# OREGON INLET SITUATION ASSESSMENT AND PROCESS RECOMMENDATIONS

October 15, 2013

Prepared for

Dare County Oregon Inlet Task Force
North Carolina

Prepared by

The Ruckelshaus Institute
Haub School of Environment and Natural Resources
The University of Wyoming

Steve Smutko
Elizabeth Spaulding
Jessica Clement

Ruckelshaus INSTITUTE
A DIVISION OF THE
HAUB SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES

## Contents

# EXECUTIVE SUMMARY

## Introduction and Overview

In 2013, Dare County, North Carolina sought to explore the feasibility of using a collaborative, science-based, stakeholder driven process to determine a solution to maintaining a safe navigable route through Oregon Inlet while also protecting the natural landscape of the Outer Banks. The county requested assistance from the Ruckelshaus Institute of the Haub School of Environment and Natural Resources at the University of Wyoming to conduct a stakeholder assessment.

The purpose of this stakeholder assessment is to assist Dare County in evaluating whether this issue is amenable to collaborative problem solving. This assessment is based on information gathered from interviews with 24 stakeholders regarding their experience with Oregon Inlet and their perceptions on collaborative processes.

## Description of the Assessment Process and Methodology

This assessment is based on confidential, voluntary interviews with 24 stakeholders who represent a range of interests and connections to Oregon Inlet. These stakeholder groups consist of the fishing and boating industry, federal and state government, environmental conservation groups, and community members.

Each interview consisted of two assessment components utilized to collect both quantitative and qualitative data from the participants. The first component employed Q-methodology, a structured survey coupled with follow-up questions, to study participants' subjectivity on the issues associated with Oregon Inlet. The second component employed traditional interview questions surrounding participants' experience with collaborative process, as well as perceptions on whether a process would be appropriate for Oregon Inlet.

## Findings: Summary of Key Points

### Q-Methodology Results

Results from the Q-methodology showed that the majority of stakeholders are greatly divided between two different positions on Oregon Inlet. The first position strongly supports a stabilized inlet through the use of groins, jetties, and sand bypass systems. These stakeholders are generally aligned with the commercial fishing and boating industry, and see a strong economic incentive for improving navigability through the inlet.

The second position strongly supports a structure-free inlet, relying on the current system of dredging in order to maintain a navigable route. These stakeholders are generally aligned with the environmental conservation organizations, as well as the U.S. Fish & Wildlife Service and the National Park Service. They attach great importance to maintaining wildlife habitat and allowing natural processes to shape the shoreline of the Outer Banks.

The most significant finding arising from the Q-methodology component of the assessment is the nearly complete lack of middle ground on issues surrounding Oregon Inlet. This is rarely seen in Q-methodology, and highlights the polarization of the stakeholders on issues surrounding the inlet.

**Interview Results**

Results from the second component of the interviews, which were a number of questions pertaining to experience and opinions on collaborative processes, showed that while the majority of stakeholders have doubts that all individuals will participate in a process in good faith, they are still optimistic that a process can help the county determine a management solution to Oregon Inlet. The Ruckelshaus Institute discovered there is a high level of distrust among the stakeholders and this may impact a process. A variety of scientific and technical information needs were also identified. Most stakeholders conceded that if a process were either not convened or unsuccessful, the outcome would be maintaining status quo. There were varying perceptions on whether status quo is acceptable.

**Recommendations**

Based on our interviews and our analysis of both the quantitative and qualitative data, we do not recommend a solution-seeking process at this time.

Due to the extremely polarized and entrenched positions of the majority of the stakeholders, it seems highly unlikely that there is a potential for a collaboratively solved solution. This polarization is further complicated by the federal mandates of the Fish & Wildlife Service and the National Park Service, who must protect and maintain wildlife habitat. Because of these mandates, certain stakeholder groups are able to achieve their interests in maintaining a structure-free inlet, and therefore lack incentive to enter into negotiations within a process.

Rather than a solution-seeking process, we recommend a collaborative learning process. Collaborative learning entails bringing stakeholders together to evaluate available information and determine what information needs still exist. The potential benefits of engaging in a collaborative

learning process include improved relationships among the stakeholders, as well as an increased understanding of the possibilities and limitations associated with management of Oregon Inlet. This increase in technical understanding may allow parties to discover areas of agreement and expand their understanding of the interests and values held by other stakeholders. This in turn may expand their range of acceptable solutions to Oregon Inlet, opening up the possibility of eventually engaging in a solution-seeking process.

This page is intentionally blank

# INTRODUCTION AND BACKGROUND

## The Ruckelshaus Institute and the Purpose of This Assessment

In 2013, the Dare County, North Carolina Oregon Inlet Task Force sought to explore the feasibility of using a collaborative, science-based, stakeholder driven process to determine a solution to maintaining a safe, navigable route through Oregon Inlet while also protecting the natural landscape of the Outer Banks. The county requested assistance from the Ruckelshaus Institute to conduct a stakeholder assessment.

The Ruckelshaus Institute, a division of the Haub School of Environment and Natural Resources at the University of Wyoming, advances the understanding and resolution of complex environmental and natural resources challenges and supports stake-holder-driven solutions to environmental challenges by communicating relevant research and promoting collaborative decision making. The Ruckelshaus Institute has experience and expertise in conducting stakeholder assessments, as well as convening and facilitating collaborative problem-solving processes.

The purpose of this stakeholder assessment is to assist Dare County in evaluating whether the issues surrounding Oregon Inlet are amenable to collaborative problem solving. This assessment is based on information gathered from interviews with 24 stakeholders regarding their experience with Oregon Inlet and their perceptions on collaborative processes. Participants represented federal and state government, the fishing and boating industry, environmental conservation organizations, and community members. Each 90-minute interview employed both a Q-methodology survey as well as traditional interview questions to obtain quantitative and qualitative data that was used by the Ruckelshaus Institute to determine if a collaborative problem-solving process is an appropriate method for Dare County to seek a solution on management of Oregon Inlet.

## Background

Oregon Inlet provides the only access to the Atlantic Ocean from inland waters located between Virginia Beach, Virginia, about 85 miles to the north of Oregon Inlet, and Hatteras Inlet in Hatteras, North Carolina, about 45 miles to the south. Oregon Inlet is located in the Outer Banks, a string of barrier islands along the coast of North Carolina. These barrier islands and their migrating inlets constantly move and change under the influence of waves, currents, and the change in sea level.

Oregon Inlet is the primary route to the ocean for hundreds of commercial and recreational fishing vessels operating in the Outer Banks region of North Carolina. However, the inlet experiences high winds, strong tides, and shifting sand making navigation difficult and potentially perilous. This high-energy environment often creates sand bars and large breaking waves at the inlet's entrance to the ocean, commonly known as the ocean bar. These conditions, especially when combined with the severe storms that frequent the area, can swamp a boat or run it aground, imperiling both life and property (US GAO, 2001).

The safety and navigability of Oregon Inlet has been the subject of a series of engineering, economic, and environmental studies by federal and state agencies since the 1960s. In 1968, in response to a request by the House and Senate Public works Committees, the US Army Corps of Engineers conducted a study as to the advisability of modifications to the inlet. The Corps made recommendations that led Congress to authorize dual rock jetties and a 20-foot channel for the inlet in 1970.

Between the 1970 authorization and 2001, the Corps spent about $10 million designing the project and studying whether it was economically and environmentally sound (US GAO, 2001). A number of agencies and organizations participated in the environmental (NEPA) reviews and provided substantive comments.

Despite the many studies and modifications to the project that the Corps made since the study was first initiated, the Department of Commerce (the Marine Fisheries Service, part of the National Oceanic and Atmospheric Administration or NOAA), the Department of the Interior (National Park Service and the US Fish and Wildlife Service), various environmental groups, and other interested parties do not believe their concerns had been adequately addressed by the Corps' analysis, and they have continued to oppose the project. In general, these parties contend that the Corps' economic analysis was unsound and that the jetty project will cause significant beach erosion and impede migration of fish larvae to habitat in the sound, potentially leading to a significant reduction in the overall fish supply (US GAO, 2001).

On October 16, 2001, the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) asked the federal Council on Environmental Quality (CEQ), to help resolve outstanding issues concerning the Corps' proposal to construct the jetties on the inlet, arguing that the proposal would threaten the fisheries by interfering with larval fish movement and destroying essential fish habitat. On May 1, 2003, CEQ, COE, and the Interior and Commerce Departments

announced that they had reached agreement not to proceed with development of the proposed navigation project. The decision to cease work on the Oregon Inlet jetty project ended the 30-year planning and development effort. Since the 2001 decision, the channel through Oregon Inlet has been maintained through dredging by the US Army Corps of Engineers.

A related issue to the inlet is the placement and pending replacement of the Herbert C. Bonner Bridge that spans the inlet between Bodie Island and Pea Island along NC Highway 12. The bridge, a 2.7 mile span, was built in 1963. Constant beach erosion, severe weather and high volume of traffic has taken its toll on the bridge. The NC Department of Transportation has spent nearly $56 million on repairs, maintenance and special inspections since 1990 to fortify the bridge (NC DOT, 2013). The bridge handles about 2 million cars per year, and the state DOT ranks it a 4 on a scale of 1 to 100, with 100 being the safest (James, 2011). The Federal Highway Administration has approved a plan to replace the bridge. The final alignment for the bridge is being contested by various conservation organizations. The Southern Environmental Law Center and other conservation groups are pushing the state to consider safer bridge replacement alternatives. They advocate a longer bridge that bypasses the unstable part of the island and the wildlife refuge and travels instead through the Pamlico Sound to the village of Rodanthe and are litigating the issue (SELC, 2013).

In addition to conflicts over options to ensure navigation safety, bridge replacement, and environmental protection at the sound, is the issue of motorized vehicle access on Cape Hatteras National Seashore. Although motorized vehicle access on Cape Hatteras is not connected functionally or ecologically to issues germane to the inlet, the process used for resolving this particular conflict has had a significant impact on how people in the Outer Banks region view the prospect of a collaborative process to resolve inlet-related issues. The National Park Service convened a Negotiated Rulemaking process in 2008-2009 aimed at developing broad-based consensus on an Off-Road Vehicle (ORV) Management Plan and implementing regulations for Cape Hatteras National Seashore. Those involved in the process were unable to reach full consensus on an ORV rule. At various points in the process, parties used litigation, influence with the Congressional delegation, and media campaigns to try to affect the negotiations and outcomes (US IECR, 2013). This created significant distrust among the parties at the table, and many parties involved in the reg-neg were highly dissatisfied with the process and its outcomes. Although only two parties involved in that process were interviewed for this assessment, the process received

constant negative coverage in the local media, and nearly everyone we interviewed had some, mostly negative, opinions about it.

A final factor affecting the background for this assessment is the recent political change in North Carolina state government. In 2012, both houses of the state legislature switched majority parties from Democrat to Republican. At the same time, a Republican, Pat McCrory, was also voted into the governor's office. Governor McCrory and the state legislature have expressed significant interest and support in assisting Dare County in finding a solution to Oregon Inlet. In July 2013 the General Assembly, headed by Republican Senate Leader Phil Berger, passed a bill signed by Governor McCrory that authorizes the creation of a task force to study the possibility of the state purchasing the land surrounding Oregon Inlet from the Department of Interior. The 13-member Oregon Inlet Land Acquisition Task Force will study the state's options in acquiring the land and put forth recommendations with the goal of building jetties in order to stabilize the inlet.

## DESCRIPTION OF THE ASSESSMENT PROCESS AND METHODOLOGY

This situation assessment was initiated with a review of background information and reports obtained through an independent research process and information provided to us by members of the Dare County Oregon Inlet Task Force. Information gathered included documents produced by the US Army Corps of Engineers, Wilmington Field Office, a Government Accountability Office (GAO) report produced in 2001, an engineering report on sand management options contracted by Dare County, news articles spanning several years, and county documents, and website blogs. This review of background information provided the authors with a basic understanding of the issues related to the inlet and the stakeholders involved, enough to begin the formulation of an assessment strategy.

The assessment conducted by the Ruckelshaus Institute is based on data gathered from in-person and telephone interviews of stakeholders in the coastal communities served by Oregon Inlet, and other stakeholders outside the region who had a demonstrated interest in Oregon Inlet issues. With the assistance of members of the Dare County Oregon Inlet Task Force, and faculty and staff of the University of North Carolina Coastal Studies Institute (CSI), the authors compiled a list of 46 organizations and individuals to interview. Through consultation with the Task Force members and CSI staff, the authors narrowed down the list to 30. These individuals were sent letters of introduction followed by telephone calls to schedule interviews. Follow-up telephone calls were

made a minimum of three times to find a convenient time for the interview. Not all stakeholders contacted successfully scheduled an interview. In some cases, the respondents referred the researchers to other individuals within their organization to interview. In total, 24 stakeholders were interviewed for this assessment. Elizabeth Spaulding conducted the interviews in July and August 2013. Each interview took on average of ninety minutes. Table 1 provides a summary of the stakeholder groups and the number of respondents belonging to each group. A list of the individuals interviewed for this assessment is contained in Appendix A.

**Table 1. Attributes of Participants**

| **Professions:** | |
|---|---|
| 4 Federal government employees | |
| 5 State government employees | |
| 1 Local government employees | **Gender:** |
| 2 Economic/Tourism | 22 male |
| 8 Fishing & Boating Industry | |
| 4 Environmental Conservation | 2 female |

The assessment consisted of two distinct survey methodologies employed in the stakeholder interviews. The first was a quantitative approach to identify participant viewpoints and perceptions about the issues and options related to safe navigation, sand management, and environmental protection in Oregon Inlet. This method, called Q-Methodology, segments the participants into groupings or themes related to their responses to a set of questions. These groupings provide information about how divided or unified the survey respondents' perceptions of the issues are, and where there might be common ground.

The second component consisted of a set of open-ended questions designed to elicit information about the potential for the application of a collaborative, consensus-seeking process for developing solutions that reduce navigation hazards at the inlet while maintaining ecological integrity. Respondents answered questions regarding their prior experience with collaborative processes, their assessment of the potential of common ground on Oregon Inlet issues, their use of information regarding inlet issues, and logistical details necessary to engage in a collaborative process.

Because the Q-Study methodology is complex and the results require a greater degree of explanation and discussion, this report contains a detailed description of that methodology and our findings. Following the discussion of Q-Study assessment component, we report the findings of the

portion of the interviews that focus on the participants' perceptions of a collaborative process. We then summarize our findings in a conclusion section.

## Q-Methodology

The first component of the assessment employed Q-methodology, a structured survey coupled with follow-up questions, to study participants' subjectivity on the issues associated with Oregon Inlet. The second component employed traditional interview-style questions to gain a deeper understanding of the individual stakeholder's connection to Oregon Inlet, as well as their interest and capacity to participate in an organized, solution-seeking process.

Q-methodology identifies participant viewpoints and perceptions and the criteria that are important to participants, and explicitly outlines areas of consensus and conflict on an issue. It is a method that seeks to clarify the range of subjectivity in a discourse, and the reasons for the varieties of subjectivities within that range. The benefit of conducting a Q-study, as compared with a using only a traditional interview process, is that it combines both quantitative and qualitative analysis of stakeholder views, providing a more specific and objective identification and grouping of perspectives and values. Q-study results can serve as both a starting point for collaborative dialogue and provide the sideboards for defining acceptable conditions and objectives.

Q-methodology allows us to describe the main opinions that prevail among different stakeholder types regarding a subject based on quantitative and qualitative analysis. However, because it is not a random-sample survey of a population, we cannot describe with any certainty how many people within a population ascribe to an opinion. This report therefore describes a discourse, i.e. what is said, regarding the management options for Oregon Inlet, not the characteristics of the populations of those involved in the topic. The Q-methodology results in this report highlight the dominant perspectives key stakeholders hold regarding trade-offs on Oregon Inlet management.

**Table 2: Terminology used in this study**

| Terminology | Description |
|---|---|
| Q-Methodology | A method used to quantitatively and qualitatively measure subjectivity within a discourse. The method uses Q-sorts, a collection of statements, as input for the quantitative analysis and discover the main themes in a discourse, and follow-up interviews to discover the context and reasons for those themes. |

| | |
|---|---|
| Discourse | A conversation regarding a particular topic or issue. In Q-methodology the entire discourse is the population, not people. |
| Q-Study | A study using Q-methodology. |
| Q-Sort | The placement of cards in the format featured in Figure 1. Each card contains a statement that represents an opinion within a discourse. |
| Q-Sample | The collection of statements on cards used in a Q-sort. Each statement represents a particular opinion within a discourse. The statements together for the discourse. The statements are used in the Q-sort. |
| P-Sample | The participants in a Q-study. Each participant is a stakeholder who represents a particular voice within a discourse. |
| Factor Analysis | A statistical method that correlates Q-sort responses into groupings or factors. Each grouping of statements is mathematically unique from other groupings. |
| Factor | A statistically identified group of statements. |
| Theme | A main perspective within a discourse, that is associated with a factor. |

The core component of a Q-study is the Q-sample. The Q-sample is a collection of statements that accurately reflects the range of opinions within a particular discourse. Research in preparing the Q-sample was conducted by a post-doctoral researcher at the UNC Coastal Studies Institute. He gathered publications, meeting notes, media reports, socio-economic literature, county documents, and other secondary sources available online or in print in in Dare and Hyde counties. We researched these secondary sources for all statements that express an opinion regarding management of Oregon Inlet. From this initial list of statements, 36 statements were selected (see Table 3) using the following criteria:

1. All discourse topics had to be represented in the final Q-sample.
2. Each statement had to be unambiguous and clear.
3. Each statement had to use as much as possible the original, place-based language (although some editing was sometimes necessary e.g. sentence structure for clarity).

Each interviewee was provided the Q-sample containing the 36 statements on cards. Participants were asked to place these cards on a continuum of strongly agree to strongly disagree in the arrangement shown in Figure 1 below.

**Figure 1. Q-Sort: Placement Cards with Statement**

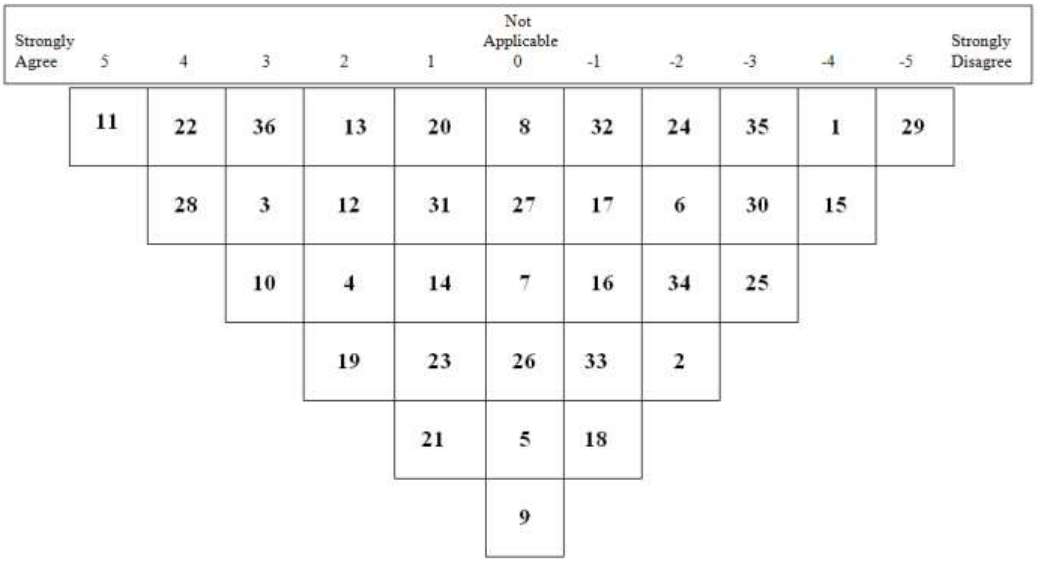



**Table 3: The statements used in the Q-sorts and the topics with which they are associated.**

| # | Topic 1 | Topic 2 | Q-Sort Statement |
|---|---|---|---|
| 1 | Cultural | | Please, if you love the Outer Banks or live here, understand that this is part of our heritage and it is dying quickly. All of the millions of dollars spent on studies could have paid to solve the problem. |
| 2 | Ecological | | Let's just fill the whole inlet in with sand and stop all the dredging and let nature play its course. |
| 3 | Ecological | | If the inlet closes (and no other major inlets form), the increase in fresh water in the sound will cause the disappearance of clams, oysters and many salt water species of fish will disappear. |
| 4 | Ecological | Cultural | The inlets are exactly the way they should be. It's just people who are having a hard time adapting. |
| 5 | Ecological | Jetty<br>Groin | Please, no more jetties-groins. As proven, they increase erosion, strip sandbars and shoals and clog the inlet. |
| 6 | Ecological | Jetty | I believe that a jetty would create new fish and marine habitat and it would also cause the sand that has drifted down from south Nags Head to naturally replenish. |
| 7 | Ecological | Jetty | Building jetties would be environmentally harmful because they would restrict the migration of fish larvae from the ocean to the sounds inside the inlet, where the larvae develop into fish. |
| 8 | Ecological | Jetty | The jetties will reduce successful movement of fish larvae, juvenile fish and invertebrates into the sounds, which is of particular concern to economically valuable fish such as flounder. |
| 9 | Ecological | Weir<br>Jetty | It is important to incorporate a weir into the design of a northern Oregon Inlet jetty to allow fish larvae to migrate over the jetty through the inlet into the Sound. |

| # | Topic 1 | Topic 2 | Q-Sort Statement |
|---|---|---|---|
| 10 | Ecological | Sand Bypass System | The sand bypass system will permanently alter the shoreline and affect turtle and shorebird habitat. |
| 11 | Ecological | Sand Bypass System | The sand bypass system will disrupt natural sand migration into Pamlico Sound. |
| 12 | Ecological | Weir | A weir would not work because the additional sand deposited from Nags Head beaches down to Oregon Inlet will result in the weir becoming sanded in, nullifying its expected benefit of allowing larvae migration to flow through. |
| 13 | Economic | | You will see major income loss if that inlet isn't fully open. Commercial and recreational fishing will be affected, so marinas will die as well. |
| 14 | Economic | | The burden for funding Oregon Inlet should fall to local taxpayers and users. |
| 15 | Economic | | Several economic studies have been performed to assess the benefits of a stabilized O.I., the most recent in 2006 by Moffatt & Nichol, and each have indicated the great economic benefits from a dependable, navigable inlet. |
| 16 | Economic | | Fishing, both commercial and recreational, is a major Outer banks industry which heavily supports another major industry, tourism. Without the Oregon Inlet, we will lose fishing and the tourism will suffer badly. |
| 17 | Economic | Bridge | Time to rethink the whole Oregon Inlet with its shoaling problem. No need to build the new Bonner Bridge to Nowhere, much more cost effective to build a bridge around Pea Island entirely. |
| 18 | Economic | Bridge Dredging | Quit wasting money. Dredging or engineering in the Oregon Inlet is nothing but a big subsidy for a special interest. |
| 19 | Cultural | Economic | The commerce that moves through this inlet: commercial, recreational, and oceangoing, is a way of life and source of independence for many. |
| 20 | Economic | Dredging | If we had a 16-foot channel in Oregon Inlet with a dredge for a deep enough channel, it would more than triple the employment in the industry. |
| 21 | Economic | Bridge | Put the money into ferry service at Oregon inlet and forget the bridge. |
| 22 | Economic | Jetty | A jetty would cost some more money but in the future would save a lot more in the long run. |
| 23 | Safety | Economic | I don't understand how money could be an issue when lives are at stake trying to navigate the Oregon Inlet. |
| 24 | Engineering | Dredging | It's pointless to manually keep OI open to larger, deeper vessels. |
| 25 | Engineering | Bridge Elevated Portion | The new Bonner bridge currently being proposed by the state has an elevated portion 5,000 feet long that would allow the navigation channel to be moved as conditions dictate. This would eliminate the need for the jetties and the terminal groin. |
| 26 | Engineering | Dredging | Destroy the jetty on the south end of OI, and use tax money to dredge every year. |
| 27 | Engineering | Dredging | Prevention of the migration of the sand into the navigation channel has to be the goal. We have to intercept the sand and dredging has proven to be ineffective for any significant degree of time. |

| # | Topic 1 | Topic 2 | Q-Sort Statement |
|---|---|---|---|
| 28 | Engineering | Groin Bridge | A terminal groin on the north side, and using the old bridge would be a good idea. Granted, it would cause problems. But, there is no solution that won't cause problems. |
| 29 | Engineering | Groins Sand Bypass System | The only permanent solution for Oregon Inlet is terminal groins accompanied with a sand bypass system. |
| 30 | Engineering | Jetty Sand Bypass System | Inlets are stabilized and managed all over the world without adverse effects through the construction of jetties and sand bypass systems |
| 31 | Engineering | Sand Bypass System | Modern sand bypass technology can keep Pea Island supplied with sand. |
| 32 | Engineering | Jetty | I don't think we should put a jetty on the north side of the inlet because the sand that migrates down the beach from the north to south will no longer be deposited on the beaches south of the inlet. |
| 33 | Intrinsic | | It is no secret that these inlets open and close – they've been doing so for tens of thousands of years and will continue to do so no matter how hard man tries to stop them. |
| 34 | Intrinsic | | Outer Banks residents simply must come to grips with the geologic reality of where they live. |
| 35 | Social Capacity | | I believe we have the intellectual capacity to figure this thing out, given that it's been over 30 years that we've been talking about this issue. |
| 36 | Recreation | Jetty | Construction of the jetties will diminish much of the public's recreational use of the Bodie Island spit. |

The resulting Q-sorts were loaded into PQMethod software, which uses principal components analysis to generate factors. The factors are derived from the numerical placement of the statements in each Q-sort on the continuum from -5 (strongly disagree) to 5 (strongly agree) in the Q-sorts. Each factor is formed by a group of statements that correlate with each other and together represent a main perspective within this discourse.

After completing the Q-sort exercise, the participants were interviewed to explore the deliberation process and the trade-offs involved for each participant in deciding the location of the statements. The researchers compiled a list of questions (Table 4) to create consistency while allowing the interviewee and researcher to digress into issues related to the subject important to the interviewee. The interviews were used to describe the factors that resulted from the quantitative analysis and to provide the context to the perspective it contained. This process reflects the internal deliberation a person goes through on any subject and captures the internal subjectivity of the participant and the context in which their deliberation takes place.

**Table 4: Q-Sort Interview Questions**

| |
|---|
| 1. While deciding what statements you agreed or disagreed with, were there any trade-offs that were particularly difficult? |
| 2. Considering that these statements represent the public discourse or conversation regarding the issues being considered in relation to how Oregon Inlet should be managed, do you feel your viewpoints and opinions are represented? Is there anything missing? |
| 3. What statements did you most agree with and why? |
| 4. What statements did you most disagree with and why? |
| 5. What statements wound up more in the middle section and why? |

## FINDINGS: Q-SORT RESULTS

The 24 resulting interviews forms the P-sample, the diverse set of stakeholders who together represent the various ways in which contributions are made to this discourse regarding options to keep Oregon Inlet navigable. Although the 24 interviews are less than were hoped, the integrity of the results are not diminished with Q-methodology. Including stakeholders who represent the full range of perspectives is critical to this methodology while the number of participants is not important in this type of study. In this study, the 24 interviewees adequately represent the stakeholder types on this issue.

Factor analysis is a statistical method that finds factors, sets of elements in a database that mathematically correlate with each other, but that are distinct from other sets of elements. In Q-methodology, the factors consist of Q-sorts that correlate with each other and the statements associated with those Q-sorts. Depending on the size of the database and the number of statements used, two to seven themes usually result.

In this Q-study, each factor that resulted from the statistical analysis represents a theme in the discourse regarding options for Oregon Inlet. Two strong themes and one weak one resulted from the analysis, together explaining 69% of the entire discourse. Tables 5 and 6 reflect the distinguishing statements for the dominant themes, i.e. the statements that quantitatively emerged as unique to that factor. Below each table is a short narrative describing each theme. Table 7 shows the average ranking for each statement for the two themes. Tables 7 and 8 display the resulting themes that emerged from the factor analysis.

The general orientation in Theme 1 was in favor of engineered options for the sake of the economy and human safety. Theme 2 favored continuing dredging or a long bridge over or around Pea Island to compensate for natural processes. The perception in Theme 3 was not clear about any options other than groins, acknowledged the economic hardships that might occur if the inlet closed but was also certain regarding the inevitable changing nature of the Outer Banks, including Oregon Inlet.

Theme 3 does not identify clear options and is ambivalent between the outcomes of any option. Only one stakeholder is associated with this theme, and the amount of the discourse that this theme represents is very small. Thus, for all intents and purposes, there are two clear, dominant and statistically valid themes that emerged. It is highly unusual that a Q-study results in only two solid themes. Usually there are between four and 7 factors, depending on the complexity of the discourse and the different approaches that emerge. In this case, only two opposing ways of looking at options for a navigable channel for the Oregon Inlet arose in this analysis.

The themes are described below based on the Q-sorts and the interviews. A table associated with each theme shows the distinguishing statements. To see the ranking for each theme for all statements, see Table 7.

## Theme 1: Engineered Structures

**Table 5. Theme 1 Distinguishing Statements**

| Statement | Average Ranking |
|---|---|
| 27. Prevention of the migration of the sand into the navigation channel has to be the goal. We have to intercept the sand and dredging has proven to be ineffective for any significant degree of time. | 5 |
| 30. Inlets are stabilized and managed all over the world without adverse effects through the construction of jetties and sand bypass systems. | 2 |
| 1. Please, if you love the Outer Banks or live here, understand that this is part of our heritage and it is dying quickly. All of the millions of dollars spent on studies could have paid to solve the problem. | 2 |

| | |
|---|---|
| 23. I don't understand how money could be an issue when lives are at stake trying to navigate the Oregon Inlet. | 0 |
| 33. It is no secret that these inlets open and close – they've been doing so for tens of thousands of years and will continue to do so no matter how hard man tries to stop them. | 0 |
| 34. Outer Banks residents simply must come to grips with the geologic reality of where they live. | -1 |
| 4. The inlets are exactly the way they should be. It's just people who are having a hard time adapting. | -2 |
| 6. The sand bypass system will permanently alter the shoreline and affect turtle and shorebird habitat. | -2 |
| 14. The burden for funding Oregon Inlet should fall to local taxpayers and users. | -3 |
| 24. It's pointless to manually keep OI open to larger, deeper vessels. | -3 |
| 21. Put the money into ferry service at Oregon inlet and forget the bridge. | -4 |
| 18. Quit wasting money. Dredging or engineering in the Oregon Inlet is nothing but a big subsidy for a special interest. | -4 |
| 2. Let's just fill the whole inlet in with sand and stop all the dredging and let nature play its course. | -5 |

The most highly ranked statement was number 27: "Prevention of the migration of the sand into the navigation channel has to be the goal. We have to intercept the sand and dredging has proven to be ineffective for any significant degree of time." This was followed by statement # 16 "Fishing, both commercial and recreational, is a major Outer banks industry which heavily supports another major industry, tourism. Without the Oregon Inlet, we will lose fishing and the tourism will suffer badly." And # 19 which also identified the economic importance of the inlet. This theme is clearly in favor of all options that involve engineering. Jetties and a sand bypass system ranked first, groins and a sand bypass system second and dredging to allow a 16-foot channel was third. Any statements that raised objections to these options were firmly disagreed with. The perspective in this theme also clearly disagreed with dredging only, and also disagreed with a long, new Bonner Bridge to allow sand to migrate naturally.

The Q-sorts and the interviews show various reasons for this clear choice. The first reason is economic. The stakeholders that were involved in the fishing, recreation and tourism industries

were associated with this theme. They felt strongly that if the inlet closed for lack of funding or natural causes, Dare County and beyond would suffer economically, tourism and recreation would decrease and livelihoods would be lost. Statement 15, which stresses the economic studies that indicate the high economic value of a stabilized, navigable Oregon Inlet, was ranked highly and often mentioned in interviews as an important reason for choosing engineered structures.

Closely tied to economic arguments are concerns for the culture and heritage of the area. The perception in this theme is that without a navigable Oregon Inlet, a way of life would disappear and a culture and the historical context of the area would be absent. Stakeholders in this theme discuss the already diminished fishing fleet due to the shallowness of the inlet, and the economic and cultural consequences of this. If the existing recreational and remaining commercial fishing industries could not navigate through this channel, these stakeholders feel a community they hold dear will disappear.

A last reason for choosing engineered structures is for the sake of human safety. The current Inlet is seen as dangerous because of its shallowness and a stabilized Inlet would save lives. Additionally, when weather on the Atlantic is threatening or becomes untenable, having the inlet navigable provides an opening to calmer waters that otherwise would not exist until far further south or north. Some of the stakeholders spoke of this concern based on personal and tragic experiences.

This methodology forces participants to weigh the trade-offs that are found in the discourse within a 36-statement format. As such, statements using environmental arguments against engineered structures were ranked negatively. The interviews show that this does not mean that environmental factors are entirely discounted in this theme, but that economic, cultural and safety concerns are ranked higher. In most interviews the belief was expressed that natural systems would adapt to engineered structures, that sand resulting from deeper dredging or sand by-pass systems would not harm the shore, and may even benefit others downstream or believe that the environment within the Sounds would improve with a stabilized, open Inlet. There were some that did feel that at a certain point "humans have to be important. They have to be more important than birds, and turtles and fish…For one, it's a safety issue."

## Theme 2: Dredging

### Table 6. Theme 2 Distinguishing Statements

| Statement | Average Ranking |
|---|---|
| 17 Time to rethink the whole Oregon Inlet with its shoaling problem. No need to build the new Bonner Bridge to Nowhere, much more cost effective to build a bridge around Pea Island entirely. | 4 |
| 8. The jetties will reduce successful movement of fish larvae, juvenile fish and invertebrates into the sounds, which is of particular concern to economically valuable fish such as flounder. | 4 |
| 7. Building jetties would be environmentally harmful because they would restrict the migration of fish larvae from the ocean to the sounds inside the inlet, where the larvae develop into fish. | 3 |
| 5. Please, no more jetties-groins. As proven, they increase erosion, strip sandbars and shoals and clog the inlet. | 3 |
| 32. I don't think we should put a jetty on the north side of the inlet because the sand that migrates down the beach from the north to south will no longer be deposited on the beaches south of the inlet. | 2 |
| 36. Construction of the jetties will diminish much of the public's recreational use of the Bodie Island spit. | 1 |
| 16. Fishing, both commercial and recreational, is a major Outer banks industry which heavily supports another major industry, tourism. Without the Oregon Inlet, we will lose fishing and the tourism will suffer badly. | 1 |
| 15. Several economic studies have been performed to assess the benefits of a stabilized O.I., the most recent in 2006 by Moffatt & Nichol, and each have indicated the great economic benefits from a dependable, navigable inlet. | 0 |
| 13. You will see major income loss if that inlet isn't fully open. Commercial and recreational fishing will be affected, so marinas will die as well. | -1 |
| 23. I don't understand how money could be an issue when lives are at stake trying to navigate the Oregon Inlet. | -1 |
| 3. If the inlet closes (and no other major inlets form), the increase in fresh water in the sound will cause the disappearance of clams, oysters and many salt water species of fish will disappear. | -2 |
| 31. Modern sand bypass technology can keep Pea Island supplied with sand. | -2 |

| | |
|---|---|
| 22. A jetty would cost some more money but in the future would save a lot more in the long run. | -3 |
| 28. A terminal groin on the north side, and using the old bridge would be a good idea. Granted, it would cause problems. But, there is no solution that won't cause problems. | -3 |
| 6. I believe that a jetty would create new fish and marine habitat and it would also cause the sand that has drifted down from south Nags Head to naturally replenish. | -4 |
| 29. The only permanent solution for Oregon Inlet is terminal groins accompanied with a sand bypass system. | -4 |

The highest rated statement in Theme 2 was #33: "It is no secret that these inlets open and close – they've been doing so for tens of thousands of years and will continue to do so no matter how hard man tries to stop them". The second most highly rated statements that were agreed with were #17:"Time to rethink the whole Oregon Inlet with its shoaling problem. No need to build the new Bonner Bridge to Nowhere, much more cost effective to build a bridge around Pea Island entirely", and # 8: "The jetties will reduce successful movement of fish larvae, juvenile fish and invertebrates into the sounds, which is of particular concern to economically valuable fish such as flounder".

The statements most disagreed with were first of all #30: "Inlets are stabilized and managed all over the world without adverse effects through the construction of jetties and sand bypass systems". The next two statements most disagreed with were #29: "The only permanent solution for Oregon Inlet is terminal groins accompanied with a sand bypass system" and #6: "I believe that a jetty would create new fish and marine habitat and it would also cause the sand that has drifted down from south Nags Head to naturally replenish."

The options most agreed with in this theme are only mildly agreed with: a Bonner Bridge that would be very long, continuing to dredge and a ferry service. This theme disagrees with any statement that is positive about any engineered solution other than a long Bonner Bridge, and agrees with any statement that raises concerns about engineered structures. The statement that was most agreed with in Theme 1 is the fifth most disagreed statement in Theme 2.

Theme 2 represents the perspective that any engineered option will ultimately be overwhelmed by natural processes, and ultimately do more harm to the sounds and the shoreline geologically and ecologically. There are very different perspectives on how natural processes operate between the two Themes: Theme 1 is concerned that if the inlet closes and no other major inlets form, the

increase in fresh water will destroy species such as oysters and clams (Statement #3) and Theme 2 disagrees. Where Theme 1 mildly agrees that a jetty would create fish habitat and help redistribute sand in a helpful manner (Statement #6), Theme 2 strongly disagrees. Theme 1 generally has far more confidence in engineered structures to stabilize the inlet and Theme 2 not only does not share that confidence, this perspective is concerned it would do more harm than good.

Again, although some statements may be in the negative numbers due to the restriction of this method which forces participants to weigh trade-offs according to the relative amount of agreement and disagreement, the interviews provide more context. This theme acknowledges, for example, the importance of the inlet to all kinds of economic drivers, and also acknowledges that its closing would affect the area culturally. This theme also does not agree with Statement #2 "Let's just fill the whole Inlet in with sand and stop all dredging and let nature play its course". This theme is most strongly disagreed with by Theme 1 and also firmly disagreed with by Theme 2. Although Theme 2 does represent the perception that eventually nature is possibly going to play its course and the area should prepare for it, there is no desire to see the fishing, recreation, boat building and tourism industries suffer. Additionally, if there is one option that is considered positively in Theme 2, it is dredging, although it is acknowledged to be a stop-gap solution. The long bridge is seen as the most optimal solution because it would conserve Pea Island by not inhibiting the flow of sand, allow for a naturally derived, navigable channel and create safe passage for vehicles while allowing free flow of larvae. On the other hand, this option is disagreed with by Theme 1.

### Theme 3: Groins and Reality

The one distinguishing statement for this theme is Statement 23: "I don't understand how money could be an issue when lives are at stake trying to navigate the Oregon Inlet" which was ranked as the most disagreed with statement. The one stakeholder who was clearly associated with this theme represents the perspective that most engineered structures will not provide a viable option for a navigable Oregon Inlet, but on the other hand be deeply concerned regarding the economic importance of the inlet.

This theme does not provide a clear perspective regarding options. On the one hand statement 22: "A jetty would cost some more money but in the future would save a lot more in the long run" is agreed with, as are subsequent statements discussing the benefits of sand bypass systems and

groins on the other hand statement 18 is also agreed with: “Quit wasting money. Dredging and engineering in the Oregon Inlet is nothing but a big subsidy for a special interest”. Statements reflecting the perspective that the inlet is beyond human control are also ranked highly.

In the negative rankings, the confusing juxtaposition of opinions continues. When looking at the interview, it is clear that there is a disapproval of spending too much money trying to control what are seen as ultimately insurmountable natural obstacles to a stabilized inlet. The one option that appears to receive full approval are terminal groins, and to a lesser degree jetties and sand bypass systems.

This theme seems to represent an ambiguous perspective: on the one hand there is complete acknowledgement of the strength of the Atlantic and the long-term natural processes involved in the creation of Outer Banks and its ecosystem. On the other hand there is strong empathy and loyalty to the ocean-based economic activities that are possible because of the inlet. Although it does not provide a strong preference for any options, and weak preference for some, this theme does represent the wavering sentiment that undoubtedly is shared by other residents of this area.

## Q-Study Summary

Table 7 shows how each statement loaded onto the three themes. The two statements that all three themes agreed with are #19: ‘The commerce that moves through this inlet: commercial, recreational and oceangoing, is a way of life and source of independence for many” and statement #35 “I believe we have the intellectual capacity to figure this thing out, given that it’s been over 30 years that we’ve been talking about this issue.” The first received high levels of agreement, the second lower levels.

**Table 7: Average Ranking of Statements for Each Theme (from 5, strongly agree, to -5, strong disagree)**

| Statement | Theme | | |
|---|---|---|---|
| **Theme** | **1** | **2** | **3** |
| 1. Please, if you love the Outer Banks or live here, understand that this is part of our heritage and it is dying quickly. All of the millions of dollars spent on studies could have paid to solve the problem. | 2 | -2 | -2 |
| 2. Let's just fill the whole inlet in with sand and stop all the dredging and let nature play its course. | -5 | -2 | -1 |
| 3. If the inlet closes (and no other major inlets form), the increase in fresh water in the sound will cause the disappearance of clams, oysters and many salt water species of fish will disappear. | 2 | -2 | 1 |
| 4. The inlets are exactly the way they should be. It's just people who are having a hard time adapting. | -2 | 1 | 1 |
| 5. Please, no more jetties-groins. As proven, they increase erosion, strip sandbars and shoals and clog the inlet. | -2 | 3 | -2 |
| 6. I believe that a jetty would create new fish and marine habitat and it would also cause the sand that has drifted down from south Nags Head to naturally replenish. | 1 | -4 | 0 |
| 7. Building jetties would be environmentally harmful because they would restrict the migration of fish larvae from the ocean to the sounds inside the inlet, where the larvae develop into fish. | 0 | 3 | -2 |
| 8. The jetties will reduce successful movement of fish larvae, juvenile fish and invertebrates into the sounds, which is of particular concern to economically valuable fish such as flounder. | -1 | 4 | -2 |
| 9. It is important to incorporate a weir into the design of a northern Oregon Inlet jetty to allow fish larvae to migrate over the jetty through the inlet into the Sound. | 1 | 0 | 0 |
| 10. The sand bypass system will permanently alter the shoreline and affect turtle and shorebird habitat. | -2 | 3 | 1 |
| 11. The sand bypass system will disrupt natural sand migration into Pamlico Sound. | 0 | 1 | 0 |

| | | | |
|---|---|---|---|
| 12. A weir would not work because the additional sand deposited from Nags Head beaches down to Oregon Inlet will result in the weir becoming sanded in, nullifying its expected benefit of allowing larvae migration to flow through. | 0 | 1 | 0 |
| 13. You will see major income loss if that inlet isn't fully open. Commercial and recreational fishing will be affected, so marinas will die as well. | 3 | -1 | 5 |
| 14. The burden for funding Oregon Inlet should fall to local taxpayers and users. | -3 | -1 | 0 |
| 15. Several economic studies have been performed to assess the benefits of a stabilized O.I., the most recent in 2006 by Moffatt & Nichol, and each have indicated the great economic benefits from a dependable, navigable inlet. | 3 | 0 | 3 |
| 16. Fishing, both commercial and recreational, is a major Outer banks industry which heavily supports another major industry, tourism. Without the Oregon Inlet, we will lose fishing and the tourism will suffer badly. | 4 | 1 | 3 |
| 17. Time to rethink the whole Oregon Inlet with its shoaling problem. No need to build the new Bonner Bridge to Nowhere, much more cost effective to build a bridge around Pea Island entirely. | -2 | 4 | -3 |
| 18. Quit wasting money. Dredging or engineering in the Oregon Inlet is nothing but a big subsidy for a special interest. | -4 | -1 | 1 |
| 19. The commerce that moves through this inlet: commercial, recreational, and oceangoing, is a way of life and source of independence for many. | 4 | 2 | 4 |
| 20. If we had a 16-foot channel in Oregon Inlet with a dredge for a deep enough channel, it would more than triple the employment in the industry. | 1 | -1 | -1 |
| 21. Put the money into ferry service at Oregon inlet and forget the bridge. | -4 | 0 | -1 |
| 22. A jetty would cost some more money but in the future would save a lot more in the long run. | 2 | -3 | 4 |
| 23. I don't understand how money could be an issue when lives are at stake trying to navigate the Oregon Inlet. | 0 | -1 | -5 |
| 24. It's pointless to manually keep OI open to larger, deeper vessels. | -3 | 0 | 1 |
| 25. The new Bonner bridge currently being proposed by the state has an elevated portion 5,000 feet long that would allow the navigation channel to be moved as conditions dictate. This would eliminate the need for the jetties and the terminal groin. | -1 | 0 | 0 |
| 26. Destroy the jetty on the south end of OI, and use tax money to dredge every year. | -3 | 0 | -1 |

| | | | |
|---|---|---|---|
| 27. Prevention of the migration of the sand into the navigation channel has to be the goal. We have to intercept the sand and dredging has proven to be ineffective for any significant degree of time. | 5 | -3 | -4 |
| 28. A terminal groin on the north side, and using the old bridge would be a good idea. Granted, it would cause problems. But, there is no solution that won't cause problems. | 0 | -3 | -1 |
| 29. The only permanent solution for Oregon Inlet is terminal groins accompanied with a sand bypass system. | 1 | -4 | 2 |
| 30. Inlets are stabilized and managed all over the world without adverse effects through the construction of jetties and sand bypass systems | 2 | -5 | -4 |
| 31. Modern sand bypass technology can keep Pea Island supplied with sand. | 1 | -2 | 2 |
| 32. I don't think we should put a jetty on the north side of the inlet because the sand that migrates down the beach from the north to south will no longer be deposited on the beaches south of the inlet. | -1 | 2 | -3 |
| 33. It is no secret that these inlets open and close – they've been doing so for tens of thousands of years and will continue to do so no matter how hard man tries to stop them. | 0 | 5 | 3 |
| 34. Outer Banks residents simply must come to grips with the geologic reality of where they live. | -1 | 2 | 2 |
| 35. I believe we have the intellectual capacity to figure this thing out, given that it's been over 30 years that we've been talking about this issue. | 3 | 2 | 2 |
| 36. Construction of the jetties will diminish much of the public's recreational use of the Brodie Island spit. | -1 | 1 | -3 |

Table 8 presents a summary of the way responses associate with potential options for a navigable Oregon Inlet. "Variance" in this study refers to the amount of the discourse that can be explained by each theme.

We conclude that Theme 1 favors engineered options as a way to protect economic, cultural, and human safety needs of the Outer Banks region. Theme 2, and to some degree Theme 3, empathize with economic arguments for a stabilized inlet, but ultimately are skeptical that engineered structures would keep the inlet sustainably navigable while avoiding ecological and/or geological damage. The two main themes, 1 and 2, statistically hardly overlap because the values they reflect are very different and there are no options on the table that can satisfy both sets of values, i.e.

economic and ecological well-being for humans and natural communities. Theme 3 seems to reflect both sets of values to some extent and appears conflicted about options, other than terminal groins.

In summary, the analysis reveals a highly polarized set of stakeholders who view the issues and the potential solutions very differently. The fact that only two main themes emerge is an indication of the degree of polarization among stakeholders and a lack of middle ground. Q-study results can serve as both a starting point for collaborative dialogue and provide the sideboards for defining acceptable conditions and objectives. It is clear from these results that stakeholders are far apart with respect to a dialogue about navigation and sand management options.

**Table 8. Summary of Possible Options for a Navigable Oregon Inlet, N.C.**

| Theme 1 | Theme 2 | Theme 3 |
|---|---|---|
| All engineered structures are considered appropriate options in this theme. The economic, cultural and human safety needs of the area make these indispensable in this perspective. Highest ranked option is jetties and sand bypass system, second ranked is groins and a bypass system, last is deep dredging. | Although the economic needs for having a stabilized inlet are acknowledged, engineered options are perceived to ultimately fail and do more harm than good geologically and ecologically. If any options are preferred, the first would be a long Bonner Bridge, the second continued dredging. | There is no clear preference indicated in this theme regarding options. There is a clear acknowledgement of the economic significance of the inlet but also the opinion that a stabilized inlet might require more money than is reasonable considering the natural processes involved. |
| Variance Explained in the Discourse (%) | | |
| 37 | 26 | 6 |

## FINDINGS: STAKEHOLDER INTEREST AND CAPACITY FOR A COLLABORATIVE PROCESS

After completing the Q-sort component of the interviews, stakeholders were asked a series of questions pertaining to their experience and perceptions on collaborative processes in general, as well as their views on what factors would either allow and/or prohibit the success of a collaborative process on Oregon Inlet. These questions were designed to aid the Ruckelshaus Institute in determining if there is stakeholder interest and capacity to engage in a collaborative

problem solving process on the issues associated with Oregon Inlet. The authors offered interviewees confidentiality to encourage them to be candid in our conversations. In addition, as is required by the University of Wyoming, interviewees were read an implied consent form and asked if they were aware of the potential risks in participating in the survey. As was explained to the interviewees, this final report reflects what the authors heard in the interviews, but every effort has been made to avoid attribution to specific individuals or organizations (unless the individual stated that attribution was acceptable). The authors express their gratitude to those interviewed for sharing their experiences and opinions freely. The letter of introduction, the survey questionnaire, and interview protocol are contain in Appendices B and C.

## Stakeholders' Connections to Oregon Inlet

Stakeholders were asked to describe their connection to Oregon Inlet and their participation in any organized efforts to advance a solution toward what they perceive the problems to be. The purpose of these questions was to gain an improved understanding of the relationship each of the stakeholders have to Oregon Inlet, as well as their history working toward resolving the identified issues.

Many stakeholders expressed a very direct and long connection to Oregon Inlet through the regular use of the inlet for both commercial and recreational fishing. Many grew up in the Outer Banks, and have family and friends who also rely on the inlet for their livelihood. The dangers of traveling through the inlet are very real and relevant to them. Other stakeholders had a more removed yet tangible connection to the inlet, in that the inlet contributes economically to the Outer Banks and they have an interest in the prosperity of their community. This was typically seen in stakeholders who are involved in the management and promotion of tourism and economic development in Manteo. Still others had a purely vocational connection to the inlet, as the management of Oregon Inlet is a component of their jobs. This was seen with stakeholders who work in both state and federal agencies, and often interface with the public on regulatory and development aspects of the North Carolina coastline. Last, several stakeholders had very little direct connection to the inlet, but found value in it as a habitat for wildlife and as a relatively pristine natural landscape.

## Prior Experience with Collaborative Stakeholder Processes

There are varying levels of history among the stakeholders regarding participation in any organized efforts to advance a solution on Oregon Inlet. Many stakeholders are currently participating on the Dare County Oregon Inlet Task Force, as well as the Oregon Inlet Users Association. These stakeholders are generally aligned with the fishing and boating industry. Other stakeholders who work for a state or federal agency have participated in meetings and interacted with the public on issues around Oregon Inlet, though these were not necessarily considered "organized efforts." The most common form of participation expressed was attendance at public meetings and interactions with local government. Last, many of the stakeholders interviewed stated that they had not yet participated in any efforts to find a solution for Oregon Inlet.

Stakeholders were next asked a series of questions regarding their experiences and opinions on collaborative processes. The purpose of these questions was to gain an understanding of how multi-party negotiations were perceived within the community, and how these perceptions might impact the participation of stakeholders in future processes.

The first question regarding perceptions of collaborative processes was specific to the Cape Hatteras National Seashore Off-Road Vehicle Negotiated Rulemaking ("reg-neg") process. Very few interviewed stakeholders had actually participated in this process, but almost all of them had heard about it and had fairly strong opinions regarding its success, or lack there of. Some stakeholders believed the process was organized well, and could have potentially succeeded if there were not some severely limiting factors. These factors were generally identified as particular parties involved in the process who did not come to the table in good faith and did not abide by the agreements made. According to one stakeholder, "the environmental folks over-played their hand and pushed for regulations above and beyond practical, creating an atmosphere in which meaningful dialogue and the teachable moment for those folks in the middle was lost." Other stakeholders saw the reg-neg as doomed from the outset because they believed the National Park Service had already decided what their course of action would be and that the process was not genuinely seeking stakeholder input. Very little was said about the reg-neg that would imply it was considered a successful process by the stakeholders interviewed.

When asked whether they believe all parties with a stake in Oregon Inlet's management could work collaboratively and discuss the issues in good faith, local stakeholders associated with the commercial and charter boat industry generally expressed hope that all parties could, but also voiced concerns that certain stakeholders would repeat their actions exhibited in the Cape Hatteras

reg-neg. When asked to elaborate on who these stakeholders might be, it was consistently the environmental conservation organizations that were identified. One stakeholder warned that, "unless and until the other stakeholders think that they [environmentalists] are being honest, there is no chance for dialogue." However, while there was clear doubt expressed by the majority of stakeholders interviewed that the environmental contingency would act in good faith, several did believe that this was a different process and that if selection of the representatives was done very intentionally, there might be a chance that honest negotiations could occur.

## Key Issues to be Resolved

Stakeholders were then asked to identify the key issues they believe need to be discussed and resolved in order for a collaborative process to be successful. A diverse set of interests and issues was expressed, as seen below:

- Stabilization of Oregon Inlet through the use of groins and jetties
- The economic impact of a stabilized inlet versus a structure-free inlet
- Impacts of sand bypass systems
- The question of who should own the land surrounding Oregon Inlet if not the federal government
- Potential interim solutions
- Reliable revenue streams to implement a long-term solution

## Barriers to a Collaborative Process

Stakeholders were next asked to identify what they believe to be the most significant barriers to success of a collaborative process on Oregon Inlet issues. Several barriers were identified by the majority of the stakeholders, as seen below:

- The strategies and actions of the environmental conservation community
- Lack of resources, particularly funding in which to continue research as well as implement any agreed upon actions
- Stakeholders' preconceived notions about other's motives
- Federal property ownership around Oregon Inlet
- The politics associated with such large decisions

- The differing perspectives and reliance on science

With regard to these identified barriers, stakeholders were then asked how they believed these barriers could be overcome. With regard to the apprehension that all parties might not be willing to participate in good faith, many stakeholders feared there were no solutions for overcoming this particular barrier. Others expressed more optimism, and stated that identified barriers could be overcome through clear and intentional selection of participating stakeholders, through the creation of partnerships across stakeholder groups in order to share resources, through the help of Congress, and through improved and increased research on both the engineering capabilities as well as environmental impacts.

## Ingredients of a Successful Process

The stakeholders were asked what they would consider to be a successful outcome from a collaborative process. Many of the stakeholders went immediately to their preferred solution and stated that success would be a stabilized inlet. For example, one participant stated that success would be to "find the middle ground on [this issue] and hopefully the middle ground will be a deep channel through the Oregon Inlet." Another participant stated that success would be the "recognition that the public lands… are sustainable assets…that have to be regulated." Others reflected that the mere ability to engage in civil dialogue with the spectrum of stakeholders and explore options would be a success. One participant expressed that he hoped a process would open stakeholders' eyes to the interests of others, stating that success would be for all stakeholders to "recognize that folks who have lived here for hundreds of years should have the right to continue to exist here."

When asked what the potential consequences might be to them or others if a process was either not successful or not undertaken at all, the nearly unanimous response was that the situation would remain the same. For some, this situation is completely unacceptable. Others see this as either a good situation, or at the very least, not in any way harmful. Very few saw any new consequences arising if a process were not successful. One participant did predict that if a process was unsuccessful, "we're going to end up in courts and we're going to have to battle it out. The only one's that win there are the lawyers." And lastly, one participant stated that the status quo was one that meant the loss of a lifestyle. "You're going to see, " he said. "We're losing our heritage."

After explaining that collaborative processes strive to be as inclusive as possible, with all relevant parties engaged, the stakeholders were then asked who they believe should be involved in the process. This list created by stakeholders mirrored the list generated at the outset of the assessment, and included:

- Commercial fisherman
- Recreational fisherman
- Environmental conservation organizations
- Fish and Wildlife Services
- National Park Service
- Tourism Board
- North Carolina state agencies
- United States Coast Guard
- Army Corp of Engineers

The last question in this series was if the stakeholder would be interested in participating in a collaborative effort. Not surprisingly, the stakeholders who are the most intimately connected with Oregon Inlet were the ones who voiced the strongest interest in participating in a collaborative process. However, the majority of the stakeholders did express that they would be willing to participate in a collaborative process, assuming that the time and financial resources were available to them. There was a bit of reluctance by a couple of stakeholders who thought their presence at the table might not be welcome, but they still stated that they were amenable to the idea. Several stakeholders who are involved with Oregon Inlet through state or federal agencies stated that they would likely be involved unless a more appropriate colleague was chosen.

## Information Needs

The next series of questions focused on the information stakeholders thought they might need in order to participate in a solution-seeking collaborative process, as well as what they perceived the information needs of others to be. Along with these potential gaps in information, stakeholders were asked to identify any completed scientific or engineering studies on Oregon Inlet that they thought were either more or less credible, as well as being relied upon by the public. The objective for these questions was to not only understand where there might be differing opinions on the

validity of science and technology within the dialogue, but also to begin to understand how extensive a joint fact-finding process will need to be if a collaborative process is convened.

A variety of scientific, engineering, and economic studies were identified as being necessary in order for a diverse group of stakeholders to make informed and well-considered decisions. These studies, as well as other identified needs, include:

- An updated economic assessment similar to the Nicholas assessment completed in 2006
- Improved models of the various types of stabilizing structures that may be used on Oregon Inlet
- Impacts to fish larva due to sand migration
- Economic implications of the variety of management alternatives
- Statutory framework governing the management of Oregon Inlet
- What new technology is available, and how can it be applied to Oregon Inlet
- How will a moving inlet impact the new bridge
- A precise set of maps outlining the shoals with a time series component to shoe movement

## Logistical Needs

The last series of questions focused on the logistical limitations and needs of the stakeholder with regard to their ability to participate in a collaborative process. The purpose of these questions was to gain an understanding of how a process might be structured in order to ensure maximum availability and participation by the stakeholders.

The primary limitation to participation expressed by stakeholders was a lack of time, particularly in the summer months. As one participant explained it, meetings can't be too long because he's already "trying to survive in tough economy right now." However, many stakeholders stated that if they were given adequate notice and time to arrange their schedule before each meeting that they would likely be capable and interested in participating. Stakeholders who worked for state and federal agencies stated that they may also be limited by funding.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the results gathered from the Q-sort and follow-up interviews with each of the stakeholders, the Ruckelshaus Institute does not recommend convening a solution-seeking process at this time.

When assessing whether a collaborative process is appropriate for a particular issue, there are a number of questions that must be addressed. In determining answers to these questions, the analyst can begin to outline the dynamics of the conflict, which will in turn help determine the current potential for collaboration as well as highlight what potential barriers to a successful collaboration might exist. These questions are outlined below, along with the conclusions the Ruckelshaus Institute has drawn regarding Oregon Inlet.

- *Are the issues clear?*
  Yes, the issues underlying the Oregon Inlet conflict are clearly defined and seemingly well understood by the majority of the interviewed stakeholders.

- *Is the timing appropriate?*
  There is a clear sense of urgency expressed by the stakeholders that denotes that the issues are ripe for discussion and the stakeholders eager to find a solution. However, due to the regulatory constraints on development associated with the federal land ownership on both sides of the inlet, it may not be an appropriate time to attempt negotiating solutions that include the insertion of permanent structures.

- *Is the issue negotiable?*
  Given the extremely polarized and entrenched positions of the majority of the stakeholders involved in the issue, the management of Oregon Inlet may not be negotiable at this point in time. If stakeholders were willing to step away from their positions and expand their thinking beyond a stabilized inlet versus a structure-free inlet, there might be more room for negotiation and solution generation. However, very few stakeholders expressed a willingness to do so.

- *Can the participants be identified? Will they participate in good faith?*
  Interested and invested stakeholders are easily identified, and many have expressed willingness to participate in a dialogue on how Oregon Inlet should be managed.

- *What is the history of the situation?*
  The history associated with Oregon Inlet is extensive, spanning decades of conflict and controversy on how the inlet should be managed. This history is a significant contributor to the contentious and distrusting relationships among many of the stakeholders.

- *What is the level of trust among participants?*
  The level of trust between certain stakeholder groups is very low. Differences in values have contributed to a longstanding distrust between the fishing community and the environmental conservation community. These relationships were even further strained after the Cape Hatteras National Seashore Off-Road Vehicle Negotiated Rulemaking.

- *What is the level of contention?*
  Contention between certain stakeholder groups is high. Again, this can be attributed to the general differences in culture and values between the various entities, which was exacerbated through the Cape Hatteras reg-neg.

- *Is there political support for resolution?*
  There is local political support for a solution that will improve the safety and navigability of Oregon Inlet. Support from the Governor's office has also recently been expressed. However, increased attention and support from the federal government will be necessary for any lasting solutions that meet the expectations of those who want a stabilized inlet.

- *Are resources available to support collaboration?*
  Conversations with the Governor's policy staff have indicated that there is sufficient support within local and state government that adequate resources would be available to support a collaborative process.

- *Are key decision makers willing to use the process?*
  Key decision makers have expressed an interest and willingness to engage in a collaborative process to seek solutions on the management of Oregon Inlet.

While many of the questions could be answered positively, it was determined that there are still too many existing barriers to recommend a solution-seeking process. These barriers are primarily related to the questions of negotiable issues, trust, and political support. A more in depth analysis of these barriers are found below.

## Barriers to Collaboration: Are the issues negotiable?

There are a number of barriers currently existing that will likely make a solution-seeking process unsuccessful. The first of these barriers is the extremely entrenched positions many of the stakeholders expressed throughout the interviews. While many interviewees voiced optimism that a collaborative process would allow stakeholders to find a workable solution, they often simultaneously expressed that they would only participate if the purpose of the process was to seek methods of managing the inlet that aligned with their particular positions. For instance, one participant stated that he would be willing to participate in a collaborative process, "as long as we are working toward a stabilized inlet." This sentiment was echoed by a large number of the assessment participants. On the other end of the spectrum, another participant stated that they would gladly participate in a process, but they would "not support a permanent structure under any circumstances." These two contradictory sentiments leave very little room for negotiating options that would meet the interests of all the stakeholders, thus likely prohibiting a solution-seeking process from being successful.

## Barriers to Collaboration: Will parties negotiate in good faith?

A second existing barrier is the lack of incentive several stakeholders have to participate in a process. In order for a collaborative, solution-seeking process to be successful, all parties at the table must feel that the process is their best option for meeting their interests. There will likely be a lack of incentive to participate if a stakeholder believes they have a better alternative to fall back on than an negotiated agreement. If the current status quo is perceived as being better than any potential solution arising from negotiations within a process, there is little reason for the

stakeholder to invest valuable time and resources into a process. In this particular situation, several key stakeholders are content with the status quo of Oregon Inlet remaining structure-free, as it meets their interest in preserving the natural landscape. The current regulatory framework enforces this status quo, and stakeholders in support of a structure-free inlet have the ability to hold the Fish and Wildlife Service and the National Park Service accountable to these frameworks. Thus, while these stakeholders are willing to participate in dialogue on the issue of Oregon Inlet management, they have little reason to enter into negotiations that may weaken or change the status quo. Therefore, without all parties negotiating earnestly and in good faith, it is unlikely that a solution-seeking process would be successful.

### Barriers to Collaboration: Is there political support?

Another significant barrier to a solution-seeking process is the clear and seemingly non-negotiable management mandates that both the Fish and Wildlife Service and the National Park Service must adhere to. These mandates prevent management actions that would negatively impact wildlife habitat, particularly that of the nesting plover and other birds that are dependent on beach habitat managed by the Department of the Interior. According to scientific studies that many key stakeholders rely upon, installing permanent structures into Oregon Inlet would cause significant impacts. Thus, until these federal mandates are changed, there is very little room for negotiating a solution that involves a permanent structure. That being said, a bill recently signed into law by Governor Pat McCory authorizes the creation of a task force to study the possibility of the state purchasing land surrounding Oregon Inlet from the Department of Interior. If this transfer of land ownership were to occur, these federal mandates inhibiting the use of solid structures within Oregon Inlet would no longer create a barrier to negotiation.

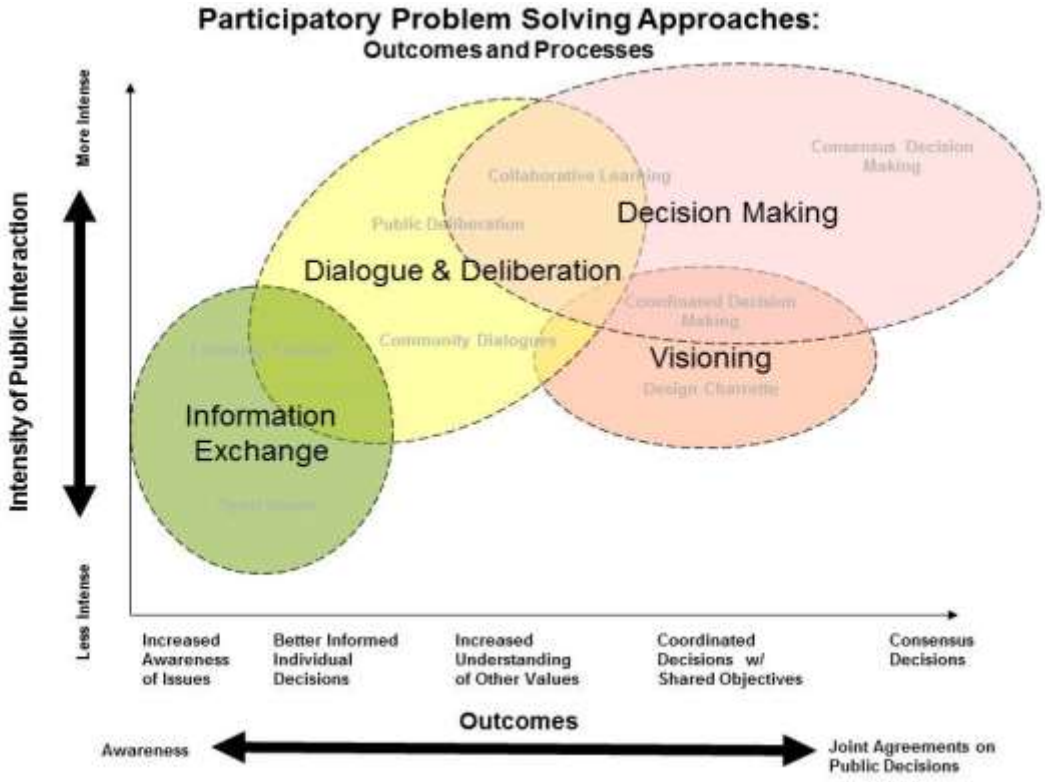
## ALTERNATIVES TO A SOLUTION-SEEKING PROCESS

A collaborative, solution-seeking process is just one of many forms of participatory processes that stakeholders may engage in when seeking solutions to public problems. Public participation approaches are commonly tailored to the specific circumstances of an issue or the stakeholders involved, drawing on elements or practices to suit the context and incorporating different participatory techniques and formats at different project. As shown in Figure 2, participatory

problem-solving approaches can be differentiated with respect to the outcomes intended and the intensity of public interaction.

As Figure 2 illustrates, participatory approaches can range from processes that seek to increase peoples' awareness of the issues to those that are designed to reach consensus decisions on solutions for resolving the issues under discussion. Each process incorporates varying degrees of public interaction, with consensus-seeking processes requiring the most intense level of public involvement. As one moves toward the upper-right portion of the diagram, the process approaches are designed to achieve greater levels of understanding and move from dialogue to action. Processes that lie within the decision making "bubble" include collaborative learning, coordinated decision making and consensus decision making.

**Figure 2. Participatory Problem Solving Approaches**




It is understandable that those seeking a policy solution to the issues related to Oregon Inlet would wish to pursue an outcome that results in joint agreements on public decisions. A consensus-seeking or solution-seeking process, if successful, can ultimately lead to binding agreements between the stakeholders at the table and the agencies responsible for carrying out those

agreements. However, as discussed earlier, such a process requires a significant degree of stakeholder trust, an ability for parties to negotiate in good faith, and a solution set that is wide enough to enable the various interests to find a settlement point. These ingredients are not present surrounding the Oregon Inlet issues at this time.

## A Collaborative Learning Process

Rather than convening a consensus-seeking or solution-oriented process, the Ruckelshaus Institute suggests that key stakeholders interested and invested in the management of Oregon Inlet instead engage in a collaborative learning process. The objective of this process should not be to reach agreement on a management strategy, but rather to evaluate available information and determine what the remaining research needs are. The process of seeking out and evaluating information may also result in stakeholders discovering potential areas of agreement that expand the currently perceived options for improving navigation safety while protecting the natural landscape.

The need to develop mutual understanding on key issues such as engineering capabilities, environmental impacts of sand migration, and economic implications of a stabilized inlet was one that quickly became apparent during the assessment. Many stakeholders cited similar examples of permanent structures being utilized around the globe, but there was a great variance in perception on whether those models would be appropriate for Oregon Inlet. For example, many stakeholders discussed a jetty-groin system being utilized in Australia. Some believe a similar system will adequately improve navigational safety and mitigate natural coastal processes within Oregon Inlet while others believe that the quantity of water passing through Oregon Inlet is far too great for a similar system to handle. Some stakeholders claimed there is clear, irrefutable evidence that sand bypass systems and permanent structures negatively impact larva migration while others declared there has been no definitive studies proving this. Nearly all the stakeholders were aware of the 2006 economic study done by Moffat & Nichol, but some strongly believe it is proof that the local economy depends on a stabilized inlet and others believe the study is outdated and irrelevant. While some stakeholders have a strong understanding of the regulatory framework that constrains development of Oregon Inlet, others believe that the Fish and Wildlife Service and the National Park Service have vast decision-making authority of how the land around Oregon Inlet is used. It is clear that these foundational differences in evaluating and applying available information is a major component to the general conflicts associated with Oregon Inlet. There was also a general

sentiment expressed that more information is needed in order to fully address the spectrum of stakeholder interests.

A collaborative learning process should focus on gathering information relevant to potential management and decision-making needs. Thus it should be confined to the information needs identified by the stakeholders, such as engineering options and capabilities, environmental impacts of hardened shorelines, economic implications of the various management alternatives, and the statutory framework governing Oregon Inlet. Many studies have been conducted over the last several decades addressing questions relevant to Oregon Inlet. The first step of a collaborative learning process should then be to gather these studies and address both the strengths and weaknesses of each. This will inform what research needs still remain. A collaborative learning process should result in a final report that describes the initial areas of disagreement, the questions addressed throughout the process, the information obtained, and any agreed upon recommendations or conclusions that can be drawn.

The potential benefits of convening a collaborative learning process are numerous. Along with increasing the general understanding of the possibilities and limitations associated with the management of Oregon Inlet, it would also be a potential opportunity for improving relationships and the quality of dialogue among stakeholders. By removing the pressure of needing to reach a mutually agreed upon solution, stakeholders may be more inclined to engage with those they lack trust in. The process of discussing and evaluating information and finding common ground may help stakeholders better understand the underlying interests and values of others, thus potentially increasing the likelihood of stakeholders expanding their range of acceptable solutions.

Of course, a collaborative learning process offers its own unique set of challenges as well. There must be an incentive for stakeholders to commit resources to participation in a process that will not necessarily contribute to the furtherance of their specific goals. If additional research is deemed necessary by the stakeholders, they will need to determine how to allocate available resources to fund it. Differing levels of trust in the science can create its own set of conflicts that will eventually need to be negotiated. Therefore, if a collaborative learning process is begun, it needs to be done strategically. Clear objectives must be set from the beginning and the appropriate stakeholders committed to a learning process involved, as well as appropriate experts that can assist in the evaluation of information. Adequate resources will need to be identified and committed in order to

fund any additional research. A third party neutral should be involved in order to facilitate safe and productive dialogue.

## REFERENCES

Addams, H., 2000. Q Methodology. Social Discourse and Environmental Policy: an application of Q methodology. H. Addams and J. Proops. Northampton, MA, Edward Elgar Publishing, Inc.

Addams, H., et al., 2000. Social Discourse and Environmental Policy. Northampton, MA, Edward Elgar Publishing Inc.

Cheng, A. S., and Mattor, K., 2006. "Why won't they come? Stakeholder perspectives on collaborative national forest planning by participation level." Environmental Management, Volume 38, Issue 4, pp. 545 - 561.

James, Erin July 7, 2011. "NCDOT: Suit Won't Delay Bonner Bridge Replacement". *The Virginian-Pilot*.

NC DOT, 2013. "Bonner Bridge Replacement Project." Accessed on October 9, 2013 at http://www.ncdot.gov/projects/bonnerbridgereplace/

Southern Environmental Law Center, 2013. "Bonner Bridge Replacement Case Summary." Accessed on August 12, 2013 at http://www.southernenvironment.org/cases/bonner_bridge_replacement#sthash.Pz8YTqul.dpuf.

Steelman, T. A., et al., 1999. "Understanding Participant Perspectives: Q-Methodology in National Forest Management." Journal of Policy Analysis and Management **18**(3): 361-388.

US Government Accountability Office (GAO), 2002. Oregon Inlet Jetty Project: Environmental and Economic Concerns Need to Be Resolved. GAO-02-803, Sep 30, 2002.

US Institute for Environmental Conflict Resolution (USIECR), 2013. "NPS Cape Hatteras National Seashore Off-Road Vehicle Negotiated Rulemaking, January 2005 - February 2009." Accessed on October 9, 2013 at http://www.ecr.gov/Projects/CaseBrief.aspx?Project=794.

van Eeten, M., 2000. Recasting Environmental Controversies: A Q Study of the Expansion of Amsterdam Airport. Social Discourse and Environmental Policy. H. Addams and J. Proops. Northampton, MA, Edward Elgar Publishing Inc.

Webler, T., et al., 2001. "What is a Good Public Participation Process? Five Perspectives from the Public." Environmental Management **27**(3): 435-450.

Woolley, J. T., et al., 2000. "The Conflicting Discourses of Restoration." Society and Natural Resources(13): 339-357.

## APPENDIX A – LIST OF COMPLETED INTERVIEWS

*Economic/Tourism*

Karen Brown, Outer Banks Chamber of Commerce

Lee Nettles, Dare County Tourism Bureau

*Environmental Conservation*

Don Barger, National Parks Conservation Association

Geoff Gisler, Southern Environmental Law Center

Walker Golder, Audubon Society

Todd Miller, NC Coastal Federation

*Federal Government*

Mike Bryant, US Fish & Wildlife

Pace Wilbur, NOAA

Dr. Jesse McNinch, US Army Corps of Engineers

Barclay Trimble, National Park Service

*Fishing and Boating Industry*

John Bayliss, Dare County Boat Builders Foundation

Mikey Daniels, Oregon Inlet Users Association

Ernie Foster, NC Waterman Association

Bob Peele, Wanchese Seafood Industrial Park

Britton Shackleford, Oregon Inlet Sportfishing Guides Association

Harry Schiffman, TowboatUS & SeaTow

Tony Tillet, Oregon Inlet Fishing Center

Jim Tobin, Pirate's Cove Marina

*Local Government*

Bobby Outten, Dare County

*State Government*

Malcom Fearing, NC Dept. of Transportation

Kathy Rawls, NC Division of Marine Fisheries

Frank Jennings, NC Division of Coastal Management

Dr. Matthew Godfrey, NC Wildlife Resources Commission

Zane Hedgecock, NC Dept. of Agriculture

## APPENDIX B – LETTER OF INTRODUCTION

Date

Name

Address

City

Dear First Name,

We are requesting your assistance in a study to identify different stakeholder perspectives on development of the Oregon Inlet, and to assess the opportunities for a stakeholder dialogue on sand management options. This study is being conducted in partnership with Dare County. You are receiving this letter because of your knowledge and interest in this issue. The study will provide valuable data that can be used to provide an explanation regarding how and why key stakeholders view the tradeoffs associated with development of the Oregon Inlet.

The study will be conducted in person and involves two steps. In the first step, participants are asked to rank variables presented as statements printed on small cards. The second is a one-on-one interview to further explore these beliefs and values and to assess the potential for a collaborative, science-based process for developing recommendations on sand management in the inlet. All survey and interview responses will remain confidential and any personal identifying characteristics will be removed to ensure your anonymity. This project complies with human research protection guidelines set out by the University of Wyoming's Office of Research and Economic Development. For more information or concerns, please contact the office at (307) 766-5322.

Elizabeth Spaulding with the Ruckelshaus Institute will be contacting you soon to schedule a date, time, and location for an interview. The interview should take no more than one-hour and a half, and will be conducted by Elizabeth, the Ruckelshaus Institute's Public Policy Facilitator, or me. If you are interested in participating in this study, we will send you more information on the study prior to the interview.

We would greatly appreciate your participation in this project. Please feel free to contact Elizabeth Spaulding at (307) 766- 5331 or espauldi@uwyo.edu or me at (307) 766- 2703 or steve.smutko@uwyo.edu if you have any questions about this project.

Thank you for your time and consideration in participating in this study.

Sincerely,

Steve Smutko, PhD.
University of Wyoming
Haub School of Environment and Natural Resources
Dept. of Ag & Applied Economics

# APPENDIX C – INTERVIEW PROTOCOL

## Oregon Inlet Interview Protocol

**Interview Intro:**
Thank you for taking time to participate in our interview. I am Elizabeth Spaulding with the Ruckelshaus Institute at the University of Wyoming. We have been contracted by the Dare County Commission and the Dare County Oregon Inlet Task Force to gather information about stakeholder perceptions of Oregon Inlet issues, and how best to structure and conduct a collaborative process that will assist state and local government in identifying strategies for creating a sustainable and reliable navigable channel through Oregon Inlet.

Dare County and the Oregon Inlet Task Force is seeking assistance on how best to involve interested parties, share information, and work as collaboratively as possible on developing recommendations for creating a sustainable and reliable navigable channel through Oregon Inlet. Because collaboration means different things to different people, the Oregon Inlet Task Force wants to understand how people with an interest in and knowledge of Oregon Inlet view the idea of collaboration, in particular their expectations for how interested parties can best work together, and under what conditions. This information will help the Oregon Inlet Task Force, and North Carolina state government determine how to engage with various interest groups as they move to develop strategies for maintaining a navigable channel.

We are gathering information from a wide range of interested parties to better understand their perceptions of the issues and views about collaboration, and if and under what conditions they are willing to work together. We expect to interview about 30 people.

[Review the Stakeholder Assessment Consent Form with participant]

Do I have your permission to begin asking you questions?

**Q-SORT FOLLOW-UP**

1. While deciding what statements you agreed or disagreed with, were there any trade-offs that were particularly difficult?

2. Considering that these statements represent the public discourse or conversation regarding the issues being considered in relation to reliable navigation, sand management, and environmental integrity, do you feel your viewpoints and opinions are represented? Is there anything missing?

3. What statements did you most agree with and why?

4. What statements did you most disagree with and why?

5. What statements wound up more in the middle section and why?

**PERCEPTIONS ABOUT COLLABORATIVE PROCESSES**
Now I'm going to ask you a series of questions about what your connections to Oregon Inlet and your perceptions about collaborative problem solving.

**Info on Stakeholders:**
The first few questions are about you, your connection to Oregon Inlet, and your experience in dealing with specific issues related to the inlet.

6. Please tell me a bit about yourself. What is your connection to the Oregon Inlet?

7. Have you been involved on any organized effort to advance a solution toward what you perceive to be the problems related to the Inlet? Could you describe those efforts?

**Views About Collaboration:**
The next set of questions is related to working collaboratively with other groups. Collaboration can often mean different things to different people. We want you to think about a process that will allow you to work with others in agreeing on the problems to be solved, developing options that can work to solve those problems, evaluating those options, and then reaching agreement on the best path forward. Collaboration can be achieved even if other parties may or may not share your perspective on how the Oregon Inlet can and should be dealt with.

8. Are you familiar with, or were you involved in the Cape Hatteras National Seashore Off-Road Vehicle Negotiated Rule Making ("reg-neg") process? What are your perceptions about that process?

9. What is your experience in working with individuals from different backgrounds, values, or positions to find solutions on tough issues?

10. Do you believe that it is possible for all of the parties with a stake in this issue to work collaboratively and discuss the issues in good faith? Why or why not?

11. What are the key issues you believe need to be discussed and resolved in order for this collaborative effort to be successful? Do you believe that these issues are negotiable?

12. What do you think might be the most significant barriers to collaboration on the Oregon Inlet issue?

13. How can those barriers be overcome?

14. What would you consider to be a successful outcome from a collaborative process?

15. What might the potential consequences be to you and others if a collaborative process is not undertaken or is not successful?

16. Would you be interested in participating in a collaborative effort? If not, what would need to happen to encourage your participation?

17. Collaborative efforts as a general rule are inclusive. Who do you think needs to be aware of or should participate in this process?

**Information Sharing**
18. What technical information would you need in order to participate effectively in a collaborative process?

19. There have been many scientific and engineering studies of the Oregon Inlet undertaken over the years. Do you think that some of these studies can be of use in helping a collaborative group understand the issues and find solutions?

20. Do you believe that more studies should be undertaken in order to help a collaborative group understand the issues and find solutions? If yes, what kinds of studies?

21. What studies or other sources of information about the Oregon Inlet do you believe are credible resources that should be used as a basis for discussion?

22. Do you believe that there are studies or other sources of information that are generally accepted by many people as reliable, but you feel are not reliable or are misleading? If yes, which studies, or what information do you feel is misleading?

**Logistics:**

23. Because the Oregon Inlet issue is quite complex, it is likely that that a collaborative process could involve multiple meetings lasting several hours each. Would you be willing to commit to regular meetings over the course of several months?

24. Will you have time or financial constraints that will prevent you from participating?

**Other:**

25. Do you have any concerns or questions regarding the Ruckelshaus Institute or the Dare County Oregon Inlet Task Force convening this process?

26. Do you have any questions for me?

## APPENDIX D – Q-SORT STATEMENT

# Oregon Inlet Q-Statements

1. Please, if you love the Outer Banks or live here, understand that this is part of our heritage and it is dying quickly. All of the millions of dollars spent on studies could have paid to solve the problem.
2. Let's just fill the whole inlet in with sand and stop all the dredging and let nature play its course.
3. If the inlet closes (and no other major inlets form), the increase in fresh water in the sound will cause the disappearance of clams, oysters and many salt water species of fish will disappear.
4. The inlets are exactly the way they should be. It's just people who are having a hard time adapting.
5. Please, no more jetties-groins. As proven, they increase erosion, strip sandbars and shoals and clog the inlet.
6. I believe that a jetty would create new fish and marine habitat and it would also cause the sand that has drifted down from south Nags Head to naturally replenish.
7. Building jetties would be environmentally harmful because they would restrict the migration of fish larvae from the ocean to the sounds inside the inlet, where the larvae develop into fish.
8. The jetties will reduce successful movement of fish larvae, juvenile fish and invertebrates into the sounds, which is of particular concern to economically valuable fish such as flounder.
9. It is important to incorporate a weir into the design of a northern Oregon Inlet jetty to allow fish larvae to migrate over the jetty through the inlet into the Sound.
10. The sand bypass system will permanently alter the shoreline and affect turtle and shorebird habitat.
11. The sand bypass system will disrupt natural sand migration into Pamlico Sound.
12. A weir would not work because the additional sand deposited from Nags Head beaches down to Oregon Inlet will result in the weir becoming sanded in, nullifying its expected benefit of allowing larvae migration to flow through.
13. You will see major income loss if that inlet isn't fully open. Commercial and recreational fishing will be affected, so marinas will die as well.
14. The burden for funding Oregon Inlet should fall to local taxpayers and users.
15. Several economic studies have been performed to assess the benefits of a stabilized O.I., the most recent in 2006 by Moffatt & Nichol, and each have indicated the great economic benefits from a dependable, navigable inlet.
16. Fishing, both commercial and recreational, is a major Outer banks industry which heavily supports another major industry, tourism. Without the Oregon Inlet, we will lose fishing and the tourism will suffer badly.
17. Time to rethink the whole Oregon Inlet with its shoaling problem. No need to build the new Bonner Bridge to Nowhere, much more cost effective to build a bridge around Pea Island entirely.
18. Quit wasting money. Dredging or engineering in the Oregon Inlet is nothing but a big subsidy for a special interest.
19. The commerce that moves through this inlet: commercial, recreational, and oceangoing, is a way of life and source of independence for many.

20. If we had a 16-foot channel in Oregon Inlet with a dredge for a deep enough channel, it would more than triple the employment in the industry.
21. Put the money into ferry service at Oregon inlet and forget the bridge.
22. A jetty would cost some more money but in the future would save a lot more in the long run.
23. I don't understand how money could be an issue when lives are at stake trying to navigate the Oregon Inlet.
24. It's pointless to manually keep OI open to larger, deeper vessels.
25. The new Bonner bridge currently being proposed by the state has an elevated portion 5,000 feet long that would allow the navigation channel to be moved as conditions dictate. This would eliminate the need for the jetties and the terminal groin.
26. Destroy the jetty on the south end of OI, and use tax money to dredge every year.
27. Prevention of the migration of the sand into the navigation channel has to be the goal. We have to intercept the sand and dredging has proven to be ineffective for any significant degree of time.
28. A terminal groin on the north side, and using the old bridge would be a good idea. Granted, it would cause problems. But, there is no solution that won't cause problems.
29. The only permanent solution for Oregon Inlet is terminal groins accompanied with a sand bypass system.
30. Inlets are stabilized and managed all over the world without adverse effects through the construction of jetties and sand bypass systems
31. Modern sand bypass technology can keep Pea Island supplied with sand.
32. I don't think we should put a jetty on the north side of the inlet because the sand that migrates down the beach from the north to south will no longer be deposited on the beaches south of the inlet.
33. It is no secret that these inlets open and close – they've been doing so for tens of thousands of years and will continue to do so no matter how hard man tries to stop them.
34. Outer Banks residents simply must come to grips with the geologic reality of where they live.
35. I believe we have the intellectual capacity to figure this thing out, given that it's been over 30 years that we've been talking about this issue.
36. Construction of the jetties will diminish much of the public's recreational use of the Bodie Island spit.

## APPENDIX E- Q-SORT INSTRUCTIONS

# Q-Sort Instructions
# Stakeholder Assessment Regarding Oregon Inlet

Please provide us with your viewpoints regarding the Oregon Inlet. You do this by sorting the 36 statements provided along a scale from most agree (+5) to most disagree (-5). How you evaluate these statements, and how you consider the trade-offs in this process, is what is important for us. This is not a test and there are no right or wrong answers. The objective is to meaningfully understand your opinions and your reasons for them.

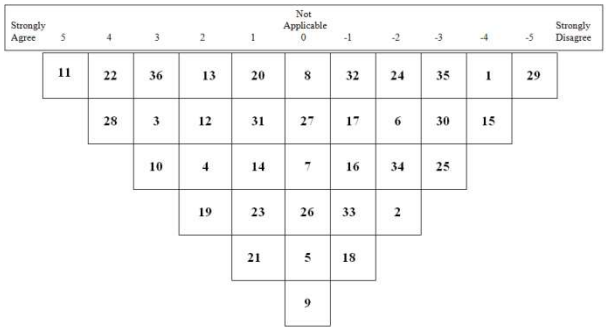
**What to do:**

First: Place the response sheet on a table with enough room to be comfortable.
Second: read through the statements, placing them in three piles: one to the left for statements you generally agree with, one to the right for statements you generally disagree with and a pile in the middle for statements of lesser importance, or that you are ambivalent about.

Third: Examine more closely the pile of statements you generally agree with. Spread these out, and select the one you most strongly agree with. Place this in the +5 space according to the response sheet. Then pick out the next two statements that you most agree with and place them in the +4 column. Continue this with the statements you agree with. In this methodology, what columns you place your statements in (e.g. -3, +5 or -5) is what is important. The rows have no significance.

Next: Repeat the process for the statements you disagree with, or that are of lesser importance to you, or you feel ambivalent about – they will go in the middle columns. The center column (identified by "0") may not be of zero importance to you, but statements that you least agree or disagree with, or that you are not sure about, or you about which you have mixed feelings.

Finally: when you have completed the sorting, all 36 statements will be arranged in front of you on the statement guide. **Please be sure that you have one statement in each square and that all squares are filled**. At this point, you may review your ordering and change the positions of any statements if you want to.




Please record the statement number (on the back of the cards) in the appropriate box on the response sheet. *An example of a completed response sheet is shown in the diagram at left*. **Send your completed response sheet to the Ruckelshaus Institute in the enclosed return envelope.**

Confidentiality: All the information you provide will be held in strictest confidence in the tabulation and in reporting of the results.

## APPENDIX F- Q-SORT RESPONSE SHEET

# Oregon Inlet Q-Sort Response Sheet

Thank you for participating in this stakeholder assessment. One part of this assessment consists of this card sorting exercise to explore the perspectives of stakeholders regarding Oregon Inlet issues. Please sort the cards according to the statements you most agree with to those you most disagree with according to the format below. Record the corresponding card numbers in the boxes in the diagram below. Return the response sheet to the address below. **See enclosed information for more complete instructions.**

| Strongly Agree 5 | 4 | 3 | 2 | 1 | Not Applicable 0 | -1 | -2 | -3 | -4 | -5 Strongly Disagree |
|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 22 | 36 | 13 | 20 | 8 | 32 | 24 | 35 | 1 | 29 |
| | 28 | 3 | 12 | 31 | 27 | 17 | 6 | 30 | 15 | |
| | | 10 | 4 | 14 | 7 | 16 | 34 | 25 | | |
| | | | 19 | 23 | 26 | 33 | 2 | | | |
| | | | | 21 | 5 | 18 | | | | |
| | | | | | 9 | | | | | |

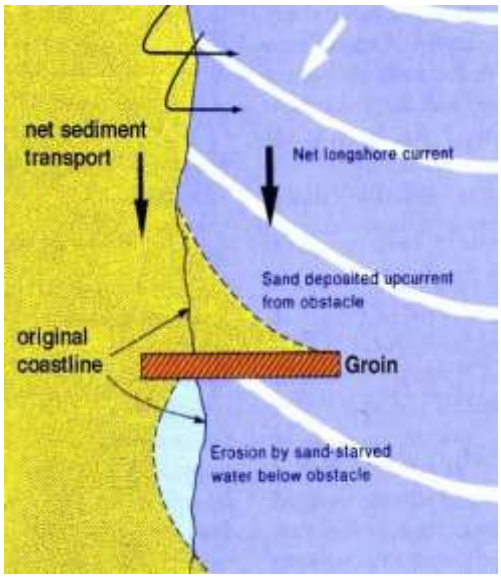


Please return your completed response sheet with your card numbers in the stamped, return envelope included in your packet. Any questions? Please contact Elizabeth Spaulding at espauldi@uwyo.edu or 307-766-5331.

**APPENDIX G – INFORMATION SHEET ON ENGINEERED STRUCTURES**

# GROINS

A **groin** is a rigid hydraulic structure built from an ocean shore that interrupts water flow and limits the movement of sediment. A groin is constructed across the beach, perpendicular to the shoreline, and is designed to trap sand moving in the longshore transport system. In the ocean, groins create beaches, or avoid having them washed away by longshore drift. All of a groin may be under water, in which case it is a **submerged groin**. Groins are generally made of concrete, or rock piles, and placed in groups. Sometimes, the term jetty (a structure used to stabilize an inlet) is misused to refer to a groin.




As sand accumulates on the updrift side of the groin, the beach at that location becomes wider. However, this is often accompanied by accelerated erosion of the downdrift beach, which receives little or no sand via longshore transport. It is important to realize that groins do not add any new sand to the beach, but merely retain some of the existing sand on the updrift side of the groin.

Groins are usually constructed from materials including steel, timber, or stone. The length, elevation, and spacing between groins should be designated on the basis of local wave energy and beach slope. Groins that are too long or too high tend to accelerate downdrift erosion because they trap too much sand. Groins that are too short, too low, or too permeable are ineffective because they trap too little sand. Flanking may occur if a groin does not extend far enough landward. Groins are generally constructed in groups called groin fields.

Source: Delaware Sea Grant College Program, Coastal Processes FAQ, accessed at http://www.deseagrant.org/outreach/coastal-processes-faq-difference-between-jetty-groin, July 26, 2013

## JETTIES

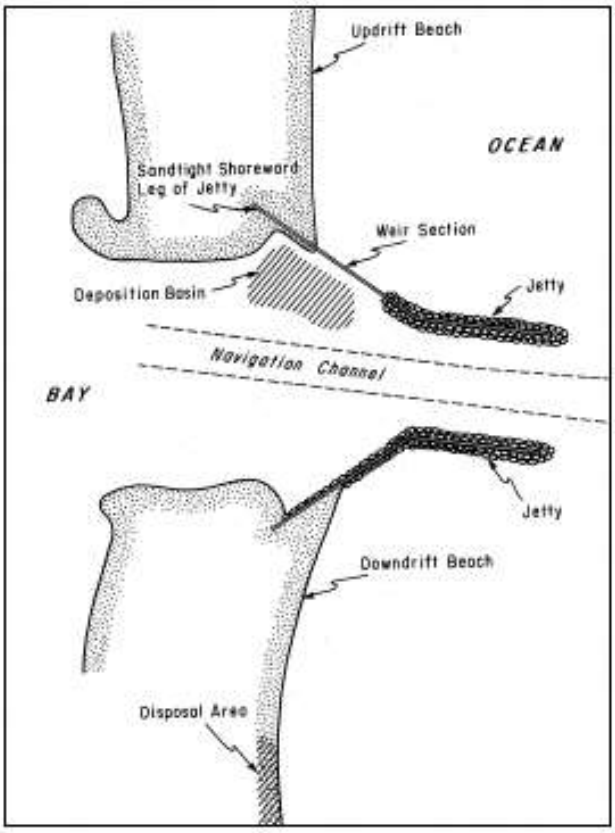
Jetties are structures built at tidal inlets to stabilize the locations of the inlets.

Because jetties interrupt longshore sand transport, the effect of jetties on adjacent beaches is similar to the effect of groins: accretion occurs on the updrift side, and erosion occurs downdrift. The offset is generally more extreme at jettied inlets, due to the length and relative impermeability of the jetties and the presence of strong tidal flow in the inlet channel. Long, impermeable jetties, combined with tidal currents in the inlet, allow very little sand to flow across the inlet. Material that does pass through or around the jetties contributes to shoaling either in the interior of the inlet or offshore, depending upon the direction of tidal flow.

Source: Delaware Sea Grant College Program, Coastal Processes FAQ, accessed at http://www.deseagrant.org/outreach/coastal-processes-faq-difference-between-jetty-groin, July 26, 2013

## WEIR JETTY SYSTEM

A weir jetty system is one of several methods for bypassing sediment at coastal inlets. The weir section, typically less than 304.8 m (1,000 ft) long, is a depressed region of the jetty that permits waves and the longshore current generated by wind, waves, and tide to transport sediments moving along the coast to enter a deposition basin located in the lee of the weir, thereby reducing the amount of sediment entering the navigation channel. A weir also acts as a breakwater and provides a semiprotected area for dredging the deposition basin. Another benefit is to allow flood currents to enter the inlet over the weir and through the channel during flood flow with subsequent channeling of ebb flows out the navigation channel between the jetties. The flood currents are weaker in the navigation channel, relative to the channel ebb currents, promoting net seaward sediment flushing. Thus less sediment enters the bay channels, where it is lost to the beach system if it settles in flood shoals in the bay or contributes additional volume in bay channels that require dredging. A potential benefit for new jetty systems is that the outer tips of the jetties may not need to extend seaward as far as a system without a weir jetty, because seaward sediment transport from the beach along the outside of the jetty is minimized (Seabergh and Lane 1977).




The figure at left shows typical elements of a weir jetty system. The key elements of a weir jetty system are: (a) the navigation channel, (b) the jetty structures, (c) the weir section, (d) the deposition basin, (e) the updrift beach, (f) the downdrift beach, and (g) disposal area.

Source: W. C. Seabergh, Weir Jetties at Coastal Inlets:Part 1, Functional Design Considerations by US Army Corps of Engineers, ERDC/CHL CHETN-IV-53, December 2002.

## SAND BYPASSING SYSTEM

A Sand Bypass System is a permanent solution to sand erosion and littoral drift problems affecting river mouths and navigation channels. They transport the littoral drift across tidal entrances to help prevent accretion on the updrift side, control downdrift erosion, and maintain navigation channels.

A number of different systems have been developed around the world. Most systems fall under one or a combination of the following generic types:

− Water-based mobile systems often include maintenance dredging;

− Land-based mobile systems;

− Fixed systems such as a trestle- or breakwater-mounted.

Mobile systems are those in which the entire physical plant can be moved and relocated in order to reach areas of the bypassing site. When floating dredgers are used to capture and deposit sand in a bypassing operation, the system is considered to be mobile and water-based; if a dragline or a jet pump is mounted on trailers the mobile system is an example of a land-based bypassing plant.

Fixed systems are those in which the entire bypassing plant has a set location. Dredger pump systems typically operate from a building or platform. Such systems require a high degree of predictability of littoral transport, movement paths and deposition patterns.

Source: Pedro Loza, *Sand Bypassing Systems*, June 2008. Accessed at http://repositorio-aberto.up.pt on July 26, 2013

## APPENDIX H – STAKEHOLDER ASSESSMENT IMPLIED CONSENT FORM

# University of Wyoming
# Stakeholder Assessment Implied Consent Form

### I. General purpose of the study:

The purpose of this Stakeholder Assessment is to gain an understanding of stakeholder perspectives of Oregon Inlet issues. In addition we are gathering information about how best to structure and conduct a collaborative process that will assist state and local government in identifying strategies for creating a sustainable and reliable navigable channel through Oregon Inlet.

### II. Procedure:

This study will be conducted through individual interviews of people with knowledge of issues related to Oregon Inlet. Elizabeth Spaulding of the Ruckelshaus Institute will conduct these interviews. Participants will first be asked to sort a list of statements that reflect perspectives associated with navigation, economic development, sand management, and environmental integrity in order of agreement and importance. Participants will then discuss their reasoning behind the rankings with the interviewer. The interviewer will then ask participants about their perceptions of various aspects of collaborative problem solving. This should take approximately 90 minutes per interview. Interviews will be tape-recorded.

### III. Disclosure of risks

Risks associated with this study are minimal. The interview is completely voluntary and can be terminated at any point. Questions solely pertain to opinions on issues related to Oregon Inlet, and responses are kept anonymous and confidential. There is a slight risk to participants if this confidentiality were to be breached. Ruckelshaus Institute will take measures to safeguard the confidentiality of each participant in order to protect against this risk.

### IV. Description of benefits:

The primary benefit of participating in this study is the opportunity for participants to share their opinions on issues related to Oregon Inlet. There are no other forms of compensation associated with this study.

### V. Confidentiality:

Participants will not be identified by name, appearance, or nature of data in any report or material generated from the interviews. Tape recordings and transcriptions of the

interviews will be identified by a number only. The Ruckelshaus Institute will have a secured list with these numbers attached to participant names. Anonymous interview records will be kept within the Ruckelshaus Institute for 3 years. Only Ruckelshaus Institute staff will have access to these records and the list of participants. There is always a risk that these records could be accessed by non-authorized personnel. This risk is being mitigated through security measures such as password-secured files and destruction of the content after three years. Results from these interviews will not be used to support other studies.

**VI. Freedom of consent:**

The research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context. Participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled, and you may discontinue participation at any time. If you would like to withdraw from this study please inform the interviewer at this time. If for any reason you choose to withdraw your participation during or after the interview, please communicate this withdrawal to Ruckelshaus Institute staff. Ruckelshaus Institute will then destroy any record of the interview.

**VII. Questions about the research:**

If you have any questions about the study, please contact Steve Smutko of the Ruckelshaus Institute at (307) 766-2703 or steve.smutko@uwyo.edu.
If you have questions about your rights as a research subject, please contact the University of Wyoming IRB Administrator at 307-766-5320.