



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT
Silver Spring, Maryland 20910

Daniel J. Galán Kercadó, Secretary
Puerto Rico Department of Natural and
Environmental Resources
P. O. Box 366147
San Juan, Puerto Rico 00936

OCT 21 2011

Dear Secretary Galán:

Enclosed are the final evaluation findings for the Jobos Bay National Estuarine Research Reserve (Reserve) for the period from January 2006 through January 2011.

The fundamental conclusion of this evaluation is that the Commonwealth of Puerto Rico is not fully adhering to the programmatic requirements of the NERR system in its operation of the approved Jobos Bay Reserve. This document contains 11 recommendations, four of which are mandatory.

NOAA commends the Reserve and the Department of Natural and Environmental Resources for the strong partnerships that have been established or maintained with local residents and numerous commonwealth and federal agencies. The Reserve has been successful in increasing awareness of the GRF program and opportunities for research; has taken steps to disseminate and translate the research being conducted at the Reserve, and is providing its expertise to expand the NERRS SWMP vegetation monitoring to tropical systems. The Reserve's education programs and its Coastal Training Program are expanding to meet specific needs of local students, teachers, and local communities. Research, education, and partnership activities and programs are integrated in support of stewardship and resource management.

However, the Reserve continues to experience both boundary encroachment and resource degradation that occurs as a result of encroachment and a lack of sufficient enforcement. This is the fifth time that the Reserve has been found to be not fully adhering to the programmatic requirements of the CZMA and the NERRS for the same reasons. The future value of the Jobos Bay Reserve for research, monitoring, and education continues to be at risk, as is the health of the Reserve itself.

In response to the Commonwealth's comments on the NOAA draft evaluation findings, we have included additional comments and information in the findings and have made some of the changes you suggested. We have also provided additional time to complete three Necessary Actions.



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Daniel J. Galán Kercadó, Secretary
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We appreciate your cooperation and assistance and that of the Reserve staff during the accomplishment of this evaluation.

Sincerely,



Donna Wieting
Acting Director

Enclosure

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FINAL EVALUATION FINDINGS
JOBOS BAY NATIONAL ESTUARINE RESEARCH RESERVE
January 2006 through January 2011

October 2011



All photos courtesy NOAA'S Estuarine Research Reserve Collection



Office of Ocean and Coastal Resource Management
National Ocean Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

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I. EXECUTIVE SUMMARY

The Coastal Zone Management Act (CZMA) of 1972, as amended, established the National Estuarine Research Reserve System (NERRS). Sections 312 and 315 of the CZMA require the National Oceanic and Atmospheric Administration (NOAA) to conduct periodic performance reviews or evaluations of all federally approved National Estuarine Research Reserves (NERRs). The review described in this document examined the operation and management of the Jobos Bay National Estuarine Research Reserve (JBNERR or the Reserve) during the period from January 2006 through January 2011. The Reserve is administered by the Puerto Rico Department of Environmental and Natural Resources.

This document describes the evaluation findings of the Director of NOAA's Office of Ocean and Coastal Resource Management (OCRM) with respect to the Jobos Bay NERR during the review period. These evaluation findings include discussions of major accomplishments as well as recommendations for program improvement.

The evaluation team documented a number of Jobos Bay Reserve accomplishments during this review period. NOAA commends the Reserve and the DNER for the strong partnerships that have been established or maintained with local residents and numerous commonwealth and federal agencies. The Reserve has been successful in increasing awareness of the GRF program and opportunities for research; has taken steps to disseminate and translate the research being conducted at the Reserve, and is providing its expertise to expand the NERRS SWMP vegetation monitoring to tropical systems. The Reserve's education programs and its Coastal Training Program are expanding to meet specific needs of local students, teachers, and local communities. Research, education, and partnership activities and programs are integrated in support of stewardship and resource management.

The evaluation team also identified areas where the Reserve and its programming could or must be strengthened. The Reserve continues to experience both boundary encroachment and resource degradation that occurs as a result of encroachment and a lack of sufficient enforcement. This is the fifth time that the Reserve has been found to be not fully adhering to the programmatic requirements of the CZMA and the NERRS for the same reasons. There are four fewer DNER rangers available to enforce laws and regulations in the Reserve than there were at the time of the last evaluation. New construction continues within the boundaries of the Reserve, and legal action begun in 2005 against a number of violators has still not been resolved in almost all of those cases. Thus, the Reserve has non-conforming uses within its boundaries. These are incompatible with the purposes of the Reserve as identified in the CZMA criteria for designation of a NERR, the regulations governing the designation and operation of a NERR, and the Reserve's own mission and goals identified in its management plan. Because of these issues, the fundamental conclusion of the findings is that the Commonwealth of Puerto Rico is not fully adhering to the programmatic requirements of the Coastal Zone Management Act and the regulations of the National Estuarine Research Reserve System in its operation of the Jobos Bay National Estuarine Research Reserve because of a lack of sufficient enforcement and boundary

encroachment issues.

These evaluation findings contain 11 recommendations: four (4) Necessary Actions that are mandatory and seven (7) Program Suggestions. The Commonwealth must address the Necessary Actions by the dates indicated. Because the Reserve is not fully adhering to the programmatic requirements of the Coastal Zone Management Act and the regulations of the National Estuarine Research Reserve System, the NOAA Office of Ocean and Coastal Resource Management may make a follow-up visit to the Reserve at a time to be determined. It will impose sanctions to the extent allowed by the CZMA to redirect funds from Reserve operations funds to address the issues if there is little or no progress in addressing the encroachment and enforcement issues or if deadlines for the Necessary Actions are not being met at the time of a follow-up visit or as evidenced in cooperative agreement award performance reports and reporting required by two of the Necessary Actions in these findings.

II. PROGRAM REVIEW PROCEDURES

A. OVERVIEW

The National Oceanic and Atmospheric Administration (NOAA) began its review of the Jobos Bay Reserve in October 2010. The CZMA §312 evaluation process involves four distinct components:

- an initial document review and identification of specific issues of particular concern;
- a site visit to Puerto Rico, including interviews and public meetings;
- development of draft evaluation findings; and
- preparation of the final evaluation findings, partly based on comments from the commonwealth regarding the content and timetables of recommendations specified in the draft document.

The recommendations made by this evaluation appear in boxes and bold type and follow the findings section where facts relevant to the recommendation are discussed. The recommendations are of two types:

Necessary Actions address programmatic requirements of the CZMA's implementing regulations and of the Jobos Bay Reserve approved by NOAA. These must be carried out by the date(s) specified;

Program Suggestions denote actions that NOAA's Office of Ocean and Coastal Resource Management (OCRM) believes would improve the program, but which are not mandatory at this time. If no dates are indicated, the commonwealth is expected to have considered these Program Suggestions by the time of the next CZMA §312 evaluation.

A complete summary of accomplishments and recommendations is outlined in Appendix A.

The conclusion of these findings is that the Reserve is not fully adhering to the programmatic requirements of the CZMA and the regulations of the NERRS. Failure to address Necessary Actions included in these findings as specified will result in the invoking of interim sanctions, as specified in CZMA §312(c). Program Suggestions that are reiterated in consecutive evaluations to address continuing problems may be elevated to Necessary Actions. The findings in this evaluation document will be considered by NOAA in making future financial award decisions relative to the Jobos Bay Reserve.

B. DOCUMENT REVIEW AND ISSUES DEVELOPMENT

The evaluation team reviewed a wide variety of documents prior to the site visit, including: (1) Jobos Bay Reserve §312 evaluation findings dated 2006; (2) federally approved Environmental Impact Statement and program documents; (3) financial assistance awards and

work products; (4) semi-annual performance reports; (5) official correspondence; and (6) relevant publications on natural resource management issues in Puerto Rico.

Based on this review and on discussions with OCRM, the evaluation team identified the following priority issues:

- The Reserve's general administration, including grants and fiscal management;
- Status of Reserve staffing and needs;
- Implementation and status of the Management Plan;
- Facilities development and operations planning;
- Enforcement activities;
- Implementation of the Reserve's research, stewardship, monitoring, coastal training, and education programs;
- The manner in which the Reserve coordinates with other governmental and non-governmental organizations and programs in the Commonwealth and region;
- Major accomplishments and challenges during the review period; and
- The commonwealth's response to the previous evaluation findings dated November 2006. The Jobos Bay Reserve's assessment of how it has responded to each of the recommendations in the evaluation findings dated 2006 is located in Appendix B.

C. SITE VISIT TO JOBOS BAY NATIONAL ESTUARINE RESEARCH RESERVE

Notification of the scheduled evaluation was sent to the Puerto Rico Department of Environmental and Natural Resources, Puerto Rico's Resident Commissioner to the U.S. House of Representatives, and regional newspapers. In addition, a notice of NOAA's "Intent to Evaluate" was published in the Federal Register on September 2, 2009.

The site visit to the Jobos Bay Reserve was conducted from January 24 – 28, 2011. The evaluation team consisted of Ms. Chris McCay, Evaluation Team Leader, National Policy and Evaluation Division, OCRM; Ms. Nina Garfield, Program Specialist, Estuarine Reserves Division, OCRM; and Dr. Ken Moore, Research Coordinator, Chesapeake Bay-Virginia National Estuarine Research Reserve.

Before and during the site visit, the evaluation team met with Jobos Bay Reserve staff; the Secretary, senior management, and staff from the Puerto Rico Department of Environmental and Natural Resources; other commonwealth agency staff; U.S. Department of Agriculture Natural Resources Conservation Service staff; NOAA Center for Coastal Monitoring and Assessment staff; coastal researchers; educators; local government staff and officials; Jobos Bay Advisory Council members; non-profit organizations; NERRS Graduate Research Fellows; and OCRM Estuarine Reserves Division staff. Appendix C lists people and institutions contacted during this review.

As required by the CZMA, NOAA held an advertised public meeting on Tuesday, January 25, 2011, at 5:00 p.m. at the Jobos Bay Reserve Visitors Center, Road 705, Kilometer 2.3, Main Street, Aguirre, Puerto Rico. The public meeting gave members of the general public the opportunity to express their opinions about the overall operation and management of the Jobos

Bay Reserve. Appendix D lists individuals who registered at the meeting. NOAA's responses to written comments submitted during this evaluation are summarized in Appendix E.

The Jobs Bay Reserve staff members were crucial in setting up meetings and arranging logistics for the evaluation site visit. Their support is gratefully acknowledged.

III. RESERVE PROGRAM DESCRIPTION

NOAA's Office of Ocean and Coastal Resource Management designated the Jobos Bay National Estuarine Research Reserve (JBNERR or the Reserve) in 1981. The lead agency is the Puerto Rico Department of Environmental and Natural Resources (DNER). The Reserve is administratively positioned within DNER's Bureau of Coasts, Reserves, and Refuges.

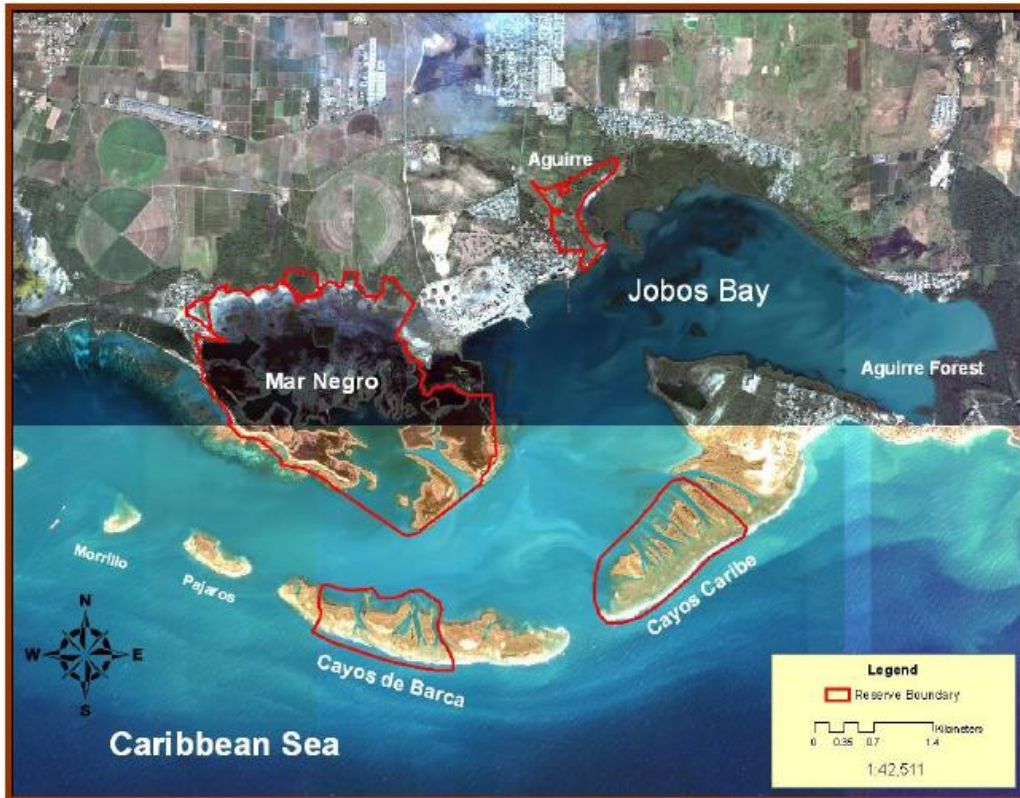
JBNERR is located within the municipalities of Guayama and Salinas on the southern coast of Puerto Rico. The Reserve is comprised of approximately 2,800 acres of coastal wetland and subtidal habitats representative of the West Indian biogeographic region. Three coastal habitats of particular ecological and economic significance are found within the Reserve's boundaries: mangrove forests, seagrass beds, and coral reefs. These habitats form a very complex, diverse, and productive coastal association that provides unique opportunities for environmental research and education. Non-saline water flows to the sea from rivers, creeks, underground waterways, and springs.

Dense stands of mangroves occur along the Reserve's mainland shoreline and the Cayos Caribe islands. Mangroves slow water movement and trap suspended materials, gradually raising the ground level and producing organic soil. The rich, protected substrate provides habitat for a great variety of marine life, including several species of commercially valuable finfish and shellfish. Mangroves also supply nesting sites for native and migratory birds.

Many of the Reserve's shallow water areas are dominated by seagrass bed communities. Seagrass beds serve as habitat and feeding and nursery grounds for conch, octopus, squid, shrimp, and juvenile lobster. Additionally, the endangered hawksbill sea turtle, green turtle, and West Indian manatee have been observed in the Reserve's seagrass beds.

Jobos Bay Reserve is the only site in the National Estuarine Research Reserve System that contains a representative example of an offshore Caribbean coral reef. The Reserve's corals display the typical zonation of Caribbean reefs. Finger corals, gorgonians, zoanthids, and seagrass beds characterize the scoured channels between the Cayos Caribe islands. Like many reef communities found in southern Puerto Rico, communities located off Cayos Caribe exhibit relatively low diversity and abundance and tend to be dominated by massive scleractinian corals, gorgonian octocorals, and algae.

JOBOS BAY NATIONAL ESTUARINE RESEARCH RESERVE PUERTO RICO



IV. REVIEW FINDINGS, ACCOMPLISHMENTS, AND RECOMMENDATIONS

A. OPERATIONS AND MANAGEMENT

1. Administration and Staffing

All Jobos Bay Reserve staff members are well respected by the local communities, federal and commonwealth agencies, and academic institutions, and there are strong partnerships with all. Several significant partnerships will be discussed elsewhere in these findings. The staff's enthusiasm, dedication, and energy were cited numerous times, and several people noted both strong professional and personal relationships with various staff members.

The Reserve has been and is in a time of some transition. There was a change in leadership at DNER during the evaluation period. Throughout almost all of this evaluation period, the Reserve was managed by an acting manager. A permanent manager began working at the Reserve only within the last eight to nine months of this evaluation period. At the time of the site visit, a new Coastal Training Program coordinator had just been hired, and the education coordinator was starting a six-month leave period; her return from leave was uncertain. (Since the site visit, she has permanently left.)

The position of maintenance specialist was cut from the Reserve late in this evaluation period. Staff members from two DNER regional offices have helped with trail maintenance, and their assistance is acknowledged and appreciated. Although local community residents are willing to assist the Reserve with some of its maintenance needs, the maintenance specialist played a far greater role than his title indicated. In particular, he was the Reserve's boat operator, and many people with whom the evaluation team met said his absence is quite detrimental. He was extremely knowledgeable about the Reserve and its resources, was bi-lingual, was able to answer numerous questions when he took people out, and talked with other boaters when he was in the Bay to answer questions or provide information to them. He took NERRS Graduate Research Fellows (GRFs), post-secondary students, visitors, and participants in education programs into the Bay.

The need for boat operation was and will continue to be vital, in part because access to much of Jobos Bay is by boat only. There are very few driving or walking trails to get to the water's edge in many areas of the Bay, where dense stands of mangroves occur along the Reserve's mainland shoreline. Cayos Caribe and Cayos de Barca are accessible only by boat. Only Reserve and commonwealth employees may operate the Reserve's boat. One of the Reserve staff members has to operate the boat whenever it is needed for research or education activities now, which may sometimes take time away from their own activities. In a Reserve with a larger staff, this would not be as great a concern. Some boat support is provided by DNER Rangers (enforcement officers), who took the evaluation team out into Jobos Bay, but as discussed later in these findings, there are significant issues involving encroachment and enforcement, which should be their primary responsibility.

In meetings with the evaluation team, some community members suggested that a list be compiled of local fishermen who would volunteer to provide that service with some advance notice.

One of the GRFs indicated that a kayak would be helpful in some phases and types of field work, and the Reserve's new management plan does propose the purchase of five kayaks. These would not require a state employee to 'operate' them, but a kayak would not serve every research need. A kayak also poses a safety concern, because an individual could be out on the water alone.

Both of these ideas are helpful in some circumstances, but they do not completely replace the need for established mechanisms to provide boat access to the Bay and may raise safety or liability issues. Providing boat access does not require that a dedicated boat operator for the Reserve be hired; it does not require that the Reserve be solely responsible for providing free boat access on demand for everyone. However, it is the responsibility of DNER and the Reserve to find ways to meet the need so that research, education, and stewardship programs are not negatively affected and safety is not compromised. The section of the Findings entitled *Graduate Research Fellowship (GRF) Program* contains a discussion and recommendation that are related to the boat access issue.

PROGRAM SUGGESTION: The DNER and Reserve are urged to look for ways to meet the need for boat access to the Reserve so that support for research, education, and stewardship activities can be dependably and safely met and maintained.

Enforcement at the Jobos Bay Reserve is conducted by officers from the DNER Ranger Corps. The larger issue of enforcement is discussed elsewhere in this document, but there is a concern about non-federal match involving the rangers. Salary dollars from rangers who conduct enforcement activities at the Reserve are submitted as non-federal match in cooperative agreement award applications. The nexus between a ranger's salary dollars as match and the amount of time spent by that ranger in Reserve surveillance is difficult to establish, both from the cooperative agreement award applications and from the semi-annual performance reports for those awards within this evaluation period. For example, if 25 percent of a ranger's salary is used as non-federal match, then it is assumed that 25 percent of his time is dedicated to Reserve enforcement activities. However, neither the percent of salary nor the percent of time is clear. This issue has been raised in a previous evaluation, and the Reserve's cooperative agreement awards and performance reports must be clearer about the correlation between match salary dollars and employee time dedicated to the Reserve.

NECESSARY ACTION: The match dollars proposed in cooperative agreement awards, particularly from non-Reserve staff salaries, must clearly and accurately reflect the actual support provided to the Reserve. This must be addressed to OCRM's satisfaction in conjunction with each future federal financial assistance award.

With the exception of the manager position, all other staff positions at the Reserve are funded with federal dollars from CZMA Section 315 cooperative agreement awards. It is OCRM's

expectation that, in general, reserve core positions (manager, education coordinator, and research coordinator) will be funded by the state or commonwealth partner, while federal funds will be used to carry out the reserve's programs. Reserves where core positions are funded with match dollars have more resources overall and consequently more robust programs. OCRM encourages DNER to look for ways to begin shifting some portion of the education or research coordinators' salaries to commonwealth monies. This could initially start with a percentage of one of these salaries, with a gradual increase in the percentage over time.

PROGRAM SUGGESTION: The DNER and Reserve are encouraged to shift some percentage of one or more core staff salaries (in addition to the manager's position) to commonwealth funding, with a gradual increase in the percentage over time.

2. Reserve Boundaries, Encroachment, and Enforcement

Jobos Bay NERR has faced issues of enforcement of its boundaries, encroachment into the Reserve, and protection of natural resources for many years. All but the first CZMA Section 312 evaluation findings have discussed the undefined or unclear nature of the Reserve's boundaries, the encroachment of structures into the Reserve, or the lack of sufficient enforcement of those boundaries to prevent encroachment and to protect natural resources. Program suggestions and necessary actions have been articulated, and in some cases, they have been addressed. Nevertheless, encroachment into the Reserve and natural resource degradation resulting from both encroachment and insufficient enforcement have continued.

The designation of the Jobos Bay NERR was in 1981; after the second evaluation only four years later, those evaluation findings (dated January 1985) noted the loss of a routine enforcement effort within the Reserve boundaries and included a recommendation to assign a minimum number of rangers to the Reserve to enforce the existing regulations. The recommendation also noted the lack of a clearly defined boundary and said that the northern, or at a minimum the northwestern, boundary should be surveyed and clearly marked.

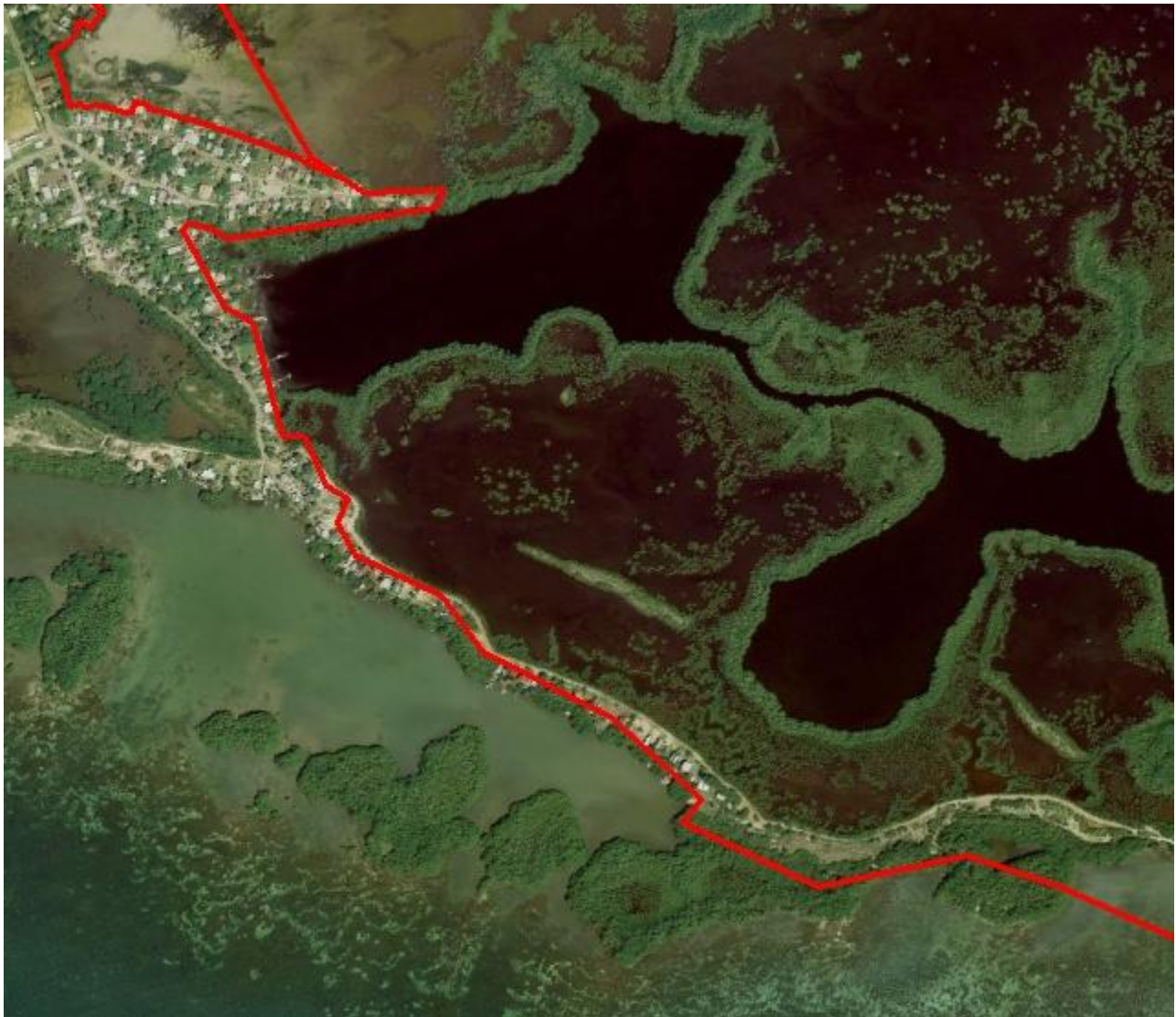
Problems with the lack of sufficient enforcement and boundary encroachment are still occurring. The northwestern area of the Reserve includes Mar Negro. Throughout the years, Mar Negro, and specifically the Las Mareas and Camino del Indio areas, has been the focus of much of the illegal construction and encroachment into the Reserve. The evaluation findings dated July 1998 included three Necessary Actions to stop further construction in the Las Mareas and Camino del Indio areas. Yet at the next evaluation, the December 2002 findings said, "During the 2001 evaluation site visit, the evaluation team visited Las Mareas and Camino del Indio and was dismayed to witness that encroachments and illegal construction in both areas have continued unabated." Cooperative agreement performance reports submitted since the last evaluation site visit in 2006 indicate that no new illegal piers or docks have been built. However, when the evaluation team took a boat tour during the site visit, there were at least three new piers or docks within the Mar Negro area and an extension of a dwelling within Reserve lands.

There have been questions about ownership of property, but some of those parcels of unclear ownership have been bought and sold. There also has been ongoing illegal construction that is

clearly within the Reserve's boundaries. Appendix F lists all of the recommendations dealing with these issues that have been included in past evaluation findings for the Jobos Bay Reserve. Figures 1, 2, and 3 on this and the following page are aerial photos from Mar Negro with the Reserve boundary line superimposed showing boundary encroachment.

FIGURE 1 - JOBOS BAY NERR, MAR NEGRO AREA

In this aerial photo, the Reserve is on the right side of the red boundary line, Las Mareas is toward the top of the aerial, and Camino del Indio is in the bottom half of the aerial



Aerial photography (May 2010) from "Digital Coast," NOAA Coastal Services Center

FIGURE 2 - LAS MAREAS (Reserve property to the east of the red boundary line)



Aerial photography (May 2010) from "Digital Coast," NOAA Coastal Services Center

FIGURE 3 - CAMINO DEL INDIO (Reserve property to the northeast of the red boundary line)



Aerial photography (May 2010) from "Digital Coast," NOAA Coastal Services Center

At this point there are three major issues involving the Reserve's boundaries, encroachment, and enforcement:

- 1) NERR boundaries that currently include non-conforming and incompatible uses resulting from illegal construction of permanent structures (houses and buildings) on Reserve land;
- 2) existing illegally constructed piers, docks, and ramps within Reserve boundaries that are currently the subjects of legal action, and those that are new but illegally constructed since the last evaluation site visit;
- 3) lack of sufficient enforcement and other efforts to prevent new encroachment and resulting degradation of natural resources.

First, it is clear to OCRM that resolution of the issue of existing illegal structures and encroachment into the Reserve will not occur within any reasonable length of time, given that it has been ongoing for two decades. It is unlikely that illegal houses and buildings will be required to be torn down and removed. Thus, the Reserve has non-conforming uses within its boundaries. These are incompatible with the purposes of the Reserve as identified in the CZMA criteria for designation of a NERR, the regulations governing the designation and operation of a NERR, and the Reserve's own mission and goals identified in its management plan. It is therefore necessary for the Reserve to amend its boundaries to exclude those areas within the Mar Negro area that contain incompatible uses. The Jobos Bay NERR management plan 2010-2015 currently under review by OCRM must reflect the exclusions prior to plan approval by OCRM.

NECESSARY ACTION: The boundaries of the Jobos Bay Reserve must be amended to exclude illegally constructed permanent structures (houses and buildings) on land in the Las Mareas and Camino del Indio areas that encroach into the Reserve. The amended boundaries must be reflected in the Reserve's management plan before OCRM will approve the plan. Changes to the 2010-2015 management plan reflecting the amended boundaries must be submitted to OCRM by April 23, 2012.

Second, the issue of illegal piers, docks, and ramps that existed prior to 2006 and those illegally constructed since the 2006 evaluation site visit in the Mar Negro (Las Mareas and Camino del Indio) area must be resolved. Prior to the February 2006 evaluation site visit, 19 complaints were filed regarding illegal piers and ramps in the Camino del Indio area. Based on information provided by the Reserve just prior to this January 2011 site visit, there were two legal cases from that list for which removal orders have been issued: case #05-053-ZMT, removal order issued 9/May/08; and case #05-056-ZMT, removal order issued 22/Nov/10. DNER needs to identify the dates on which the piers were removed or provide an explanation about why they have not yet been removed. The information also indicates there are still 13 outstanding legal cases pending (case numbers 05-054-ZMT, 05-057-ZMT through 05-065-ZMT, 05-067-ZMT through 05-068-ZMT, and 05-071-ZMT). These were all submitted or filed in February 2005; the most recent hearing dates for all 13 range from 2005 through 2010; and all of these still carry a status of "for hearing." Resolution of these six-year-old cases as well as the new construction noted by the evaluation team during the site visit in Mar Negro must be a priority. OCRM expects DNER to expedite these and exercise due diligence in an effort to have these cases all settled by the next

evaluation.

NECESSARY ACTION: By April 23, 2012, the Puerto Rico Department of Natural and Environmental Resources and Jobos Bay NERR must submit a strategy for review and approval to NOAA's Office of Ocean and Coastal Resource Management that details how and when the 13 outstanding illegal pier/dock/ramp cases as well as new structures built since the evaluation site visit in February 2006 will be resolved and removed.

By the same date the DNER and Reserve must identify the dates of removal of two piers for which removal orders have already been issued or provide an explanation about why they have not yet been removed. The Reserve must report on the status of each legal case and DNER's efforts at resolution of the cases by written or electronic correspondence to the OCRM Estuarine Reserves Division quarterly after initial submission of the strategy until all cases have been resolved, which must occur no later than the next evaluation.

Third, the issue of preventing new encroachment, illegal construction, and the resulting degradation of natural resources must be addressed. There are currently eight enforcement officers (rangers) assigned to a large section of the southern coast of Puerto Rico, including Jobos Bay, and they are responsible for enforcement both on land (inland to the boundary of the coastal zone – generally one kilometer) and water (to 12 miles offshore). At the time of the last evaluation site visit in 2006, there were 12 enforcement officers. DNER has not filled the four positions lost through attrition since then.

The evaluation team met with seven of these eight enforcement officers. When asked for their opinions, the rangers said that their personal and unofficial assessments were that eight rangers assigned only to Jobos Bay would be necessary to effectively patrol the Jobos Bay waters and uplands every day for continuous 24-hour cycles. According to the rangers, currently they are only able to address boating infractions such as speeding, use of jet skis, illegal anchoring or tying to mangroves, etc., when they patrol the waters. They are able to issue tickets on the spot for those types of violations. On most weekends they spend much of their time in the area of Salinas because of its high concentration of boats and are not able to patrol in Jobos Bay. Other days they generally pass through Jobos Bay once as they head west and once as they head east. Meanwhile, at least one person with whom the evaluation team met reported seeing illegal crab traps, which is something the rangers are not dealing with at this time. Others are aware of the use of illegal fishing nets.

For an offense like the construction of an illegal pier, a complaint is filed by a ranger. The complaint goes to the DNER Office of Legal Affairs and then to the DNER Office of Official Examiners and Administrative Judges. Some violations are handled through the commonwealth court system rather than through administrative hearings. Depending upon the complexity of the case, number of people called to testify, appeals, etc., this process can take and has taken years in some cases before resolution is reached.

Regardless of whether or not additional enforcement officers will be assigned to the Reserve, the

rangers and the evaluation team discussed several ideas and suggestions that could help them in their surveillance. It appears that some signs and markers in the Bay have disappeared or have been vandalized since the last evaluation. More signs need to be placed or replaced to identify restricted areas, prohibited activities, sensitive habitats, or areas where certain activities can occur, e.g., areas where boats are allowed to anchor. Additional signage is also needed to more clearly delineate the existing kayak trail (or a new trail if a different location is chosen), including any sections of the trail that are designed for different levels of skill.

The rangers were particularly interested in learning about the natural resources of the Reserve. OCRM agrees that enforcement activities could be more effective if the rangers understood, for example, why it is important to protect mangroves or why ongoing prop scarring of seagrass beds can lead to degradation of the function of those beds. Both classroom training and field training would benefit the rangers and the Reserve. The Coastal Training Program could be a good venue in which to provide natural resource protection and management training for the enforcement officers. And with one or more rangers and a Reserve staff member out in the Bay together for field training, the rangers would learn from an expert, and the staff member would have an opportunity to observe what is happening in the Reserve.

The rangers are able to accomplish very little upland surveillance in the Reserve. The rangers said the same type of classroom and field training about the Reserve's uplands would be beneficial to them, and OCRM concurs, because illegal activities on trails and in the uplands of the Reserve are occurring. During the site visit the evaluation team saw evidence of motorized vehicle and bike activity, illegal hunting, and one GRF reported seeing people on horseback on a trail. One of the reasons that illegal entry onto Reserve property is occurring is because of the number of uncontrolled access points. The Reserve staff indicated it plans to block or close off some of the access points so that only two controlled points remain. This may be a significant deterrent once it is completed.

Another idea the evaluation team discussed to enhance enforcement activities is to provide rangers with handheld GPS (global positioning system) units that have been loaded with maps and data showing the specific boundaries of the Reserve, restricted areas, prohibited activities, sensitive habitats, or areas where certain activities can occur. This could prove effective in providing immediate locations so rangers can be more certain and accurate in issuing tickets or filing complaints for illegal activities. Some local residents and members of the Initiative for Eco-development of Jobos Bay, Inc. (IDEBAJO) expressed interest in participating in some way in enforcement surveillance. The evaluation team learned from one of the university representatives with whom it met that a computer program or application has been developed that allows the general public to inform authorities about any environmental irregularity using a cell phone.

There is a range of mechanisms and methods to enforce the Reserve's boundaries and prevent encroachment and resource degradation, but it is ultimately the responsibility of the Puerto Rico DNER and the Reserve to successfully address those issues. Although enforcement strategies for Jobos Bay NERR have been prepared over the years, another is needed now. The Reserve, the Ranger Corps, and DNER leadership must develop an enforcement strategy aimed at preventing further boundary encroachment, new illegal construction, and resulting natural resource

degradation. To meet those goals, the strategy must include, at a minimum:

- 1) discussion of the challenges and conditions that led to the encroachment and illegal construction;
- 2) mechanisms for two-way regularly scheduled reporting and emergency reporting on surveillance findings between rangers and Reserve staff;
- 3) time frames and protocols that will be followed when illegal activity is discovered, including periodic monitoring until the situation is resolved; and
- 4) outreach/training activities for rangers and local residents to inform them of Reserve regulations and the importance of the natural resources and reasons for protecting them.

In addition to these required minimum approaches, the strategy could include other approaches, some of which have been discussed above. Other approaches include, but are not limited to: a decrease in the number of access points into the Reserve; an increase in the number of enforcement staff dedicated to the Reserve; more frequent patrols on Reserve lands and water; engagement of community members; classroom and field training for enforcement staff and community members; the provision to rangers of handheld GPS (global positioning system) units that have been loaded with access point or trail maps and data; remote surveillance cameras in sensitive habitats, and an increase in signage to identify Reserve boundaries, restricted areas, prohibited activities, sensitive habitats, or areas where certain activities can occur, e.g., areas where boats are allowed to anchor.

NECESSARY ACTION: By April 23, 2012, the Puerto Rico Department of Natural and Environmental Resources, the Ranger Corps, and Jobos Bay NERR must develop and submit an enforcement strategy for review and approval to NOAA's Office of Ocean and Coastal Resource Management. The strategy must articulate the challenges and conditions that led to the encroachment and illegal construction and must be designed to prevent further boundary encroachment, new illegal construction, and resulting natural resource degradation.

The strategy must include, at a minimum, discussion of the challenges and conditions that led to the encroachment and illegal construction; mechanisms for two-way regularly scheduled and emergency reporting on surveillance findings between Rangers and Reserve staff; time frames and protocols that will be followed when illegal activity is discovered, including periodic monitoring until the situation is resolved; and outreach/training activities for rangers and local residents to inform them of Reserve regulations and the importance of the natural resources and reasons for protecting them.

The Reserve must report on activities and results from implementing the strategy by written or electronic correspondence to the OCRM Estuarine Reserves Division every quarter after initial submission of the strategy.

3. Management Plan

The Reserve has submitted a revised management plan to OCRM, and the 30-day public comment period was advertised in the Federal Register on January 12, 2011. As was discussed in the section above entitled “Reserve Boundaries, Encroachment, and Enforcement” and one of the associated Necessary Actions, the amended boundaries of the Jobos Bay NERR (to exclude illegally constructed buildings in Las Mareas and the Camino del Indio area that encroach into the Reserve) must be reflected in the Reserve’s management plan before OCRM will approve the plan. As also noted in that earlier Necessary Action, the revised management plan must be submitted *[by a date certain, which will be six months from the date of the final findings]*.

4. Facilities and Infrastructure

During this evaluation period, the Reserve built a boat ramp and a dock near the visitor center and installed a T1 line for improved internet, e-mail and communication needs. It expanded the Visitor Center hours of operation to increase public access to the Reserve during some weekend time. The Reserve also has a new boardwalk built by the U.S. Forest Service in an area of mangroves for researcher access.

The Reserve’s facilities include a visitor center with exhibits, staff offices, a research lab, a small meeting room, kitchen, and basic dormitory facilities. The visitor center complex is the restored club house of the Aguirre Sugar Plantation. The Reserve includes other structures that are part of the plantation, which is registered with the Puerto Rico Office of Historic Conservation. These structures are all in significant disrepair. There is also an abandoned train station on the Reserve’s property near the main roadway entrance.

Most of the Reserve’s buildings are no longer suitable for their intended purposes. The only meeting room is a space created in the center of the visitor center exhibit space that is not large enough for many meetings and education programs. The small parking lot is not big enough to accommodate staff and visitor vehicles as well as the Reserve’s vehicles. Research facilities do not include a wet lab or enough space for visiting researchers. The absence of and need for these was noted by several researchers and GRFs. Some educators also indicated a need for more microscopes and tables for use during education activities at the Reserve. The dormitory space is basic and adequate but could be made more comfortable for long-term use by visitors and researchers. The water quality and scientific laboratory is well kept and professional, but its use is stressed by the lack of other suitable space for the processing of field or other samples, and its access is limited for outside researchers and students, especially after normal working hours.

The previous evaluation findings dated November 2006 included a program suggestion recommending that the Reserve develop a comprehensive facilities plan. The Reserve has done so, with ambitious plans to rehabilitate and reuse many of the historic plantation buildings and to construct new spaces as well. The train station will be renovated to serve as a welcome/interpretive center for visitors entering the Reserve and will include office space as well. As part of the rehabilitation and construction work, the Reserve wants to incorporate ‘green’ and sustainable design concepts. The Reserve prepared a facilities master plan and submitted it to OCRM for review just a few months before the evaluation site visit.

ACCOMPLISHMENT: The Reserve has completed a facilities management plan to address the challenges of rehabilitation and reuse of aged, historically significant buildings as well as plan for the construction of new facilities, all incorporating sustainable design concepts. It has established high-speed internet access, which is vital to the success of Reserve programs and research capabilities. A new boardwalk for the use of researchers to access some areas of the Reserve’s mangroves is in place.

The rehabilitation of historic structures and the construction of new buildings is an ambitious and expensive proposition. However, maintenance of the structures once they are completed may be an even greater challenge. Although funding for construction may be restricted during a time of budget constraints, sources of money for the more routine activities needed to maintain these facilities may be even scarcer. The DNER and the Reserve will need to plan carefully for the funding and staffing needs for ongoing maintenance and upkeep of all of the Reserve’s facilities. At some other Reserves, there is a single point of contact/facilities coordinator who is responsible for scheduling the use of rooms and buildings, for making sure rooms are unlocked and ready for use when scheduled, providing keys when appropriate for visiting researchers, and for coordinating maintenance needs and activities for the Reserve’s facilities. Jobos Bay NERR might find this particularly helpful as more of the historic structures and newly constructed buildings become available for use.

Trails within the Reserve are also a part of its infrastructure, and trail maintenance is an access, personal safety, and resource protection issue. There are four established public trails – three for walking and one for kayaking. Staff members from two DNER regional offices have helped with trail maintenance, but one GRF reported bringing a chain saw to clear a trail so a research area could be reached. As is noted in the section above, the evaluation team saw evidence of motorized vehicle and bike activity during the site visit, and one GRF reported seeing people on horseback on a trail. One of the reasons that illegal entry onto Reserve property is occurring is because of the number of uncontrolled access points and ‘unofficial’ trails. The Jobos Bay NERR is proposing to close off a number of illegal access points so that there are only two ingress/egress points into the Reserve, and this should help. Regular surveillance through maintenance (more ‘eyes’ on the property) as well as prominent signage can also be an effective means to assure public safety and provide a greater level of resource protection.

5. Coordination and Partnerships

The Reserve has developed strong ties with the neighboring communities. The residents view themselves, and are viewed by the Reserve, as vital stakeholders in the sustainability and success of the Jobos Bay NERR. Local communities are interested in greater socio-economic development and eco-tourism in the Jobos Bay area but do not want to sacrifice traditional fishing activities and the natural resources upon which community culture is based.

The Initiative for Eco-development of Jobos Bay, Inc., (IDEBAJO) is a non-profit organization composed of traditional fishing associations and community and environmental groups. In late

2009 the Puerto Rico DNER and the Pescaderia de Mar Negro, Inc., represented by IDEBAJO, entered into a co-management agreement for the Reserve. The agreement provides that both co-signers will integrate the community into the management of the Reserve and promote local socio-economic development. Local residents are now or will be involved in activities such as facilities maintenance, fund raising, planting mangrove forests, and training tourist facilitators. During the site visit, numerous people discussed the recent loss of the boat operator position at the Reserve and subsequent negative effects (discussed in other sections of these findings). Some community members suggested that a list be compiled of local fishermen who would volunteer to provide that service with some advance notice. Another idea was to compile a similar list of volunteers who would be willing to assist student researchers or any others in need of help with field work/data collection when no one is available.

It was apparent to the evaluation team that local residents and citizen groups are some of the strongest supporters of the Reserve. The willingness on the part of the DNER, the Reserve, and local residents to collaborate in the operation and management of the NERR is likely to provide more options and greater cooperation in addressing the challenges the Reserve faces.

The local Aguirre power plant is adjacent to the Reserve's northeast boundary. It is one of five power plants in Puerto Rico owned and operated by the Puerto Rico Electric Power Authority (PREPA, the English acronym; AEE, the Spanish acronym) supplying electricity to the entire Commonwealth. To help in the restoration of the Reserve's north boundary mangrove system, two ponds are being constructed. One was completed during this evaluation period, and the AEE Aguirre power plant supplied water for the pond. The AEE also funded and completed the installation of the pipeline that carries the water to the pond.

ACCOMPLISHMENT: The Reserve and local residents are strongly committed to work cooperatively to resolve challenges and issues the Jobos Bay NERR faces and to promote local socio-economic development in a way that protects and sustains the natural environment. To that end they have entered into a co-management agreement for the Reserve. The Reserve's Coastal Training Program and staff in particular place a priority on community engagement.

The Conservation Effects Assessment Project (CEAP) is a multi-agency effort to quantify the environmental effects of conservation practices and programs and to develop the science base for managing the agricultural landscape for environmental quality. In May 2008 over a dozen federal and commonwealth agencies (including the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), NOAA, and the Puerto Rico Departments of Agriculture and Natural and Environmental Resources), universities, a national association representative, and a local farming operation entered into the Jobos Bay Watershed partnership agreement as well as the Jobos Bay Special Emphasis Watershed CEAP Project agreement. The NRCS is the coordinating agency for the CEAP project. The findings section entitled "Research Activities" includes greater detail about the project itself.

ACCOMPLISHMENT: The Reserve, and in particular its CTP and research staff members, have been a partner in the Jobos Bay Conservation Effects Assessment Project. The partnership is addressing the impacts of agriculture on groundwater, which is the most significant freshwater source into the Bay, and the results should be transferable to other agricultural areas in Puerto Rico.

Sea Grant has also had a partnership with the Reserve during this evaluation period. From 2005 through 2010, the University of Puerto Rico Sea Grant College Program (UPRSGCP) and the Reserve established a formal collaboration in which UPRSGCP provided office space at the UPR Mayaguez Campus and funded 50 percent of the salary and fringe benefits of the Coastal Training Program (CTP) coordinator. The agreement also allowed the Reserve to use facilities across the University of Puerto Rico system and provided access to official vehicles and equipment upon request and availability. The Reserve staff indicated that the NERR-Sea Grant partnership provided other benefits, including: establishment of working relationships in training with a number of government agencies and university programs; assistance to the Reserve in a number of management, stewardship, and educational activities; the design and implementation of a workshop on the development of storm water pollution prevention plans for industries; and introduction of the Sandwatch Program, which is a protocol for measuring and understanding beach profiles as a form of stewardship involving communities in management issues and science literacy. A community in the Jobos Bay NERR watershed is serving as a pilot community for this program.

Other federal agency partners with whom the evaluation team met expressed strong interest in continued cooperative projects and partnerships with the Jobos Bay NERR. The U.S. Forest Service continues to work with the Reserve in mangrove research. Because rainfall in the Reserve ranges from very low to very high, mangrove forests are stressed. The Forest Service believes the mangrove forests provide good climate change research opportunities, and during this evaluation period, it built a boardwalk in the Reserve that provides better access for long-term mangrove monitoring. It also is funding a graduate student to conduct research on nutrient cycling in Jobos Bay cays to determine if they are nutrient limited. ('Nutrient limited' generally indicates that nitrogen and phosphorus in the water are out of an appropriate balance.)

In addition to the CEAP discussed above, the NRCS has financial and technical assistance it would like to make available to the Reserve. It wants to continue work on 'CEAP-like' projects, such as storm water management on a watershed basis, with the Jobos Bay NERR and have a greater presence through partnerships in the whole Reserve area.

The US Geological Survey (USGS) conducted research in the Reserve during this evaluation period (see Section entitled "Research Activities") and is interested in continuing to do so. According to the representative with whom the evaluation team met, the USGS is becoming more interested in coastal hydrology and specifically in understanding the temporal and spatial location of fresh water discharge in Jobos Bay. It wants to install piezometers in the Bay, and this may help inform the CEAP work and results. The USGS also has a climate change initiative and wants to work with the Reserve to jointly leverage resources and capabilities to address climate change.

The US Fish and Wildlife Service (USFWS) works with Reserve through the USFWS Ecological Services Endangered Species Program to address manatee protection, which is a high priority species. Almost all of the manatees in waters around Puerto Rico are centered in Jobos Bay. Areas in Puerto Rico are being considered for designation as manatee protection areas by the USFWS, and Jobos Bay is a logical choice. The Ecological Services Coastal Program provides financial and technical assistance to on-the-ground habitat restoration and protection projects through non-regulatory, incentive based partnerships.

The Puerto Rico Coastal Zone Management Program is also located in DNER and was an active participant in the CEAP at Jobos Bay Reserve. The coastal program manager serves on the Reserve’s research advisory committee. The coastal zone management program’s regional assessment for climate change committee has met only once but will now include the Reserve.

Both the Reserve and the coastal zone management program are signatories to the Caribbean Regional Association (CaRA) memorandum of agreement. CaRA established and administers a sustained observing system for the northeast Caribbean region – the Caribbean Regional Integrated Coastal Ocean Observing System (CaRICOOS). The coastal zone management program hosts CaRICOOS, and the Reserve’s SWMP contributes data to the system.

<p>ACCOMPLISHMENT: The Jobos Bay Reserve has strong relationships with numerous commonwealth and federal agencies, all of which are actively promoting the furtherance of those partnerships.</p>
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6. Volunteer Support

The local communities and residents are at the heart of the Reserve’s volunteer support. As discussed in an earlier section of these findings, IDEBAJO, a non-profit organization, and DNER entered into a co-management agreement for the Reserve. The agreement provides that both co-signers will integrate the community into the management of the Reserve and promote local socio-economic development. Local residents are now or will be involved in activities such as facilities maintenance, fund raising, planting mangrove forests, and training tourist facilitators. OCRM supports this partnership and agreement, but the Reserve, DNER, and the volunteers should be somewhat cautious that certain tasks that might normally be completed as paying jobs (particularly facilities maintenance, construction activities, and boat operation) and that might provide more socio-economic development opportunities are not all completed solely by volunteers. There also may also be safety or liability issues when volunteers are involved.

The Reserve’s draft management plan proposes the creation of a “Friends of Jobos Bay NERR” group, which would support a volunteer program that would be available to assist with restoration activities.

7. Advisory Council and Committees

According to the Reserve's draft management plan, a Citizen Consult Council (sometimes referred to as the Citizen Advisory Committee) currently exists to ensure that public concerns are considered. Its membership includes a variety of stakeholders chosen by their respective agencies or groups: USDA Natural Resource Conservation Service, USEPA, US Geological Survey, US Fish and Wildlife Service, Puerto Rico Electric Power Authority, Puerto Rico Land Authority, DNER, municipalities of Salinas and Guayama, Agricultural Workers Association, Fishermen Association, Hunting and Shooting Association, Chevron-Phillips Corporation, Environmental Dialogue Committee, Puerto Rico Institute of Water, Soil Conservation Supervisors Board, University of Puerto Rico Sea Grant College Program, and members of the surrounding communities. The Council also provides input, guidance and support for programmatic direction and management of the Reserve.

The Reserve has Research, Education, and Coastal Training Program Advisory Committees and a Stewardship Restoration Science Committee that was established during this evaluation period. The previous evaluation findings contained program suggestions recommending that these committees be reactivated, reinvigorated, augmented, or more involved.

The evaluation team met with several members of those committees during the site visit, and they were active and engaged, wanted to provide more support to the Reserve, wanted to attempt to meet more frequently, and had a few suggestions to improve how the committees operate.

The research and education advisory committee members with whom the team met greatly value the opportunities the Reserve provides to researchers, students, and teachers. They indicated that most of the member interaction on each committee is one-on-one but expressed the desire to have more face-to-face meetings, both within and among committees. Some of the research committee members believe that more coordination and leadership of the committee from the Reserve is needed because of the increase in the number of ongoing research projects. They were interested in a meeting of all Reserve advisory committees to consider the new management plan and the role they could play in its implementation. Members from the education committee volunteered to write or assist Reserve staff in writing funding or other types of proposals if needed.

During these site visit discussions, an idea arose from some of the members that creating an over-arching Reserve Advisory Committee might encourage more communication and integration across sectors and Reserve programs. The existing Public Consult Council, the existing Research, Education, CTP, and Stewardship committees, and any other ad hoc committees would then all serve as subcommittees of the larger over-arching Advisory Committee. The larger committee would be composed of the leadership of each of the subcommittees and would meet once or twice a year; one of the larger committee meetings might also include as many members of the subcommittees as could attend. Given the enthusiasm of the committee members with whom the evaluation team met, the Reserve should give these ideas and suggestions some consideration.

PROGRAM SUGGESTION: The Reserve should consider a reconfiguration of its advisory committees to promote more cross-sector dialogue and understanding among the committees and among individual members.

B. RESEARCH AND MONITORING

1. Research Activities

The Reserve's research program incorporates watershed, bay, and nearshore environments in a 'summit to sea' approach. The management plan indicates that the Reserve's research program focuses on three key issues: climate change impacts on coastal ecosystems and communities; land use change impacts on coral and coral-related habitats; and the interrelationship between ecological integrity and community resilience. There is a strong degree of integration among the research, CTP, and stewardship sectors in some projects, as evidenced by the Jobos Bay Conservation Effects Assessment Project (CEAP).

The objective of the CEAP is to determine the environmental effects that conservation practices may have on coastal waters and associated habitats in a tropical ecosystem and ultimately on coral reefs. Agriculture still plays a role in the Jobos Bay watershed, so the project is located on a farm immediately north of the Reserve boundary at Mar Negro. A management plan has been designed using agricultural BMPs, and the farmer is implementing nine of 15 BMPs at this time. Because Jobos Bay is located in the more arid southeastern coast of Puerto Rico, groundwater is the most significant freshwater source to the Bay. There are 13 shallow water sampling wells placed on the farm property: seven along the irrigation center pivot, four up gradient, and two down gradient. The wells are used to characterize shallow ground water flow patterns and water chemistry up gradient and down gradient and to evaluate subsurface water flow into the Reserve. The Reserve's SWMP data has been used as well.

The Reserve's Coastal Training Program provided training to over 100 participants on a variety of topics related to the CEAP project, including wetlands, hydrology, and soils. As part of the project, the CTP coordinator developed a questionnaire for local farmers and conducted a socio-economic study from the data, which was used in the planning of the project.

The project is still ongoing, but the baseline assessment is done. The NRCS is performing an economic analysis of implementing BMPs, and the farmer has a contract for five years to implement the practices. As a result of the partnerships, the Reserve has obtained Coastal Change Analysis Program (C-CAP) satellite imagery and aerial photography, and NOAA's National Center for Coastal and Ocean Science (NCCOS) has mapped the benthic habitats in the Reserve and analyzed sediments for contamination. Separate from the CEAP project, NOAA's Coastal Services Center has mapped land use, land cover, and elevation from high resolution imagery, including LIDAR imagery, of the Reserve's watershed. This topographic and benthic characterization provides the first comprehensive baseline of the Reserve's habitats and land coverage from the summit of the watershed to the sea. All of these efforts will provide data on land cover uses and benthic habitats for future research and management initiatives.

Staff members from the USGS have conducted two research projects in the Reserve and published those reports during this evaluation period: Historical Ground-Water Development in the Salinas Alluvial Fan Area, Salinas, Puerto Rico, 1900-2005 (a series of maps); and Effects of Changes in Irrigation Practices and Aquifer Development on Groundwater Discharge to the Jobos Bay National Estuarine Research Reserve near Salinas, Puerto Rico. Both involve groundwater, which is the major source of fresh water into Jobos Bay and a significant source of concern. Both projects addressed how changes in agricultural practices and land use have affected groundwater levels and ground water flow to the Mar Negro area and some black mangrove die-off near Salinas.

Five GRFs conducted research during this evaluation period on topics including land use effects on coastal ecosystems, eutrophication, marine pollution, and nutrient dynamics. Other non-GRF Program graduate students have done research within Jobos Bay toward their theses and received some level of support from the Reserve as well.

The Metropolitan University (UMET) is a private, non-profit, secular undergraduate university. UMET and DNER signed an agreement during this evaluation period that allows UMET students to use the Reserve as a field lab for practical experience. Students in the School of Science and Technology are required to conduct some type of research project. Many come to the Jobos Bay Reserve to use the Reserve's library for research programs and conduct research. Students often contact the Reserve to find out the Reserve's research priorities and then develop field based projects to support those priorities. Projects have looked at interstitial salinity in mangroves, submerged aquatic vegetation, and the use of ponds by birds.

Some of the research committee members believe that more coordination and leadership of the committee from the Reserve is needed because of the increase in the number of ongoing research projects. OCRM encourages the research coordinator to work with the committee to bring about a more cohesive involvement in the research program.

The National Estuarine Research Reserve System is prioritizing establishment of reserves as sentinel sites to monitor and understand climate change impacts on coastal resources. The first focus is on sea level change and impacts to key estuarine habitats, emergent vegetation, and submerged vegetations. Since the Jobos Bay mangrove ecosystem is already showing signs of climate based impacts, OCRM strongly encourages the Reserve to develop a habitat mapping and change plan that includes vertical control infrastructure and linkage of monitoring systems within the reserve into a common geo-spatial framework.

During the course of the site visit, several people with whom the evaluation team met mentioned areas of concern for which research could result in a better understanding of or even possible solutions to those issues. These include toxics from nearby sources of pollution, such as the use of coal ash from a nearby power plant as fill material at construction sites in the Jobos Bay watershed. The ash has high levels of heavy metals and radioactive isotopes. The nearby Salinas municipal landfill is also using coal ash to line an expansion area and, according to written information provided to the evaluation team, has an apparent history of storm water runoff into the Reserve and Jobos Bay. OCRM encourages the research program to consider providing these topics to researchers and students seeking an area of research that can support

the Reserve's needs.

The previous findings (2006) included some discussion about the need to disseminate and translate the research conducted at the Reserve and a variety of methods to do so. The findings recognized that this would likely be a large and time-consuming task, and there was no recommendation included. Since then, however, the Reserve has taken some steps to meet that need. Research project reports have been published electronically on the Reserve's website, and for those that are not available in electronic format, the website lists the project reports available at the Reserve. The research coordinator organized the Aquatic Sciences Meeting of the American Society of Limnology and Oceanography, which was an important forum for research dissemination and increased the visibility of Jobos Bay Reserve as well as the entire NERRS to this world-wide group of scientists, students, and resource managers. Research and monitoring staff have collaborated with the Reserve's education program staff to support students in science fair projects and have served as science fair judges. One of the graduate research fellows taught a teacher workshop about mangroves, and the research coordinator and education coordinator were interviewed for a television program discussing the Reserve's research and education programs. OCRM encourages the Reserve to continue and to increase its efforts to disseminate and translate research conducted in the Jobos Bay NERR.

ACCOMPLISHMENT: The Jobos Bay Reserve has taken some steps to disseminate and translate the research being conducted in Jobos Bay to a variety of audiences, and particularly to non-scientists. The research and education staffs have collaborated in a number of activities to accomplish this.

2. Graduate Research Fellowship (GRF) Program

The evaluation findings dated 2006 noted that, "The GRF Program is an important component of JBNERR's Research and Monitoring Program that provides a good opportunity to engage graduate students in research at the reserve. However, the GRF Program has low visibility in Puerto Rico." The findings then included a program suggestion encouraging the Research and Monitoring Program, the Research Advisory Committee, and the Education and Outreach Program to work together to increase awareness about GRF opportunities at the Reserve in Puerto Rico and the wider Caribbean area.

Since the previous evaluation site visit, the Reserve was quite successful in increasing awareness about GRF opportunities through visits to educational institutions, by e-mail, and through press releases. A total of 10 applications were received for five GRF openings during this evaluation period. Applications came not only from Puerto Rico but from universities along the east coast of the United States. In addition to their own research, several of the GRFs gave presentations to Jobos Bay Reserve staff, for a teacher workshop, or at a meetings or conferences, such as the Aquatic Sciences Meeting of the American Society of Limnology and Oceanography, which was organized by the Reserve's research coordinator.

ACCOMPLISHMENT: The Reserve has been successful in increasing awareness of the GRF program and the opportunities for research at the Jobos Bay NERR by GRFs.

The evaluation team was able to talk with all five students who were or are GRFs during this evaluation period. In general, all were pleased with their experiences at the Reserve. They found the staff to be cooperative and as helpful as possible. However, several fellows mentioned the loss of the boat operator as a negative factor that forced them to be creative in how to address their need for boat access in Jobos Bay. One mentioned the possible availability of a kayak as a partial solution, and although this does not address all water access situations, OCRM is pleased to hear that the Reserve's management plan will include the acquisition of several kayaks.

Several of the GRFs mentioned various logistical problems besides the need for boat access. Some of the problems are likely related to the various personnel changes that occurred throughout this evaluation period. At times some of the GRFs were confused as to who was the point of contact for their logistical support and what the protocols were for communication and coordination. One found it difficult to reach someone in the DNER budget office and was not sure who in the Reserve could help. For some, lab access outside of normal business hours was difficult because it required obtaining a key and it was unclear how to arrange for that or if one was available. In most cases when work needed to be conducted by the GRFs after business hours, they indicated that it was the research coordinator who stayed late to allow them after-hours access to the facilities. This is commendable and demonstrates the commitment of the research coordinator, but it is not a solution sustainable over the long run and not one that will facilitate increased research use of the Reserve.

The lack of a wet or dirty lab presented difficulties, and that limitation should have been known before the GRF arrived to conduct research. One GRF's solution was to work in a men's restroom where water and drainage were available. A screened-in outdoor workspace with water and drainage would help until the new lab facilities are completed. Other GRFs just wanted clear protocols or guidance about what they can or cannot do, or what they are expected to provide and what the Reserve will provide (for example, does a GRF or external researcher need to pay a boat or kayak rental fee to the Reserve and/or pay for gasoline for boat use? Should the need for boat use be requested a set number of days in advance? Is any diving gear available for use? If after-hours lab use is needed, how does one obtain a key? Is wet lab space available?).

The Reserve's management plan includes "Facilities Use Rules and Regulations." These do not, however, address situations and questions unique to researchers. The Reserve should develop a set of protocols to help any GRF or visiting researcher. The most important information to provide is to identify the GRFs' or other researchers' main point of contact. In almost all Reserves, the first point of contact for GRFs and external researchers is the research coordinator, which seems appropriate at Jobos Bay but should be clarified. The protocols could also answer other questions and provide information to address at least those concerns mentioned above.

PROGRAM SUGGESTION: The Reserve should develop clear protocols for communication and coordination with Graduate Research Fellows and other external researchers. These protocols should be posted on the Reserve's website.

3. System-wide Monitoring Program (SWMP)

The goal of SWMP is to identify and track short-term variability and long-term changes in estuarine water quality, habitat, and land use in each reserve within the NERR system. Each reserve now has at least four data loggers to collect water quality data, and once a month samples are collected and analyzed. During this evaluation period, the Jobos Bay Reserve's SWMP suffered during personnel turnover, and it struggled to submit data. All of the Reserve's data sets have finally been submitted. A SWMP technician has been hired to help with SWMP activities and data management to fully comply with the NERRS' protocols and requirements. The Reserve contracted with the Virginia Institute of Marine Science (VIMS – lead agency for the Chesapeake Bay-Virginia NERR) for sample analyses during this review period, and payments fell behind, in part because of the lengthy time involved in the contracting and payment processes. At the time of the site visit, Jobos Bay NERR, VIMS, and OCRM began discussing ways to avoid this problem in the future. The Reserve intends to use the agreement it has with the University of Puerto Rico Water Institute (UPRWI) as a solution to the problem by providing funds to the UPRWI, which will then contract with VIMS for sample analyses.

The estuarine sampling portion of CEAP used nutrient and chlorophyll monthly sampling from four SWMP monitoring locations. Several of the GRFs with whom the evaluation team spoke indicated that they made use of SWMP data as part of their research projects. SWMP data is also used by and is part of the Caribbean Regional Integrated Coastal Ocean Observing System (CaRICOOS).

The research coordinator, as well as several local scientists who are active in the reserve, are participating in the expansion of protocols for NERRS system-wide monitoring of emergent and submerged vegetation. They have provided reviews of draft protocols for the development of the "Mangrove Community Vegetation Sampling Addendum," which was drafted in November 2010, by contributing information and expertise on sampling protocols. The research coordinator is a member of the ad hoc research group established by the NERRS Research Coordinator sector in January 2011 to further refine these specific protocols as needed, and his participation and expertise is vital to this endeavor.

ACCOMPLISHMENT: The Jobos Bay Reserve research staff is providing its expertise to expand the NERRS SWMP vegetation monitoring to tropical systems such as the important mangrove communities common in the Caribbean and southern US coastal waters.

C. EDUCATION AND OUTREACH

1. Education Programs

Traditionally the Reserve's education programs have focused primarily on grades K-12, and cumulatively that group represents the largest number of visitors to the NERR during the years of the evaluation period. During the school year, the education staff handles about three classroom groups per week. The program for a classroom group includes a presentation in the

Visitors Center on ecosystems and a field trip into the Reserve for species identification, some lab activities, and use of water quality data to prepare reports (adjusted to the grade level). The Reserve has implemented the Estuaries 101 curriculum.

Since 2005, the Reserve has offered a summer workshop for children in grades 5 and 6 entitled “Guardians of the Estuary.” This is a very popular week-long day camp, and camp for grades 8 through 12 has just recently been added. According to pre- and post workshop tests and other evaluation methods, these summer workshops have increased the students’ environmental and estuarine literacy.

The evaluation team met with several teachers, and all expressed their enthusiasm and great appreciation for the educational programs the Reserve offers. One science teacher who works with an environmental club that comes to the Reserve said that the exposure students get through classes helps attract students to science. She indicated that she has limited library and other resources and depends upon the Reserve to help support her. Another teacher recognizes that his students will teach their parents about the Reserve, natural resources, and an appreciation for both.

Several universities in Puerto Rico used the Reserve as a field lab to provide teacher training. In return, teachers have developed field-based activities for the Estuaries 101 curriculum. The Reserve offers teacher training that provides required contact hours that meet commonwealth requirements. The education staff offered several teacher workshops about Jobos Bay ecosystems and other workshops to teaching training programs from several universities. The education coordinator also gave a presentation about climate change and global warming for students and professors of the University of Puerto Rico-Rio Piedras campus education faculty. One of the Reserve’s GRFs gave a presentation to a teacher training workshop entitled “Mangroves: What We Learn from Sediments.”

There are several examples of the collaboration and integration of the education programs with research and stewardship efforts. The research coordinator and education staff supported students in science fair projects and served as judges in several science fairs. Education staff members and a SWMP technician created and translated an educational activity in the NERRS Estuaries 101 curriculum, integrating Reserve SWMP data. Several Boy Scouts and Girl Scouts did special stewardship projects to obtain badges and other insignia, including mangrove reforestation, coastal and forest clean-ups, and trails evaluations.

ACCOMPLISHMENT: The Reserve’s education programs for students and teachers are growing to fulfill a significant and important need, and they are met with enthusiasm and appreciation. Integration of, and communication among, the research, stewardship, and education program staffs have been ongoing and advantageous for the development of the Reserve’s overall educational program.

A partnership of the Reserve’s education staff, pre-service teachers and faculty professors, other public and private school teachers, and Sea Grant produced a new JBNERR Education Guide. The next step is to move forward with evaluation of the curriculum and activities by other

teachers, modify the Guide as needed, and put the revised guide on the Reserve's website where it is accessible to all. Given the amount of work and time that went into the first stage of production, this next step should be shepherded by the Reserve to completion.

PROGRAM SUGGESTION: The Reserve should ensure that the new Education Guide is completed and that the Guide, as well as other relevant educational materials, are made available on the Reserve's website.

2. Outreach Programs and Activities

Because of the close relationship between the Reserve and the surrounding communities, almost all of the Reserve's programs have an outreach and an education component to them. Several people with whom the evaluation team met indicated that keeping local residents apprised and informed is something they value.

During this evaluation period, the Reserve was able to purchase a traveling exhibit and banners, which were displayed at community fairs, environmental symposia in schools, and other venues. The small library at the Reserve continues to be a source of information about Puerto Rico's natural resources, environmental science, and local Aguirre history for local K-12 and college students. Reserve staff participated in several television programs that provided an opportunity to promote the Reserve and the importance of coastal and marine ecosystems. The education coordinator also offered video conferences about mangroves and other species at the Reserve.

Jobos Bay Reserve hosted open houses and provided activities for the community and students during *Estuary Day*, *Planet Earth Day*, *World Monitoring Day*, and several *Coastal Cleanup Days*. There is now a bilingual web site for the Reserve, and it has its own *Facebook* page, too.

The evaluation team noted that the Jobos Bay NERR web site needs to be updated. The staff list is not current; the CTP Activities Calendar shows no activities scheduled; and the Reserve Bulletins page talks about production of the bulletins as though it is an ongoing activity, but there are no bulletins available after 2002.

Two of the evaluation team members had never been to Jobos Bay NERR and were unfamiliar with the walking trails at the Reserve. The trails are mentioned on the web page, but there are no trail maps that show the actual route and that could be printed out and used during a trail hike. The habitat maps that have been created of the Reserve would also be of interest to some of the web page users.

PROGRAM SUGGESTION: The Reserve should update all aspects of its website, include new information such as trail maps and habitat maps, and develop a protocol for maintenance of the website.

3. Coastal Training Program

The Reserve's Coastal Training Program (CTP) is structured and managed to primarily serve the targeted audiences located in the Jobos Bay watershed. Secondly, it serves resource managers, municipal government officials, and non-governmental organizations throughout the island. From 2005 to 2010, the CTP had a working relationship and formal collaboration with the University of Puerto Rico Sea Grant College Program (Sea Grant) and the Interdisciplinary Center for Coastal Studies (ICCS). Sea Grant provided office space at the University of Puerto Rico Mayaguez Campus and funding for salary and fringe benefits for the half-time position of CTP coordinator. The ICCS provided its expertise in planning and natural resources management issues and conducted training in socioeconomic monitoring for coastal managers at the Reserve.

During this evaluation period, the CTP held 37 capacity building and training activities for approximately 740 participants within the Jobos Bay watershed and the entire island. These programs and activities focused on coastal community development, land use planning, and water quality degradation. Collaborative efforts among the Reserve's CTP, Sea Grant, and EPA supported 22 coastal municipalities, 17 other communities, and 11 other entities to submit a small municipal separate storm sewer system general permit application with a storm water pollution prevention and management plan. The Reserve-Sea Grant partnership in the CTP designed and implemented a workshop on the development of storm water pollution prevention plans for industries, reaching planners, engineers, and private consultants working in the watershed.

The Reserve's CTP worked with the Las Mareas community in Salinas municipality to assist its efforts in working toward sustainable economic development. As a result, the community was able to develop and obtain approval for a municipal ordinance and a resolution. The ordinance authorized the city mayor to commercially lease the municipal fishery village to Mar Negro Fishery, Inc., for a nominal amount for 30 years. This represents an investment of approximately \$1.8 million in the community. The resolution authorized the mayor to cede a municipal street area to the Mar Negro Fishery for its use. In turn the Mar Negro Fishery Village non-governmental organization will initiate a reforestation project and a natural resources conservation plan for the area.

Local community representatives with whom the evaluation team met are strongly supportive of the CTP and are eager to see the CTP continue its work with them.

As mentioned earlier in the discussions about the CEAP, the Reserve's CTP provided technical training (in collaboration with the Puerto Rico Natural Resources Conservation Service) in wetland determination and identification of flora associated with wetlands in the Reserve.

Shortly before the site visit, the Reserve initiated a new partnership with the University of Puerto Rico Water Resources Institute to collaborate on the administration and implementation of the CTP.

ACCOMPLISHMENT: The Jobos Bay NERR Coastal Training Program has established a strong relationship with local communities and has met specific needs to benefit them. The Coastal Training Program has played a large part in educating and convincing local residents that the Reserve and its natural resources can provide an economic benefit for them.

D. STEWARDSHIP AND RESOURCE MANAGEMENT

Within the NERR system, many reserves conduct or accomplish programs or activities related to land acquisition, enforcement, restoration, restoration science, technical advice and support, and community education under the general rubric of stewardship and resource management. Because the Reserve has integrated stewardship, research, and education components, many elements of stewardship and resource management are identifiable in some of its activities and programs, as is noted in the discussions above. This has included, but is not limited to: encroachment and resource management issues; sea grass restoration training; the Conservation Effects Assessment Project; Boy Scout and Girl Scout stewardship projects including mangrove reforestation, coastal and forest clean-ups, and trails evaluations; and CTP technical training in wetland determination, the flora associated with wetlands, and the development of storm water pollution prevention plans for industry.

ACCOMPLISHMENT: The Reserve has integrated its research, education, and partnership activities and programs in support of stewardship and resource management.

In 1993, the Puerto Rico Land Authority (PRLA) illegally bulldozed wetlands and mangroves to drain leased agricultural fields to the north of Mar Negro. As a result of an enforcement action by the US Environmental Protection Agency (EPA), EPA prepared a consent order requiring the PRLA to undertake a number of actions, some of which were directed at immediate correction of the violations, while others were intended as compensation. In particular, the PRLA was required to restore the mangrove habitat and create an agricultural buffer strip planted with specific plants that will effectively uptake nutrients from the agricultural fields that would otherwise flow into Reserve waters.

The Reserve and DNER developed an action plan and timeline for coordinating efforts with the PRLA and other agencies as necessary to complete the consent order actions. The last action not yet completed is the buffer strip. During this evaluation period, the DNER Bureau of Forest Service designed a filter strip along the northern boundary at Mar Negro, but the PRLA has not yet planted the strip. Although not legally required to do so, the Reserve has indicated during the site visit and in its management plan that it intends to plant the strip and is working with the NRCS to determine suitable plant material. OCRM encourages the Reserve to complete the planting.

The CEAP is and will be generating information about the effects of agricultural activities on the groundwaters and waters of the Jobos Bay estuary. Such information could be useful for decisions about plant materials for the buffer strip as it receives runoff from agricultural lands.

PROGRAM SUGGESTION: The DNER and Reserve should foster the completion of the planting of the agricultural buffer strip along the Reserve's northern boundary at Mar Negro and integrate appropriate information generated by the Conservation Effects Assessment Program in making decisions about any further buffer design and plant choices.

One of the traditional yet innovative strategies for habitat management that has been used in Jobos Bay by local fishermen is the selective trimming of mangrove roots, creating small canals with access to the Bay. This allows juvenile fish to have access to the Bay, particularly during low tide, when high heat and low oxygen levels of trapped water in congested mangrove canals can cause fish kills. The reserve may wish to evaluate this management strategy to determine whether it should be adopted to enhance the reserve ecosystem.

V. CONCLUSION

For the reasons stated herein, I find that the Commonwealth of Puerto Rico is not fully adhering to the programmatic requirements of the Coastal Zone Management Act and the regulations of the National Estuarine Research Reserve System in the operation of its approved Jobos Bay National Estuarine Research Reserve.

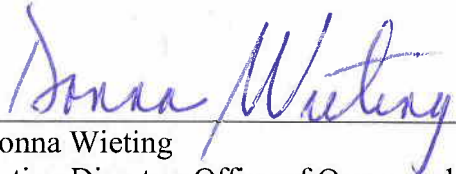
NOAA commends the Reserve and the DNER for the strong partnerships that have been established or maintained with local residents and numerous commonwealth and federal agencies. The Reserve has been successful in increasing awareness of the GRF program and opportunities for research; has taken steps to disseminate and translate the research being conducted at the Reserve, and is providing its expertise to expand the NERRS SWMP vegetation monitoring to tropical systems. The Reserve's education programs and its Coastal Training Program are expanding to meet specific needs of local students, teachers, and local communities. Research, education, and partnership activities and programs are integrated in support of stewardship and resource management.

However, the Reserve continues to experience boundary encroachment and resource degradation that accompanies encroachment and a lack of sufficient enforcement. This is the fifth time that the Reserve has been found to be not fully adhering to the programmatic requirements of the CZMA and the NERRS for the same reasons. There are four fewer DNER rangers available to enforce laws and regulations in the Reserve than there were at the time of the last evaluation. New construction continues within the boundaries of the Reserve, and legal action begun in 2005 against a number of violators has still not been resolved in almost all of those cases. Thus, the Reserve has non-conforming uses within its boundaries. These are incompatible with the purposes of the Reserve as identified in the CZMA criteria for designation of a NERR, the regulations governing the designation and operation of a NERR, and the Reserve's own mission and goals identified in its management plan.

These evaluation findings also contain 11 recommendations: four (4) Necessary Actions that are mandatory and seven (7) Program Suggestions. The Commonwealth must address the Necessary Actions by the date indicated. Because the Reserve is not fully adhering to the programmatic requirements of the Coastal Zone Management Act and the regulations of the National Estuarine Research Reserve System, the NOAA Office of Ocean and Coastal Resource Management may make a follow-up visit to the Reserve at a time to be determined. It will impose sanctions to the extent allowed by the CZMA to redirect funds from Reserve operations funds to address the issues if there is little or no progress in addressing the encroachment and enforcement issues or if deadlines for the Necessary Actions are not being met at the time of a follow-up visit or as evidenced in cooperative agreement award performance reports and reporting required by two of the Necessary Actions in these findings.

The Program Suggestions should be addressed before the next regularly-scheduled program evaluation, but they are not mandatory at this time. Program Suggestions that must be repeated in subsequent evaluations may be elevated to Necessary Actions. Summary tables of program accomplishments and recommendations are provided in Section VI.

This is a programmatic evaluation of the Jobos Bay National Estuarine Research Reserve that may have implications regarding the state's financial assistance awards. However, it does not make any judgment about or replace any financial audits.



Donna Wieting
Acting Director, Office of Ocean and Coastal
Resource Management

OCT 21 2011

Date

VI. APPENDICES

Appendix A. Summary of Accomplishments and Recommendations

The evaluation team documented a number of the Puerto Rico Department of Environmental and Natural Resources' and Reserve's accomplishments during the review period. These include:

Issue Area	Accomplishment
Facilities and Infrastructure	<p>The Reserve has completed a facilities management plan to address the challenges of rehabilitation and reuse of aged, historically significant buildings as well as plan for the construction of new facilities, all incorporating sustainable design concepts. It has established high-speed internet access, which is vital to the success of Reserve programs and research capabilities. A new boardwalk for the use of researchers to access some areas of the Reserve's mangroves is in place.</p>
Coordination and Partnerships	<p>The Reserve and local residents are strongly committed to work cooperatively to resolve challenges and issues the Jobos Bay NERR faces and to promote local socio-economic development in a way that protects and sustains the natural environment. To that end they have entered into a co-management agreement for the Reserve. The Reserve's Coastal Training Program and staff in particular place a priority on community engagement.</p>
Coordination and Partnerships	<p>The Reserve, and in particular its CTP and research staff members, have been a partner in the Jobos Bay Conservation Effects Assessment Project. The partnership is addressing the impacts of agriculture on groundwater, which is the most significant freshwater source into the Bay, and the results should be transferable to other agricultural areas in Puerto Rico.</p>
Coordination and Partnerships	<p>The Jobos Bay Reserve has strong relationships with numerous commonwealth and federal agencies, all of which are actively promoting the furtherance of those partnerships.</p>
Research Activities	<p>The Jobos Bay Reserve has taken some steps to disseminate and translate the research being conducted in Jobos Bay to a variety of audiences, and particularly to non-scientists. The research and education staffs have collaborated in a number of activities to accomplish this.</p>

Graduate Research Fellows (GRF) Program	The Reserve has been successful in increasing awareness of the GRF program and the opportunities for research at the Jobos Bay NERR by GRFs.
System-wide Monitoring Program	The Jobos Bay Reserve research staff is providing its expertise to expand the NERRS SWMP vegetation monitoring to tropical systems such as the important mangrove communities common in the Caribbean and southern US coastal waters.
Education Programs	The Reserve's education programs for students and teachers are growing to fulfill a significant and important need, and they are met with enthusiasm and appreciation. Integration of and communication among the research, stewardship, and education program staffs have been ongoing and advantageous for the development of the Reserve's overall educational program.
Coastal Training Program	The Jobos Bay NERR Coastal Training Program has established a strong relationship with local communities and has met specific needs to benefit them. The Coastal Training Program has played a large part in educating and convincing local residents that the Reserve and its natural resources can provide an economic benefit for them.
Stewardship and Resource Management	The Reserve has integrated its research, education, and partnership activities and programs in support of stewardship and resource management.

In addition to the accomplishments listed above, the evaluation team identified several areas where the program could be strengthened. Recommendations are in the forms of Program Suggestions and Necessary Actions. Areas for improvement include:

Issue Area	Recommendation
Administration and Staffing	PROGRAM SUGGESTION: The DNER and Reserve are urged to look for ways to meet the need for boat access to the Reserve so that support for research, education, and stewardship activities can be dependably and safely met and maintained.
Administration and Staffing	NECESSARY ACTION: The match dollars proposed in cooperative agreement awards, particularly from non-Reserve staff salaries, must clearly and accurately reflect the actual support provided to the Reserve. This must be addressed to OCRM's satisfaction in conjunction with each future federal financial assistance award.

<p>Administration and Staffing</p>	<p>PROGRAM SUGGESTION: The DNER and Reserve are encouraged to shift some percentage of one or more core staff salaries (in addition to the manager’s position) to commonwealth funding, with a gradual increase in the percentage over time.</p>
<p>Reserve Boundaries, Encroachment, and Enforcement</p>	<p>NECESSARY ACTION: The boundaries of the Jobos Bay Reserve must be amended to exclude illegally constructed permanent structures (houses and buildings) on land in the Las Mareas and Camino del Indio areas that encroach into the Reserve. The amended boundaries must be reflected in the Reserve’s management plan before OCRM will approve the plan. Changes to the 2010-2015 management plan reflecting the amended boundaries must be submitted to OCRM by April 23, 2012.</p>
<p>Reserve Boundaries, Encroachment, and Enforcement</p>	<p>NECESSARY ACTION: By April 23, 2012, the Puerto Rico Department of Natural and Environmental Resources and Jobos Bay NERR must submit a strategy for review and approval to NOAA’s Office of Ocean and Coastal Resource Management that details how and when the 13 outstanding illegal pier/ramp cases as well as new structures built since the evaluation site visit in February 2006 will be resolved and removed.</p> <p>By the same date the DNER and Reserve must identify the dates of removal of two piers for which removal orders have already been issued or provide an explanation about why they have not yet been removed. The Reserve must report on the status of each legal case and DNER’s efforts at resolution of the cases by written or electronic correspondence to the OCRM Estuarine Reserves Division quarterly after initial submission of the strategy until all cases have been resolved, which must occur no later than the next evaluation.</p>
<p>Reserve Boundaries, Encroachment, and Enforcement</p>	<p>NECESSARY ACTION: By April 23, 2012, the Puerto Rico Department of Natural and Environmental Resources, the Ranger Corps, and Jobos Bay NERR must develop and submit an enforcement strategy for review and approval to NOAA’s Office of Ocean and Coastal Resource Management. The strategy must articulate the challenges and conditions that led to the encroachment and must be designed to prevent further boundary encroachment, new illegal construction, and resulting natural resource degradation.</p> <p style="text-align: center;"><i>(continued next page)</i></p>

	<p>The strategy must include, at a minimum, the challenges and conditions that lead to the encroachment and illegal construction; mechanisms for two-way regularly scheduled and emergency reporting on surveillance findings between Rangers and Reserve staff; time frames and protocols that will be followed when illegal activity is discovered, including periodic monitoring until the situation is resolved; and outreach/training activities for rangers and local residents to inform them of Reserve regulations and the importance of the natural resources and reasons for protecting them.</p> <p>The Reserve must report on activities and results from implementing the strategy by written or electronic correspondence to the OCRM Estuarine Reserves Division every quarter after initial submission of the strategy.</p>
Advisory Council and Committees	PROGRAM SUGGESTION: The Reserve should consider a reconfiguration of its advisory committees to promote more cross-sector dialogue and understanding among the committees and among individual members.
Graduate Research Fellows (GRF) Program	PROGRAM SUGGESTION: The Reserve should develop clear protocols for communication and coordination with Graduate Research Fellows and other external researchers. These protocols should be posted on the Reserve’s website.
Education Programs	PROGRAM SUGGESTION: The Reserve should ensure that the new Education Guide is completed and that the Guide, as well as other relevant educational materials, is made available on the Reserve’s website.
Outreach Programs and Activities	PROGRAM SUGGESTION: The Reserve should update all aspects of its website, include new information such as trail maps and habitat maps, and develop a protocol for maintenance of the website.
Stewardship and Resource Management	PROGRAM SUGGESTION: The DNER and Reserve should foster the completion of the planting of the agricultural buffer strip along the Reserve’s northern boundary at Mar Negro and integrate appropriate information generated by the Conservation Effects Assessment Program in making decisions about any further buffer design and plant choices.

Appendix B. Commonwealth's Response to Previous (2006) Evaluation Findings

Program Suggestion: Program Suggestion: OCRM strongly encourages DNER and JBNERR to: (1) fill current staff vacancies; (2) identify staffing needs that may arise as the reserve's programs mature; (3) explore methods to retain qualified staff; and (4) provide consistent, long-term support for the reserve's core staff.

Response: DNER and JBNERR filled all required vacancies at the Reserve and explored available methods to retain hired personnel. The DNER Regional and Central Office provided support to core staff and programs during this evaluation period.

Necessary Action: Within one month of receipt of final evaluation findings, JBNERR must submit a strategy and timeline for revising its management plan to OCRM. Once the strategy and timeline are complete, JBNERR must provide updates on the management plan's revision process in its semi-annual performance reports. The revised plan must be completed by March 2008.

Response: DNERR-JBNERR completed the Revision of the Management Plan and was submitted and accepted by NOAA-NERRS. It has been posted in the Federal Register for Public Comment Period as of January 2011.

Program Suggestion: As part of its management plan revision, JBNERR should develop a comprehensive facilities plan that assesses its current facilities and its future facilities needs. The reserve's core mission and its capacity should be an integral component of the plan. The plan should describe the pros and cons of refurbishing and maintaining the abandoned structures versus demolishing them; it also should provide detailed cost projections for each option. Additionally, the plan should incorporate sustainable design principles and an energy strategy that examines the potential for generating solar and wind power.

Response: A Jobos Bay Facility Plan was incorporated in the Management Plan Revision, it identifies the best uses of the facilities acquired. A comprehensive facility plan was developed and submitted to NOAA on November 30, 2010.

Program Suggestion: The Research and Monitoring Program should work in concert with JBNERR's Research Advisory Committee (RAC) and Education and Outreach Program to increase awareness about GRF opportunities at JBNERR. Efforts should be made to publicize the program not only in Puerto Rico, but also throughout the wider Caribbean in order to enhance and diversify the program's applicant base.

Response: JBNERR Research Coordinator has worked with Universities, not only locally but with students in the Continental USA (i.e. Perdue, USF, Boston State U.), to increase awareness of the GRF Program. During this evaluation period of the five openings two came from the U.S. and three from Puerto Rico.

Program Suggestion: The Research and Monitoring Program and the RAC should work together to move the Committee toward a more formal, integrated working group. The RAC should consider broadening its expertise and responsibilities and should begin working collectively in an advisory capacity. In particular, the Committee should develop long-term research priorities that address emerging issues at the reserve.

Response: JBNERR Research Coordinator worked on the integration of the RAC and formalized the group by implementing a parliamentary process. We incorporated the RAC to help identify and to develop the long term research priorities to be incorporated in the revised Management Plan. These priorities opened venues of collaboration with NOAA initiatives, with the Caribbean Regional Association, local universities, and the NOAA Caribbean Coral Reef Institute, and increased our exposition to the scientific community.

Program Suggestion: OCRM encourages the Education and Outreach Program to develop an education curriculum that: (1) further promotes experiential learning about Jobos Bay's valuable natural and cultural resources; (2) aligns with commonwealth educational content standards; (3) targets local students and teachers; and (4) incorporates the reserve's research and monitoring projects.

Response: Education and Outreach Program has developed a new JBNERR Education Guide created by pre-service teachers and faculty professors from the Education Department-University of Puerto Rico Río Piedras Campus and teachers from public and private schools from Jobos Bay watershed and throughout PR, in a collaborative effort between JBNERR education staff and Sea Grant UPR-Humacao. These curricular activities were created following the PR Department of Education standards with the help of the EAC. Our laboratory technician was an important linkage between the monitoring and educational outreach.

Program Suggestion: OCRM encourages the Education and Outreach Program to: (1) reinvigorate and augment the CTP Advisory Committee with local community representatives; (2) revise the CTP strategic plan; (3) diversify the program's delivery methods beyond workshops; and (4) transition the CTP Coordinator into a full-time position.

Response: JBNERR CTP Coordinator worked to augment the awareness of the JBNERR strategic plan within the general community and stakeholders. This partnership with other important stakeholders revitalized and increased JBNERR's exposition. CTP Strategic Plan was revised within the new Management Plan document. During this period the CTP coordinator transitioned into a full time position.

Program Suggestion: JBNERR should continue to strengthen its visibility locally and regionally through outreach to area municipalities, Special Communities, relevant commonwealth agencies, researchers, educators and the general public.

Response: JBNERR promoted the message of natural resources conservancy, throughout Jobos Bay Special Communities. A Stewardship Interagency Agreement was developed and signed to bring all stakeholders to recognizing the need for Jobos Bay protection and management within their agencies. A co management agreement was signed with IDEBAJO, Initiative for the Economic Development of Jobos Bay (Mar Negro, Inc), to enhance their involvement with

Reserve issues and assist them as they develop economic eco tourism initiatives in Jobos Bay. All Reserve's Programs worked together in the development and implementation of these efforts.

Program Suggestion: OCRM strongly encourages the Education and Outreach Program to reactivate and revitalize its EAC as soon as practicable.

Response: JBNERR Education Coordinator and Environmental Educator reactivated the EAC. These collaborated in delivering workshop for teachers, impacting schools of the Region. The members met frequently, demonstrating their interest and commitment in forming part of the EAC.

Necessary Action: JBNERR and DNER must continue to address remaining resource issues in Camino del Indio and Las Mareas. In its semi-annual progress reports, JBNERR will report on progress in addressing: (1) the court case regarding title holdings in Camino del Indio; (2) enforcement cases and the removal of illegal piers within the boundary of the reserve; and (3) reduced water quality in Mar Negro resulting from historical filling in Camino del Indio.

Response: Nineteen legal cases regarding pier construction in the Mar Negro Area were submitted, of these, four were removed voluntarily, and two were ordered removal but have not been removed. The remaining are awaiting court hearings. The DNER legal division withdrew from the boundary case. Enforcement continues with the surveillance of the DNER Rangers in the area.

Program Suggestion: JBNERR and DNER should develop a reserve stewardship plan and budget that includes the parcels acquired during the review period.

Response: The New Revised Management Plan incorporates a Stewardship Plan that identifies land acquisition needs, and a preliminary budget scenario. All acquired parcels have been incorporated into the Reserve's Boundary with this new Management Plan Revision.

Program Suggestion: DNER should dedicate a coordinator to oversee implementation of the interagency stewardship agreement in order to keep partners engaged and to ensure that the agreement becomes the standard operating procedure for permitting, enforcement and stewardship in the Jobos Bay Watershed.

Response: As pertinent the Jobos Bay manager served as coordinator for this stewardship agreement and participated in the meetings. Due to changes in government, the committee has not met since 2007.

Appendix C. Persons and Institutions Contacted

Puerto Rico Department of Environmental and Natural Resources

Daniel Galan Kercado, Secretary
Damaris Delgado, Director, Bureau of Coasts, Reserves, and Refuges
Ernesto Diaz, Manager, Puerto Rico Coastal Management Program
Lt. Harold Ramirez, Ranger Corps
Sgt. Angel Colon, Ranger Corps
Melvin Torres, DNER Regional Director
Luis Cancel, DNER Regional Director

Jobos Bay National Estuarine Research Reserve

Carmen Gonzalez, Manager
Angel Dieppa, Research Coordinator
Sandra LeBron, Education Coordinator
Carmelo Davila, Coastal Training Program Coordinator
Enid Malave
Nilda Pena
Sebastian Garcia

Current and Former Graduate Research Fellows at Jobos Bay NERR

Michael Martinez-Colon
Mayte Rodriguez-Colon
Ivelisse Rodriguez-Colon
Suhey Ortiz-Rosa
Virginia Schutte

Jobos Bay NERR Research Advisory Committee

Ariel Lugo, U.S. Forest Service
Jesus Rodriguez, U.S. Geological Survey

Jobos Bay NERR Education Advisory Committee

Alida Ortiz
Jose Sanchez
Maritza Gonzalez
Edgardo Ortiz

Federal and Commonwealth Agency Representatives

Edwin Mas, USDA, Natural Resources Conservation Service
Jose Castro, USDA, Natural Resources Conservation Service
Yaminette Rodriguez, USDA, Extension Services
Chris Caldow, NOAA, NCCOS
David Whitall, NOAA, NCCOS

Ariel Lugo, U.S. Forest Service
Jesus Rodriguez, U.S. Geological Survey
Jan Zegarra, U.S. Fish and Wildlife Service
Maria Marquez, Puerto Rico Land Authority

Local Government Representatives

Leslie Rodriguez, Planning Director, City of Caguas

Academic/Educational Representatives

Ruby Montoya Ospina, Metropolitan University
Dallas Alston, University of Puerto Rico at Mayaguez
Fred Schaffner Gibbs, University of Turabo at Gurabo
Edgardo Ortiz, University of Puerto Rico at Humacao
Jorge Corredor, University of Puerto Rico
Lillian Ramirez, University of Puerto Rico Sea Grant Program
Ruperto Chaparro, University of Puerto Rico Sea Grant Program
Jorge Rivera Santos, University of Puerto Rico Water Resources Research Institute

Other Organizations and Individuals

Jose Menendez, Sierra Club
Jose Claudio, IDEBAJO
Nelson Santos, IDEBAJO
Justo Gonzalez, AEE
Luis Reyes, AEE

Appendix D. Persons Attending the Public Meeting

The public meeting was held on Tuesday, January 25, 2011, at 5:00 p.m. at the Jobos Bay National Estuarine Research Reserve Visitors Center, Road 705, Kilometer 2.3, Main Street, Aguirre, Puerto Rico. The following attended the meeting:

Guillermo De Jesus
Angel L. Martinez
Alberto Rubio
Margarita Colon
Russell Ortiz
Victor Alvarado Guzman
Samuel Velez
Deborah Norman
Estaban Paban
Ruth Santiago
Helene Marotta
Dianachy Felix
Xavier Estrada
Jose A. Gonzalez
Jose Claudio
George Nieves
Luis A. Santiago
Leslie Rodriguez
Nelson Santos
Justo L. Gonzalez
Maria Zayas
Hery Colon Zayas
Walesisa Rojas
Narces Chupany
Luis A. Reyes Santini
Ales Cruz
Leonardo Rodriguez
Fred Schaffner
Ivelisse Rodriguez
Jaime Plaza
Manuel Morales
Dilsa I. Cortes
Jose I. Cordero
Ruperto M. Berrios
Ana Concepcion Rubio
Hector J. Cardona
Adneris Hernandez

Appendix E. NOAA's Response to Written Comments

NOAA received one written comment regarding the management or administration of Jobos Bay National Estuarine Research Reserve. The letter is part of the official record of the evaluation and is briefly summarized here, followed by NOAA's response.

Ruth Santiago, on behalf of

Initiative for Eco-Development of Jobos Bay, Inc. (IDEBAJO)

Comment: Ms. Santiago noted that the designation of the Reserve provided protection for the Jobos Bay's resources but also impacted the livelihoods of local communities. She provided several examples worldwide where successful conservation and sustainable development projects are community-based and where eco-tourism activities can generate income for local people while conserving natural areas. IDEBAJO (on behalf of Pescaderia Mar Negro, Inc.) and the Puerto Rico Department of Natural and Environmental Resources entered into a cooperative agreement following that type of model. The agreement provides that both parties will integrate the community into the management of the Reserve and will promote local socio-economic development. This is a significant accomplishment and an important step toward reconciling the tension created by the Reserve's designation and subsequent prohibition of community use of the resource. Another accomplishment Ms. Santiago noted is greater access to the Visitors Center.

She notes several challenges that the Reserve faced and still faces, including, for example: use of coal ash as fill material at multiple construction sites in the Jobos Bay and adjacent watersheds; construction of sprawling single-family housing developments that critically affect the South Coast Aquifer with greater extractions and reduced recharge rates; the expansion of the Salinas municipal landfill immediately adjacent to Reserve boundaries; and the presence of contaminants in Jobos Bay from residues of a tire fire. Her letter also discusses current or emerging issues the Reserve faces, including a new Puerto Rico permitting law that provides little or no opportunity for input from the Reserve and DNER in the siting approval process; emission of solid waste or discharges by industry and watercraft into the Bay; shortage of personnel to monitor or curtail environmental violations; and rising sea level and ocean acidification.

Ms. Santiago's letter also lists a variety of opportunities to address some of the Reserve's challenges and issues. Some of these involve promoting and implementing co-management agreements with host communities; using sustainable development policies as guidance for low impact economic growth centered on eco-tourism; developing plans, practices, and training sessions on waste management for host communities; constructing ground water recharge ponds; implementing and enforcing a DNER moratorium on additional extractions from the South Coast Aquifer; conducting a full scale education campaign with local youth at local, regional, and island-wide levels; and publishing maps of the Reserve trail systems.

In terms of areas for improvement, Ms. Santiago notes that workshops and training programs need to be expanded in size and demographics in order to provide opportunities for youth and community members to develop skills in sustainable or low impact socio-economic development. The Coastal Training Program should create a process to provide follow-up with participants and organizers, while the education program could improve its effectiveness by

adding more topics and targeting youth under the “train the trainer” philosophy so they can serve as community liaisons. Financial and other incentives from independent funds should be used to recruit youth.

Finally, on behalf of IDEBAJO, Ms. Santiago discusses several areas where members of communities might be able to work or collaborate with the Reserve and NOAA. Several of these involve research projects and topics and ecotourism activities and opportunities.

OCRM’s Response: The evaluation team thanks Ms. Santiago and IDEBAJO for the thoughtful comments. During the site visit public meeting, IDEBAJO gave a lengthy and informative presentation, touching on many of the same points raised in Ms. Santiago’s letter.

OCRM agrees that the partnership and cooperative agreement between the Reserve and local communities is significant and appears to be strengthening their relationship. The partnership creates opportunities to address some of the Reserve’s challenges and issues (noted on pp. 17-18). OCRM also concurs with the identification of many of those challenges, including lack of “...personnel to monitor or curtail environmental violations” and believes that the issue of encroachment into, and enforcement of, the Reserve’s boundaries must be the top priority. That issue has been present almost since the day of designation, yet still remains.

OCRM encourages IDEBAJO, local communities, and community groups to continue and even expand their work with the Reserve. As noted in numerous places throughout the findings, OCRM is pleased to see how the Reserve and the local residents support one another.

Appendix F. Evaluation Findings Recommendations and Necessary Actions Pertaining to Boundary, Enforcement, Encroachment, and Resource Protection Issues at Jobos Bay NERR from Findings dated January 29, 1985 through Findings dated November 8, 2006

JANUARY 29, 1985 FINDINGS (First Evaluation)

(No differentiation between program suggestions and necessary actions)

Resource Protection Recommendation: A minimum complement of rangers must be assigned to the JOBANES to ensure that existing regulations are enforced. The northern boundary, or at minimum the north-western boundary, of the JOBANES should be surveyed and clearly marked.

AUGUST 5, 1987 FINDINGS

Found the Commonwealth was not adhering to the terms and intent of Section 312 of the CZMA and National Estuarine Sanctuary Program Regulations

(No differentiation between program suggestions and necessary actions)

Enforcement Recommendation: Enforcement must be improved at the Reserve. The DNR should work with the Ranger Corps to insure enforcement at the Reserve for the protection of site-specific natural resources of the Reserve. Logs of the specific type of monitoring and surveillance performed by the Ranger Corps should be submitted to the MEMD with the quarterly performance reports under future operations awards. The Ranger Corps should be more involved with the Reserve's onsite and island-wide educational efforts.

Reserve Boundary – Survey and Signage Recommendation: The DNR should survey the Reserve's boundaries by September 1987. Temporary boundary signs should be posted immediately and permanent signs posted upon completion of the survey. Ways to prevent or deter thefts of the signs should be explored by the DNR. Local residents should be made aware of the Reserve boundaries and the Reserve's protected status, as well as the types of activities restricted within its boundaries.

JULY 7, 1989 FINDINGS

(No differentiation between program suggestions and necessary actions)

Staffing – Rangers Recommendation: The DNR should examine ways to increase the number of Rangers assigned to the Reserve for optimal effectiveness. One alternative could be to redeploy rangers to the Reserve from other less sensitive areas during peak hunting and visiting periods to relieve the workload of the three Rangers currently assigned to the Reserve.

Reserve Boundary Recommendation: Reserve officials must quickly resolve the boundary conflict between the aerial map used in the Federal acquisition award and the recently developed survey map.

Reserve "Use" Regulations Recommendation: Given the DNR's long history of involvement in

attempting to complete “use” regulations for the Reserve, the project should be made a high priority. The DNR should assign an additional attorney to the project to expedite matters and to fill in should the assigned attorney be absent for any length of time. The DNR attorneys should consider regulations that prohibit hunting during certain migration seasons.

DNR Rangers and Enforcement: The DNR Rangers should develop and employ alternative enforcement tactics. For example, the DNR may want to require hunters to check in and out of the Reserve during hunting season. The DNR could improve control over potential hunting violations through this method. Additional training to accommodate the development of alternative enforcement strategies is encouraged.

FEBRUARY 22, 1993 FINDINGS

Found the Commonwealth was not fully adhering to the programmatic requirements of the NERR system in operation of the Jobos Bay NERR

Public Use Regulations Necessary Action: DNR must place high priority on finalizing and implementing the JB-NERR Public Use Regulations. By May 15, 1993, DNR must submit to OCRM a completed draft document (in English) including documentation of review by the public and relevant Commonwealth and Federal agencies (e.g. public hearing notices, written comments, etc.). A final version of the regulations (in English) must be submitted to OCRM within 90 days of receipt of NOAA’s review comments.

Reserve Boundary Conflicts Necessary Action: DNR must, by May 15, 1993, formally notify all affected parties of its final legal position on the JB-NERR boundary. The exact boundary must also be included in the Management Plan and Use Regulations.

Resource Protection – Surveillance and Enforcement Necessary Action: DNR must improve surveillance and enforcement at JB-NERR by: ► incorporating into the Management Plan a resource protection strategy that establishes priorities, patrolling schedules, staff and equipment needs, and permanent channels of substantive communication with the Reserve Manager (dates specified in Recommendation 2); ► implementing the enforcement strategy by instituting a regular series of coordinating meetings between DNR Headquarters, JB-NERR and the DNR Rangers focusing on routine operations and emerging enforcement issues at the Reserve (beginning September 1, 1993); ► ensuring, by September 1, 1993, that the DNR Rangers continuously have access to a dedicated, seaworthy and clearly marked patrolling vessel specifically equipped with modern navigation, communications and safety gear.

September 27, 1995 FINDINGS

Found the Commonwealth was not fully adhering to the programmatic requirements of the NERR system in its operation of the Jobos Bay NERR

Enforcement and Boundary Delineation Necessary Action: A. DNER and JBMERR must prepare and submit a detailed boundary map, including documentation of ownership and/or other management responsibility, according to the requirement of 15 C.F.R. 921.11(c). This must be

completed and submitted to NOAA/OCRM within six months of receipt of final findings. B. DNER and JBNERR must clearly mark these boundaries with appropriate signs, and a commitment to maintain these signs, on the ground and in the water. Specific details on number, kind, and placement of signs must be submitted to NOAA/OCRM within one year of receipt of final findings. C. DNER and JBNERR must immediately take steps to stop habitat destruction to the mangroves and other habitats of the JBNERR. DNER and JBNHERR must also prepare a resource protection plan pursuant to Necessary Action #9. (*Necessary Action #9 requires completion of a draft Final Management Plan.*) All efforts must be reported in quarterly performance reports.

JULY 23, 1998 FINDINGS

Resource Management – Boundary Encroachments Necessary Action: In order to ensure that Reserve lands are managed to be consistent with the mission and to further the goals of the Reserve program, as required by the regulations, the Commonwealth must take necessary steps, such as imposing a moratorium, to stop any further construction in the Las Mareas and Camino del Indio area. In response to the action seeking an injunction against construction of the gate across the road, the Commonwealth must provide the necessary legal services, both to defend against the litigation and, if feasible, to file a cross-complaint seeking a permanent injunction against further construction. DNER must provide to OCRM, within 5 days of their filing in court, all court documents. The Commonwealth must also provide to OCRM, in writing, a status report of these litigations, including copies of all relevant court documents, and the strategy for the next steps, within 30 days of the receipt of these final findings and every 30 days thereafter until the litigation is completed.

Resource Management – Boundary Encroachments Necessary Action: The Commonwealth must elevate the priority of resolving all title issues and must provide the necessary legal service to accomplish this task. DNER must provide to OCRM, in writing, a strategy and a timeline that address this issue within 90 days of receipt of these final findings.

Enforcement and Surveillance Needs Necessary Action: Boundary, protected area, and public use regulation signs must be erected in those areas of the Reserve where boundary issues are not in dispute within 120 days of receipt of these final findings. In areas of boundary dispute, signs must be erected within 60 days of resolving the issue and status of this action must be reported to NOAA, in writing, through the quarterly or semi-annual performance reports. (**Note:** Correspondence from the Commonwealth indicates that posts and sign installation has been scheduled for August 1998.)

DECEMBER 10, 2002 FINDINGS

Found the Commonwealth was not fully adhering to the programmatic requirements of the NERR system in its operation of the Jobs Bay NERR

Resource Integrity – Las Mareas and Camino del Indio Property Invasions and Resource Damage Necessary Action: Within six months of receipt of the final evaluation findings, DNER must submit to NOAA a Recovery Action Plan and timeline for addressing encroachment and

illegal construction on reserve property and attendant resource degradation. The plan must include the elements described in these findings and identify specific actions with target dates. Progress on the implementation of the plan shall be reported in JBNERR's operations awards semi-annual progress reports.

Resource Integrity – Resource Degradation on the Northern Boundary Necessary Action: DNER must lead the effort to coordinate and complete the land transfer, design and construction of the filter strip, and mangrove restoration on the northern portion of the reserve in order to achieve a more sustainable ecological system. Within six months of receipt of the final evaluation findings, DNER must submit to NOAA an action plan and timeline for coordinating efforts with PRLA and other agencies as necessary to complete the Consent Order actions. The plan must identify specific actions with target dates that will advance the progress of the land transfer, design and construction of the filter strip, and mangrove restoration until completed. Progress on the implementation of the plan shall be reported in JBNERR's operations awards semi-annual progress reports.

Enforcement Necessary Action: DNER must take action to provide an increased and regular Ranger Corps presence throughout the reserve as well as to ensure that back-up officers will be available when they are required. DNER also must provide necessary legal support to Ranger Corps enforcement actions in a timely manner to ensure that rangers feel empowered to engage in appropriate enforcement, particularly in cases of illegal fill and construction on reserve property. Within six months of receipt of the final evaluation findings, DNER must notify NOAA in writing of the actions it has taken to improve Ranger Corps staffing and effectiveness at JBNERR. Progress on the implementation of these actions shall be reported in JBNERR's operations awards semi-annual progress reports.

NOVEMBER 8, 2006 FINDINGS

Stewardship Program – Camino del Indio and Las Mareas Necessary Action: JBNERR and DNER must continue to address remaining resource issues in Camino del Indio and Las Mareas. In its semi-annual progress reports, JBNERR will report on progress in addressing: (1) the court case regarding title holdings in Camino del Indio; (2) enforcement cases and the removal of illegal piers within the boundary of the reserve; and (3) reduced water quality in Mar Negro resulting from historical filling in Camino del Indio.