



ELAW

Environmental Law Alliance Worldwide

Scientific Review of the
Environmental Impact Assessments for the
Construction of two Breakwaters at
Long Bay, Negril, Westmoreland, Jamaica
by
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Overall review prepared for the
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This document contains the professional opinion of the Jamaica Environment Trust (JET). In arriving at our opinion we made every reasonable attempt to ensure that our resource persons are informed and reliable and experts in the area in which their comment and analysis is sought. JET encourages readers to apply their own critical analysis to the information provided in this document and by others, particularly where JET's opinion differs from those others.

Background

The proposed construction of two breakwaters at Long Bay in Negril has generated considerable public comment and recent opposition from a number of tourism stakeholders. The Jamaica Environment Trust (JET) requested the Environmental Law Alliance Worldwide (ELAW) to conduct a scientific review of the Environmental Impact Assessment (EIA) of the breakwater proposal and this follows beginning on Page 6. There is, however, a wider context to this latest proposal which JET raises here.

The problem of beach erosion at Long Bay in Negril has been occurring for decades, although measurement and documentation did not get underway until the late 1990s. A number of likely causal factors were identified – the draining of the Great Morass in the 1950s, removal of beach vegetation (including mangroves), depletion of the back beach sand dune, inadequate sewage treatment resulting in nutrient overloaded waters and resulting coral reef decline, removal of seagrass beds, construction of ad hoc hard structures (groynes, wave attenuation devices, breakwaters), overfishing, poor planning and development control enforcement and insufficient attention paid to setbacks. In 2006, coastal engineers Smith Warner International were commissioned by the Negril Coral Reef Preservation Society (NCRPS) to do a study on beach erosion in Negril with recommendations for reversing the erosion trends. This study was funded by the Environmental Foundation of Jamaica (EFJ) and presented at a public meeting in Negril in 2007, at which JET was represented by its CEO, Diana McCaulay. The meeting was lightly attended and Ms. McCaulay was concerned to observe that while the evidence of poor coastal zone management was outlined and discussed in some detail, including the need for a coastal zone management plan, the approach recommended by Smith Warner was less about ecosystem restoration and more about beach nourishment and a series of underwater structures.

In 2011, JET became aware of a plan to “Enhance and Rehabilitate” the beach at Sandals Negril, also designed by Smith Warner International. This proposal recommended breakwaters and BioRock structures, along with beach nourishment and a timber jetty. JET submitted a review of this proposal to NEPA, which included the macro concerns stated above, the lack of consultation with those outside of the Negril community, specifically JET, and the need for a holistic and long-term plan for Negril. That Review is attached as an appendix. This plan was never implemented, to the best of JET’s knowledge.

In September 2012, as part of the GOJ/EU/UNEP Climate Change Adaptation and Disaster Risk Reduction project – Increasing the Resilience of Coastal Ecosystems, 20 acres of seagrass were replanted in the Negril Marine Park. 84% of the transplants died, due to the passage of Hurricane Sandy, according to the 3rd quarter project report (October-December 2012. JET was told by NEPA (Sheries Simpson, via e-mail dated 28 June 2013) that replanting was continuing in Long Bay, but at the time of writing we are not aware whether this was successfully completed. Under this project, there is also a plan to create artificial reefs – the current status of this is unknown to JET.

In early 2013, JET became aware of a plan to use a substance called Shorelock to promote beach accretion in Jamaica. Shorelock had apparently already been used on two north coast beaches without any public consultation or baseline data collection on the subject beaches and was to be used in Long Bay. JET requested monitoring reports from NEPA with regard to the effectiveness of this approach, but after many months, we learned there were none (E-mail from Nola Wright, Access Officer, dated 27 June 2013).

Despite the absence of peer review or assessment of its prior use in Jamaica, Shorelock was to be used in Negril. JET wrote to the Minister of the Environment, with a copy to the CEO of NEPA, on 25 March 2013, expressing our concerns, which included the failure to invite JET to a “sensitization meeting” to be held in Negril by the principals of Shorelock. JET also provided a referenced scientific paper to NEPA on Shorelock, also attached here as an appendix.

Stakeholders in Negril objected to the use of Shorelock. This resulted in various meetings and the number of sites it was to be applied to in Negril was reduced. Oversight was to be provided by Professor Dale Webber of the University of the West Indies, specifically baseline data as to the health of meiofauna before and after application, as well as the effects on the beach. There has been no further information coming to JET about the use of Shorelock in Negril, although a journalist did call the CEO on 2 June 2014 to ask for a comment on the results so there may be results available that have not been shared.

Then in February 2014, a presentation was made to the Negril Resort Board with regard to another proposal to build two breakwaters in Negril and to dredge the South Negril River. It transpired this was part of a 2012 project called Enhancing the Resilience of the Agricultural Sector and Coastal Areas to Protect Livelihoods and Food Security, led by the Planning Institute of Jamaica. Although some consultation had been done with the Negril community, it was very limited and stakeholders had not appreciated the scale of the works, nor that in fact a decision had been taken to go ahead. This approach drew only very partially on the Smith Warner study and proposed two offshore breakwaters (instead of a mixture of nine offshore and inshore submerged structures), there was no beach nourishment intended, no coastal zone management plan and none of the further study and design the Smith Warner study had recommended. The implementing agency was to be the National Works Agency (NWA) and the EIA Consultant was CL Environmental. Members of the Negril community contacted JET at this point expressing their worry at what they perceived to be a series of ad hoc interventions, none of which conformed to any holistic plan to restore the damaged ecosystem functions in Negril, relied heavily on hard structures and would result in considerable business disruption. JET agrees with this position. The Negril stakeholders then went to the media with their concerns.

Given this history, JET would like to state the following views:

- The many different approaches described above, with their attendant failure to communicate effectively with the public, have resulted in the current impasse.

- Negril needs an overall plan for the restoration of the damaged ecosystem functions that have been described in detail since the mid-1990s. This must include tertiary sewage treatment, phased and benchmarked connection of all properties to the central system, restoration of beach vegetation, including mangroves, seagrass replanting and a moratorium on all seagrass removal, adherence to setbacks and possibly managed retreat of those structures closest to the foreshore, control of overfishing, improved management of the Environmental Protection Area, including the marine park, and restoration of the Great Morass including its drainage patterns. All developments, new and old, need to be in strict conformance with this plan.
- NEPA needs to greatly improve the frequency and quality of its public consultation efforts. It relies too heavily on one or two partners, who may or may not pass on the information, and despite JET's objections over many years, continues to regard stakeholders far too narrowly. Negril does not belong to those who live and work in Negril. Moreover, NEPA is too reactive to the public – it needs to put information on its website, in social media or in the press in advance of the public requesting it.
- The EIA done by CL Environmental is 537 pages long, including references and appendices. The Executive Summary is roughly 20 pages long, and includes the main environmental impacts in a set of matrices. The scoring in the matrices is too simple – duration is either short or long, impacts are either direct or indirect, magnitude is either high, moderate or low, significance is either large, medium or small. There is no way these matrices will communicate the environmental risks and impacts of breakwaters in a fragile and degraded marine park to a lay reader. Jamaican EIAs, including this one, have become less and less accessible to the average person. NEPA needs to insist that the environmental impact findings of an EIA be presented in a much simpler and clearer summary for the general public.
- In addition to the appendices already mentioned, JET also submits two other documents: (1) An FAO technical document on the construction of breakwaters, which explains the complexities. We remain concerned about the National Works Agency's expertise in this area. (2) A scientific paper on the effectiveness of natural habitats in protecting coastal areas from storms and sea level rise. We believe restoring natural coastal features is more effective over the long term in protecting coastal ecosystems.

Jamaica Environment Trust
June 3rd, 2014

Introduction

The Environmental Law Alliance Worldwide (ELAW) was asked by the Jamaica Environment Trust to review the Environmental Impact Assessment (EIA) documents for the Construction of two Breakwaters at Long Bay, Negril, Westmoreland, Jamaica, which were prepared in April 2014. The two breakwaters would be 516 m and 422 m long, in water between 3.0 - 4.1 m deep, and 1,500 – 1,600 m offshore in Long Bay, on the western side of the country.¹ The project also includes the following activities:

- 1) Creating a stockpile area at the mouth of the South Negril River, measuring 30 m x 47 m (excluding access roads);
- 2) Dredging and de-silting an area measuring 33 m x 42 m, to a depth of 3 m (total volume 4,754 m³), and
- 3) Filling the stockpile area with new sediment (total volume 3,339 m³).²

The EIA Should Clarify What the Breakwaters Can Accomplish

There appear to be two rationales offered for the project. The introduction in the executive summary of the EIA reads:

“The Government of Jamaica has implemented the *“Enhancing the Resilience of the Agriculture Sector and Coastal Areas to Protect Livelihoods and Improve Food Security Project”*. Under Component 1 of this project, the *“Construction of Break Water Structures Offshore Negril (Negril Breakwaters)”* sub-project was formulated to rehabilitate and protect the Negril coastal area. CEAC Solutions Limited has been commissioned by the NWA to provide technical assistance to plan, execute and monitor construction operations for the Negril breakwaters.”

This paragraph suggests that the rationale behind the creation of these breakwaters is to protect coastal communities, which certainly has merit, even if breakwaters are not the best way to ensure coastal protection. The EIA introduction goes on to say:

“Negril boasts the longest continuous stretch of white sand beach in Jamaica and it is lined with hotels, bars, villas and restaurants. According to the World Travel & Tourism Council (2012), Negril alone accounts for 20.9% of the stopover arrivals for 2012, making this area the third most visited resort area in the island. Through the tourism industry, Negril provided the second highest number of direct jobs in Jamaica in 2012 (9,365), accounting for 26.6% within the entire island. However, an erosion problem has faced Long Bay beach; in terms of long term trends over the past 40 years, the beach along Long Bay was said to have been dominated with erosion totalling approximately 40m (SWIL, 2007).”³

This paragraph makes it clear that tourism is a—if not the—primary driver behind this project. Reinforcing this point, the project rationale includes the following two

¹ Environmental Impact Assessment Construction of Two Breakwaters at Long Bay, Negril, Westmoreland, Jamaica. Prepared by CL Environmental Consultants. April 2014. 493 pp. p. 59-60.

² *Ibid.* p. 79.

³ *Ibid.* p. xxiv.

paragraphs:

“Situated on the western tip of Jamaica, Negril boasts the longest continuous stretch of white sand beach in Jamaica (approximately 7 km). The shoreline of Long Bay is lined with hotels, bars, villas and restaurants and is a famous holiday spot for tourists and Jamaicans alike. According to the World Travel & Tourism Council (2012), Negril alone accounts for 20.9% of the stopover arrivals for 2012, making this area the third most visited resort area in the island. Further, through the tourism industry, Negril provided the second highest number of direct jobs in Jamaica in 2012 (9,365), accounting for 26.6% within the entire island. Indeed, the "7-Mile Beach", as it is often referred to, is a major attraction for many persons visiting Negril and through this, a number of indirect services that have blossomed along Long Bay as well. These include water sports activities, craft vending, hair braiding and itinerant vending, all of which are income earning activities for the residents in the area.”

“The beach erosion along Long Bay not only poses a direct threat to the tourist industry in Negril, but nationally as well. On the national scale, Travel & Tourism generated 25.6% of Jamaica’s GDP in 2011 based on its direct, indirect and induced GDP impact and was found to be larger than that of the financial services, communication services, and all other sectors in Jamaica. In 2011, Travel & Tourism sustained a total of 0.28 million direct, indirect, and induced jobs in Jamaica (World Travel & Tourism Council 2012) and directly employs more persons than the financial services, education, communication services, and chemicals manufacturing sectors.”

Thus, this project appears to be designed to protect the lucrative tourism that occurs at Long Bay.

Project proponents should be clear about this rationale, so that the public is not misled into believing that constructing two breakwaters will mitigate the impacts of sea level rise.

The EIA describes the situation along the Negril shoreline as follows:

“Similar to results of past studies, this study [the Risk and Vulnerability Assessment Methodology Development Project] also showed that the Negril shorelines have been experiencing severe and irreversible erosion and retreat. Further, estimations based on global sea level rise projections and local storm wave predictions showed that the impact on Negril will be devastation – using the lowest projections of accelerated sea level rise (ASLR) for 2060, an extreme 50-year return storm, it was shown that approximately 50 percent of the beach will lose more than half of its present width. The study also emphasised the importance of the coastal ecosystems and specifically coral reefs and sea grasses protecting the shoreline. It found that beach areas with coral reefs and thick sea

grasses located seaward statistically experienced less erosion in the past.”⁴

This paragraph leaves little doubt that the Negril area is vulnerable to sea level rise and storminess. It also leaves little doubt that future events are likely to cause further erosion, given the particular combination of bathymetry in the bay, morphology of the shoreline, weather patterns, currents, and development. But most importantly, the paragraph mentions the importance of coral reefs and seagrass beds in mitigating erosion. It is this observation that the project proponents would do well to give more attention.

In fact, in the chapter on baseline conditions of the area, the EIA states the relationship between specific habitats and shoreline protection even more clearly:

“A comprehensive risk and vulnerability study (RiVamp) was conducted on Negril in 2010. The link between ecosystems and shoreline protection from sea level rise and storm surge was analysed and seagrass beds and nearshore coral reefs were found to play a critical role in stabilization of the shoreline. The study showed that the absence of reefs in some areas caused 83 % of the shoreline erosion in some areas. The study also proved that the absence of seagrass explained 41 % of the shoreline erosion in a particular area. The width of both the reef and the seagrass bed were found to be significant parameters (RiVamp 2010).”

“To effectively manage reef resources, information on benthic communities (mainly growth and recruitment) and herbivore densities are required. Healthy reefs must have coral recruits because their presence is a function of the resilience of the coral population and its ability to repopulate a reef. *Diadema* sp. and herbivorous fish densities and their impact on the benthic community also influence reef health (NEPA 2013). Overfishing on the reefs has contributed to a decline in the herbivorous, algal-grazing fish, resulting in reefs that are dominated by algae. Jamaica’s reefs have become dominated by algae highly dependent on *Diadema antillarum* to keep algal levels down (NEPA 2011).”⁵

A conservative reading of these findings from the RiVamp study might suggest that every effort should be made within Long Bay to conserve natural habitats and facilitate the regeneration and continued health of coral reefs and seagrass beds. Indeed, coastal communities increasingly are turning to natural barriers, rather than hardened shorelines, to buffer them from the impacts of sea level rise and storms. Natural barriers are being found to be both more reliable and more cost effective.⁶

In the Negril region, preventing beach erosion is an understandable goal, but it may not be a tenable one with the solution proposed by this EIA. If natural vegetation

⁴ *Ibid.* p. 8.

⁵ *Ibid.* pp. 240-241.

⁶ Arkema, K. K., G. Guannel, G. Verutes, S. A. Wood, A. Guerry, M. Ruckelshaus, P. Kareiva, M. Lacayo, and J. M. Silver. 2013. Coastal habitats shield people and property from sea-level rise and storms. *Nature Climate Change* 3, 913–918.

and living structures are superior to manmade ones, then every effort should be made to protect and enhance the growth of these species in Long Bay. This EIA does not follow that logic.

Impacts to Living Marine Resources are Likely to be Substantial but are Inadequately Represented

The EIA describes the operational impacts from the breakwaters on the reefs and seagrasses as follows:

“There is a potential for habitat fragmentation after the construction phases. This may occur between the seagrass beds in the lagoon and surrounding reefs. This may affect larval distribution/dispersion, migration of juveniles or other mobile invertebrates. The use of the seagrass beds as a foraging ground may also be affected, that is, turtles and other animals may be hindered or their feeding patterns disrupted.

The rate of sand accretion in seagrass bed areas as a result of the breakwaters is not anticipated to have adverse effects on the beds. The rate of accretion should not exceed the rate of seagrass growth rate.”⁷

These two paragraphs represent the entire section on operational impacts on reefs and seagrass beds—the naturally protective resources available in the area—associated with this project. If seagrasses and corals are integral to shoreline protection, then this discussion of impacts seems inadequate at best, and it would behoove the project proponents to expand it.

For example, it would be helpful to anyone reviewing the EIA and making decisions about whether the project should go forward to be able to review surveys from other similar breakwater projects. Has this offshore breakwater design been proven to be effective elsewhere? Similarly, the project proponents should have included an ecological assessment of the seagrass beds and coral reefs.

- What level of connectivity among corals and seagrasses currently exists?
- Are the seagrasses annual or perennial species?
- How much genetic variation exists among the seagrasses in the region?
- What is the smallest viable population size for these species needed to be able to reproduce despite the potential breakwater barriers?
- How many marine mammals and sea turtles currently use this habitat, and are likely to be affected by its alteration?
- What are the likely impacts on seagrass and coral recruitment, growth, and survival, if currents are reduced by 22 percent and flushing times increased 13-16 percent?⁸
- Is it a reasonable assumption that all remaining corals and seagrasses will be able

⁷ Environmental Impact Assessment Construction of Two Breakwaters at Long Bay, Negril, Westmoreland, Jamaica. Prepared by CL Environmental Consultants. April 2014. 493 pp. p. 386.

⁸ *Ibid.* p xxxiii.

- to survive?
- Do the pavement areas play a specific ecological role, for example, are they important for population connectivity with the remaining thriving coral and seagrass areas?

This information is critical to understanding the effects such a project would have, and it does not appear to have been considered in the EIA. Despite the paucity of information about potential impacts it might have, Figure 4-74 reveals that the southern breakwater will be located directly in a seagrass-coral habitat complex. Chapter 4 defines the areas as “pavement:”

“flat, with low relief, solid carbonate rock with little or no fine-scale rugosity. It is covered with algae, hard coral, gorgonians or other sessile organisms that are dense enough to partially obscure the underlying surface in some areas while less colonized sections are covered by a thin sand veneer.”⁹

This description, the pavement surveys, and the accompanying photographs do show areas with algae and reduced rugosity, as the EIA reports. Nevertheless, there is no speculation or investigation about the role these habitats may play in helping to maintain the surrounding reef areas.

Thus, it appears that—from the insufficient description of the impacts, combined with the clear recognition of the importance of these natural habitats—the project proponents have not seriously investigated or considered the negative effects that construction of these two breakwaters will cause.

Mitigation Efforts Are Lacking

In a similar vein, the mitigation efforts proposed for the living marine resources that will be destroyed by this project do not match the severity of the potential biological loss. It appears that the EIA—with the exception of silt screens to be hung during dredging activities and promises to halt construction under poor weather conditions—does not include specific mitigations for the affected species.

In the mitigation chapter, the EIA states that relocation is likely to cause “more damage than good.”¹⁰ That conclusion may be accurate. What is distressing, however, is that no other mitigation efforts are proposed instead. In a project where damage is certain, it seems appropriate to expect some form of feasible mitigation, and some dedication of funding to ensure that mitigation and monitoring occur.

Further, chapter 8 describes 10 alternative scenarios, not one of which addresses a different location for the breakwaters based on the habitat impacts they will have. In the discussion of alternative scenarios, the EIA includes one on species relocation, and concludes:

⁹ *Ibid.* p. 244.

¹⁰ *Ibid.* p. 401.

“The nature of hardness of the substrate combined with the small size and fragility of the majority of coral colonies located in this area make these colonies less than suitable for relocation. The tools necessary; the potential negative impact to both the surrounding environment and the relocation site; the high wave energy in shallow water environments (which makes it easy to dislodge newly relocated colonies); the potential smothering of small colonies by rapidly growing macroalgae; the expense of relocation activities; all combine to suggest that not all corals potentially impacted by the project should be relocated. A Natural Resource Valuation (NRV) should be conducted in order to guide the process of what should be relocated and a cost benefit analysis provided. Instead of relocating all coral colonies we suggest that findings of the Natural Resource Valuation (NRV) be used to determine the value of this area and as such how much the client should put towards management of the area instead of the relocation activities. By funding the management of the area, there should be an overall improvement in the remaining natural environment, which is unlikely if left unmanaged.”

“It is our opinion that coral and sponge colonies growing on the pavement should not be relocated.”¹¹

Improving management and understanding of which species and locations are the most valuable is a worthy approach but it is discouraging that an NRV has not already been done. Specifically, an NRV would help decision makers understand where resources should be devoted to other types of mitigation, and again would help with describing the true impact of the project. The project proponents agree, stating in the EIA that:

“A Natural Resource Valuation (NRV) is an essential component of the mitigation process; it is highly recommended that an NRV be used to guide project decisions.”¹²

It seems irresponsible, therefore, that one has not yet been done before the decision about the project had to be made.

Conclusion

In summary, the communities may decide in the end to allow these two breakwaters to be built, but that decision should be based on full information, which is not included in this EIA. The EIA is misleading with regard to the overall benefits the breakwaters can promise, and fails to provide sufficient information regarding impacts and mitigation.

¹¹ *Ibid.* p. 411-412.

¹² *Ibid.* p. 401.