 CFR 7.12, the Superintendent’s Compendium, and other rules affecting PWC management at the national seashore, including NPS system-wide and state-level laws):*** These are the current conditions at the national seashore, which allow PWC use. The rule would modify 36 CFR 7.12 to decrease flat-wake restrictions for PWC users around shorelines. The rule would also take some elements already included in the Superintendent’s Compendium and codify them in the special regulation. The current PWC management conditions at the national seashore are similar to Alternative C in the FEIS (NPS 2019a).
- ***PWC Ban Baseline (under 36 CFR 3.9):*** In the absence of a special regulation, PWC use would be banned under 36 CFR 3.9, like other NPS sites not granted special permission to develop a special and park-specific rule. This is the “no action” alternative (Alternative A) identified in the FEIS (NPS 2019a).

NPS believes that a ban on PWC use at the national seashore is unlikely given the long history of PWC use at the national seashore. Even if the special rulemaking process was to fail in the short-term, NPS would likely pursue other avenues to ensure some amount of PWC use at the national seashore. As a result, a complete ban on PWC use at the national seashore is unlikely to be the appropriate baseline scenario.

This economic analysis follows the suggestion of OMB *Circular A-4* to analyze the benefits and costs of the rule under multiple baseline scenarios. Given that the Current Conditions Baseline, “under all existing PWC management rules”, is the more realistic outcome of a failure to promulgate the rule, we use this baseline in the main analysis. As the PWC Ban Baseline, “under 36 CFR 3.9”, is possible but less likely, we analyze the impacts of the rule relative to this baseline in Appendix B.

2.4 KEY IMPACT CATEGORIES

This economic analysis evaluates the impacts of the regulatory alternatives on the following key categories:

- PWC visitor numbers and experience;
- Non-PWC visitor numbers and experience;
- Ecological effects;
- Public safety; and
- Regional economic impacts.

Due to data limitations, it is infeasible to monetize the potential impacts of the rule on these categories relative to the baseline. Instead, this economic analysis provides contextual information on baseline levels of value and qualitatively describes the direction of likely changes in consumer and producer surplus.

We also considered including NPS enforcement costs and carbon emission as impact categories in this RIA. However, we determined that the rule was unlikely to result in incremental changes to these categories. This analysis assumes that the rule will not result in the dedication of additional resources for enforcement of PWC regulations, and that NPS and other entities that patrol the national seashore will not incur additional labor costs. Moreover, the text of the rule notes that PWC management at the national seashore is expected to be easier to enforce under the rule, however this potential benefit is not quantified in this analysis. Additionally, this analysis assumes that the rule will not result in an appreciable change in emissions from PWCs, negating the need to evaluate potential carbon costs or benefits.

CHAPTER 3 | BASELINE CONDITIONS

This chapter describes the baseline conditions at the national seashore likely to be representative of future conditions at the national seashore in the absence of the rule. Section 3.1 provides a broad overview of the geography and resources of the national seashore and describes the regional economic contributions of visitors. Section 3.2 describes the current management of PWC at the national seashore, including NPS-specific as well as other state and local requirements. Sections 3.3 and 3.4 estimate the number of potentially affected entities, including individuals engaged in PWC use, as well as other types of national seashore visitors. Section 3.5 characterizes national- and state-level trends in PWC ownership to provide context on how national seashore visitation could change in the future absent the rule. Section 3.6 describes public launch locations for PWCs near the national seashore.

As described in more detail throughout the remainder of this chapter, six overarching findings of our baseline analysis include:

1. The national seashore contains 160 miles of shoreline that welcomes an average of 4.5 million visitors per year.
2. In 2018, these visitors spent over \$189 million on their recreational experiences in the region, contributing \$234 million to economic output in the region.⁶
3. The best available data suggests that the national seashore sees approximately 14,000 PWC visitors per year, representing about 0.3 percent of total visitors.
4. Little is known about the full inventory of businesses that derive a significant portion of their revenue from PWC visitors at the national seashore. Existing surveys suggest 13 PWC rental companies in Florida provide services to these visitors.
5. Based on historic data and industry experts, the total number of PWCs owned in the region is not expected to increase over the timeframe of this analysis.
6. PWC visitors have at least 31 public launch locations within ten miles of national seashore boundaries as well as other substitute coastal locations for their recreation experiences.

⁶ Unless otherwise noted, all monetized values presented in this chapter have been converted to 2019 USD using gross domestic product (GDP) values provided by the Bureau of Economic Analysis at <https://apps.bea.gov/iTable/iTable.cfm?ReqID=19&step=4&isuri=1&1921=flatfiles> (see Section 1, Table 1.1.9).

3.1 DESCRIPTION OF GULF ISLANDS NATIONAL SEASHORE AND SURROUNDING REGION

Gulf Islands National Seashore represents one of the most-visited parks in the country and provides significant contributions to the regional economies of counties adjacent to the national seashore.

3.1.1 DESCRIPTION OF THE NATIONAL SEASHORE

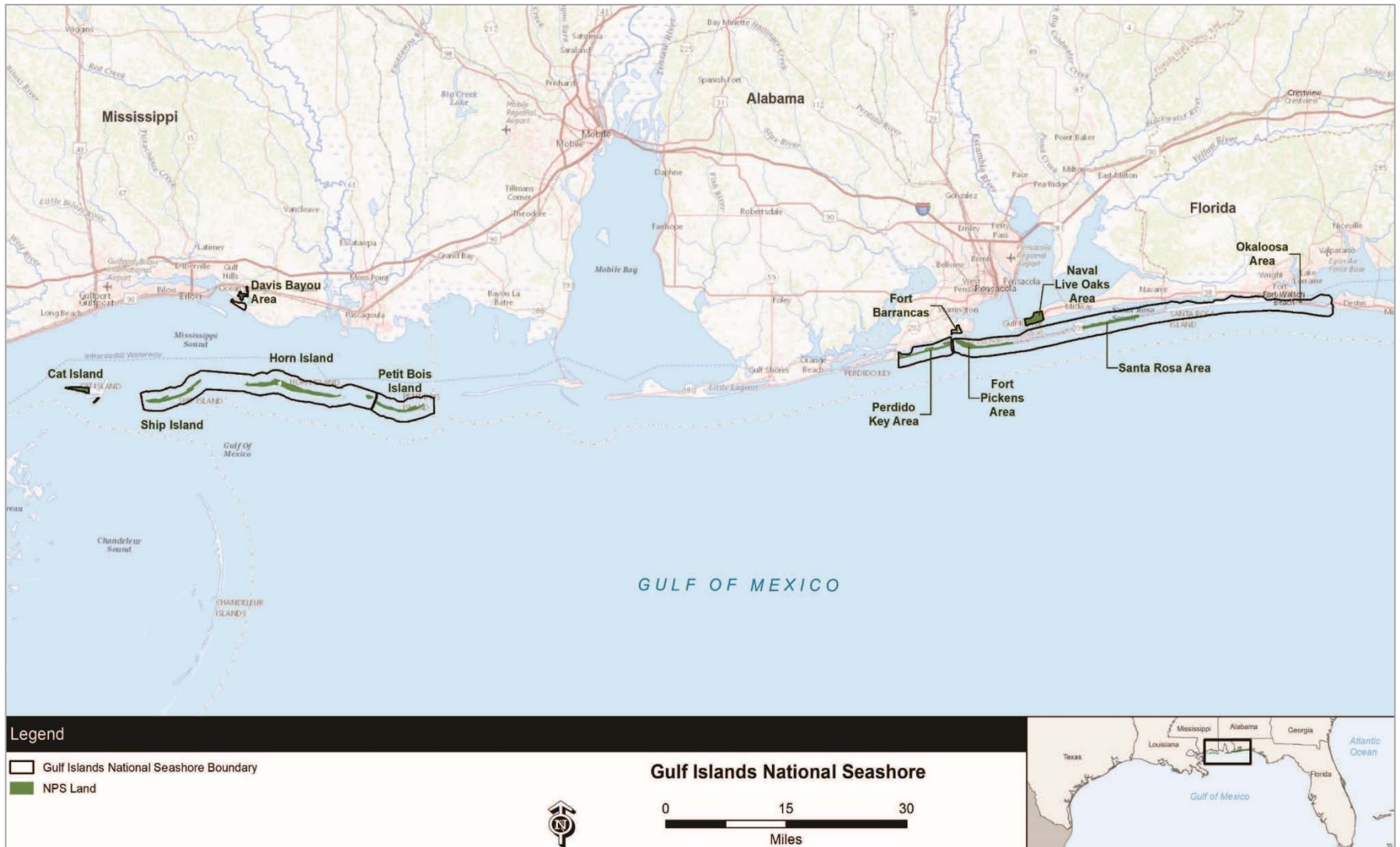
Gulf Islands National Seashore, designated as a national seashore since 1971, is located along the north coast of the Gulf of Mexico and includes approximately 160 miles of seashore between Florida and Mississippi.⁷ As presented in Exhibit 3-1, the national seashore comprises barrier islands and coastal mainland, and about 80 percent of the area within the national seashore boundaries is open water. The easternmost boundary of the national seashore in Florida is East Pass, which is immediately west of Destin; the westernmost boundary in Mississippi is Cat Island, located due south of Gulfport on the mainland. The Florida district of the national seashore is located along and very near the coastal mainland, adjacent to the popular Pensacola Beach. The Mississippi district is mostly a string of islands located much further (9 to 12 miles) from the coastal mainland, requiring a water vessel to access.

The national seashore provides habitat for hundreds of animal species, including 19 federally listed threatened and endangered species (NPS 2014). The national seashore functions as an important destination for migrating birds as well as nesting and foraging territory for other birds. Marine mammals, including several species of dolphins and the West Indian manatee, as well as marine reptiles, including five species of sea turtles, are also found in national seashore waters. More than 200 species of fish are found in the national seashore, including the endangered Gulf sturgeon, in addition to many invertebrate species.

The national seashore contains designated wilderness on Horn and Petit Bois Islands, which is managed pursuant to the Wilderness Act of 1964. Both islands are located about ten miles from the Mississippi coastal mainland and represent some of the only undisturbed barrier islands in the Atlantic Ocean and Gulf of Mexico. Apart from the noise and visual aspects associated with recreation activity near the islands, these islands remain undeveloped and in their natural state, preserving ecological conditions and providing opportunities for solitude.

⁷ The contiguous shoreline and islands in Alabama, including Mobile Bay, are not part of the national seashore.

EXHIBIT 3-1. MAP OF GULF ISLANDS NATIONAL SEASHORE



3.1.2 GULF ISLANDS NATIONAL SEASHORE CONTRIBUTION TO REGIONAL ECONOMY

Within the NPS system, Gulf Islands National Seashore is among the most heavily visited in the country (see Section 3-3 for more details). These visitors contribute to the vitality and size of the economy of the region surrounding the national seashore. Cullinane Thomas et al. (2019) estimated the contribution of trip-related spending by NPS visitors within local economies (i.e., within a 60-mile radius of park boundaries, inclusive of 31 counties). Visitor spending can include money spent on lodging, camping fees, restaurants, groceries, gas, transportation, recreation industries, and retail. The authors found that the approximately 4.2 million visitors at the national seashore in 2018 spent more than \$189 million, which supported 2,481 local jobs, \$80 million in labor income, \$137 million in contributions to the local gross domestic product (GDP), and \$234 million in economic output in that year.⁸

For additional context, we consider the size of the economies immediately adjacent to the national seashore, those most likely to experience impacts of visitor spending. The National Ocean Economics Program (NOEP) estimates the size of the total economy in surrounding coastal areas as well as the size of the tourism and recreation economy dependent on ocean-related activities and industries (Exhibit 3-2). By comparing the size of the tourism and recreation economy derived from ocean activities and industries to the total size of the economies in the five counties adjacent to the national seashore, tourism and recreation contributes about 11.2 percent of jobs, 4.7 percent of wages, and 3.7 percent to economic output (GDP). It is also likely that the national seashore provides contributions to coastal economies in Alabama, despite the lack of presence within Alabama boundaries, where water vessels destined for the national seashore launch from Alabama shorelines.

⁸ Economic contributions are estimated by multiplying total visitor spending by regional economic multipliers and are not synonymous with economic impact analysis (Cullinane Thomas et al. 2019).

EXHIBIT 3-2. SIZE OF COASTAL ECONOMIES IN COUNTIES ADJACENT TO THE NATIONAL SEASHORE (2019 USD)

STATE/COUNTY	TOTAL SIZE OF ECONOMY ¹			SIZE OF TOURISM AND RECREATION SECTOR DEPENDENT ON OCEAN-RELATED ACTIVITIES AND INDUSTRIES ²		
	EMPLOYMENT	WAGES (MILLIONS)	GDP (MILLIONS)	EMPLOYMENT	WAGES (MILLIONS)	GDP (MILLIONS)
Florida						
Escambia County	130,114	\$5,696	\$14,384	12,843	\$238	\$454
Okaloosa County	81,574	\$3,721	\$9,397	11,152	\$244	\$485
Santa Rosa County	36,084	\$1,380	\$3,485	4,890	\$82	\$165
Mississippi						
Harrison County	84,768	\$3,293	\$8,565	9,989	\$161	\$332
Jackson County	49,507	\$2,542	\$6,614	4,019	\$61	\$126
TOTAL	382,047	\$16,631	\$42,445	42,893	\$785	\$1,562
Sources:						
1. Coastal Economy Data provided by the National Ocean Economics Program (NOEP), available at: http://www.oceaneconomics.org/Market/coastal/coastalEcon.asp . Downloaded on June 25, 2019.						
2. Ocean Economy Data provided by the National Ocean Economics Program (NOEP), available at: http://www.oceaneconomics.org/Market/ocean/oceanEcon.asp?ci=N . Downloaded on July 4, 2019.						

States are required to publish Statewide Comprehensive Outdoor Recreation Plans (SCORPs) in order to be eligible for funding from the United States Land and Water Conservation Fund (LWCF).⁹ These documents characterize the state of recreation at the local level. They also provide an additional vantage into the size of the recreation sector in counties adjacent to the national seashore. These values are not specific to participation in recreation activities at the national seashore, but include recreation at the national seashore.

In Florida, the 2016-2017 SCORP provides a detailed overview of the number of outdoor recreationists and their total expenditures by county, split between residents and visitors.¹⁰ Exhibit 3-3 summarizes this information. Visitors make up a larger portion of the total base of recreationists relative to residents, and visitors spend more on recreation activities than residents (between 30 and 50 percent more, depending on the county). These findings suggest that, in the Florida counties adjacent to the national seashore, non-residents contribute more to the recreation economy than residents. In Mississippi, the most recently available SCORP spanning 2015-2019 does not provide the same county-by-county recreation estimates for comparison.¹¹

EXHIBIT 3-3. PARTICIPATION IN OUTDOOR RECREATION IN COUNTIES ADJACENT TO THE NATIONAL SEASHORE (2019 USD)

STATE/COUNTY	RESIDENTS		VISITORS	
	NUMBER PARTICIPATING IN OUTDOOR RECREATION	TOTAL EXPENDITURES ON OUTDOOR RECREATION (MILLIONS)	NUMBER PARTICIPATING IN OUTDOOR RECREATION	TOTAL EXPENDITURES ON OUTDOOR RECREATION (MILLIONS)
Florida				
Escambia County	162,636	\$200.6	1,083,399	\$621.2
Okaloosa County	295,060	\$347.6	1,965,534	\$951.3
Santa Rosa County	165,879	\$245.7	1,104,999	\$426.1
Source: Florida SCORP (2016-2017): https://floridadep.gov/sites/default/files/Economic-Study-Appx-B-w-tags.pdf				

⁹ LWCF is a federal program established in 1965 to provide funds to federal, state, and local governments for the acquisition of land and water for the benefit of all Americans. More information is available at: <https://www.lwcfcoalition.com/>

¹⁰ Expenditures may include money spent on food, transportation and accommodation, fees and other participation costs, and gear and equipment.

¹¹ The previous Mississippi SCORP (2009-2014) also does not provide details by county: https://www.recpro.org/assets/Library/SCORPs/ms_scorp_2009.pdf

3.1.3 PWC VISITOR CONTRIBUTION TO REGIONAL ECONOMY

Data are not available specific to expenditures associated with PWC trips in order to quantify the contribution of PWC visitors at the national seashore to the regional economy.¹² We expect that PWC visitors also contribute expenditures across the categories described in analysis by Cullinane Thomas et al. (2019) that studies all recreation types. There is likely a certain sub-set of businesses in the local economy that derive a significant portion of their revenue from PWC visitors. For example, as part of the FEIS (NPS 2019a) data collection effort, 13 PWC rental companies were identified in Florida, of which 8 were surveyed to better understand the potential effects of the rule on these businesses (see Section 3.4.1.3 for more details about this survey).¹³ This survey was not designed to estimate the contribution of PWC use at the national seashore to the total revenues of these companies, but does highlight which businesses are likely to derive significant business activity on account of these visits (Louis Berger 2018). It is also possible that other tourism operators, including companies that offer tours of the area by PWC, garner a larger portion of their revenue from PWC visitors at the national seashore.

3.2 PWC RULES AT GULF ISLANDS NATIONAL SEASHORE AND SURROUNDING AREA

Given the shoreline nature of the national seashore and the high portion of water to total national seashore acreage, many visitors access or enjoy the national seashore via water vessel. Historically, all water vessels (including motorized and non-motorized boats, in addition to PWCs) have been managed through similar rules, including rules stipulated in the Superintendent's Compendium, as well as other NPS-wide rules codified in the CFR Title 36, Chapter 1, Part 3.^{14,15}

Through the CFR, some aspects of PWC use across all NPS-managed lands are subject to system-wide federal standards, for example:

- All PWC riders must wear a Type I, II, III, or V personal flotation device (PFD) approved by the United States Coast Guard (USCG).
- The PWC operator must attach an automatic engine cut-off to their person, clothing, or PFD.
- No wake jumping within 100 yards of the vessel creating the wake.

¹² The National Marine Manufacturers Association (NMMA) does estimate the economic impact of recreational boating by state and sub-region within state. It is likely that PWCs are also included in their estimates. The more recent information is available at: <https://www.nmma.org/statistics/publications/economic-impact-infographics>

¹³ Given the distance between the coastal mainland and the barrier islands in the Mississippi district, it is unlikely that any PWC rental companies on the coast of Mississippi provide rentals to national seashore visitors.

¹⁴ <https://www.govinfo.gov/app/details/CFR-2011-title36-vol1/CFR-2011-title36-vol1-part3>

¹⁵ The full Gulf Islands National Seashore Superintendent's Compendium is available at: <https://www.nps.gov/guis/learn/management/compendium.htm>

36 CFR also delegates some authority to the individual NPS-sites to establish their own management and protections through a Superintendent's Compendium. At the national seashore, the Superintendent's Compendium is updated annually, with the last update in February 2019 (NPS 2019b). Through the compendium, PWCs have been managed alongside other motorized water vessels at the national seashore. These management provisions currently include closures in certain waters, including the lakes, ponds, and lagoons of Petit Bois, Horn, West Petit Bois, Ship, and Cat Islands (NPS 2019b).

PWC operators are also subject to other rules and regulations at the state level.¹⁶ For instance:

- **Florida state law:** In addition to several rules specifying similar requirements to 36 CFR 3.9, Florida state law stipulates¹⁷:
 - No PWCs may operate from 30 minutes after sunset to 30 minutes before sunrise. Navigation lights must be used between sunset and sunrise.
 - Weaving through congested vessel traffic, jumping wakes unreasonably close, and swerving at the last minute to avoid collision are considered reckless operation of a vessel.
 - A person must be 14 years of age to operate a PWC and 18 years of age to rent a PWC. Related, it is unlawful to knowingly allow a person under age 14 to operate a PWC.
 - Anyone born after January 1, 1988 is required to complete an approved boating education course and possess a boating education identification card.
- **Mississippi state law:** In addition to several rules specifying similar requirements to 36 CFR 3.9, Mississippi state law stipulates¹⁸:
 - A person younger than 12 years of age cannot operate a PWC unless accompanied by an adult at least 21 years of age and must have completed a boating safety course.
 - Anyone born after June 30, 1980 must successfully complete an approved boating safety course prior to operating any motorized vessel.
 - Operation of a PWC at any more than flat-wake speed is restricted within 100 feet adjacent to any small craft, marina, or public boat launch ramp. Operation is prohibited within 100 feet behind a water skier or another vessel.
 - PFD requirements are the same as 36 CFR 3.9, except that Type V are not approved.

¹⁶ 36 CFR 3.9b notes that applicable state laws for PWCs supersede the rules outlined in 36 CFR 3.9 when the state rules are more restrictive.

¹⁷ More information on Florida state laws governing PWCs is available at: <https://myfwc.com/boating/regulations/>

¹⁸ More information on Mississippi state laws governing PWCs is available at: <https://www.mdwfp.com/law-enforcement/boating-rules-regs/general-boating-rules-regulations/>

- PWCs should not be operated in a manner that requires the operator to swerve at the last possible moment to avoid collision. Furthermore, a PWC should not jump the wake of another boat recklessly or unnecessarily close to that boat.
- On marine waters south of Interstate Highway 10 (I-10), PWCs must not be operated at an excessive speed within 100 feet of another occupied boat or PWC except in a crossing situation or overtaking in accordance with navigation rules.

36 CFR 3.9 also requires the national seashore to institute a special regulation that sets out the parameters of PWC use specific to the conditions of the national seashore. Since May 2006, PWC use at the national seashore has been managed pursuant to special regulation 36 CFR 7.12, which allows PWCs with certain restrictions, as described in Chapter 1.

3.3 TOTAL VISITORS AT GULF ISLANDS NATIONAL SEASHORE

This section describes the total annual visitation at the national seashore to provide a sense of the number of potentially affected entities by the rule. Because our cost-benefit analysis differentiates between effects incurred by PWC and non-PWC visitors, our final goal is to establish total visitors *by recreation type* under baseline conditions. Some of the best available data to provide details by recreationist type, however, were not collected specifically for studying recreation activity at the national seashore. Therefore, the next two sections establish that this new data set can provide a reasonable approximation for total annual visitation levels before disaggregating by recreation type in Section 3.4. To do this, we first introduce the most common source of data for describing visitor counts at NPS sites (i.e., the NPS Integrated Resource Management Applications Portal) then describe a new data set that counts recreationists by type (i.e., the Deepwater Horizon Oil Spill Recreation Survey).

3.3.1 SUMMARY OF NPS IRMA DATA (2009-2018)

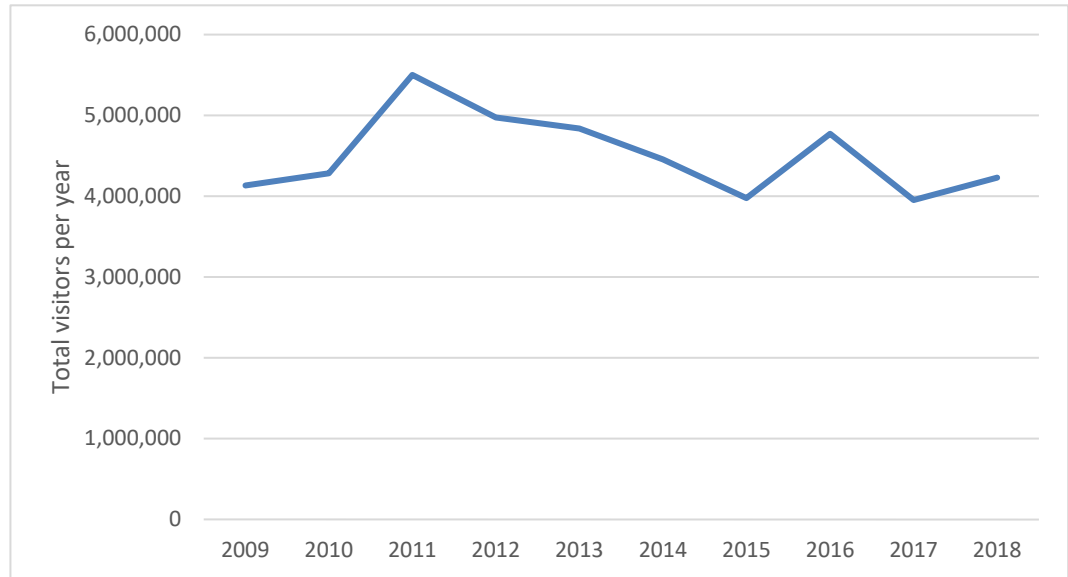
The NPS maintains information on total visitors at NPS sites in the Integrated Resource Management Applications (IRMA) Portal. Federal land management agencies, including the NPS, capture data on recreation to inform decision-making and increase understanding of the various impacts of visitation. Each park establishes and routinely updates its methodology for counting and reporting visitor use statistics.¹⁹

Gulf Islands National Seashore conducts its counting operations by state. In Florida, vehicle counters are located at various areas throughout the national seashore, including high traffic beach and picnic locations. NPS staff also count the total number of visitors at select attractions within the national seashore (e.g., Fort Barrancas), estimate the number of visitors on private boats, and use ticket sales data from the Pensacola Bay Cruises to estimate the number of visitors arriving via ferry. Similarly, in Mississippi, NPS staff also

¹⁹ A full description of the NPS recreational visitation count is summarized in IEC (2017).

use vehicle counters as well as counts of tour boats, private boats, and number of buses. However, the NPS does not specifically count PWC visitors.

EXHIBIT 3-4. ANNUAL GULF ISLANDS NATIONAL SEASHORE RECREATION VISITORS (2009-2018)



Source: IEc calculations using data from NPS IRMA downloaded on April 5, 2019. Data available at: <https://irma.nps.gov/Stats/>.

Exhibit 3-4 presents the trend in overall Gulf Islands National Seashore recreation visits over a ten-year period between 2009 and 2018 based on the NPS IRMA data. These years reflect reasonable baseline conditions given restrictions around PWCs consistent with current practices and future predictions of PWC practices in the absence of the rule (see Chapter 2 for baseline consideration discussion).²⁰ Across these years, the average annual number of visitors was about 4.5 million. The highest visitation year was 2011 with an estimated 5.5 million visitors, whereas the lowest visitation year was 2017 with about 4.0 million visitors. The NPS IRMA data do not provide sufficient detail to disaggregate visitors by the type of recreation they engage in at the national seashore.

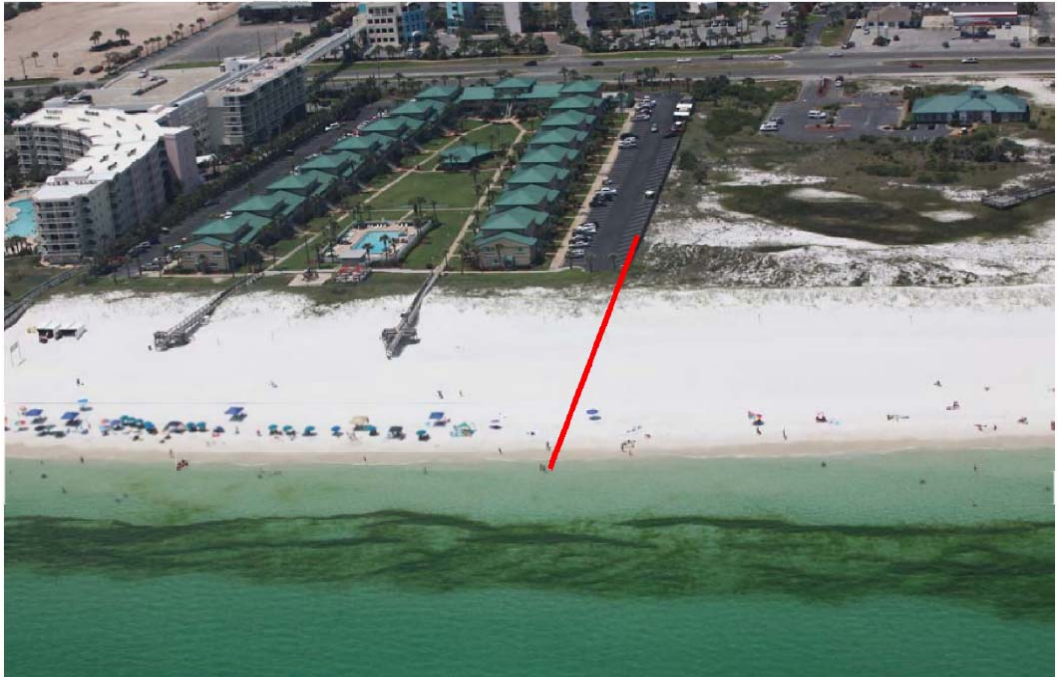
3.3.2 SUMMARY OF THE DEEPWATER HORIZON OIL SPILL RECREATION STUDY DATA (JUNE 2012 - MAY 2013)

Following the Deepwater Horizon oil spill in April 2010, an intensive aerial survey (the Deepwater Horizon Oil Spill Recreation Survey, hereafter “DWH survey”) was conducted to estimate the effect of the spill on recreational beach use across the Gulf Coast (Tourangeau et al. 2017, Horsch et al. 2017). Over a three-year study period, more

²⁰ The timeframe included in our analysis of the IRMA data intentionally excludes the timeframe during which PWCs were banned at the national seashore due to lack of a special regulation (April 2002 through May 2006). We discuss the implications of the previous temporary PWC ban in Chapter 4.

than three million photos of the shorelines were taken from airplanes, making this one of the largest aerial surveys ever conducted. The Gulf Coast was divided into 743 beach segments that were photographed from above at pre-determined intervals with the goal of representing total annual visitation along the coast. Of all the photographs collected, 497,000 were used to “count” recreationists along shorelines through both manual and automated methods. Exhibit 3-5 provides an example of an aerial photo taken during data collection. The three-year period reflects the immediate aftermath of the spill (2010-2011) as well conditions after recovery (2012-2013) for comparison.²¹

EXHIBIT 3-5. EXAMPLE AERIAL PHOTO FROM DWH DATA COLLECTION EFFORT



Source: Supplementary materials to Tourangeau et al. (2017), available at: <https://doi.org/10.1093/jssam/smx010>

The DWH data covers more than 1,000 miles of shoreline, including most of the Florida district of the national seashore.²² While the survey was initiated to study the effects of the oil spill on recreation across the Gulf Coast, a sub-set of the data can also be used to estimate visitation levels in select areas of the national seashore specifically. Moreover, because the DWH data focus on shorelines, it may better capture visitors that enter the national seashore via water instead of by land. However, the DWH data *only* capture

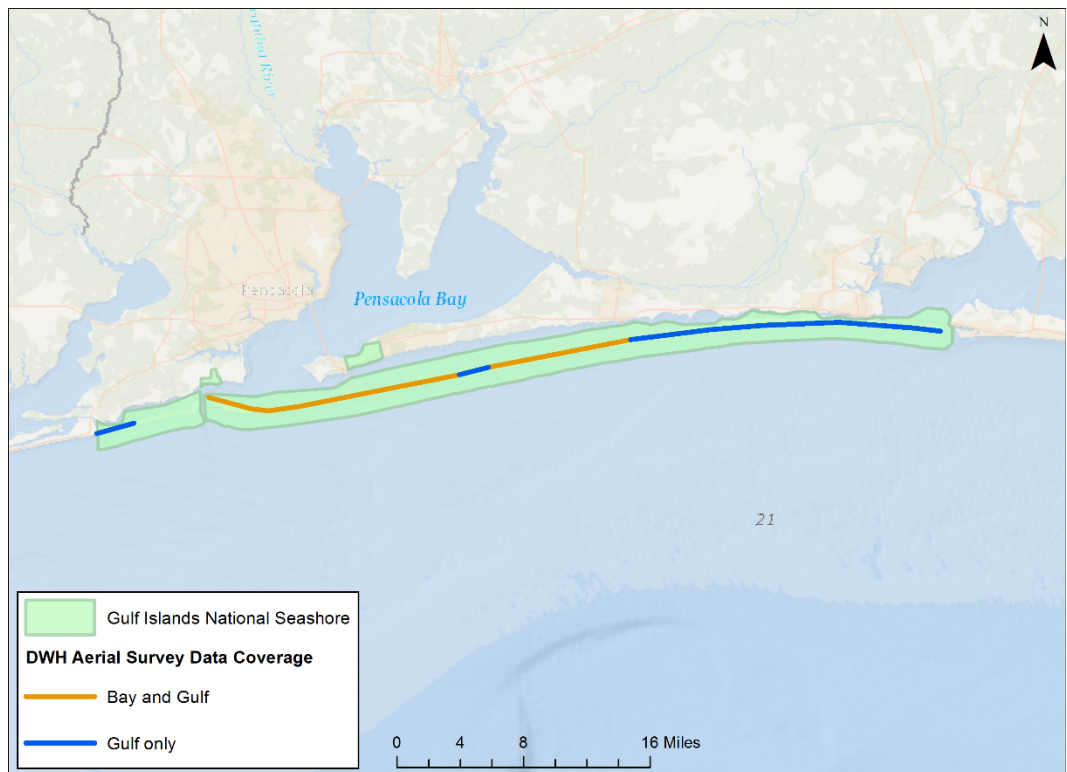
²¹ More details about this survey and the resulting data (hereafter “DWH data”) are available in Tourangeau et al. (2017) and Horsch et al. (2017). Data available in the Deepwater Horizon Administrative Record at: <https://www.fws.gov/doiddata/dwh-ar-documents/941/DWH-AR0305129.pdf>. The aerial survey counting effort was complemented with on-the-ground interviews.

²² There are approximately four miles of the national seashore that are not represented by the DWH data at all. However, there are larger stretches of the national seashore that only include DWH data on the Gulf-side of the islands.

shorelines, including about 100 yards offshore, and does not cover the full extent of the bay-side (north) of the barrier islands, where PWC activity occurs. This leads the DWH data to underestimate total national seashore visitation.

Exhibit 3-6 identifies the DWH data coverage along with Gulf Islands National Seashore boundaries. As described in the map, the Florida-portion of the national seashore is nearly fully represented by the DWH data. In some cases, however, the data only contain visitor counts from the Gulf-side. Moreover, because the DWH data focused on mainland shorelines, the Mississippi-portion of the national seashore – which covers islands miles from the coastal mainland – was not included in the DWH data collection effort. Our use of the DWH data, therefore, focuses on the Florida district of the national seashore then employs other NPS data to predict Mississippi visitation levels from the Florida estimate.

EXHIBIT 3-6. DWH DATA COVERAGE AND NATIONAL SEASHORE BOUNDARIES



Source: IEc map using data from NPS and DWH.

The following discussion provides the analytical approach for estimating total Gulf Islands National Seashore attendance in Florida using the DWH data.

1. We restrict the total DWH data set using both temporal and geographic rules. Following the same convention used in the DWH data collection effort, we assume that the data collected in 2012-2013 is the best representation of baseline conditions at the national seashore. Importantly, this is a relatively recent year, represents post-DWH spill characteristics, and occurs outside of the temporary

PWC ban period at the national seashore. Then we restrict the data geographically to within the national seashore boundaries in Florida.

2. To count recreationists in Florida, we employ the same methodology and decision rules originally created for the purposes of the DWH study. Moreover, like the DWH study, the raw counts are “weighted” to reflect sampling probability, adjust for weather conditions, and consider non-response.²³ Our re-analysis of the data only considered one adjustment: adding visitors on motorboats into our total visitor count.²⁴ For the year between June 2012 and May 2013, we estimate the total recreationists in the Florida district of the national seashore to be about 3.5 million (see Exhibit 3-7). The NPS IRMA data for the same months predicts visitation levels in the Florida section of the national seashore to be about 3.8 million.²⁵

Given the similarities in counts between the data sources, and the fact that the NPS IRMA data is generally considered the most reliable for counting visitors at NPS, this indicates that the using DWH data at a more disaggregated level may be a reasonable means to further understand the distribution of recreationists within the national seashore.

EXHIBIT 3-7. FLORIDA-SPECIFIC GULF ISLANDS NATIONAL SEASHORE VISITATION ESTIMATES BY DATA SET (JUNE 2012-MAY 2013)

DATA SOURCE	NUMBER OF VISITORS IN FLORIDA DISTRICT OF THE NATIONAL SEASHORE
NPS IRMA ¹	3,822,644
DWH ²	3,505,820
Sources:	
1. IEc calculations using monthly visitation reports by state for the national seashore downloaded on May 8, 2019 and May 29, 2019.	
2. IEc calculations using DWH data. See main text for details.	

²³ More specific details on the data processing and weighting scheme are available in Tourangeau et al. (2017) and Horsch et al. (2017).

²⁴ The original DWH study dropped motorboats from their analysis of the shoreline photos because another data collection effort was assumed to be a better representation of motorboat counts (i.e., aerial photos of docks and marinas). Because visitors on motorboats were counted during the post-processing of the data but excluded from the final counts, we add back in the total number of visitors on motorboats.

²⁵ IEc calculations using monthly visitation reports by state for the national seashore downloaded on May 8, 2019 and May 29, 2019.

3.4 PWC AND OTHER RECREATIONIST TYPES AT THE NATIONAL SEASHORE

The primary benefit of the DWH data is that it provides insight into the level of PWC use in the national seashore when combined with other available data. In addition, while PWC users are directly regulated by the rule, other types of recreationists may be affected by changes in the management of PWCs in the national seashore, including through possible changes in noise levels, public safety, and crowding on beaches where PWCs would no longer be allowed to land. However, as described in Section 3.3.2, the DWH survey did not cover the entire boundaries of the national seashore, including all of Mississippi, the area outside of 100 yards from the shoreline, and some portion of the bay-side in Florida. Therefore, we use the DWH data in combination with other data sources collected specifically for the FEIS (NPS 2019a) to provide the best available annual estimates of the number and distribution of recreation types across the complete national seashore. The remainder of this section describes the other data sets that provide additional insight into recreationist counts at the national seashore, which include:

- Site specific PWC survey (2013 and 2015);
- Aerial counts of PWC and other water vessels (2013); and
- Survey of PWC rental companies (2017).

3.4.1 NUMBER OF PWC AND OTHER BOATS USING DATA PRESENTED IN THE FEIS

The NPS undertook multiple data collection efforts to better understand the number and spatial distribution of PWC visitors at the national seashore to inform the FEIS (NPS 2019a). These efforts included both counts conducted from select sites across the national seashore, as well as an aerial survey with more complete national seashore coverage. Analysts also collected data from select PWC rental companies within and nearby national seashore boundaries, data from which can be extrapolated to estimate the number of PWCs that enter national seashore waters on rentals.

3.4.1.1. Site Counts of PWC (2013 and 2015)

NPS developed a sampling methodology for counting PWCs that would be representative of PWC use areas within the national seashore and the summer season (Volkert 2015). Researchers identified target dates and survey locations using expert knowledge of PWC representation at the national seashore and how weather conditions affect the number of visitors. On selected dates, researchers were stationed across the national seashore and responsible for counting PWCs that passed pre-determined markers over a 12-hour period in Florida sites and an 8-hour period in Mississippi sites. Across both 2013 and 2015, six counting dates were included in the survey effort, although different sites were monitored in 2013 than 2015.

Exhibit 3-8 presents the PWC counts across the selected sites for the six dates in 2013 and 2015.²⁶ The monitoring data from dates in 2013 – which includes sites from both states – conveys that the majority of PWC visitors at the national seashore spend time in Florida. The survey locations in Mississippi represent islands located 9 to 12 miles from the main shoreline, making them less accessible to PWCs. The highest traffic date was a holiday in 2013, when 336 PWCs were recorded across the locations, followed by two non-holiday weekend dates later in the summer, when 155 and 175 PWCs were recorded. The lowest count date, when only 81 PWCs were recorded, may be due to no counts at one high-traffic location in Florida.

In addition to the specific number counts, this analysis identifies the following:

- There is much variability in PWC activity across days, including weekend dates.
- Holiday weekend dates experience higher use than non-holiday weekend dates.
- Even on weekdays, PWC activity is non-negligible in certain areas of the national seashore. However, the sampled weekdays are proximate to a holiday weekend. These numbers, therefore, may be more a reflection of holiday crowds than usual summer weekdays.

While this survey provides useful context, there are several reasons the data are limited for quantifying activity levels:

- Individual PWCs could be double counted across various counting stations. This would lead to over-estimates of the total number of PWC visitors.
- The chosen dates are reflective of highest use dates based on past NPS enforcement reporting, meaning extrapolating to a longer timeframe may result in over-estimated total counts. Not only are the dates reflective of high use days overall, but weekends in general, are expected to experience higher use than weekdays.²⁷
- The observation locations were chosen because they are known to be places where PWCs traverse, however they are only a sample of points across the full national seashore. This sampling frame may result in an under-estimate of total counts where PWCs spend time in other areas of the national seashore.

²⁶ This data collection effort also involved study of whether observed PWCs were following existing (current conditions) rules around flat-wake zones and safe operating distance from other vessels. Across most stations, and even more so at the Florida stations, researchers observed imperfect compliance. More details are provided in Volkert (2015).

²⁷ The DWH data demonstrates that weekends are about 38 percent busier than weekdays.

EXHIBIT 3-8. TOTAL PWCS COUNTED BY STATION LOCATION (2013 AND 2015)

STATION LOCATION	MAY 26, 2013	JUNE 22, 2013	JUNE 23, 2013	AUGUST 4, 2013	JULY 1, 2015	JULY 2, 2015
	SUNDAY (HOLIDAY)	SATURDAY	SUNDAY	SUNDAY	WEDNESDAY	THURSDAY
Florida						
PC 01 (Santa Rosa area, east boundary)	50	44	12	19		
PC 02 (Opal Beach near parking lot 10)	15	16	9	9		
PC 03 (Ft. Pickens, west of property entrance)	23	12	No data	17		
PC 04 (Ft. Pickens on ferry dock)	35	21	8	36		
PC 05 (Perdido Key at dune crossover D)	48	26	21	42		
PC 06 (Perdido Key near Spanish Cove at Robertson's Island)	129	34	24	43		
Crab Island (Choctawhatchee Bay)					N/A	202
PC 01(Santa Rosa Island, west of Navarre Beach at property entrance)					10	N/A
PC 06 Perdido Key Point					19	N/A
Sub-total Florida	300	153	74	166	29	202
Percent of total	89%	99%	91%	95%	N/A	N/A
Mississippi						
PC 07 (West Petit Bois)	2	0	0	0		
PC 08 (West Petit Bois, east end)	5	0	0	2		
PC 09 (Horn Island East)	3	2	0	1		
PC 10 (Horn Island West)	24	0	7	6		
PC 11 (East Ship Island, east end of island)	4	0	0	0		
Sub-total Mississippi	38	2	7	9	N/A	N/A
Percent of total	11%	1%	9%	5%	N/A	N/A
TOTAL	338	155	81	175	29	202
Source: IEc calculations using data from NPS (2019a) and Volkert (2015).						

3.4.1.2. Aerial Counts of PWCs and Other Water Vessels (2013)

The NPS also conducted an aerial survey of the national seashore to count PWCs and other water vessels (i.e., boats and kayaks) on two summer weekends in 2013: one holiday weekend and one non-holiday weekend. The counting was focused on “popular areas at the national seashore” but is expected to be more spatially representative than the site-specific counts described in Section 3.4.1.1 (NPS 2018). However, the aerial survey effort involved just one fly-over of the national seashore each day (two total flyovers), and therefore only represents brief snapshots in time unlike the full-day count available from the site-specific survey. The aerial survey effort is also less likely to double-count moving PWCs because of the speed of the aerial survey.

The outcome of the two aerial counts is presented in Exhibit 3-9. Consistent with the site-specific observation survey, the number of PWCs in Mississippi represent the minority of PWCs in the national seashore. Furthermore, the PWCs observed in the aerial survey are even more concentrated in the Florida district of the national seashore relative to the Mississippi district, where only 2 to 3 percent of the PWCs can be found. Finally, the total PWC counts – across both Florida and Mississippi – are 452 and 532 on the holiday and non-holiday dates, respectively. These values represent totals well above the totals recorded on the day-long site-specific observation surveys, providing further justification that the site-specific surveys were not fully representative of the PWCs at the national seashore.

EXHIBIT 3-9. AERIAL COUNT OF WATER VESSELS (2013)

	FLORIDA		MISSISSIPPI		TOTAL
	SUB-TOTAL	PERCENT OF TOTAL	SUB-TOTAL	PERCENT OF TOTAL	
August 3, 2013 (non-holiday weekend)					
Boats	2,890	85%	527	15%	3,417
Kayaks	471	99%	3	1%	474
PWCs	514	97%	18	3%	532
September 2, 2013 (holiday weekend)					
Boats	2,373	90%	272	10%	2,645
Kayaks	266	97%	9	3%	275
PWCs	442	98%	10	2%	452
Source: IEc calculations using counts presented in NPS (2019a).					

An additional advantage of the aerial survey is that the resulting data were geo-referenced and can be compared with the DWH data boundaries. Therefore, we can use the aerial

survey to better understand what portion of water vessels are “missing” from the DWH count presented in Section 3.3.2. Exhibit 3-10 describes the percent of total counted water vessels found within boundaries important for the interpretation of the DWH data. First, we present the percent found within a 100-yard radius around the shoreline, as defined using the mean high water line from the National Oceanic and Atmospheric Administration (NOAA)’s Continually Updated Shoreline Product (CUSP).²⁸ This analysis shows that between 35 and 36 percent of boats and about 38 percent of PWCs are found within 100 yards of shorelines in Florida. Second, we present the percent of water vessels found within the DWH data boundaries of the sample already restricted within a 100-yard radius around shorelines.²⁹ This analysis demonstrates that about three-quarters of PWCs counted during the aerial survey would have been captured by the DWH data given the boundary limitations. On the other hand, only about half of boating visitors are captured by the DWH data relative to the aerial survey coverage. Together, this suggests that the DWH data misses a fair portion of the water vessels at the national seashore.

EXHIBIT 3-10. PERCENT OF WATER VESSELS FOUND WITHIN SPECIFIED BOUNDARIES IN AERIAL SURVEY IMPORTANT FOR DWH DATA INTERPRETATION (2013)

	BOATS		KAYAKS		PWCs	
	3-AUG-13	2-SEP-13	3-AUG-13	2-SEP-13	3-AUG-13	2-SEP-13
Percent within 100-yard radius around shoreline						
Florida	36%	35%	69%	72%	38%	38%
Mississippi	69%	79%	67%	100%	61%	30%
Percent within DWH boundaries (of those within 100-yard radius around shoreline)						
Florida	54%	57%	80%	81%	75%	78%
Mississippi	0%	0%	0%	0%	0%	0%
Source: IEc calculations using counts presented in NPS (2019a) and provided by NPS in georeferenced format. The shoreline radius was determined using the mean high water line provided by NOAA’s Continually Updated Shoreline Product (CUSP).						

3.4.1.3. PWC Trip Estimates from Rental Survey

The FEIS (NPS 2019a) effort included a survey of nearby PWC rental companies between March and May 2017 to better understand several facets of the PWC rental fleet, including vintage, use level, and travel destinations. These rental companies – 13 were contacted, 8 responded – either had launch locations from leased property into waters within national seashore boundaries or very nearby, implying that rented PWCs were

²⁸ More information about NOAA’s CUSP data set is available at: <https://shoreline.noaa.gov/data/datasheets/cusp.html>

²⁹ The uncaptured area in the DWH data includes some areas on the bay-side of the barrier islands and a four mile stretch to the west, see Exhibit 3-6 for a map.

very likely to traverse the national seashore waters during their trips. The survey contained questions about the number of PWCs available for rent, the average number of rentals per day, and the duration of the rental season, which together provide another estimate of the number of PWC visitors at the national seashore that enter on *rented* PWCs in particular.³⁰

Using the survey responses summarized in Louis Berger (2018), we estimate the number of rented PWCs that enter the national seashore. Exhibit 3-11 demonstrates that surveyed PWC rental companies may send PWC renters on between 25,000 and 57,000 trips per year. When confining our count to the six companies that launch directly into the national seashore waters, this results in 12,000 to 29,000 rented PWCs per year. This suggests that PWC rental companies are a significant contributor to the overall number of PWC visitors at the national seashore each year.

3.4.2 NUMBER OF VISITORS AND WATER VESSELS USING DWH DATA

This section references the DWH data introduced and presented in aggregate in Section 3.3.2. We present both the disaggregated details of visitor count by recreationist type, as well as the number of water vessels (as opposed to visitors on vessels) counted in the data.

3.4.2.1. Number of Visitors by Type in DWH Data

The DWH data contains recreationist counts across thirteen categories within four generalized locations proximate to the shoreline: beach, piers and jetties, water, and other. We present the total visitor count across these thirteen categories by month for the Florida district of the national seashore in Exhibit 3-12.

As presented in Exhibit 3-12, most visitors within the Florida section of the national seashore found on shorelines are beachgoers (64 percent). Among those visitors found in the water (25 percent), most are neither fishing nor on a boat, therefore likely swimming. All other categories make up less than 10 percent of the total visitor count, and generally much lower than 10 percent. For instance, PWC users only comprise about 0.1 percent of visitors along shorelines, nearly the same percent contribution as visitors on sailboats. Visitors on canoes and kayaks make up only a slightly larger share of the total at 0.2 percent followed by visitors on motorboats at 0.8 percent. Exhibit 3-12 also suggests that the DWH data boundaries captures 4,000 PWC visitors within Florida-specific national seashore waters during a 12-month period.

³⁰ More details of the survey methodology and outcomes are available in Louis Berger (2018).

EXHIBIT 3-11. ESTIMATED NUMBER OF PWC TRIPS GENERATED BY PWC RENTAL OPERATORS

SURVEYED PWC RENTAL OPERATOR	LAUNCH DIRECTLY INTO NATIONAL SEASHORE WATERS	START OF SEASON	END OF SEASON	ESTIMATED NUMBER OF DAYS IN SEASON [A]	NUMBER OF PWCs FOR RENTAL [B]	NUMBER OF RENTALS PER DAY [C]	RIDES PER PWC/DAY [C]/[B]	ESTIMATED NUMBER OF PWCs RENTED OVER SEASON [A]*[C] ¹		
								OPEN 7 DAYS/WEEK	OPEN 5 DAYS/WEEK	OPEN 3 DAYS/WEEK
1	Yes	15-Mar	15-Oct	214	12	42	4	8,988	6,420	3,852
2	Yes	End of May	Mid-August	76	10	10	1	760	543	326
3	Yes	Year round	Year round	364	8	unknown	unknown	unknown	unknown	unknown
4	Yes	1-Mar	1-Nov	245	15	55	4	13,475	9,625	5,775
5	No	Late February	December	276	15	45	3	12,420	8,871	5,323
6	Yes	March	September	213	6	24	4	5,112	3,651	2,191
7	No	May	August	121	20	130	7	15,730	11,236	6,741
8	Yes	1-Apr	31-Oct	213	6	4	1	746	533	320
Total (all)								57,231	40,879	24,527
Total (launch directly into the national seashore)								29,081	20,772	12,463

Source: IEC calculations using data presented in Louis Berger (2018) and summarized in NPS (2019a).
Notes:

- Survey respondents were asked only to identify one estimate for the number of PWC rentals per day. We expect that weekends might be busier than weekdays, and that summer months are busier than the shoulder seasons. We use the seven, five, and three day per week scenarios as a way to provide a potential range given the estimate in column C might not be reflective of average conditions across the full operating season.

EXHIBIT 3-12. DISTRIBUTION OF VISITORS IN FLORIDA DISTRICT OF THE NATIONAL SEASHORE USING DWH DATA (JUNE 2012-MAY 2013)

MONTH ¹	BEACH		PIERS AND JETTIES		OTHER	WATER								TOTAL
	GENERAL	FISHING	GENERAL	FISHING	GENERAL	GENERAL	FISHING	CANOE OR KAYAK	MOTOR BOAT	PWC	PARASAILI	SAIL BOAT	SURFING OR BOARD	
Jun-12	352,737	118	4,673	1,540	61,856	164,547	148	1,168	2,808	1,076	0	59	9,601	600,333
Jul-12	318,022	82	9,356	13	30,428	228,348	200	1,234	8,396	957	0	327	7,409	604,771
Aug-12	163,780	71	24,818	4,839	15,968	99,709	180	727	2,057	221	0	143	5,795	318,310
Sep-12	175,416	137	9,070	2,316	28,682	69,787	171	408	1,386	14	0	193	4,046	291,627
Oct-12	147,609	191	8,836	2,688	11,872	41,358	105	660	2,544	346	0	283	4,356	220,849
Nov-12	40,296	144	3,724	487	6,578	8,059	0	231	400	0	0	12	403	60,335
Dec-12	28,287	263	9,797	1,182	2,882	5,338	60	0	749	35	0	25	332	48,951
Jan-13	44,792	557	304	0	3,637	4,857	79	197	189	0	0	235	1,784	56,631
Feb-13	59,292	422	493	16	7,327	5,841	29	10	871	0	0	248	3,005	77,552
Mar-13	212,269	159	6,697	758	15,185	25,301	63	916	2,179	178	0	356	711	264,772
Apr-13	383,106	285	15,863	2,892	34,702	58,276	393	903	3,116	870	80	133	4,766	505,384
May-13	319,439	227	17,293	2,669	31,213	77,887	295	467	3,672	303	0	121	2,723	456,306
Total	2,245,047	2,657	110,924	19,400	250,328	789,306	1,722	6,922	28,368	4,000	80	2,135	44,931	3,505,820
Percent of total visitors	64.0%	0.1%	3.2%	0.6%	7.1%	22.5%	0.0%	0.2%	0.8%	0.1%	0.0%	0.1%	1.3%	

Source: IEc calculations using DWH data.
Notes:
1. Data not intended to be representative at the month level. This analysis focused on the annual totals and averages.

3.4.2.2. Number of Water Vessels by Type in DWH Data

The DWH aerial survey data collection effort also counted the number of water vessels separately from the number of visitors on water vessels. We can use the relationship between the total number of visitors observed in the DWH data with the total number of water vessels in the DWH data to estimate the average number of visitors per PWC.

Exhibit 3-13 presents the number of water vessels counted in the Florida district of the national seashore using the DWH data. The data identify approximately 30,000 water vessels within 100 yards of the shoreline between June 2012 and May 2013: 21,000 (71 percent) of water vessels were boats, 5,100 (17 percent) were canoes and kayaks, and 3,600 (12 percent) were PWCs. For comparison, the NPS IRMA data counted about 3,600 private boats in Florida over the same timeframe.³¹

We then use the total number of PWC *visitors* in Florida (Exhibit 3-12) and the total number of PWC *vessels* in Florida (Exhibit 3-13) to calculate an average number of visitors per PWC vessel of 1.1. For comparison, the PWC rental companies surveyed in Louis Berger (2018) noted that it is “very common” a PWC for two people to ride together, however one respondent noted that the average number of riders per PWC was somewhere between one and two.

EXHIBIT 3-13. DISTRIBUTION OF WATER VESSELS IN FLORIDA DISTRICT OF THE NATIONAL SEASHORE USING DWH DATA (JUNE 2012-MAY 2013)

MONTH-YEAR	BOATS ¹	CANOES/KAYAKS	PWCS	TOTAL
Jun-12	1,776	656	856	3,288
Jul-12	5,582	757	915	7,254
Aug-12	1,509	545	230	2,284
Sep-12	1,242	372	25	1,640
Oct-12	2,423	571	376	3,369
Nov-12	458	196	0	654
Dec-12	494	0	65	559
Jan-13	230	195	0	425
Feb-13	959	10	0	969
Mar-13	1,725	759	192	2,676
Apr-13	2,344	636	644	3,624
May-13	2,188	422	294	2,904
Total	20,929	5,119	3,597	29,646
Percent of total vessels	70.6%	17.3%	12.1%	

Source: IEc calculations using DWH
 Note: Boats category is an aggregate across motorboats, sail boats, and other boats to match the presentation of the aerial survey findings from NPS (2019a) presented in Exhibit 3-9.

³¹ NPS estimates that 14,232 visitors arrived into the national seashore by private boat in Florida. The counting methodology states that the total number of boats are multiplied by four to estimate the total number of visitors on boats.

3.4.3 SUMMARY OF PWC AND NON-PWC VISITORS

This section uses the DWH data together with the data collected for the FEIS to provide our best estimates of the number of PWC and non-PWC trips to the national seashore each year. Because none of the above-mentioned datasets provide both full geographic coverage of the national seashore nor a full year coverage, we use the findings from other data sets to “adjust” for the shortcomings of other data sets. There are four types of adjustments we consider in order to predict the number of PWC visitors:

1. Predict Mississippi visitation from Florida visitation

Mississippi PWC visitors can be predicted from the Florida DWH data using three different ratios of visitors between states: from the NPS IRMA data, the observation study for the FEIS (Volkert 2015), and the aerial survey (FEIS 2018). We include each of those estimates in our summary that follows.

2. Adjust for full-year coverage

The DWH data is the only data set that provides estimates of PWC visitors across a full year.³² In order to extrapolate our findings from select individual counting dates for surveys conducted for the FEIS (NPS 2019a), we use the monthly variation observed in the DWH data (see Exhibit 3-12) to predict full year coverage. We also consider how counts conducted on weekends can be adjusted to weekday levels using the distribution of PWC visitors observed in the DWH data across the full year on weekends (59 percent) versus weekdays (41 percent). We drop selected counting dates that occurred on weekend holidays from extrapolation to the full year given lack of data to support an appropriate ratio between holiday and non-holiday coverage.

3. Adjust for full-national seashore boundary coverage

The best spatial representation of PWCs across the national seashore comes from two days of aerial survey conducted for the FEIS (NPS 2019a). We adjust for the under-representation of the DWH data using the percentage coverage estimates displayed in Exhibit 3-10. While the site-specific observation study (Volkert 2015) and rental company survey (Louis Berger 2018) are not expected to be fully representative of the geographic extent of the national seashore boundaries, data do not exist to “adjust” these values because their representativeness is unknown.

4. Adjust for number of passengers on PWCs

The PWC counts conducted for the FEIS (NPS 2019a) as well as the analysis of PWC trips estimated from the PWC rental company survey (Louis Berger 2018) focus on the number of PWC vessels. Using the number of passengers on a PWC observed in the DWH data (average of 1.1, see Section 3.4.2.2), we multiply the number of vessels by this adjustment factor to predict the total number of visitors.

³² The NPS IRMA data provides visitor estimates at the annual level, but not specific to PWC visitors. Because we believe the seasonal distribution for PWC visitors differs from the seasonal distribution for total visitors at the national seashore, the DWH data is most appropriate for our use.

3.4.3.1. Best Available Estimates of PWC Visitors per Year

Exhibit 3-14 presents the findings of our adjustments across multiple data sets for the Florida district, Mississippi district, and overall national seashore. The underlying data sets – adjusted using relatively similar methods – produce total annual PWC visitor estimates with a very wide ranges: between 13,724 and 344,092 in Florida and between 179 and 13,255 in Mississippi. This exercise demonstrates that the true count of PWC visitors remains difficult to estimate. Extrapolating full year coverage from one or two select weekend counts introduces considerable error, whereas using data sets that are not fully representative of national seashore boundaries requires strong assumptions about the level of potential under-count.

We highlight the estimates we believe are the best representation of district specific annual PWC user visitation levels. In Florida, we believe the best count of the total number of PWC visitors per year starts with the DWH data, but includes correction for lack of full park coverage using the aerial surveys. This results in an estimated 13,700 PWC visitors in the Florida district per year. In Mississippi, we believe the best count is extrapolated from the adjusted DWH data (i.e., our best estimate for Florida) using the relative ratio of PWCs found in Florida and Mississippi from the two aerial surveys. This results in an estimated 311-481 PWC visitors in the Mississippi district per year. Across both the full national seashore, this implies a total of approximately 14,000 PWC visitors per year, or 0.3 percent of the total annual visitors at the national seashore.

3.4.3.2. Best Available Estimates of Non-PWC Visitors per Year

To estimate the total number of non-PWC visitors at the national seashore per year, we subtract our best available PWC visitor counts from the total national seashore visitor estimates from both NPS IRMA and DWH data sources. Exhibit 3-15 summarizes these findings. We anticipate between 3.5 and 3.8 million non-PWC visitors annually in Florida relative to between 915,000 and 998,000 non-PWC visitors annually in Mississippi. This suggests that about 99.7 percent of visitors at the national seashore in Florida and Mississippi are non-PWC visitors.

EXHIBIT 3-14. ANNUAL ESTIMATES OF PWC VISITORS AT GULF ISLANDS NATIONAL SEASHORE BY DATA SOURCE

MAIN DATA SOURCE	ADJUSTMENTS FROM OTHER DATA SOURCES				FLORIDA	MISSISSIPPI	TOTAL
	EXTRAPOLATE FROM FLORIDA TO MISSISSIPPI	CORRECTED FOR FULL SEASHORE COVERAGE ¹	CORRECTED FOR FULL YEAR COVERAGE ²	CORRECTED FOR NUMBER OF VISITORS ON PWC ³			
DWH		Yes			13,700		
DWH	Yes, using NPS IRMA: 21 percent MS, 79 percent FL	Yes				2,740	
DWH	Yes, using observational study (Volkert 2015): 1-11 percent MS, 89-99 percent FL	Yes				179 - 1,740	
DWH	Yes, using aerial survey (NPS 2019a): 2-3 percent MS, 97-98 percent FL	Yes				311 - 481	
Observational study, Volkert (2015)			Yes, using two weekend days in June as reference	Yes	17,200	681	17,800
Observational study, Volkert (2015)			Yes, using one weekend day in August as reference	Yes	122,000	6,630	129,000
Aerial survey, NPS (2019a)			Yes, using one weekend day in August as a reference	Yes	344,000	13,200	357,000
Rental survey, Louis Berger (2018)			Yes, assuming open 7 days/week	Yes			32,000
Rental survey, Louis Berger (2018)			Yes, assuming open 5 days/week	Yes			22,800
Rental survey, Louis Berger (2018)			Yes, assuming open 3 days/ week	Yes			13,700

Source: IEC calculations using various above-listed data sources. See main text for details.

Notes:

Estimates are rounded to three significant digits

1. Corrected using ratio of PWCs observed within and outside of a 100-yard radius from shoreline as well as the ratio of PWCs observed within the DWH data relative to the full aerial survey coverage (NPS 2019a), see Exhibit 3-10.
2. Corrected using both (1) the monthly variation in PWC visitors observed in the DWH data (see Exhibit 3-12) and (2) the ratio of visitors observed on weekdays versus weekends across the full year from the DWH data (59 percent weekend, 41 percent weekdays).
3. Multiply number of vessels by 1.1 to estimate total number of passengers using the ratio of visitors to passengers from the DWH data (see Section 3.4.2.2).
4. Rows highlighted with orange represent the best estimates of annual PWC visitors at the national seashore for each state.

EXHIBIT 3-15. ANNUAL ESTIMATES OF NON-PWC VISITORS AT GULF ISLANDS NATIONAL SEASHORE BY DATA SOURCE

	FLORIDA	MISSISSIPPI	TOTAL
NPS IRMA			
Total visitor count ¹	3,820,000	998,000	4,820,000
Best available PWC visitor count ²	13,700	311-481	14,000-14,200
Estimated non-PWC visitor count	3,810,000	998,000	4,810,000
DWH data			
Total visitor count ³	3,510,000	915,000	4,420,000
Best available PWC visitor count ²	13,700	311-481	14,000-14,200
Estimated non-PWC visitor count	3,490,000	915,000	4,410,000
Notes: Estimates are rounded to three significant digits. Sources:			
1. NPS IRMA			
2. IEc calculations. See Exhibit 3-14 for details.			
3. IEc calculations using DWH data.			

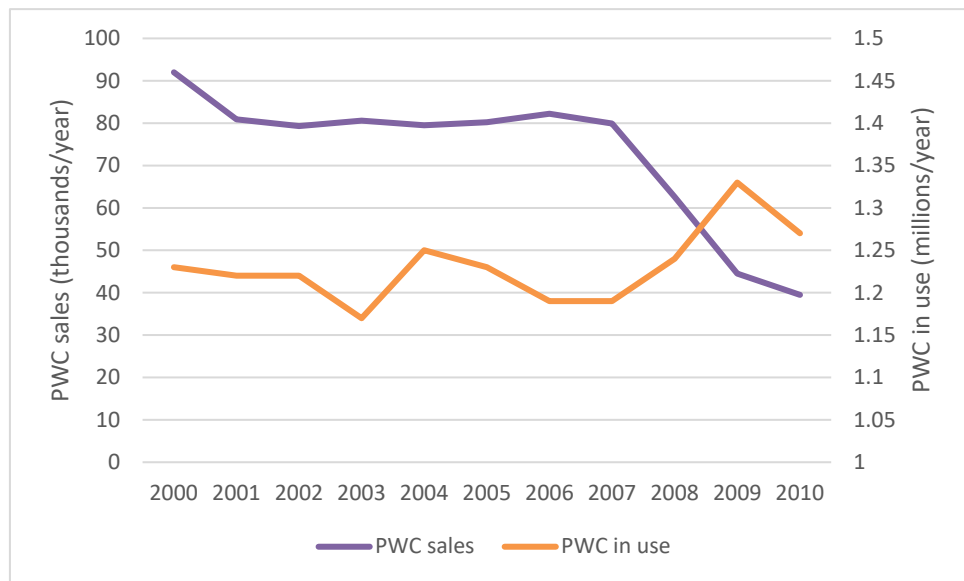
3.5 TRENDS IN PWC OWNERSHIP

The data described above provides insight into the historic PWC and non-PWC visitation levels at the national seashore in order to determine potential changes in activity levels over the next ten years. The relevant baseline, however, must also consider future conditions in the absence of the rule. In this section, we describe the best available information on trends in PWC ownership as evidence for how PWC use at the national seashore is likely to change over the timeframe for this analysis.

The National Marine Manufacturers Association (NMMA) is the industry group that collects and distributes statistics related to recreational boating in the United States. In their 2011 statistical abstract, they describe trends in the number of PWCs in use and number of sales nationally between 2000 and 2010.³³ This information is summarized in Exhibit 3-16. Between 2000 and 2010, PWC sales declined while PWC use has remained relatively constant between 1.2 and 1.3 million nationwide.

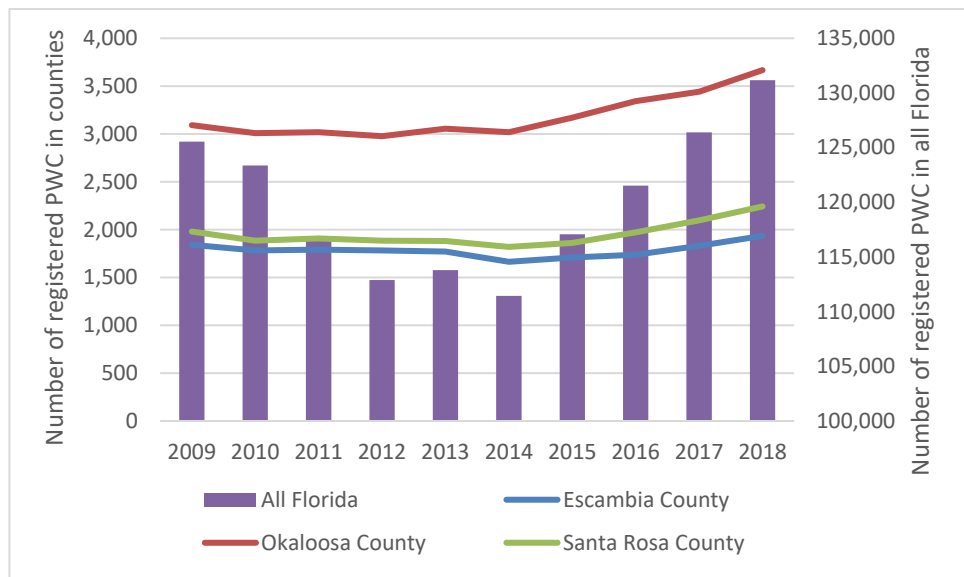
³³ This report was made available to IEc by the NPS through their data collection for the FEIS (NPS 2019a). More recent statistical abstracts are available from NMMA at <https://www.nmma.org/statistics/publications/statistical-abstract>.

EXHIBIT 3-16. NATIONAL TRENDS IN PWC SALES AND USE (2000-2010)



Source: NMMA Recreational Boating Statistical Abstract (2011)

EXHIBIT 3-17. PWC REGISTRATION IN FLORIDA (2009-2018)



Source: Florida Fish and Wildlife Conservation Commission (FWCC) Boating Accident Statistics reports from various years. Available at: <https://myfwc.com/boating/safety-education/accidents/>

National trends, however, may obscure patterns at the state and more local level, which are potentially more relevant to the national seashore. In Florida, the Florida Fish and Wildlife Conservation Commission (FWCC) publishes annual Boating Accident Statistics, which also describe the number of PWCs registered in each county and across

the full state. Exhibit 3-17 summarizes PWC registration totals in Florida for the most recently available ten-year period (2009-2018). The total number of PWC registrations in the three counties in Florida adjacent to the national seashore was constant between 2009 and 2014 then experienced an increase between 2014 and 2018. That trend is more pronounced at the state level, where total registration was on the decline between 2009 and 2014 before growth starting in 2014. To our knowledge, similar registration information is not publicly available for Mississippi.

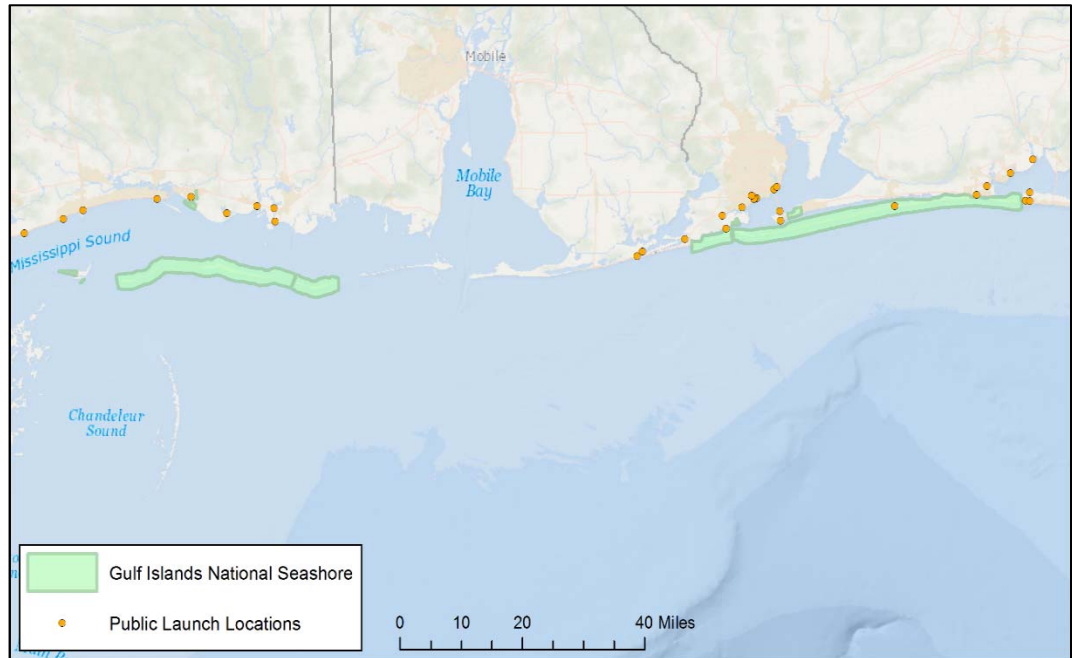
Together, the national, state, and county information provide a mixed view of trends in PWC use historically, in part due to the differences in time periods and in part due to the differences in statistics recorded. This makes it somewhat difficult to project PWC use at the national seashore in the future. Industry representatives, however, do not expect PWC registration to increase appreciably in the next ten years.³⁴ Therefore, it is unlikely that PWC visitation at the national seashore will change considerably over the timeframe of this analysis. For this reason, we assume that the PWC visitor levels displayed in Exhibit 3-15 are a reasonable representation of future PWC visitor levels at the national seashore.

3.6 PWC LAUNCH LOCATIONS NEAR THE NATIONAL SEASHORE

Data do not exist to characterize how PWC visitors launch their vessels into national seashore waters. PWC visitors with access to their own vessel may launch from three NPS-owned boat launches of the national seashore or non-NPS owned docks or marinas within national seashore waters or nearby, while PWC visitors riding rented PWCs are most likely to launch from the 13 PWC rental companies surveyed by Louis Berger (2018) (see Section 3.4.1.3).

To provide context on the number and location of public PWC launch points near the national seashore, we rely on georeferenced data from the DWH survey effort that watched 219 public launches with marinas across the North Gulf Coast to estimate the number of boating trips (see Tourangeau et al. 2017 for more details). This was expected to be a better representation of the total number of recreational boaters than the number counted in aerial photos along the shoreline. The map in Exhibit 3-18 presents the number of these public launch locations within 10 miles of the national seashore boundaries that may cover all PWCs destined for that national seashore as well as other nearby travel destinations. This data includes 31 public launch locations within 10 miles of the national seashore boundaries, which may not be exhaustive of all public launch locations within and outside of national seashore boundaries.

³⁴ Personal communication with Jack Willis of Info-Link on June 10, 2019.

EXHIBIT 3-18. PUBLIC DOCKS AND MARINAS WITHIN 10 MILES OF NATIONAL SEASHORE BOUNDARIES

Source: IEc map produced using data from the DWH Survey effort described in Section 3.3.1 and Tourangeau et al. (2017). Data may not be inclusive of all public launch locations within and outside of national seashore boundaries.

CHAPTER 4 | COST-BENEFIT ANALYSIS OF THE RULE

This chapter presents our cost-benefit analysis of the rule relative to the baseline conditions at the national seashore, as described in Chapter 3. Section 4.1 summarizes relevant literature on economic values associated with PWCs and other recreational beach trips to the national seashore. Drawing on this literature, we assess the incremental costs of the rule in Section 4.2 and incremental benefits of the rule in Section 4.3. Given limited changes in PWC management relative to the current rules at the national seashore as well as significant data limitations, our analysis of costs and benefits of the rule is qualitative, yet does offer potential magnitude of costs and benefits based on the best available information. Section 4.4 describes the potential for regional economic impacts. Our findings are summarized in Section 4.5, which we follow with a discussion of information limitations and key sources of uncertainty in Section 4.6.

As described in Exhibit 4-1, the over-arching finding of our analysis is that the effects of the rule are expected to be minor, in some cases negligible. PWC visitors may experience minor benefits where flat-wake zones are reduced. Moreover, non-PWC visitors may incur minor costs at shorelines on account of potentially more noise from PWCs where flat-wake zones decrease. Changes in PWC management strategies also results in minor costs for some ecological resources at the park, including SAV, wildlife and habitat, and threatened and endangered species. Public safety effects, water quality changes, and regional economic impacts are expected to be negligible.

EXHIBIT 4-1. SUMMARY OF COSTS AND BENEFITS OF THE RULE

CATEGORY OF POTENTIAL CHANGES IN RULE	DIRECTION OF POTENTIAL EFFECT	SECTION IN CHAPTER
PWC visitor trips and experience around shorelines where flat-wake zones decrease	Minor Benefit	4.3.1
Non-PWC visitor numbers and experience around shorelines where flat-wake zones decrease	Minor Cost	4.2.1
Ecological effects: SAV, wildlife and habitat, threatened and endangered species	Minor Cost	4.2.3
Ecological effects: water quality	Negligible Effects	4.3.2
Public safety	Negligible Effects	4.2.2
Regional economic impacts	Negligible Effects	4.4

4.1 SUMMARY OF LITERATURE ON ECONOMIC VALUES ASSOCIATED WITH RECREATIONAL TRIPS

Individuals value recreational experiences based on multiple factors, for example, some related to the site (e.g., proximity, water quality) and some related to the regulation of the activity (e.g., crowding, area closures). In welfare economics, the most common way to describe the benefit of a recreational trip is through consumer surplus. Consumer surplus represents the difference between what individuals would be willing to pay (hypothetical) and what they do pay (actual); the difference between the two is the utility gained from the activity. The economic literature focuses both on estimating total values for recreational experiences as well as attributes that affect that value.

Consumer surplus related to a recreation trip may be affected by changes in the site- or management-specific factors that contribute to overall willingness to pay (WTP). To estimate the welfare effects of changes in conditions of a recreation trip, analysts generally calculate changes in consumer surplus. For example, if recreationists experience less desirable trips due to the rule which decrease their consumer surplus relative to baseline conditions, the change in consumer surplus is equivalent to the amount of utility lost. This value can also be interpreted as the portion of the total value of a trip derived from the characteristic that is changing.

With respect to the public's WTP, economists apply a variety of methodological approaches to estimate use and non-use values. Revealed preference techniques examine individuals' behavior in markets in response to changes in environmental or other amenities (i.e., people "reveal" their value through their behavior). For example, travel cost models are frequently applied to value access to recreational opportunities, as well as to value changes in the quality and characteristics of these opportunities. Basic travel cost models are rooted in the idea that the value of a recreational resource can be estimated by analyzing the travel and time costs incurred by individuals visiting the site. Another revealed preference technique is hedonic analysis, which is often employed to determine the effect of site-specific characteristics on property values.

The concept of non-use (also referred to as "passive use") values recognizes that people may have a positive preference for a good or service beyond any current or even expected future use. Non-use values are thought to reflect an environmental ethic, and are a measure of the utility that people derive from indicators of improved ecological health or functioning. Economists generally see these values as motivated by three key factors:

- Existence value, defined as the benefit gained simply from knowing the resource exists;
- Option value, allowing for potential use of the resource in the future; and/or
- Bequest value, reflecting a desire to ensure continued existence of the resource for future generations.

By definition, non-use values do not affect people's behavior. Thus, revealed preference methods do not apply to non-use values. Economists therefore employ stated preference methods to elicit information on non-use values (or on total economic values, inclusive of

use and non-use value). Stated preference methods include such tools as the contingent valuation method, conjoint analysis, or choice experiments. In simplest terms, these survey-based methods elicit information from respondents in order to estimate their WTP for a given resource or service (e.g., a species population), or for programs designed to protect that resource or service.

In addition to economic *values*, economists employ models of economic activity levels in commercial markets in order to estimate the regional economic *impacts* generated by a policy or activity. Regional economic impacts refer to changes in regional economic activity levels and may be measured, for example, in terms of changes in revenues, value-added, employment, wages and tax receipts. Regional economic impacts may also be associated with changes in non-market activities, such as recreation.

In the context of the rule, estimates of the value visitors place on recreation trips is necessary to monetize the effect of any changes in the *quantity* of trips among PWC and non-PWC visitors at the national seashore. Estimates of the incremental change in the value of a full trip are required to monetize the effects of changes in the *quality* of trips when the impacts of the rule alter the characteristics of trips. For example, PWC users may experience diminished value of trips when speed restrictions are imposed while non-PWC users may experience increased value for other beach and marine recreational experiences due to the reduced noise.

This section summarizes the available literature on the values individuals place on recreational beach trips as well as the magnitude of value losses associated with less desirable trips. While many studies exist to demonstrate the values other types of recreationists place on their recreation experiences (e.g., motorized boaters, beach visitors), the literature is very limited on the values PWC users place on trips. Moreover, across the recreation literature, very few studies demonstrate how the management changes expected from the rule elements will affect WTP among non-PWC users.

4.1.1 VALUE OF RECREATIONAL TRIPS

Neher et al. (2013) study the WTP for a NPS visit across a sub-set of all NPS sites using a travel cost model. They find that surveyed individuals are willing to pay an average of \$84 for a trip (inclusive of single and multi-day trips) to a national seashore in the Southeast, the region inclusive of Gulf Islands National Seashore.³⁵ This estimate provides a useful reference point for the value the national seashore visitors place on a trip. However, it does not break down this estimate by recreationist type. The sections that follow explore the broader literature on the values recreationists hold for specific

³⁵ Unless otherwise noted, all monetized values presented in this chapter have been converted to 2019 USD using gross domestic product (GDP) values provided by the Bureau of Economic Analysis at <https://apps.bea.gov/iTable/iTable.cfm?ReqID=19&step=4&isuri=1&1921=flatfiles> (see Section 1, Table 1.1.9).

types of recreational trips, with a focus on the distinction between PWC and non-PWC trips.³⁶

4.1.1.1. PWC Trips

We identified a single study focused on WTP for PWC trips specific to the Lake Tahoe region in California and Nevada. Hagerty and Moeltner (2005) estimate various travel cost models using data collected from on-site surveys of 333 PWC visitors during the summers of 2001 and 2002 across six lakes and reservoirs in the Lake Tahoe region. Even among a relatively contained geographic area, the authors find considerable variation in WTP estimates based on the travel destination. For example, Lake Tahoe itself provides PWC visitors with the most value, with median WTP per trip between \$316 and \$352, depending on the model employed. Other lake destinations in the region provide between \$58 and \$132 in consumer surplus per PWC trip.³⁷

While a useful reference point, the many differences between the national seashore and the Lake Tahoe region make this study inappropriate for a benefit transfer in our analysis. OMB *Circular A-4* (2003) notes that the relevant characteristics of the sites should be similar, however lakes and coastal shoreline in different geographic regions are too dissimilar to transfer. Additionally, the *Circular A-4* criteria also stipulates that the availability of substitute in the two contexts should be similar. Extensive shoreline and water access along the North Gulf Coast adjacent to the national seashore provides ample opportunity for substitute PWC experiences, while limited lake access characteristic of the inland mountain region may offer less opportunities for PWC use.

4.1.1.2. Non-PWC Beach Trips

Oregon State University maintains a Recreation Use Values Database (RUVD) that functions as a repository of economic valuation studies in the United States and Canada. This collection of 421 studies provides 3,192 estimates of per person per day values for specific recreation activities, making it an ideal platform for meta-analysis.^{38,39} Exhibit 4-2 presents the summary findings provided in Rosenberger (2016) for activities likely to take place at the national seashore across studies that focused on the southern United States. Comparing across activity types, individuals value saltwater fishing and

³⁶ Another important conclusion of Neher et al. (2013) is that variation in WTP across NPS-managed sites, site type, and region is considerable. This suggests that implementing a benefit transfer using values derived from visitor experiences in one site to another destination should be implemented with caution and considerable caveat.

³⁷ This same data set is also used by Moeltner and Shonkwilder (2005) to explore methodological contributions to the recreation economics literature. Additionally, in their discussion, they note that the welfare losses individual experience from bans (and effective bans due to low water levels resulting in no access) on PWC use in particular areas are generally lower than similar values assigned to motorized boat trips found elsewhere in the literature. The authors argue that this discrepancy is more likely to be an artifact of data collection techniques and empirical model selection than actual variation across recreationist type.

³⁸ Hagerty and Moeltner (2005), summarized in Section 4.1.1.1, is the only study included on values associated with PWC trips across North America.

³⁹ An earlier version of this database was used for the meta-analysis by Rosenberger and Loomis (2000).

nonmotorized boating trips above other categories. Motorized boating (which does not include PWC use) and swimming are the two categories that provide the least value to participants, with beachgoing and wildlife viewing in the middle of the range. The extent to which the values associated with motorized boating are similar to the value of PWC use is unclear given limited PWC studies.

EXHIBIT 4-2. RECREATION TRIP VALUES, PER PERSON PER DAY (2019 USD)

ACTIVITY TYPE	SOUTHERN UNITED STATES	
	NUMBER OF STUDIES	MEAN ESTIMATE (PER PERSON, PER DAY)
Saltwater fishing	56	\$133.47
Nonmotorized boating	26	\$155.25
Beach	32	\$80.10
Wildlife viewing	112	\$61.34
Motorized boating	15	\$27.99
Swimming	2	\$15.83
TOTAL (all activities)	687	\$78.58
Source: Rosenberger (2016), summarizing available literature in the Oregon State University Recreation Use Values Database (RUVD) available at: http://recvaluation.forestry.oregonstate.edu/		

The RUVD values likely represent the best estimates of regionally appropriate values individuals place on non-PWC recreation trips because of the volume of the underlying literature through 2016. However, it is likely that more localized geographic considerations and type of recreation destination also result in variation in the values people place on trips. Two other relatively recent studies provide welfare estimates for recreationists in geographies closer to the national seashore. These include the following:

- Parsons et al. (2009) estimate the total welfare loss for all types of beach visitors of a beach closure at the Padre Island National Seashore on the Gulf Coast of Texas between \$4.06 and \$23.73 per trip.
- Ha (2007) estimates the average consumer surplus for beach recreationists in northwestern Florida (including areas overlapping with the national seashore) to be \$81.94 per day. However, the types of recreationists in the data are not distinguished, meaning it is possible that both PWC and non-PWC visitors are represented in this estimate.

4.1.2 VALUE LOSS OF SPEED RESTRICTIONS ON PWCS

We did not identify any studies focused on quantifying the change in value of a PWC trip due to the presence of flat-wake zones. Based on the literature regarding the influence of

flat-wake zones on values for motorized boating trips, we assume that PWC users prefer speed over no wake conditions, and that flat-wake zones, therefore, provide some level of disutility to PWC users. Where the loss in value is high enough and other substitute travel destinations exist, PWC users may decide to avoid flat-wake zones by traveling to their second choice destination instead, where the difference in utility garnered from the first-choice and second-choice destinations represents the loss in value associated with flat-wake zones.

While not for PWC users specifically, this relationship is well-studied in the recreational boating literature. One set of studies evaluates the effects of the presence of a no wake or speed reduction zone on recreational boating behavior but does not quantify the reduction in value of these trips. In their study of recreational lake usage in Iowa, Egan et al. (2004) find that about half of the surveyed population of recreation visitors prefers lakes with wake limits while the other half prefers lakes without. They interpret this finding as evidence of conflicting interests among anglers and other recreational boaters: that anglers prefer lakes with wake limits while recreational boaters prefer without.

Gorzelany (2006) uses aerial surveys in Lemon Bay, Florida to study recreational boating activity more specifically in the presence of new speed limits. Their data – collected before and after the rules went into effect for comparison – suggests some changes in the spatial distribution of boaters, but with no clear pattern. The author interprets this as evidence that speed limits have a limited effect on visitation to a site for recreational boating.

One study quantifies welfare losses of speed limits on recreational boaters.⁴⁰ Thomas and Stratis (2002) study the welfare effects of speed limits on recreational boaters in areas where manatees congregate in southwest Florida. They find that the presence of speed limits resulted in the substitution of trips towards areas that did not have speed limits. Using survey data, they also estimate that recreational boaters lose between \$9.09 and \$11.88 in welfare benefits per trip for the reduction of choices in boating areas. This represents the lost value of a trip due to the presence of speed limits.

These studies provide mixed evidence on how no wake zones might influence the quantity and quality of PWC trips based on analogous studies of motorized boaters. Egan et al. (2004) and Thomas and Stratis (2002) demonstrate that motorized boaters have a preference for speed, while Thomas and Stratis (2002) quantify the value loss from speed restrictions. Gorzelany (2006) suggests that recreational boaters still travel to areas with new speed limits, while Thomas and Stratis (2002) find substitution of trips to other destinations.

⁴⁰ Other studies have been conducted in settings outside of the United States, which cannot be used in benefit transfer per guidance from OMB *Circular A-4* (2003). For example, Rosato et al. (2007) study the effect of the introduction of speed limits on recreational boaters in the Lagoon of Venice, Italy. They find that the loss in consumer surplus per trip once the speed restrictions went into place was between 76 and 99 euros (2002).

4.1.3 VALUE LOSS OF PWC NOISE ON NON-PWC VISITORS

PWCs produce noise that is audible to other nearby recreationists. The presence of noise from PWCs may result in recreation trips with reduced value where non-PWC visitors prefer quiet or more natural settings. For example, Davenport and Davenport (2006) note that most public concern about PWCs is related to noise pollution. Therefore, the reduction in PWC noise associated with flat-wake zones and area closures may increase the value of recreation trips for non-PWC visitors.

Most of the literature on the effects of noise on the value of recreation trips is related to the disutility associated with congestion on beaches. The noise in this scenario is the noise produced by other beachgoers. As described by Cessford (1999), the type of noise experienced by beachgoers (e.g., noise produced by other beachgoers, waves hitting the shoreline, airplanes overhead, boats in the water, birds) likely results in different effects on the value of their trips. Therefore, the noise contributions from nearby beachgoers or other sources may be perceived differently from the noise contributions of PWCs offshore.

We identified a single study focused on the effects of PWC noise on beachgoers. Komanoff and Shaw (2000) estimate the value beachgoers would be willing to pay to remove the noise associated with PWC use from their recreation experience. To do this, they draw from the literature on the effect of environmental noise (from airplanes and highways) on residential property values. Based on this existing literature, they infer that the value of a beach day is degraded by one percent for each one dBA noise increment level a PWC contributes. This estimate, however, is drawn exclusively from existing studies of the impact of noise from airplanes and highways on residential property values. Therefore, transferring this estimate to the PWC noise levels at the national seashore would not follow best practices in benefit transfer stipulated by OMB *Circular A-4* (2003).

Related evidence also dictates that other non-PWC users in the range of PWCs might experience disutility associated with PWC noise. For example, Beal (2011) studied the conflict between PWC users and anglers on a shared lake in North Carolina and found that noise from PWCs was a major contributor to conflict. On the other hand, Wang and Dawson (2001) note that recreational boaters may be more tolerant of noise from nearby PWCs given their own contribution to noise levels based on their sample of recreationists in the Great Lakes region of New York.⁴¹ To our knowledge, evidence on the loss in value for other types of recreation trips (e.g., motorized boating trips, non-motorized boating trips) due to noise from PWCs is also not available.

4.2 INCREMENTAL COSTS OF THE RULE

This section describes the anticipated incremental costs of the rule. This includes a discussion of anticipated changes in non-PWC trips and experience around shorelines

⁴¹ For this reason, Wu et al. (2009) put both PWC users (referred to as “water scooters” in the study) and motorized boats in the same category when study conflict between recreationist types in a national park in Taiwan.

where flat-wake zones decrease, public safety around shorelines where flat-wake zones decrease, and various potential ecological costs.

4.2.1 NON-PWC VISITOR TRIPS AND EXPERIENCE DUE TO FLAT-WAKE ZONES

Under the rule, the flat-wake zones would be reduced from 0.5 miles around shorelines of the Mississippi islands and 300 yards from all other shorelines (baseline restrictions) to 150 yards around shorelines in Florida and 300 yards from shorelines in Mississippi (rule restrictions). A decrease in overall flat-wake zone implies higher speeds among PWCs closer to shores and potentially more noise for recreationists at shorelines experiencing changes.

Exhibit 4-3 describes the analysis on noise provided by PWCs from the FEIS (NPS 2019a). The FEIS (NPS 2019a) reports that a single PWC would have to pass a shoreline at a distance of approximately 4,575 feet (two-stroke engine) and 1,980 feet (four-stroke engine) in order to provide no discernable increase in noise over baseline ambient conditions at the national seashore. For two-stroke engines, this distance (equivalent to 0.87 miles) is outside the range of all current flat-wake restrictions. For four-stroke engines, this distance (equivalent to 660 yards) is outside the range of current restrictions around shorelines, except for the islands in the Mississippi district. Together, this implies that nearly all visitors on shorelines are likely to hear these PWCs as they pass the shorelines under current conditions, under the assumption that PWCs travel at speeds above flat-wake levels up until they are required to decrease speeds.

EXHIBIT 4-3. INCREASE IN NOISE LEVELS OVER EXISTING AMBIENT CONDITIONS AT VARIOUS DISTANCES FROM ONE PWC (DBA)

	TWO-STROKE PWC	FOUR-STROKE PWC
50 feet	41.0	31.7
100 feet	34.9	25.6
200 feet	29.0	19.7
450 feet (150 yards)	23.1	14.0
900 feet (300 yards)	17.2	8.5
1,980 feet (660 yards)	9.8	3.0
2,640 feet (0.5 mile)	7.1	1.8
4,574 feet (0.87 mile)	3.0	0.5
Source: Reproduced from FEIS (NPS 2019a)		
Notes:		
1. dBA is an abbreviation for A-weighted decibels, which expresses loudness in air as perceived by the human ear.		
2. Grayed cells represent the distance at which the noise level is approximately equal to existing ambient conditions.		

Exhibit 4-3 also provides context on how the noise levels might change under the rule relative to current flat-wake distances. From island shorelines in Mississippi, flat-wake zones will decrease from 0.5 miles to 300 yards. A decrease in the area covered by flat-wake zones may result in the same number of PWCs being distributed over more water

space, with unknown implications for overall noise level at shorelines.⁴² Moreover, a distinguishing feature of noise produced by PWCs is that it is highly variable, responding to changes in speeds as well as jumping in and out of the water (Komanoff and Shaw 2000).

As demonstrated by the analysis in Exhibit 4-3, the noise experienced by non-PWC visitors is in direct relationship with their distance from PWCs. While flat-wake restrictions under the rule would affect all shorelines, the change in noise will only be experienced where non-PWC visitors are in proximity to PWC visitors. The most popular destination for beachgoers at the seashore are on the Gulf-side, while existing data suggest that the most popular destination for PWC visitors is along the bay-side. This lack of overlap implies that the increase in noise may be experienced in areas where there are less beachgoers. In the sub-sections that follow, we discuss the potential for changes in noise levels at shorelines to result in changes in the quantity and quality of recreation trips for non-PWC visitors at the national seashore.

4.2.1.1. Quantity of Non-PWC Trips

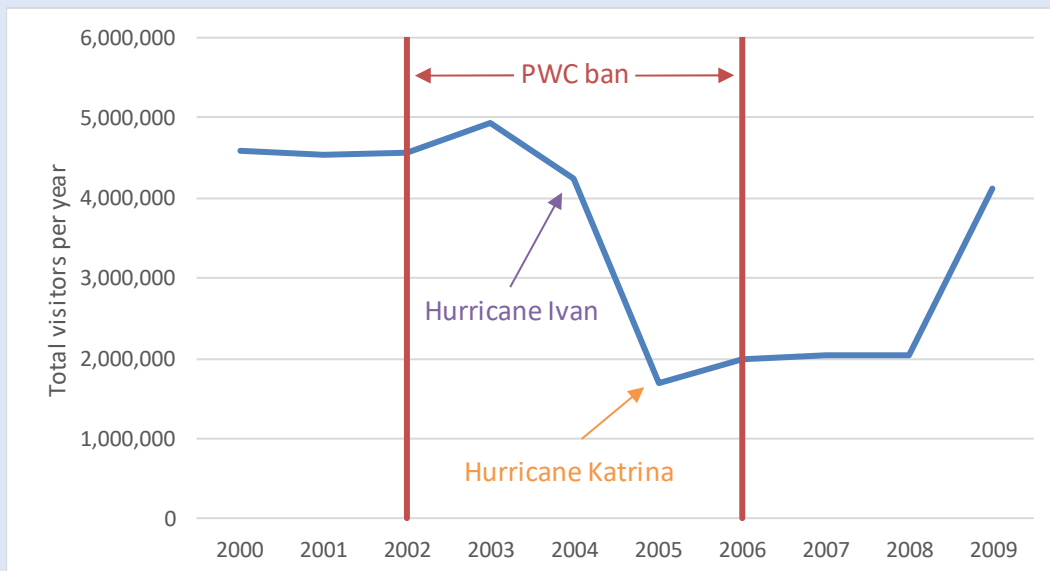
Increased noise and nuisance from PWCs closer to select shorelines could discourage some non-PWC visitors with a preference for quiet from visiting the national seashore. Little data exist to predict how non-PWC visitation levels will change under the new PWC management regime at the national seashore. However, historic trends in overall national seashore visitor levels alongside changes in PWC access suggests that non-PWC visitation levels are unlikely to change as a result of the expected increase in noise around some shorelines. For example, analysis of overall visitor levels during the temporary PWC ban at the national seashore suggest that visitor levels remained unaffected by the PWC ban: total national seashore attendance neither increased nor decreased relative to similar months during which a ban was not in place (as described further in the following text box). We interpret this finding to mean that non-PWC visitors are unlikely to make decisions regarding trips to the national seashore based on the number of PWCs operating above flat-wake speeds close to shorelines.

⁴² See the FEIS (NPS 2019a) for a full discussion on the noise impacts of multiple PWCs.

CHANGES IN TOTAL VISITORS AT THE NATIONAL SEASHORE DURING TEMPORARY PWC BAN (2002 - 2006)

This text box explores how total visitation levels at the national seashore may have been affected by the temporary PWC ban at the national seashore between April 2002 and May 2006. Unfortunately, all changes in visitation levels over this time period cannot be attributed to the PWC ban because of other simultaneous changes in conditions at the national seashore. For instance, the time over which the PWC ban was in place also coincides with closures due to hurricane damage. Hurricane Ivan in September 2004 caused considerable damage at the national seashore and resulted in closures the following year, significantly decreasing the number of visitors the national seashore. The national seashore also experienced continued damage and closures due to Hurricane Katrina starting in August 2005. The area closures associated with these hurricanes resulted in considerably suppressed attendance at the national seashore between 2005 and 2008, irrespective of the PWC rules, making it difficult to isolate any overall visitor effect specific to the temporary PWC ban. The graph below displays total annual visitation levels for the years surrounding the PWC ban and these major hurricanes (2000-2009). This exhibit clearly demonstrates the confluence of the temporary PWC ban with major hurricanes that resulted in damage to the national seashore and area closures.

ANNUAL NATIONAL SEASHORE VISITORS DURING INTERVAL AROUND PWC BAN



Source: IEC calculations using data from NPS IRMA downloaded on April 5, 2019. Data available at: <https://irma.nps.gov/Stats/>

However, we can compare overall visitation levels during the PWC ban from April 2002 through September 2004 (before Hurricane Ivan) to overall visitation levels in the same months in other non-hurricane affected years. While this comparison is still unable to isolate the effect of the PWC ban entirely, it is a better approximation for the true impact. Using monthly NPS IRMA data for the national seashore, we compare total visitation across the same month under a PWC ban (e.g., May 2002) to a non-PWC ban scenario (e.g., May 2001). When performing this analysis for all years between 1979 and 2005, then again for a narrower range of years between 2000 and 2005, we find no significant effect of having a PWC ban in place on total visitors at the national seashore.

There are several ways to interpret this finding. First, because the IRMA methodology for the national seashore does not include counts of PWCs specifically, it is possible that PWC visitors did decrease, but that those counts are not reflected in the IRMA numbers. In other words, the lack of relationship between PWC ban and total visitor level would be a result of measurement error. Second, our findings could also indicate that PWC users do not substitute towards other types of recreation within the national seashore (e.g., motorboats or beachgoers) when they are unable to use PWCs in national seashore waters. Finally, it may also suggest that non-PWC visitor trips are also unaffected by PWC management rules at the national seashore.

4.2.1.2. Quality of Non-PWC Trips

While the number of non-PWC trips to the national seashore is likely to be unaffected by the rule, it is possible that the value of these trips will be reduced on account of increased noise from PWCs, resulting in an incremental cost of the rule. As discussed in Section 4.1.3, limited evidence exists to quantify the loss in value of a beach trip from noise derived from PWCs specifically.⁴³

4.2.1.3. Summary

Existing evidence on how non-PWC visitor levels change when PWCs are banned suggests that total national seashore visitation is insensitive to the rules governing PWCs at the national seashore. This suggests that the quantity of non-PWC trips to the national seashore are likely to be unchanged by the changes in flat-wake zones around Florida and Mississippi island shorelines. However, the available literature on the quality of these trips suggests that beachgoers around shorelines may experience some loss in value of their trips on account of increase noise due to decreases in flat-wake zones. Available data suggest that beachgoers are concentrated in areas less frequented by PWC visitors, and therefore may not experience significant changes in noise levels as a result.

4.2.2 PUBLIC SAFETY DUE TO FLAT-WAKE ZONES

Decreased flat-wake zones around select shorelines not only has the potential to increase noise levels, but also the area where accidents involving PWCs may occur. While other safety rules governing PWCs at the national seashore will remain unchanged, and PWCs will continue to be subject to local state and Federal PWC rules (see Section 3.2 for a discussion), the relaxing of flat-wake zones in some areas of the national seashore may result in changes to the number of public safety incidents. Where the number of accidents resulting in injuries and damages increases, so to does the incremental cost of the rule.

Data are not available to provide context on the current level of public safety infringement resulting from PWC activity at the national seashore specifically. However, we present historic trends in the number of accidents involving PWCs at three Florida counties adjacent to the national seashore in the text box that follows.⁴⁴ This data suggests between 7 and 19 accidents involving PWCs each year. Given the limited changes in the management of PWCs contemplated in the rule, it is unlikely that there would be an effect on public safety.

⁴³ Analysis from Komanoff and Shaw (2000) suggests that the value of a beach trip decreases by 1 percent for each 1dBA increase in noise. This estimate, however, is drawn exclusively from existing studies of the impact of noise from airplanes and highways on residential property values. Therefore, transferring this estimate to the PWC noise levels at the national seashore would not follow best practices in benefit transfer requiring sufficiently similar policy contexts and affected entities as stipulated by *Circular A-4* (OMB 2003).

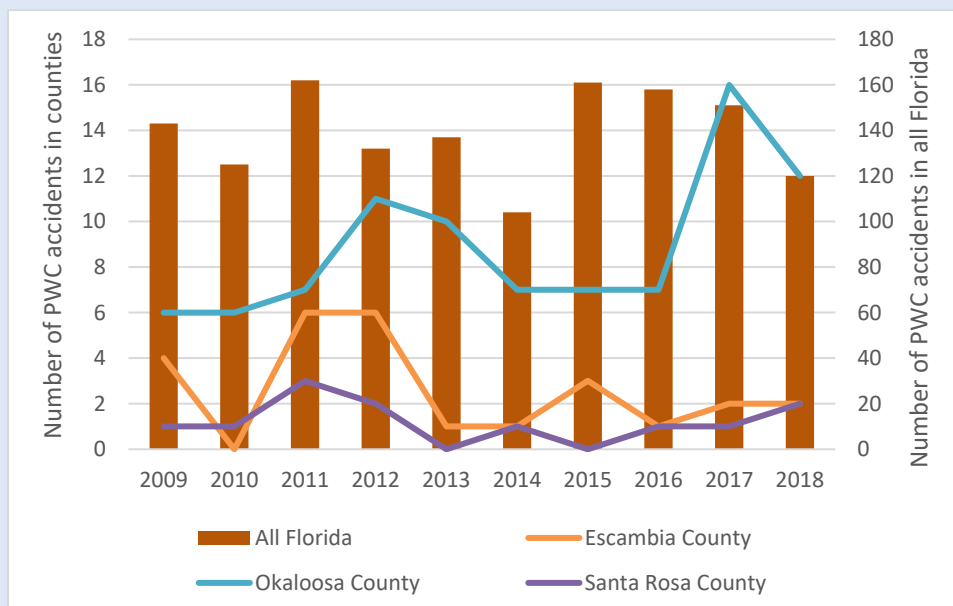
⁴⁴ Equivalent public safety data from Mississippi does not appear to be publicly available.

PWC SAFETY RECORD NEAR THE NATIONAL SEASHORE

This text box describes the recent record on PWC safety near the national seashore. Unfortunately, data specific to the national seashore are not available to provide context on the number of incidents or accidents involving PWCs. Instead, our description relies on data from nearby counties in Florida provided by the Florida Fish and Wildlife Conservation Commission (FFWCC).

We present the number of PWC accidents in counties adjacent to the national seashore relative to the entire state of Florida in the graph below. Across all three counties, between 7 and 19 accidents involve PWCs each year. Florida reports online go back as far as 2007, and therefore do not allow us to look at trends during the temporary PWC ban at the national seashore between 2002 and 2006. However, the 2007 report also shows historic trends between 2002 and 2007 in number of PWC accidents at the state level and shows a decrease between 2002 and 2004 then a leveling off between 2004 and 2007 (FFWCC 2007, p. 54). It is unlikely that this trend is the result of the PWC ban at the national seashore.

PWC ACCIDENTS IN FLORIDA (2009-2018)



Source: Florida Fish and Wildlife Conservation Commission (FFWCC) Boating Accident Statistics reports from various years. Available at: <https://myfwc.com/boating/safety-education/accidents/>

4.2.3 ECOLOGICAL COSTS

The reduction in flat-wake zones may reduce protections for ecological resources, including aquatic and shoreline vegetation, wildlife and wildlife habitat, and threatened and endangered species. The below sections summarize the expected impacts on each of these ecological resources. While the rule may have adverse impacts on these resources, the overall effect is likely to be minor. Additionally, some of the components of the rule are likely to result in ecological benefits, as described in Section 4.3.2.

4.2.3.1. Submerged Aquatic Vegetation (SAV) / Shoreline Vegetation

PWC use can adversely impact aquatic and shoreline vegetation by direct contact, pulling aquatic vegetation into engine intakes, or disturbing sediment and increasing turbidity in the water column. The FEIS (NPS 2019a) notes that PWCs have little negative impact on seagrass beds in water depths of three feet or more. In Florida this corresponds to waters within roughly 150 yards from shorelines. In Mississippi, bathymetry data on a three foot depth contour was not available, but a four foot depth contour corresponds to waters within roughly 300 yards from shoreline. Under the baseline, approximately 84 percent of the total SAV acreage in the Florida district of the national seashore and 98 percent of the SAV acreage in the Mississippi district are protected from full-throttle PWC use by flat-wake zones. Under the rule, the reduced flat-wake zones would provide protections for 74 percent of SAV acreage in Florida and 93 percent of SAV acreage in Mississippi. Overall, the reduced flat-wake zones associated with the rule will open approximately 630 acres of SAV within the national seashore to full-throttle PWC use. Vegetation in these areas may therefore be adversely affected relative to the baseline.

4.2.3.2. Wildlife and Wildlife Habitat

PWCs can directly affect wildlife and wildlife habitat through collisions and landings. PWC use can also indirectly affect wildlife through noise (in-air and in-water), vessel wake, and increased turbidity. These impacts are more likely to occur the closer to shore that PWCs are allowed to operate at full-throttle. Additionally, in-water noise impacts are likely to be greater the larger the area of the national seashore available to full-throttle PWC use. As a result, the reduction in flat-wake zones associated with the rule would likely result in adverse impacts to wildlife and wildlife habitat. However, overall effects are likely to be minor as the FEIS (NPS 2019a) finds that the flat-wake zones under the rule would still provide sufficient protection for all species. The effect of the rule on wildlife and wildlife habitat is also likely to be minor given that PWCs likely make up less than 15 percent of total motorized vessel traffic at the national seashore (see Exhibit 3-9).

4.2.3.3. Threatened and Endangered Species and Species of Special Management Concern

Among the wildlife species along the national seashore are 25 species listed as threatened or endangered under the Endangered Species Act (ESA) or listed as special management concerns at the Federal or state level. The FEIS (NPS 2019a) provides initial impact determinations for the relevant ESA-listed species under each FEIS alternative. Under Alternative D in the FEIS, which includes most of the elements of the rule, the FEIS provides initial impact determinations of “No effect” or “May affect, not likely to adversely affect” for all ESA-listed species. Additionally, for ESA-listed species with designated critical habitat, the FEIS provides an initial determination of “No Destruction

or Adverse Modification of Critical Habitat.”⁴⁵ Overall, the FEIS finds that the rule would not result in significant impacts to special status species because the reduced flat-wake zones would still provide sufficient protection from PWC use.

4.2.3.4. Estimating Economic Value of Changes to Ecological Resources

Quantification and monetization of ecological effects requires two primary pieces of information: (1) data on the incremental changes to ecological resources; and (2) data on the public’s WTP for these incremental changes. Given that the FEIS did not quantify changes to ecological resources, we were unable to quantify or monetize these changes. However, the anticipated impacts of the rule are expected to be minor for all resources. The types of values associated with ecological resources are described below for context.

From an economic perspective, the “value” of an animal or species reflects the full range of contributions the species makes to people’s well-being. Value is frequently measured in terms of the public’s WTP for the species, inclusive of all use and non-use services, such as the following:

- a) **Market value:** This is relevant to species that are bought and sold in commercial markets. This type of value is generally quantifiable based on market data.
- b) **Non-market value:** Non-market values are associated with uses of a given resource outside of markets, including for recreational purposes such as hunting, fishing, or wildlife viewing. The value people hold for this activity is measured by the utility they derive from the activity above and beyond what they pay for it.
- c) **Ecological value:** Perhaps more indirectly, ecological value may contribute to people’s WTP for the species, for example as a predator or prey species, or in supporting a healthy, stable, resilient ecosystem. The ecological function of a species may be contribute to the total economic value of other resources (e.g., species interconnected by the food chain) or to the broader ecosystem.

An ideal study for use in quantifying the social welfare values of the rule would be specific both to the wildlife at the national seashore and to the policy question at hand (restrictions on PWC use).

4.2.3.5. Summary

The changes to flat-wake zones under the rule are likely to result in minor adverse impacts to aquatic and shoreline vegetation, wildlife and wildlife habitat, and threatened and endangered species. We are not able to value these impacts because data do not exist to quantify the expected ecological changes. However, the impacts are likely to be minor overall due to the substantial protections provided by the reduced flat-wake zones included under the rule and the fact that the regulatory changes are only relevant to a

⁴⁵ These initial impact determinations will be reviewed by US Fish and Wildlife Service and National Marine Fisheries Service when the rule is published.

small percentage of total recreationists (including motorized vessel recreationists) at the national seashore.

4.3 INCREMENTAL BENEFITS OF THE RULE

In this section, we describe the anticipated incremental benefits of the rule. This includes a discussion of anticipated changes in PWC trips and experience around shorelines as well as the potential benefits to ecological resources.

4.3.1 PWC VISITOR TRIPS AND EXPERIENCE DUE TO FLAT-WAKE ZONES

A reduction in flat-wake zones around Florida shorelines and the islands in Mississippi may represent an incremental benefit for PWC users with a preference for speed in areas closer to the shoreline. These reductions have the potential to increase both the quantity and quality of PWC trips at the national seashore. We discuss the evidence around the potential for each in the subsections that follow.

4.3.1.1. Quantity of PWC Trips

Reductions in flat-wake zones at several areas of the national seashore may theoretically make PWC activity at the national seashore more attractive relative to baseline flat-wake restrictions, potentially resulting in an increase in individuals traversing the national seashore waters by PWCs. Moreover, if the flat-wake conditions at the national seashore are less restrictive than the flat-wake restrictions at other nearby areas that allow PWCs, this may make a trip to the national seashore more desirable than other substitute destinations. However, data do not exist to predict how PWC visitation levels at the national seashore might change with the relaxation of flat-wake restrictions. Similarly, data do not exist to characterize the flat-wake zones at the national seashore relative to other areas that might currently represent substitute locations for PWCs to travel. Without evidence to guide a more robust analysis, and given evidence that a PWC ban does not affect overall visitation levels (see text box), we suggest that it is unlikely that PWC visitation levels will be affected by the change in flat-wake restrictions around a fraction of the shoreline at the national seashore.

4.3.1.2. Quality of PWC Trips

While it is unlikely that reduced flat-wake zone restrictions in the rule will encourage more PWC trips to the national seashore, existing PWC trips may result in greater value to PWC visitors with a preference for speed closer to the shoreline, resulting in an incremental benefit of the rule. However, the rule does not allow PWCs to travel faster than current limitations; the rule merely increases the surface area over which PWCs can travel at existing speeds. Therefore, any increase in the value of the trip is expected to be minor. Quantifying these benefits is constrained by limited data and evidence to support precise values attached to these improved trips.

As described in Section 4.1.2, no studies exist to demonstrate how speed restrictions result in lost value to PWC users or how reduced speed restrictions result in more value to

PWC users. The one relevant study examines the impact of speed limits on recreational boaters in southwest Florida (Thomas and Stratis 2002). They estimate that recreational boaters lose between \$9.90 and \$11.88 of the value per trip in the presence of restrictive speed limits. While this range of values provides useful context for how trip values may increase with a reduction in flat-wake restrictions, applying the results of a study about recreational boaters to PWC visitors does not follow best practice for benefit transfer from OMB *Circular A-4* (2003).

4.3.1.3. Summary

Data do not exist to support claims that the number of PWCs would increase alongside the reduction in flat-wake zones. However, suggestive evidence from the recreational boating literature offers a potential increase in value per trip when flat-wake zones are reduced.

4.3.2 ECOLOGICAL BENEFITS

This analysis anticipates that the reduction in flat-wake zones associated with the rule is likely to have a negligible impact on water quality within the national seashore. PWC use can adversely impact water quality through the discharge of unburned gasoline, combustion byproducts, and the spilling of gasoline during refueling. Water pollution is a much larger threat from older two-stroke engines as compared to newer and cleaner four-stroke engines. This analysis anticipates that the reduction in flat-wake zones will create a larger area of water open to full-throttle PWC use, resulting in more water available for mixing and dilution of pollutants. However, the FEIS (NPS 2019a) estimates that this change in water available for mixing would not have a significant impact to overall water quality because the concentration of pollutants in the baseline does not exceed ecotoxicological or human health toxicity benchmarks. Overall, the effects of the rule on water quality are most likely negligible.

4.4 REGIONAL ECONOMIC IMPACTS

As presented in Section 3.1.2, visitors at the national seashore provide considerable contributions to the regional economy through their expenditures on accommodations, transportation, fuel, rentals, tours, passes, food, souvenirs, etc. For example, the 4.2 million visitors at the national seashore in 2018 contributed \$234 million in economic output (Cullinane Thomas et al. 2019). Any action that might contribute to changes in total visitor or expenditure level has the potential to impact the regional economy.

However, it is most likely that the rule will have negligible effects on the regional economy. Total visitors are unlikely to change on account of the relatively insubstantial changes in PWC management rules.⁴⁶ Moreover, in the event that the PWC management changes are enough to curtail some very small fraction of total visitors, the per visitor

⁴⁶ As evidence, total the national seashore visitor levels did not appear to change as a result of the temporary PWC ban in 2002-2006 (see text box). The ban represented far more substantial changes to PWC activity relative to current conditions than the changes given in the rule.

contributions to regional economic output of \$56 (estimated from Cullinane Thomas et al. 2019) is far more modest, and this small segment of the population is unlikely to affect regional output in a noticeable way (i.e., outside the normal range of annual variation).

Local businesses that support PWC activities more specifically (including PWC rental companies and PWC tour operators) are also unlikely to be affected. PWC rental companies that service the national seashore area are concentrated in Florida (see Section 3.4.1.3) where PWC visitors experience a net gain in ability to traverse the national seashore with less restrictions. It is possible that this makes PWC rentals in the Florida district of the national seashore more attractive, however available data is insufficient to suggest the allure of decreased flat-wake zone will result in more PWC visitors or more spending among PWC visitors, therefore the link with regional economic impacts cannot be established. Data identifying other businesses that depend on PWC tourism at the national seashore for revenue are unavailable.

4.5 SUMMARY OF COSTS AND BENEFITS OF THE RULE

In this section, we summarize the incremental costs and benefits of the rule on the affected population estimated in Chapter 3. As described in previous sections, all effects are likely to be minor if not negligible. Exhibit 4-4 provides the direction and potential magnitude of incremental costs of the rule relative to the baseline (current PWC management at the national seashore). Only the decrease in flat zone restrictions represent changes in PWC management conditions over baseline conditions.

As described in Exhibit 4-4, incremental costs arise from the lost value of non-PWC trips to select shorelines where flat-wake zones decrease and noise levels increase as well as ecological effects around shorelines where PWCs will no longer be required to travel at flat-wake speeds. Likewise, incremental benefits arise from the increased value of PWC trips around shorelines where flat-wake restrictions diminish. We have little reason to believe that public safety across the national seashore will be altered by changes in PWC management offered by the rule. Moreover, any changes to water quality are expected to be negligible.

EXHIBIT 4-4. INCREMENTAL COSTS AND BENEFITS OF THE RULE

CATEGORY OF POTENTIAL CHANGES IN RULE	NUMBER OF POTENTIALLY AFFECTED VISITORS	DIRECTION OF POTENTIAL EFFECT
PWC visitor trips and experience around shorelines where flat-wake zones decrease	13,724 visitors/year in FL; <311-481 visitors/year in MS	Minor Benefit
Non-PWC visitor numbers and experience around shorelines where flat-wake zones decrease	3.5-3.8 million visitors/year in FL; <1 million visitors/year in MS	Minor Cost
Ecological effects: SAV, wildlife and habitat, threatened and endangered species	N/A	Minor Cost
Ecological effects: water quality	N/A	Negligible Effects
Public safety	3.5-3.8 million visitors/year in FL; <1 million visitors/year in MS	Negligible Effects
Regional economic impacts	N/A	Negligible Effects
Notes: This analysis characterizes effects as "minor" if the number of affected entities is very limited, the magnitude of the effect per affected entity is small, or both. Negligible effects denote categories where the analysis indicates that changes attributable to the rule are unlikely.		

Evidence suggests that the costs and benefits resulting from the flat-wake zones reduction are likely to be experienced by both PWC and non-PWC visitors at the national seashore, but the magnitude of the effects is most likely very limited. The increase in value per trip to PWC users is not substantiated in the economics literature, but less than 0.3 percent of visitors at the national seashore would experience this gain. On the other hand, evidence does exist to suggest that beachgoers along shorelines experience a net cost on account of increased noise from PWCs traveling at higher speed closer to shorelines. While far more visitors at the national seashore are non-PWC users who may experience this cost, the level of this effect is significantly uncertain. In order for the total benefit to PWC visitors to equal the total cost to non-PWC visitors, the per trip increase in value for PWC visitors would need to be about 315 times larger than the per trip decrease in value for non-PWC visitors, if all visitors at that national seashore were affected.

In conclusion, very limited changes in the management of a very small fraction of national seashore visitors is unlikely to result in appreciable social welfare gains or losses. Moreover, the regional economy is unlikely to experience impacts given the low probability that the number of trips to the national seashore will change. We also have little reason to believe that public safety and water quality will be altered across the national seashore by changes in PWC management offered by the rule. Furthermore, data limitations, including limited existing economics literature related to the recreation values associated with PWC use, preclude our ability to monetize the costs and benefits of the rule.

4.6 INFORMATION LIMITATIONS AND KEY UNCERTAINTIES

Our analysis relies on limited data to predict the number of affected visitors, behavior changes among PWC and non-PWC visitors, and the change in value of trips associated with altered recreation conditions at the national seashore. We, therefore, provide a qualitative description of the anticipated costs and benefits of the rule. In this section, we describe how our analysis would be improved with more and better information, and how the conclusions described in Section 4.5 might change with additional data.

Our ability to quantify the costs and benefits is largely limited by a sparse economics literature around the values associated with PWC recreation, including the consumer surplus to PWC riders from trips and the disutility to nearby non-PWC riders from PWC noise. The availability of studies that demonstrate the economic values of recreation trips associated with PWC users potentially would enable us to transfer those values to this context in order to quantify costs and benefits more thoroughly. However, it is unlikely that access to more appropriate studies would significantly alter the results of our analysis.

We are also constrained by visitor count data that does not provide a definitive count on the number of PWC visitors per year at the national seashore. The available information, including information borrowed from a study of recreation costs of the DWH spill, suggests that the number of PWC visitors at the national seashore is a small fraction of the overall total visitor population, on the order of 0.3 percent of all visitors. Therefore, even more accurate data would likely lead us to similar conclusions: that the effects of the rule are expected to be minimal relative to current conditions at the national seashore, in part due to the very limited number of PWC visitors to which the rule would apply.

In summary, while our analysis is limited by incomplete data, it is unlikely that our main findings would change even with the data sources named above.

CHAPTER 5 | ANALYSIS OF REGULATORY ALTERNATIVES

The NPS additionally considered two regulatory alternatives to the rule.⁴⁷ As described in Exhibit 1-1, Alternative 1 decreases flat-wake zones relative to current management rules to 500 feet from select piers and launch ramps and 100 feet from all other shorelines; otherwise, all features are identical to the current baseline conditions. Alternative 2 includes a flat-wake zone of 300 yards from all shorelines in the national seashore; establishes additional closures around areas where SAV habitat and cultural resources are at risk; bans landing anywhere apart from select shorelines; and requires that PWCs meet 2010 EPA emissions standards within two years of publication of the final rule.

In this chapter, we analyze the incremental costs and benefits of Alternatives 1 and 2. The analysis also provides a comparison of the costs and benefits under these alternatives with the anticipated costs and benefits of the rule as described in Chapter 4. Overall, our analysis suggests that the incremental costs and benefits under Alternatives 1 and 2 are likely to differ in magnitude from the costs and benefits of the rule described in Chapter 4. Under Alternative 1, PWC visitors generally benefit more while non-PWC visitors may experience higher costs. Under Alternative 2, the opposite is true: PWC visitors benefit less while non-PWC visitors and ecological elements experience fewer costs. The same data limitations that constrain our ability to monetize these costs and benefits in Chapter 4 also preclude our ability to offer monetized impacts here as well.

5.1 COSTS AND BENEFITS OF REGULATORY ALTERNATIVES

This section describes how the incremental costs and benefits of the rule are expected to differ under Alternatives 1 and 2. Exhibit 5-1 describes the stringency of Alternatives 1 and 2 relative to the rule. In general, Alternative 1 represents a less restrictive rule for PWCs than the rule. Alternative 2 represents a more stringent rule for PWCs than the rule, including the addition of air pollutant emissions standards not present in the rule or Alternative 1.

⁴⁷ Alternative 1 is equivalent to Alternative B in the FEIS, whereas Alternative 2 is equivalent to Alternative E in the FEIS (NPS 2019a).

EXHIBIT 5-1. STRINGENCY OF ALTERNATIVES 1 AND 2 RELATIVE TO THE RULE

RULE ELEMENTS	ALTERNATIVE 1	ALTERNATIVE 2
Flat-wake zones	Less restrictive	More restrictive
Area closures	Same	More restrictive
Landing restrictions	Same	More restrictive
Emissions standards	Same	More restrictive

The relative stringency of the rules does not necessarily translate into the direction of changes in the total cost of the rule. This is because PWC visitors – the ones required to comply with the rule – are not the only entities that accrue costs and benefits. As described in Chapter 4, reducing restrictions on PWCs may benefit PWC users but also adversely affect non-PWC beach visitors. Additionally, there are far more non-PWC visitors than PWC visitors at the national seashore. Below, Section 5.1.1 (Alternative 1) and Section 5.1.2 (Alternative 2) describe how these differences in regulatory requirements across the alternatives result in effects, as well as how these effects compare to the analysis of the rule in Chapter 4.

5.1.1 ALTERNATIVE 1

Exhibit 5-2 below summarizes the incremental costs and benefits of Alternative 1 under the same categories of potential effects described in Chapter 4. In summary, PWC visitors may experience further increases in the value of their trip relative to the rule due to less restricted flat-wake zones. This also means that non-PWC visitors recreating in the same areas may experience further reduced values of trips due to the potential for increase in PWC noise near shorelines related to the rule.

EXHIBIT 5-2. INCREMENTAL COSTS AND BENEFITS OF ALTERNATIVE 1

CATEGORY OF POTENTIAL CHANGES	RULE ELEMENTS THAT DRIVE POTENTIAL CHANGES	RELATIVE TO BASELINE: CURRENT CONDITIONS	RELATIVE TO RULE
PWC visitor trips and experience around select shorelines	Flat-wake zones	Minor benefit	Incremental benefits greater than rule. Potentially more PWCs will experience less restrictive flat-wake areas given increase in area that experiences less flat-wake. Unlikely to result in increase in PWC trip quantity but may provide further increases to the value of individual PWC trips.
Non-PWC visitor numbers and experience around select shorelines	Flat-wake zones	Minor cost	Incremental costs greater than rule. Some non-PWC visitors will likely experience more noise from PWC operating at non-flat-wake speeds closer to the shoreline. However, because noise levels might increase even further relative to the rule, the lost value of non-PWC trips might be more substantial.

CATEGORY OF POTENTIAL CHANGES	RULE ELEMENTS THAT DRIVE POTENTIAL CHANGES	RELATIVE TO BASELINE: CURRENT CONDITIONS	RELATIVE TO RULE
Ecological effects: SAV, wildlife and habitat, threatened and endangered species	Flat-wake zones	Minor cost	Incremental costs greater than the rule. The reduced flat-wake zones will adversely impact ecological resources by allowing full-throttle PWC use in the shallow water areas with greater likelihood of collisions with wildlife, damage to aquatic vegetation, and disturbance of sediment and wildlife habitat.
Ecological effects: water quality	Flat-wake zones	Negligible effects	Same as rule.
Public safety	Flat-wake zones	Negligible effects	Same as rule.
Regional economic impacts	N/A	Negligible effects	Same as rule.

5.1.2 ALTERNATIVE 2

Exhibit 5-3 below summarizes the incremental costs and benefits of Alternative 2 under the same categories of potential effects described in Chapter 4. In summary, PWC visitors experience less benefits due to changes in the quality of trips relative to the rule, whereas non-PWC visitors experience less costs due to the noise associated with PWCs near shorelines. These effects would be driven largely by more substantial area closures and, to a lesser extent, by some increases in flat-wake zone coverage in Florida. The addition of EPA emissions standards for PWCs at the national seashore also has additional implications. The sub-sections that follow provide more details on those additional elements of Alternative 2.

EXHIBIT 5-3. INCREMENTAL COSTS AND BENEFITS OF ALTERNATIVE 2

CATEGORY OF POTENTIAL CHANGES	RULE ELEMENTS THAT DRIVE POTENTIAL CHANGES	RELATIVE TO BASELINE: CURRENT CONDITIONS	RELATIVE TO RULE
PWC visitor trips and experience around select shorelines	Flat-wake zones, landing restrictions, areas closures	Minor cost	Incremental costs greater than rule. The flat-wake zones around Florida shorelines are greater than under the rule. The area closures are more substantial than under baseline and rule conditions. As demonstrated in Exhibit 5-4, this area includes the bay-side of the barrier islands in Florida where PWCs are generally concentrated based on past counting efforts. Moreover, the landing restrictions at select shorelines

CATEGORY OF POTENTIAL CHANGES	RULE ELEMENTS THAT DRIVE POTENTIAL CHANGES	RELATIVE TO BASELINE: CURRENT CONDITIONS	RELATIVE TO RULE
			are more stringent for PWCs relative to the rule and baseline conditions.
Non-PWC visitor numbers and experience around select shorelines	Flat-wake zones, landing restrictions, areas closures	Minor benefit	Incremental benefits greater than rule. Non-PWC visitors are less likely to hear noise from PWCs given more substantial flat-wake zones in Florida, extensive area closures throughout the national seashore, and widespread landing restrictions. Relative to the rule, this may result in trips with more value for non-PWC visitors relative to the rule.
Ecological effects: SAV, wildlife and habitat, threatened and endangered species	Area closures, flat-wake zones	Minor benefit	Incremental benefits greater than the rule. The area closures were identified in part to protect SAV habitat. Relative to the rule, the area closures as well as expanded flat-wake zones in Florida may reduce the likelihood of collisions with wildlife, damage to SAV, and the disturbance of sediment and wildlife habitat.
Ecological effects: water quality	Area closures, flat-wake zones	Negligible effects	Similar to the rule.
Ecological effects: air quality	Emissions requirements	Minor benefit	Incremental benefits greater than the rule. The requirement that PWCs meet the 2010 EPA emission standards would likely improve air quality on the national seashore relative to the rule.
Public safety	Flat-wake zones, landing restrictions, areas closures	Negligible effects	Similar to the rule.
PWC upgrades (direct compliance costs)	Emissions requirements	Minor cost	Incremental costs greater than rule. The emissions requirements within two years of the final rule result in direct compliance costs for PWC owners. While the general public with PWCs unable to meet the emissions standards are unlikely to upgrade their model solely on account of the rule, it may change their trip destination to less desirable non-national seashore locations, resulting in a net cost of the rule. For those frequent national seashore visitors that own outdated PWCs, it is possible that they will upgrade their PWCs earlier than they would in the absence of the rule, resulting in an incremental cost. PWC rental companies adjacent to the national seashore may need to update a portion of their fleet to meet 2010 EPA emissions standards. While private PWC owners may substitute to other waters

CATEGORY OF POTENTIAL CHANGES	RULE ELEMENTS THAT DRIVE POTENTIAL CHANGES	RELATIVE TO BASELINE: CURRENT CONDITIONS	RELATIVE TO RULE
			to avoid upgrading their PWCs, private rental companies very near the national seashore boundaries may have no choice.

5.1.2.1. EPA Emissions Standards

Alternative 2 is the only alternative to require that all PWCs entering the national seashore meet the emissions standards mandated by the EPA. In 2008, the EPA tightened emissions standards for recreational marine engines beginning with the year 2010 model. These standards continued the previous restrictions around hydrocarbons and nitrogen oxides and added new restrictions around carbon monoxide emissions.⁴⁸ In practice, this means that all PWC models produced before 2003 will no longer be allowed in the national seashore two years after the final rule goes into effect. Most models produced after 2003 are built to comply with the emissions standards.

As described in the FEIS (NPS 2019a), the percent of registered PWCs in select counties adjacent to the national seashore with models built after 2003 increased from 64 percent to 76 percent between 2014 and 2018, suggesting that PWC owners are replacing their outdated PWCs irrespective of the rule. It is possible that Alternative 2 would accelerate the replacement of PWCs to meet the required standards. It is also possible that PWC owners with outdated models would choose recreation destinations in waters outside of the national seashore, substituting to “second best” locations. Additionally, PWC rental companies with launch locations into or very near the national seashore waters may expedite their upgrades in order to maintain the same level of business.

While data are limited regarding the age of PWC rental fleets (and therefore the cost of replacing older PWCs), this effect would be relatively short-term. Generally, individuals and rental companies with PWCs that are about two decades old would need to replace these vessels; however, vessels of that vintage would likely need replacing regardless. Thus, the costs of this requirement would not be the full costs of purchasing replacement vessels but rather the difference in purchasing them in two years as opposed to some years further into the future.⁴⁹ Over time as PWCs are replaced, all PWCs used in the park will be produced after 2003 and will meet standards regardless of the NPS rule.

5.1.2.2. Area Closures Near SAV Habitat and Cultural Resources

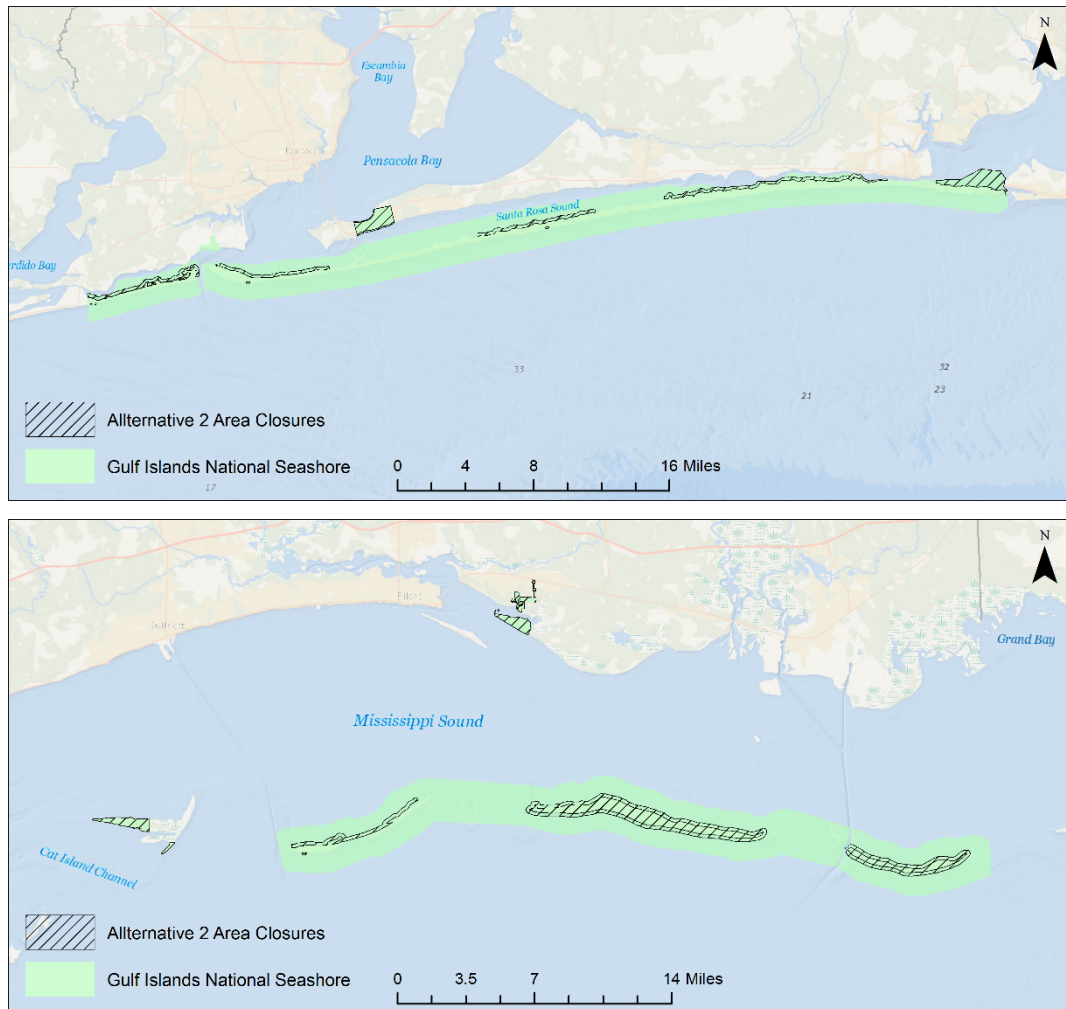
Alternative 2 includes additional PWC closures in areas with SAV habitat at risk and sensitive cultural resources. Exhibit 5-4 presents the locations of these area closures,

⁴⁸ More information about these EPA emissions standards are available in the Federal Register (2008).

⁴⁹ For reference, the average cost in 2011 of a new PWC was \$13,244 and a pre-owned PWC was \$2,728 (NMMA 2011, Part 2).

which include more significant portions of the national seashore than under the baseline, rule, or Alternative 1. Existing counts of PWCs at the national seashore demonstrate that PWCs do travel with high frequency to some of the areas included in these closures, including the bay-side of the Florida barrier islands. However, data are not available to quantify the effect of these area closures on the quality and quantity of PWC and non-PWC trips. Relative to the rule and Alternative 1, it is more likely that these restrictions would reduce the number of PWC trips or diminish the quality of experience for PWC visitors while potentially increasing the quality of trips for non-PWC visitors. SAV habitat may experience benefits, while the cultural values associated with protected cultural resources may also benefit.

EXHIBIT 5-4. MAP OF AREA CLOSURES UNDER ALTERNATIVE 2



Source: IEC map using data provided by the NPS.

Notes: These area closures include: the Davis Bayou area, the northern shores of Ship Island (except for 350 yards east from the western tip and 350 yards west from the eastern tip), 300 yards around Horn Island, 300 yards around Petit Bois Island, the northern shores of Perdido Key as well as the eastern edge of Perdido Key, the northern shores of Santa Rosa Island, the northern and southern shores of Naval Live Oaks, the northern shores of Santa Rosa Area, and Crab Island (NPS 2019a).

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APPENDIX A | REGULATORY FLEXIBILITY ACT THRESHOLD ANALYSIS

First enacted in 1980, the Regulatory Flexibility Act (RFA) was designed to ensure that Federal agencies consider the potential for regulations to unduly inhibit the ability of small entities to compete. The goals of the RFA include increasing the government's awareness of the impact of regulations on small entities and to encourage agencies to exercise flexibility to provide regulatory relief to small entities. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).⁵⁰

This threshold analysis considers the extent to which potential economic impacts associated with the rule may be borne by small entities. The purpose is to determine whether a full regulatory flexibility analysis is needed or whether the NPS can certify that the rule will not have a significant impact on a substantial number of small businesses. This analysis is conducted pursuant to the RFA, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) in 1996, and consistent with guidance from the Small Business Administration on conducting a RFA threshold analysis (SBA 2017).

A.1 INTRODUCTION AND SUMMARY FINDINGS OF THE RFA THRESHOLD ANALYSIS

This threshold analysis finds that the rule will not have a significant impact on a substantial number of small businesses and that a full regulatory flexibility analysis is not warranted. The rule largely maintains the existing management of PWCs at the national seashore with limited changes, specifically reducing the extent of flat-wake zones.

The rule does not directly regulate any businesses but rather the management of PWC users within the national seashore. The economic analysis finds these changes in PWC management are unlikely to affect visitation levels at the national seashore. Therefore, we do not expect that regional businesses that provide services to PWC users (e.g., PWC rental companies) or to other beach recreationists will be affected by the rule. The costs and benefits described in the economic analysis reflect marginal changes in the utility that PWC users and other beach visitors gain from their experiences at the national seashore. The analysis did not identify that the rule would generate any direct compliance costs to small entities or changes in recreational activity levels that would affect spending patterns in the regional economy.

⁵⁰ 5 U.S.C. 601 et seq.

This threshold analysis is organized, as follows:

1. Description of small entities affected by the rule
2. Economic impacts on small entities
3. Significant economic impact criteria and substantial number criteria
4. Description of assumptions and uncertainties
5. Certification statement

A.2 DESCRIPTION OF SMALL ENTITIES AFFECTED BY THE RULE

Three types of small entities are defined in the RFA, as follows. This analysis considers the potential effects of the rule on these types of small entities.

- **Small Business** - Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The U.S. Small Business Administration (SBA) has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to North American Industry Classification System (NAICS) industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.
- **Small Governmental Jurisdiction** - Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small government entities are not as easily identified under this standard, as they are not typically classified by population.
- **Small Organization** - Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.

The courts have held that the RFA/SBREFEA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC)*, FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers -- transmitting utilities such as electric cooperatives -- included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers,

and FERC could therefore certify that small entities were not directly impacted within the definition of the RFA.⁵¹

Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency* (EPA) addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.⁵² The basis of EPA's RFA/SBREFA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of state plans that incorporated the standards. The court found that, while EPA imposed regulation on states, it did not have authority under this rule to impose regulations directly on small entities and therefore small entities were not directly impacted within the definition of the RFA.

The SBA in its guidance on how to comply with the RFA recognizes that consideration of indirectly affected small entities is not required by the RFA, but encourages agencies to perform a regulatory flexibility analysis even when the impacts of its regulation are indirect:

“If an agency can accomplish its statutory mission in a more cost-effective manner, the Office of Advocacy [of the SBA] believes that it is good public policy to do so. The only way an agency can determine this is if it does not certify regulations that it knows will have a significant impact on small entities even if the small entities are regulated by a delegation of authority from the federal agency to some other governing body.” (SBA 2017)

The rule would maintain the existing regulation of PWCs at the national seashore with relatively minor changes, specifically the reduction in flat-wake zone. Based on these requirements, the rule directly regulates only PWC users in the national seashore, who are individuals and not small entities.

Consistent with OMB recommendations, however, this threshold analysis additionally considers the potential for the rule to indirectly affect small entities to the extent that restrictions on PWC use affect consumer demand for PWC rentals or other services (e.g., food, fuel) from small businesses near the national seashore. As discussed in Chapter 4 of the economic analysis, the rule is unlikely to affect the level of visitation to the national seashore and therefore changes in regional spending patterns of visitors are not anticipated. Additionally, most PWC rental companies are concentrated around the Florida district, where the rule in fact relaxes regulation of PWCs by reducing flat-wake zones.

A.3 ECONOMIC IMPACTS ON SMALL ENTITIES

As described above, this analysis finds that the economic impacts of the rule will not be borne by small entities. The costs and benefits described in the economic analysis reflect the potential for the rule to affect the level of utility that PWC users and other beach

⁵¹ 773 F. 2d 327 (D.C. Cir. 1985).

⁵² 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

visitors gain from their experiences at the national seashore. For example, PWC users may experience increased enjoyment from a visit to the national seashore due to the reduction in the flat-wake zone distance. The rule may also affect beach trip quality for other types of beach visitors, for example due to increased noise from PWCs from the reduced flat-wake zone distance. The parties most likely to be affected by the rule are therefore individual beach visitors and not small entities.

As discussed in Chapter 5, the NPS considered a regulatory alternative (Alternative 2) that would have required PWCs to meet EPA's 2010 emission standards. This alternative may have resulted in costs to small businesses to the extent that PWC rental companies would have needed to update their fleets to meet the emission standards so that renters could use the PWCs at the national seashore. However, this alternative was rejected by the NPS.⁵³

A.4 SIGNIFICANT ECONOMIC IMPACT CRITERIA AND SUBSTANTIAL NUMBER CRITERIA

Given this analysis does not identify any impacts to small entities, the criteria for significant economic impacts and substantial number of small entities is not relevant.

A.5 DESCRIPTION OF ASSUMPTIONS AND UNCERTAINTIES

Key information limitations for the economic analysis include specific numbers of PWC users and the distribution of these users across the sites at the national seashore, and a lack of existing research quantifying or characterizing economic values of PWC trips, and the trip-specific attributes (e.g., vessel speed) that affect these values. Thus, the analysis is not able to quantify the costs and benefits of the rule.

Despite these uncertainties, it is unlikely that improved information would affect the findings regarding potential impacts on small entities. Overall, the effects of the rule are expected to be minimal relative to current conditions at the national seashore as it contemplates relatively minor changes in management for a small fraction of total beach visitors.

A.6 CERTIFICATION STATEMENT

This threshold analysis finds that the rule will not have a significant economic impact on a substantial number of small entities. Thus, a full regulatory flexibility analysis is not warranted.

⁵³ Given that small entities are not anticipated to incur direct or indirect costs as a result of the rule, this threshold analysis does not attempt to identify the number of PWC rental companies that may be small entities. Based on the Small Business Administration size standards, any PWC rental company with annual revenues less than \$7.5 million would be considered a small business (NAICS Code 532284, Recreational Goods Rental, comprises establishments primarily engaged in renting recreational goods, including personal watercraft).

APPENDIX B | ANALYSIS UNDER ALTERNATE PWC BAN BASELINE

This appendix evaluates the costs and benefits of the rule relative to an alternative baseline. The alternative baseline reflects PWC ban conditions as described by 36 CFR 3.9. As discussed in Chapter 2, a ban on PWCs at the national seashore is the legal outcome absent a special regulation. Section B.1 describes how the categories of benefits and costs of the rule differ under the “PWC Ban” baseline as compared to the Current Conditions Baseline described in Chapters 1 through 5 of this report. Sections B.2 and B.3 evaluate the incremental costs and benefits relative to the PWC Ban baseline, respectively. Section B.4 describes potential regional economic impacts and Section B.5 summarizes the results.

B.1 CATEGORIES OF COSTS AND BENEFITS RELATIVE TO A PWC BAN

The PWC Ban baseline included in this analysis represents a full PWC ban at the national seashore. Therefore, the rule increases PWC access to the national seashore relative to these baseline conditions. PWC visitors benefit from increased access to all areas of the national seashore while non-PWC visitors may experience costs from the increased noise contributions of PWCs. Costs may accrue on account of incremental environmental degradation associated with PWC activity; however, as described in Chapter 4, the FEIS finds that PWCs have a minor effect on ambient water noise, habitat, and wildlife species relative to other baseline disturbances. Increased PWC access may also result in increased public safety risks relative to a PWC ban as well as minor benefits to the regional economy on account of increased visitation. Exhibit B-1 compares the categories of costs and benefits under the PWC Ban Baseline to the Current Conditions Baseline.

EXHIBIT B-1. CATEGORIES OF COSTS AND BENEFITS UNDER CURRENT CONDITIONS AND PWC BAN BASELINES

CATEGORY OF POTENTIAL CHANGES IN RULE	CURRENT CONDITIONS	PWC BAN
PWC visitor trips and experience around shorelines	Minor Benefit	Benefit
Non-PWC visitor numbers and experience around shorelines	Minor Cost	Cost
Ecological effects: SAV, wildlife and habitat, threatened and endangered species	Minor Cost	Minor Cost
Ecological effects: water quality	Negligible Effects	Negligible Effects
Ecological effects: air quality	No Effect	Minor Cost
Public safety around shorelines	Negligible Effects	Minor Cost
Regional economic impacts	Negligible Effects	Minor Benefit

B.2 INCREMENTAL COSTS OF THE RULE RELATIVE TO A PWC BAN

B.2.1 NON-PWC VISITOR TRIPS AND EXPERIENCE AROUND SHORELINES

Non-PWC visitors across most of the national seashore may experience new noise conditions on account of PWCs traversing seashore waters under the rule. As described in Section 4.2.1, other (non-PWC) visitors enjoying the national seashore in or near areas where PWCs are traveling above flat-wake conditions are expected to experience an increase in noise levels. PWC noise may result in some incremental reduction in quality of beach trips for non-PWC visitors.

B.2.1.1. Quantity of Non-PWC Trips

Data are not available to quantify whether and how the number of non-PWC trips may change on account of the rule. However, analysis of number of visitors at the national seashore before, during, and after the temporary PWC ban period at the national seashore between 2002 and 2006 suggests that total visitation is not sensitive to management of PWCs (see text box in Chapter 4). This may indicate that non-PWC trips are unlikely to change on account of the rule.

B.2.1.2. Quality of Non-PWC Trips

Research suggests that beachgoers prefer less noise. However, the source and level of noise is meaningful in determining whether or how the value of a beach trip is affected. Data are not available on how much noise the PWCs will contribute at a given site along the national seashore nor on how visitors are affected specifically by PWC noise. Thus, this analysis cannot quantify the effects of noise. However, we expect that the increase in PWC noise relative to PWC Ban conditions is likely to be greater than the increase in PWC noise relative to current conditions where non-PWC visitors are already accustomed to some level of noise from PWCs at the national seashore. This suggests that the incremental costs to non-PWC visitors relative to the PWC Ban baseline is likely to be greater the incremental costs relative to Current Conditions Baseline.

B.2.1.3. Summary

While the quantity of non-PWC trips to the national seashore is likely to be unaffected by the rule, the economics literature suggests that the quality of non-PWC trips may diminish, representing an incremental cost of the rule. Insufficient data and value estimates from the literature exist to enable us to quantify these costs, however.

B.2.2 PUBLIC SAFETY

As described in Chapter 4, PWCs are involved in between 7 and 19 accidents each year in the Florida counties adjacent to the national seashore. It is unknown how many of these accidents occur in the waters within the national seashore specifically, and therefore how many would have been eliminated under the PWC Ban conditions. Publicly available data do not cover the interval around the temporary PWC ban at the national seashore (2002-2006). In the absence of these data, we are unable to predict the potential incremental risk to public safety of the rule relative to the PWC Ban Baseline.

Moreover, data is not available to understand if a PWC ban results in fewer overall trips in the region or a redistribution of trips to waters where PWCs are allowed. As evidence from Section 3.6, there are many launch locations for water vessels on the coastal mainland near the national seashore, and many miles of coastline to explore. Therefore, it is possible that changes in the PWC access conditions at the national seashore would not increase the total number of safety incidents involving PWC, but instead the distribution of those incidents from outside to inside national seashore waters.

Within the national seashore, however, allowing PWCs may result in an increased public safety risk. Therefore, we anticipate an incremental cost of the rule relative to the PWC Ban baseline. The incremental public safety cost at the national seashore is likely to be greater relative to the PWC Ban than relative to current conditions.

B.2.3 ECOLOGICAL EFFECTS

Relative to the PWC Ban, the rule will result in adverse impacts to all ecological resource categories. However, these impacts are likely to be minor due to the protections provided

by the flat-wake zones under the rule. The potential impacts of the rule on each ecological resource are summarized below.

- **Water Quality.** PWC use at the national seashore will result in water pollution through the discharge of unburned gasoline, combustion byproducts, and the spilling of gasoline during refueling. However, the impacts of water pollution are anticipated to be minor and overall water quality is not expected to exceed ecotoxicological or human health toxicity benchmarks.
- **SAV and shoreline vegetation.** Under the rule, 1,142 acres of SAV in Florida and 237 acres of SAV in Mississippi would be open to full-throttle PWC use (compared to zero acres under the PWC Ban). SAV in these areas would be susceptible to impacts from full-throttle PWC use and may experience reduced primary productivity due to increased turbidity in the water column.
- **Wildlife and wildlife habitat (including threatened or endangered species).** PWC use at the national seashore may directly impact wildlife and habitat through collisions or landings and indirectly impact wildlife and habitat through noise (in-air and in-water), vessel wake, and increased turbidity. Overall impacts are anticipated to be minor, however, as the flat-wake zones included under the rule would minimize this effect.

B.3 INCREMENTAL BENEFITS OF THE RULE RELATIVE TO A PWC BAN

B.3.1 PWC VISITOR TRIPS AND EXPERIENCE ACROSS THE NATIONAL SEASHORE

Relative to the PWC Ban, the rule enables access to the national seashore for PWC visitors. While some areas will require PWCs to travel at flat-wake speeds, most of the national seashore will be accessible without the speed restrictions. This represents an incremental benefit to PWC visitors at the national seashore.

B.3.1.1. Quantity of PWC Trips

Under the PWC Ban, there would be no PWC trips to the national seashore. As described in Chapter 3, the best available estimate suggests approximately 14,000 PWC trips per year to the national seashore under current conditions. This indicates that the rule may result in an additional 14,000 PWC trips per year to the national seashore relative to the PWC Ban baseline.

However, data do not exist to suggest whether these would be entirely new PWC trips to the broader region (i.e., a net increase in regional PWC activity), or whether all or some subset of these trips may be redistributed from other substitute locations with PWC access. As described in Section 3.6, there are many water vessel launch locations near the national seashore, therefore it is possible that PWC activity would occur at other coastal sites if they were not permitted at the national seashore. However, the rule would enable access to the national seashore resulting in additional options and potentially improved site conditions for PWC use.

B.3.1.2. Quality of PWC Trips

For those existing PWC users along the Gulf Coast that place more value on spending time in the national seashore waters than their current destinations, the access to the national seashore results in an incremental benefit. These PWC users would experience an increase value per trip for access to the preferred site. Data are not available to predict the number of entities that would experience this benefit, nor do studies exist that would enable us to value this incremental change in the value of their trips.

Evidence is limited on the value of PWC trips overall, as well as at the national seashore specifically. The only available study that estimates the value of PWC trips is specific to lakes around the Lake Tahoe region of California and Nevada (Hagerty and Moeltner 2005). Even within this area, the researchers find significant variability in the estimates of WTP to access particular lakes within a relatively small region. This suggests that transferring these values to the Gulf Coast would be speculative.

B.3.1.3. Summary

PWC access to the national seashore under the rule represents an incremental benefit to PWC visitors. First, the rule may result in new PWC trips in the region (and associated value the visitors gain from these trips). Second, existing PWC users along the Gulf Coast may experience an increase in the value of their trips due to the increased options or if the national seashore is a more desirable destination than their previous destinations. Data are insufficient to monetize the value of these incremental benefits.

B.4 REGIONAL ECONOMIC IMPACTS

As described in Section 3.1, visitors at the national seashore contribute to the regional economy in adjacent coastal counties. Relative to the PWC Ban conditions, we predict that the only potential changes in total visitor numbers may arise among PWC users. Even then, the approximately 14,000 PWC visitors under current conditions account for only about 0.3 percent of total visitors, and therefore a similarly small amount of expenditures in the regional economy.

If each of the 14,000 PWC visitors contributed an average of \$56 in regional economic output (estimated from Cullinane Thomas et al. 2018), this would result in about \$770,000 of economic activity near the national seashore. Relative to the size of the nearby economies (\$42.4 billion total, \$1.5 billion specific to tourism and recreation derived from ocean activities), this represents a negligible effect and is comparable to the size of normal annual variation. However, individual beach recreation and tourism-related businesses, particularly those that support PWC users, may experience benefits.

B.5 SUMMARY

Our analysis of the anticipated incremental costs and benefits of the rule relative to a PWC Ban baseline finds that, while PWC visitors may benefit from the access to the national seashore, non-PWC visitors may experience reduced quality of visits due to

increased noise. We also anticipate potential increased public safety risks related to PWCs in the national seashore. Additionally, the rule may result in degraded water quality and habitat conditions, though these effects are most likely minor if not negligible. Finally, while impacts on the overall level of economic activity are likely minor, individual recreation- and tourism-related businesses, particularly the PWC rental companies, may benefit from increased activity.

The biggest area of uncertainty in this analysis is whether total PWC trips across the north Gulf Coast would increase, or if existing PWC trips would be displaced from other nearby destinations (resulting in a substitution effect). Where PWC trips are added to the total, this likely represents a larger incremental benefit relative to the increase in value for existing PWC visitors in nearby locations.

Significant data limitations impede our ability to quantify the anticipated costs and benefits of the rule. The relative magnitude of PWC to non-PWC visitors, however, indicates that the rule is affecting management of a small fraction of overall beach visitation and, thus, even compared with a PWC Ban baseline, the costs and benefits of the rule are relatively minor.