



[2013] JMSC Civ. 62 (Admiralty)

IN THE SUPREME COURT OF JUDICATURE OF JAMAICA

IN ADMIRALTY

CLAIM NO. A00003/2001

BETWEEN	NATURAL RESOURCES CONSERVATION AUTHORITY	1 ST CLAIMANT
AND	THE ATTORNEY GENERAL OF JAMAICA	2 ND CLAIMANT
AND	THE OWNERS AND PERSONS INTERESTED IN THE SHIP M/V NEOLLA #7 (FISHING VESSEL)	DEFENDANT

Ms. Tova Hamilton and Mr. Harrington McDermott, instructed by Director of State Proceedings for the Claimants.

Mr. Christopher Kelman and Mr. Robert Collie, instructed by Myers, Fletcher & Gordon for the Defendant.

Heard: 2nd, 3rd and 4th February 2011 and 17th May 2013

NEGLIGENCE – SHIP GROUNDED ON CORAL REEF – STATUTORY FRAMEWORK FOR OPERATIONS IN THE KINGSTON HARBOUR – REGULATIONS BREACHED – ORDER FOR METHODOLOGY OF COMPUTATION OF CORAL REEF DAMAGE – EXPERT TESTIMONY – NATURAL RESOURCE ECONOMIST – MARINE BIOLOGIST – FACTORS IN ASSESSING EXPERT TESTIMONY – COST OF REINSTATEMENT AS AGAINST THE DIMINUTION IN THE VALUE

Campbell, J.

Background

[1] The Kingston Harbour is the seventh largest natural harbour in the world. It is 16 kilometres long and 3.2 kilometres wide, it is virtually landlocked. It is ringed by the capital city of Kingston, Portmore, one of the largest growing communities in the Caribbean and the old buccaneer town of Port Royal, which was destroyed by an earthquake in 1695.

[2] On the 28th July 2001, the Cambodian fishing vessel, M/V Neolla #7, arrived in Jamaica to replenish supplies. It was the vessels fourth visit to the island. Whilst entering the Kingston Harbour, the vessel ran aground at Rackham's Cay, in the vicinity of Port Royal.

[3] The 1st Claimant, the Natural Resources Conservation Authority (NRCA), was established by legislation in 1991 to, among other things, take such steps as are necessary for the effective management of the physical environment of Jamaica so as to ensure the conservation, protection and proper use of its natural resources.

[4] The 2nd Claimant sues in a representational capacity on behalf of the Crown, pursuant to the Crown Proceedings Act.

[5] On the 2nd August 2001, the Claimants filed a Writ of Summons to recover damages for negligence, "that on or about the 28th day of July 2001 the servant and/or agent of the Defendant so negligently managed, controlled or steered the M/V Neola # 7 causing same to collide into the Rackham's Cays, located in Jamaican territorial waters, thereby causing damage thereto and whereby the Plaintiffs suffered loss and incurred expenses."

The Claim

[6] The Statement of Claim, which was filed on the 29th January 2003, averred;

- (1) The Plaintiff is a statutory body and is established under the Natural Resources Conservation Authority Act and is among other things responsible for managing, protecting and conserving the natural resources which are found within the Island of Jamaica and within the territorial waters.
- (2) The 2nd Plaintiff sues in a representational capacity on behalf of the Crown under and by virtue of the Crown Proceedings Act.
- (3) The Defendants are those who own or are interested in the Neolla # 7 (Fishing Vessel).
- (4) The coral reef which forms the subject matter of the claim is a natural resource which lies within the territorial waters of the Island of Jamaica

and is vested in the Crown by virtue of section 11 of the Maritime Areas Act 1996 (5).

- (5) On or about the 28th July 2001, the Noella # 7, a fishing vessel with gross tonnage of 930 tonnes and measuring 56 metres in length and 9.70 metres in breath, grounded on a reef on Rackham's Cay.
- (6) The said grounding was solely or contributorily caused by the negligent navigation of the Noella # 7 by the servants and agents of the Defendant.

Particulars of Negligence

- (a) Navigating the Neola #7 beyond the sea buoy marker without a pilot.
 - (b) Navigating the Neola #7 into the Kingston Harbour without the aid of instruments and or nautical charts which indicated the position of coral reefs in circumstances in which it was dangerous and or careless to do so.
 - (c) Failing to take all possible precautions to avoid colliding into and damaging the coral reef at Rackham's Cay.
 - (d) Navigating the Neola # 7 into the Kingston Harbour without taking all due care.
 - (e) Failing to stop, slow down or to navigate the Neola # 7 (Fishing vessel) in any other way so as to avoid a collision with the coral reef.
- (7) In the alternative, the Plaintiff relies on the doctrine of Res Ipsa Loquitor.
 - (8) By reason of the negligence and or carelessness of the servants and or agents of the Defendant, the Neolla # 7 grounded on the reef thereby causing substantial damage to it.

Particulars of Damage to the Reef

- (a) Scaring to the coral reef measuring 26m in length.
- (b) All reef framework within area of scaring destroyed.
- (c) All living coral within area of scaring destroyed
- (d) Reef substrate destabilized.

The Defence

[7] On 21st April 2006, the Defendants filed an Amended Defence, in which it was contended;

1. Paragraphs 1 and 2 of the Statement of Claim are not admitted as the Defendant does not know whether the allegations contained thereon are true.
2. Paragraph 3 of the Statement of Claim is admitted.
3. Save and except that the Defendant does not know and accordingly, does not admit that the coral reef referred to is vested in the Crown as alleged at paragraph 4 of the Statement of Claim is admitted.
4. Paragraph 5 of the Statement of Claim is admitted,
5. In response to paragraph 6 of the Statement of Claim, the Defendant denies that the grounding was caused solely or partially by the negligent navigation of the vessel by servants and or agents of the Defendant.
6. In response to the Particulars of Negligence set out in paragraph 6 of the Statement of Claim, the Defendant says as follows:
 - a) The Defendant denies that the navigation referred to in paragraph (a) of the Particulars of Negligence in and of itself amounts to negligence.
 - b) Paragraph (b) of the Particulars of Negligence is denied. The Defendant contends that a Pilot failed to board the vessel and manoeuvre the vessel through the channel despite the vessel's request. The Defendant further contends that the vessel was positioned in the shipping lane entering the Kingston Harbour, awaiting a Pilot and failing the attendance of the Pilot, the vessel was manoeuvred out of the shipping lane.
 - c) Save that it is admitted that the Noella # 7 ran aground and save that the Defendant will say that the vessel was proceeding at a slow speed at the material time paragraphs (a), (d) and (e) of the Particulars of Negligence are denied.

[8] In response to paragraph 7 of the Statement of Claim, the Defendant will contend that the doctrine of res ipsa loquitur is inapplicable.

[9] In response to Paragraph 8 of the Statement of Claim, the Defendant

- a) denies that its servants and/or agents were negligent and/or careless, and
- b) denies that the damage to the reef was substantial

[10] In response to the Particulars of Damage set out in paragraph 8 of the Statement of Claim, the Defendant states as follows;

- a) Paragraph (a) of the Particulars of Damage is denied. The Defendant contends that the scaring to the reef did not exceed a length of 24.4 metres.
 - b) Paragraph (b) of the Particulars of Damage is denied. The Defendant contends that the vessel is curved in both the longitudinal and traverse aspects and that this in addition to the sloping seafloor did not result in the destruction of all reef framework within the area of scaring.
 - c) Paragraph (c) of the Particulars of Damage is not admitted and the Defendant will put the Claimants to strict proof regarding the condition of the coral reef prior to and subsequent to the Neolla # 7 running aground.
 - d) Paragraph (d) of the Particulars of Damage is denied. The Defendant contends that the only area of contact that the vessel had with the reef is the centreline portions of the vessel. The Defendant further contends that numerous sessile organisms within the contact points survived the impact of the grounding.
 - e) Paragraph (e) of the Particulars of Damage is not admitted as the Defendant does not know whether this allegation is true and the Defendant will put the Claimants to strict proof thereof.
10. Further or in the alternative, the Defendant will contend that the reef which is the subject of this claim has, subsequent to July 28, 2001, been partially altered, re-shaped, obliterated or removed by the Port Authority of Jamaica, or its servants or agents, in order to widen the shipping lane. In the circumstances the Defendant will contend that any claim for general or special damages has been extinguished and/or significantly reduced and will request the Court to consider this if the Court intends to make an award in the Claimants favour.

Defendant's Request for Information

[11] On the 21st January 2008, the Defendant filed a request for information seeking, among others, answers to the following questions:

- (i) Itemize the damage to the reef caused by the grounding of the Defendant's vessel.
- (ii) Advise the cost of the restoration of the material portion of the reef and how this cost is calculated.
- (iii) Has any modification to the reef area occurred subsequent to damage caused by the alleged collision in 2001?

Answers to Defendant's Request for Information

[12] The Claimants filed the following Answers dated 3rd February 2010;

1. The "scar" caused by the grounding of the Defendant vessel was measured as having a width of approximately 7.4 metres and a length of approximately 26 metres.
2. The rehabilitation cost of the material portion of the reef would be \$346,320.00. This cost was calculated based on the review of literature, namely Economics of Coral Reef Restoration by James Spurgeon & Ulf Lindall. From the review an estimate of US18 Million per hectare was proposed. Based on the area of the reef destroyed, approximately 192.4 metres squared, the rehabilitation cost was calculated.
3. Yes modifications have been made to Rackham Cay since the collision in July, 2001.
4. The area that has undergone dredging involved sections of the East Channel and the Rackham's Cay. The nature of the dredging was to widen the then existing ship canal.
5. The decision to dredge Rackham's Cay was taken by the Port Authority in or around June 2000, as the application for approval was submitted on June 6, 2000
6. The licence granting approval for the dredging was obtained from the Natural Resources Conservation Authority on the 22nd of June 2001.

The Basis of Method for Computation of Damage

[13] By Order made on the 21st January 2008, Beswick J. ordered that the parties provide each other with the basis for the method of computing the amount of damage which each party alleged occurred by the 26th February 2008. Pursuant to the Order of Beswick J, the Defendant's Counsel wrote the Attorney General's Department and

indicated their reliance on an extract of the text from a report of Polaris Applied Sciences, Inc.

[14] On the 13th January 2010, time for compliance with Beswick J's order by the Claimants was extended to the 3rd February 2010. By way of a letter dated 2nd February 2010, the Claimants delivered to the Defendants, a report of the "Damages done to Rackham's Cay in the vicinity of Port Royal by the Neola #7 grounding prepared by Mr. Krishna Desai and a copy of the text, Economics of Coral Reef Restoration by James Spurgeon.

[15] On the 2nd February 2010, Rattray, J. ordered the Report of the Expert witness, Mr. Peter Edwards, Marine Scientist and Natural Resource Economist, to be filed and served on or before the 17th February 2010. On 12th March 2010, the Defendants filed Notice requiring the maker of the documents listed in Claimant's Notice of Intention to tender hearsay evidence of the Report and curriculum vitae of Dr. Peter Edwards to attend court.

[16] On the 4th March 2010, at a Pre Trial Review, it was ordered that;

Permission is granted to the Claimants to call Mr. Peter Edwards, Marine Environment Resource Economist, as an expert at trial. Permission was granted to the Defendant to call Mr. Gregory Challenger, Marine Biologists, as an expert at trial.

The Issues

[17] The issues for the determination of the Court

- (a) Was the Defendant negligent in its navigation of the Neolla # 7 thereby causing the grounding on Rackham's Cay.
- (b) If the Defendant was negligent, what is the appropriate quantum of damages. To what extent is the award impacted by the modification of the reef that was contemplated prior to the accident, and was in fact effected thereafter.

Was the Defendant negligent?

[18] Negligence is the omission to do something which a reasonable man, guided upon these considerations which ordinarily regulate the conduct of human affairs, would

do, or doing something which a prudent and reasonable man would not do. Alderson, B. in **Blythe v Birmingham Water Works Co. (1856) 11 Ex.781 at p784**. This involves, cumulatively, a duty of care, breach of that duty and resultant damage. The question is whether the Defendant owed a duty of care to the Claimant.

[19] A party is under a duty to take reasonable care to avoid acts and omissions which can reasonably be foreseen as being likely to injure his neighbour. In **Jamaica Public Service v Winsome Patricia Crawford Ramsay**, SCA17/03, unreported judgment of the Court of Appeal delivered on the 18th December 2006, where the Claimant had sued in negligence to recover damages for the destruction of her home by fire, which she alleged started on the Defendant's wires as a result of their negligence. The judgment of Harris JA., after noting the diversity of approaches adopted in the determination of the existence of the duty of care which one party owes to another, stated that the approach and the test in imposing a duty of care, are ensconced in three elements said in the judgment of the court, at page 62:

"These are (a) foreseeability of damage as a consequence of the negligent performance of an operation; (b) the existence of sufficient relationship of proximity between the parties and (c) whether it is fair and just that a duty be imposed.

The test in imposing a duty was propounded by Lord Bridge in the case of **Caparo Industries plc v Dickman (1990) 1 All ER 568** at page 572 in this way:

'In determining the existence and scope of the duty of care which one person may owe to another in the infinitely varied circumstances of human relationships there has for long been a tension between two different approaches. Traditionally the law finds the existence of the duty in different specific situations each exhibiting its own particular characteristics. In this way the law has identified a wide variety of duty situations, all falling within the ambit of the tort of negligence, but sufficiently distinct to require separate definition of the essential ingredients by which the existence of the duty is to be recognized.'

At pages 573 and 574 he went on to say:

'What emerges, is that, in addition to the foreseeability of damage, necessary ingredients in any situation giving rise to a duty of care are that there should exist between the party owing the duty and the party to whom it is owed a relationship characterized by the law as one of 'proximity' or 'neighbourhood' and that the situation should be one in which the court considers fair just and reasonable that the law should impose a duty of a given scope on the one party for the benefit of the other.'

A court, on its inquiry into foreseeability, must consider the nature of the relationship of the parties and must be satisfied that in all the circumstances it is fair and just to assign to a Defendant a duty of care. The ingredients of foreseeability, proximity and fairness, are inextricably interwoven in establishing a duty of care. See *Caparo Industries Plc v Dickman* (supra). The imposition of a duty is dependent on the particular circumstances of each case and indeed, the law will impose a duty of care if the requirements are satisfied."

[20] The relationship and the proximity between the Kingston Harbour and vessels operating therein, was of such a nature that rules were promulgated to regulate that relationship. The Neola # 7 is a fishing vessel with gross tonnage of 930 tonnes and net tonnage of 355, measuring 56 metres in length and 9.70 metres in breadth. The vessel has a depth of 4.20 metres. It had grounded on a small patch of reef, some 0.1 miles to the south of the east channel. The first point of impact was in approximately 8 feet of water, and was eventually arrested in two feet of water.

Regulatory Framework Concerning Operations in the Kingston Harbour

[21] The east ship channel provides the main access for large shipping in the Kingston Harbour; it is approximately 150 metres wide and 13 metres deep. The report prepared by Resolve Marine Group Ltd. speaks of the inherent risk to larger ships, involved in the manoeuvre to negotiate around the tip of Port Royal "is confirmed by a record repeated groundings that have occurred on Gun Cay and Beacon Shoal. There are several pieces of legislation to regulate the ingress and egress of vessels within the Kingston Harbour. **The Port Authority (Compulsory Towage) Harbour of Kingston) Directions 1994** in section 2, mandates that for the safe navigation, movement and

berthing of vessels, for other than excepted ships, there must be use of the towage service.

[22] **The Pilotage (Waiver of Compulsory Pilotage) 1981**, provides that a ship operating in the absence, or refusal of a pilot in the required area, may dispense with the pilotage service on the Master supplying certain information to the Port Authority and the Authority, after consideration, offers no objection to the ship proceeding without the pilot. Master Kamiya Masaaki, proceeded in the absence of a pilot and without due authorization. Rule 5; **The Shipping (Collision Prevention and Signals of Distress) Regulations, 2007**, for all vessel to “maintain a proper lookout” “by all available means.” This would of necessity include navigational charts. Rule 6, of that same regulation, requires “every vessel to proceed at a safe speed so they can take proper and evasive action to avoid collision . . . Among the factors to be considered in determining a “safe speed” are, the state of the wind, sea and current and the proximity of navigational hazards, vi) the draft in relation to the available depth of water.”

[23] Lord Atkins oft-quoted dictum is apposite,

“You must take reasonable care to avoid acts or omissions which you can reasonable foresee would be likely to injure your neighbour. Who then, in law, is your neighbour? The answer seems to be persons who are so closely and directly affected by my act that I ought reasonably to have them in contemplation as being so affected when I am directing my mind to the acts or omissions which are called in question.”
Donoghue and Stevenson {1932} AC 562 at page 578.

[24] The Master of the Neolla # 7 ought to have in his contemplation whilst operating in the harbour, all the categories named in the **Collision Prevention and Signals of Distress Regulation**, such as fishing vessels, other vessels, proximity of navigational hazards, and for vessels with radar, that ice and other floating objects may not be detected by radar. Counsel for the Claimant submitted a duty of care exists to which anyone operating a vessel in the Kingston Harbour is expected to adhere to these regulations. There exists a sufficient relationship of proximity and neighbourhood that it should reasonably have been in his contemplation that carelessness on his part may result in injury to other users of the harbour. It's a submission I accept.

Breach of Duty

[25] Was there a breach of that duty? The navigation of a ship, such as the Neolla #7, requires some special skill or competence. McNair J., in **Bolam v Friern Hospital Committee** {1975} 2 AllER118. said;

“Where you get a situation which involves the use of some special skill or competence, then the test whether there has been negligence or not is not the test of the man on the top of a Clapham omnibus, because he has not got the special skill. The test is the standard of the ordinary skilled man exercising and professing to have that special skill. A man need not possess the highest expert skill ... it is well established law that it is sufficient if he exercises the ordinary skill of an ordinary competent man exercising that particular art.”

[26] The departure from the directions of the regulations are omissions that a reasonable Master would not be expected to make. It was submitted that the Master would have communicated his need for the assistance of a pilot. If the pilotage services were absent, he would have acted in compliance with the regulations and submitted the information required to the Authority. A reasonable Master would only proceed when the Authority gave the necessary permission. The reasonable Master would have been using all the available means, which would include nautical charts to advise himself of navigational hazards. He would have been travelling at such a speed to afford him time to observe and avoid those hazards. A safe speed of operation would have caused the vessel to travel at such a speed that would consider the draft or depth of water in which they were travelling. This is important because the vessel was eventually arrested on cays at a depth of two feet of water.

What is the Appropriate Damage?

[27] Both sides are agreed that the Rackham's Cay suffered damage as a result of the grounding of the Neolla # 7. A copy of the report by Mr. Khrishna Desai, on behalf of the Claimants, describes the “scar” as the area that was visibly disturbed by the vessel. In its widest area, the scar measured approximately 7.4 metres. That

measurement was taken at its greatest depth. The length of the scar was measured at 26 metres. The approximate area of damage was calculated to be 192.4 metres.

[28] Mr. Gregory Challenger, marine biologist, at paragraph 9 of his witness statement, agrees with that calculation of the area of damage, he states, inter alia, "After a careful examination and comparison of all the documents, it is my view that the vessel grounding on 28th July 2001 caused the partial and or complete loss of coral and other biota within an estimated area of 194 square metres and that the said ecological loss is minimal in comparison to most large vessel groundings and for other reasons stated in the report."

[29] Consequent on the Order of Beswick J. on the 21st January 2008, the Claimants had submitted the work on which Mr. Khrishna Desai had assessed the damages. The work was an extract from James Spurgeon **Economics of Coral Reef Restoration**. Dr. Peter E. T. Edwards had prepared a report, "**Comments on recommended rehabilitation costs as per the Neola # 7 Grounding,**" for the National Environment and Planning Agency. Dr Gregory Challenger, Marine Biologist, would be called on behalf of the Defendant.

Claimants' Assessment of Rehabilitation Costs

[30] Mr. Krishna Desai, Marine Biologist, at the time of the incident, was Manager of the Coastal Zone Management Branch; he made an assessment based on the work of James P. G. Spurgeon and Ulf Lindahl, "**Economics of Coral Reef Restoration.**" From the Review, he proposed that an award of US\$18 million per hectare be made. Based on the area of reef destroyed, he assessed the rehabilitation cost at US\$346,320.00.

[31] Spurgeon studies comparison drawn from four countries. He indicated that costs for restoration could vary from US\$13,000.00 to over a hundred million per hectare. Recognising that resources for coral reef restoration are limited, he posits "benefit cost analysis is a decision making tool that can help select the most efficient means of

achieving maximum economic returns from using a country's resources (i.e. labour, capital and natural resources)."

[32] In defining the term restoration, Spurgeon says it covers several forms of human intervention or manipulation of coral habitats, which include;

“Restoration of a damaged reef back, as nearly as possible, to its original condition, for example in terms of its biological diversity, structure, functions and aesthetic quality.

Rehabilitation (or partial restoration) of a damaged reef, whereby the original characteristics and qualities are either partially replaced or are replaced by an alternative set, perhaps with emphasis on certain functions such as fish habitats or coast protection.

Creation is also possible under certain conditions, whereby corals are either directly introduced, or conditions are altered to enable corals in areas previously devoid of coral.”

Main costs in restoration – capital and operational

[33] Spurgeon identifies capital and operational costs as the main economic cost associated with coral reef restoration. Capital costs include both pre-construction and construction costs. Preconstruction costs include initial feasibility studies, site surveys, objective setting and planning scheme and design of the restoration. Construction costs are those needed to carry out the main restoration scheme itself, and include costs for substrata preparation, equipment, labour, materials, stock and transport. Also relevant are “the opportunity costs” of using the site and any other donor site impacts.

[34] Operation costs are often incurred for cases that call for continued operational involvement of management, maintenance and monitoring. These costs, according to Spurgeon, will include “costs such as materials, equipment, staff wages, expenses and general administrative costs. Monitoring activities have been researched, Miller et al (1993) to range between US\$45,000 - \$100,000 for each activity in the absence of the expanse of the area.

[35] Labour cost is common to both capital and operational cost. Transplanting and relocating corals central to the process, is labour intensive. Supervision and training of

labour will require the participation of experienced biologist. Selection of species, source population and target areas demand expertise in ecological processes. The damage to the donor site, as a result of transplantation, should also be an important factor.

[36] Mr. Desai testified that, in a dive that he undertook, he saw 'both dead and live skeletons of corals, including broken branching corals and soft corals and invertebrates such as sea urchins which appeared to have been crushed. In cross-examination, he said that all living coral within the scar area were destroyed. There were live corals outside the scar area, these could return. He did not agree that conditions could have returned to baseline conditions within one year. He measured re-growth in terms of decades. He agreed with Spurgeon views that, one way to approach a monetary assessment utilizes capital, operational and labour costs. He admitted that the only work he had consulted to aid his assessment, was that of Spurgeon. He did not ascribe a figure to each head of costs, his request for diving estimates for restoration did not meet with any response.

[37] Among the costs he addressed were regulatory and monitoring costs. He was questioned about the dredging work which destroyed a substantial part of Rackham's Cay. He was unable to say what was the size of the area dredged, but estimated it was more than ten times the size of the area damaged as a result of the grounding of the Noella # 7. He said that the dredging was carried out pursuant to an Environmental Impact Assessment (EIA) being conducted. The EIA contemplated factors such as, where to dredge, how much to dredge, what was available in terms of resources, what would happen to these resource and mitigation plans to deal with any damage.

[38] Mr. Desai testified further that prior to the dredging, scuba divers were hired to remove all the live corals in the area and relocate them. He said the Cays run from north to south. The dredging took off the north end closest to the shipping channel. Desai admitted that there would be some stress caused to the marine life as a result of the dredging. The noise and turbidity would have driven away the fish. He defined baseline conditions as the conditions that existed prior to the event. He says that the coral reef is capable of repairing itself, as long as "all of the corals do not die." He said

that when he did the dive on the 29th July, all the corals within the scarred area had been destroyed, those outside remained healthy. He was unable to say whether the partial restoration had taken place, it had not up until when he left NRCA.

[39] He was asked about the areas destroyed in the case studies, in Spurgeons work. In respect of the M/V Elpis, 2605 square metres were totally destroyed and 468 square metres partially destroyed. In respect of the M/V Columbus Iselin, 345 square metres were destroyed. It was suggested to Desai, that it would be more helpful to look at the actual cost, than at awards in other cases. He testified that the dredging was done by a local company.

[40] He said some of the components of the cost of the dredging would have been diving contractors, scuba divers, boats. The regulatory costs for consultants to meet with regulator, artificial reef, monitoring related work, site preparation and removal of debris. His Report was done at a time when he was not in a possession of the dredging costs. He disagreed that the sum of US\$346,000 was excessive to repair the damaged area. He said he could not particularize the Claimants' heads of costs. Of coral reefs, he describes them as being "the equivalent of a tropical rainforest. It contained many different animals and plant living together. The most important aspect is, the coral grows the framework of the reef and everything lives within that framework. Reef is mostly underwater; the Cays are usually above water."

Expert evidence of Dr. Peter Edwards – Marine Scientist and Natural Resource Economist

[41] Dr. Peter Edwards is a Marine Scientist and Natural Resource Economist at the National Oceanic and Atmospheric Administration (NOAA). He obtained a Bachelor of Science Degree in Zoology and a Master of Philosophy in Marine Sciences from the University of the West Indies. He earned a Doctor of Philosophy in Marine Studies (Marine Policy), from the University of Delaware in the United States. His duties at NOAA include estimating the local, regional and national economic impacts and value of the habitat protection and restoration activities that the National marine Fisheries Services' Office of Habitat Conservation supports. Dr. Edwards says his report was in

response to a request by NEPA for an evaluation of the suitability and acceptability of using the cost of restoration approach to determine the value of the damage caused by the M/V Neolla # 7 to the coral reef on Rackham's Cay.

[42] He said the report prepared by Mr. K. Desai, utilizes a "cost of restoration" approach to arrive at a value for compensation. This approach is one of two possible methods to derive values for economic compensation for coral reef (or natural resource damage). The other approach is the "benefit loss" approach. According to Dr. Edwards, the benefits loss method would have been a more theoretically appropriate economic approach and by its nature, would necessitate a higher compensation value for the damages sustained to Rackham's Cay. Dr. Edwards opined that based on the literature, the cost estimate of \$18 million per hectare used by Desai is, at the best, a lower bound estimate based on the best available information at the time. The median or middle settlement amount, in Dr. Edward's opinion, would be closer to US\$40 million dollars per hectare in costs.

[43] Dr. Edwards is critical of the "restoration costs" method, because it does not take into account the other economic benefits streams that were lost or impaired as a result of the grounding incident. He opines that, an application of the "benefit loss approach" would take into account coastal defence benefits, the effect of the damage on the stability of the Palisadoes spit, which supports an international airport. This approach would recognize sand budget, that Rackham's Cay is a source of coralline sand that supplies Lime Cay and Maiden Cay. Therefore, the damage could result in incremental reductions in beach quality. Similarly, Rackham's Cay has a monetized benefit in its contribution to the production of fin and shellfish.

[44] Dr. Edwards admits there are challenges associated with deriving these values as some of these values are not directly traded in the market place. In cross-examination, Dr. Edwards testified that the cost of restoration includes two streams. The physical costs in actually carrying out the restoration costs and the lost benefit cost, which is to the effect that the reef has a dollar value benefit to society.

[45] He said that the purpose of the dredging was to widen the ships channel for the ease of navigation. When asked why he did not comment on the dredging in his report, he said he had been asked specifically to comment on the suitability of the methodology adopted by Mr. Desai. He noted that the method Mr. Desai proposed was 11 months prior to the dredging operation. For that reason, he accepts that Mr. Desai's recommendation "is going some way but not all the way."

[46] He was unable to determine how the cost can be apportioned in Mr. Desai's assessed figure of \$346,260. He admits that Spurgeon's approach per hectare cost applies differential values from place to place. A vibrant coral reef in a hotel area constitutes higher value than a vibrant coral reef in a shipping lane. If there is a town near the reef which is largely dependent on it, that is a factor to be taken in consideration. Dr. Edwards was of the opinion that, given the location of Rackham's Cay, it is a marine sanctuary and provides a battery of services which benefit the fisher folks and general population. He did not regard the sum of \$18 million as being excessive. He admits that none of the case studies on which Spurgeon relied was drawn from the Caribbean Sea.

Expert Evidence of Mr. Gregory Challenger – Marine Biologist

[47] Mr. Gregory Challenger is a Marine Biologist, and a Principal of Polaris Applied Sciences, Inc. He has twenty five years experience in environmental resource management and marine and freshwater habitat restoration. He has a Bachelor of Science degree in Marine Biology and a Master in Science Education/Marine Biological Science. Since graduation 1985, he has taught at various institutions until 1990, when he worked at Beak Consultants, where he remained until 1997. At Beak, he developed and managed construction habitat restoration projects for streams, wetlands, and other special aquatic sites. Whilst at Beak Consultants, he continued his involvement with the teaching of marine biology. He joined his present firm Polaris Applied Sciences in 1998, to the date of trial. His experience, prior to Polaris, was the development of habitat mitigation, restoration and creation of projects in aquatic environments. At Polaris, he has responded to over 50 oil spills and approximately 50 large ship groundings. He received instructions from the Defendant for the preparation of a Report on the findings

of a dive survey conducted shortly after the grounding of the vessel M/V Neolla # 7 on Rackham's Cay on or about 28th July 2001. He was asked, particularly, to comment on the various methods available to quantify the damage sustained to the reef. Of an impressive lists of twenty four publication and presentations, four concerned vessel groundings; the remainder largely dealt with oil spills.

[48] He stated that the position of the scar was close to the dredging area and as such, the sediment would inhibit the re-growth of the coral. He was of the view that the subsequent dredging would have impacted the cost of restoration. Mr. Challenger is of the view that economic models are not typically used to assess reef grounding damages since they assume that all reefs are used equally in terms of economic values and they do not account for restoration or recovery. The economic models assume that reefs will no longer be present in the future, which is not the case for reefs affected by physical impact from vessels. Mr. Challenger accepts that "the long-term economic value to an area of reef can be estimated, and it can be very valuable. According to Mr. Challenger, compensation of the projected future value of a reef would mean the economic services of the area of reef injured has been essentially provided up-front and assumes that the reef is missing into the future with no further economic value. He was of the view that the value of the reef will return in most cases, and in some cases, in the not too distant future.

[49] Mr. Challenger also urged that the monetary awards in cases settled, should not be used as being synonymous with restoration cost because, oftentimes, there are commercial reasons involved in the settlement of cases which are beyond the scope of restoration costs. Damages to coral reefs are most often equated with the costs of restoration or mitigation. Mr. Challenger draws a distinction between restoration costs in the USA and other regions. He says, "Cost in most regions is restricted only to primary restoration, or actions design to help the reef return to pre-existing condition, whereas, in the US, it includes compensatory actions or replacement of interim lost reef service, pending return of the site to base line conditions." Challenger testifies that restoration cost in the US addresses all conceivable ecological losses, including structure, recreational use, biota, land protection, etc. He says, in the USA, "We include

all administrative oversight, planning, legal, assessment and long term monitoring costs." Mr. Challenger is reluctant to use comparative costs, since many factors result in differences such as labour costs, logistics costs due to location, etc.

[50] Mr. Challenger retracted in cross-examination that the Rackham's Cay's scarring of 194 square metres was the smallest area that he has worked on. He said a figure was not assessed for the grounding. He informed the court that it was usual to list cases as being worked on when he had made no assessment of damage arising from the grounding. His firm's role in the assessment was that his clients could be made aware of the restoration process. Other than the video report, he admitted he never saw the damaged area. He agreed that the report generated by the Natural Resource Assessment was used to arrive at the current range of cost which he submitted. One method of assessment was the Habitat Equivalency Analysis, which is an estimate of square metres loss. It can include an economic component and the concept is lost use until the reef recovers, this method he has used both inside and outside the USA, particularly in the EU nations. Mr. Challenger agreed that reef repairing itself can take decades, dependent on the injury and location of the reef. He testified that one species of coral identified on Rackham's Cay, the Acropora species, is generally threatened globally. He said that the reef service of 194 metres would be lost for eleven months.

[51] In his affidavit dated 25th February 2010, Mr. Challenger states at paragraph 9, inter alia, "The damaged site would have returned to baseline conditions within an eleven month period as discussed in my report and it is therefore likely that minimal or no damages would have been claimed in jurisdictions in which I have attended vessel groundings. For an area of 194 square metres, a reasonable compensatory sum would therefore fall within the region of US\$30,000 to US\$75,000. In his report dated 24th February 2010, he says at page 3;

"Approximately 60,000 corals were removed from the area prior to the work starting in December 2001, 6 months after the grounding. The translocation was of 60,000 corals was done as mitigation for the impacts (Gayle et al 2005). The amount of additional coral for removal and re-attachment from the Noella #7 grounding area of less than 200 square metres (1/900th of the dredge area) would

have been a very small component of the restoration We are unsure whether the channel dredging mitigation removed any fragments from the grounding, but considering that they were already detached, their relocation would have been simple. The Kingston container terminal EIS (NRCA 2001), mentions that corals were hand-selected for removal. A number of coral colonies were also likely permanently lost by the grounding from the crushing action of the hull, although any that were not removed would have been crushed by the dredge and or buried in silt.”

[52] Damages to coral reefs are most often equated with the costs of restoration or mitigation. In most regions, this includes only primary restoration, or actions to help the reef return to its former conditions. In the United States, restoration also includes compensatory actions, or replacement of interim lost reef services pending return of the site to baseline. Baseline is defined as the condition of the reef but for the incident, hence, the removal of the reef is part of the baseline condition for the vessel – impacted area.

[53] Mr. Challenger’s report, at page 7, states that, “Using the median value of settlement, amounts per square metre is approximately \$160 USD. The average value is \$623 USD per square metre, which is greatly affected by several outliers in the Florida Keys where extensive reconstruction of toppled reef spurs or reef structures were implemented. Those values would translate to a range of costs from \$30,912 to \$120,943 USD for an area of 194 square metres.” He emphasises that such an amount assumes that the baseline condition is being restored, which is not the case here, according to Mr. Challenger.

Influential factors identified by Mr. Challenger

[54] Mr. Challenger’s assessment of the damage to Rackham’s Cay is influenced by two factors, which he clearly considers important. Firstly, the relatively small area of 194 square metres that has been impacted by the grounding of the Noella # 7. Secondly, the dredging of the Kingston Harbour that resulted in removal of a large part of Rackham’s Cay. In respect of the size of the area impacted, Mr. Challenger’s Report at page 3 states, “The footprint is generally much smaller than we typically see with large vessel groundings. The footprint of most large vessel groundings is in excess of 3000 square

metres. He continues at page 6, "Ecological services from corals that could have been transplanted, had the grounding not occurred, would be very minimal from such a small area within the overall footprint. The grounding area is 0.1% of the footprint of the reef area removed by channel widening."

Size of the scarring

[55] Mr. Challenger had testified that the area of 194 square metres was perhaps the smallest area he has ever seen. However, in cross-examination, he admitted that a list of cases attached to his report were cases on which he had made assessments. From that list, Mr. Challenger was directed to cases which contradicted his testimony that the Noella grounding was the smallest he has seen. He then retracted his earlier testimony. The attached list contained "injury areas" of one grounding of 20 square metres, one of 40, two areas of 50, and one of 100 square metres. There were two groundings of 200 square metres. Of the 34 cases listed by Mr. Challenger, only ten were in excess of 3000 square feet "footprint of the large vessel grounding."

The effect of the dredging on the scarred area

[56] In respect of the effect of the dredging, this factor was perhaps the most important in Challenger's assessment of damages. The location of the scarred area in relation to dredge area and the fact that dredging had occurred so recently after the grounding, were of concern to Mr. Challenger. On the question of the location of the scarring on Rackham's Cays, Mr. Challenger opined that;

"Restoration of this site at Rackham's Reef would not have been a viable venture in 2001, as it appears to have been removed (deepened) in 2002 to widen the east channel to facilitate Post-Panamex (too large for the Panama Canal) entry into Kingston Port. The channel widening involved complete removal of 600 metres by 300 metres (180,000 square metres) of Rackham's Cay. If the grounding site is 160 metres from the east channel as reported, it would be well within the removal area. The GPS puts it very close to the line, which means it was either removed or likely very severely impacted by the dredging and/or siltation." Challenger reasoned that restoration was geared to return the damage reef to baseline conditions, that is to as close as possible to its pre-damage state. Because that was only likely for the period of 11 months before the dredging commenced, the loss would be

restricted to the loss of 11 months of reef service. This drove Challenger to the conclusion that there would be no "costs of restoration, since restoration is not viable and the baseline condition is the removal of the reef." (See page 7)

He summarizes his findings that the ecological loss is therefore minimal or no damages would have been claimed in jurisdiction that his firm has attended vessel groundings.

[57] At trial, the Claimants' allegation that the scarred area survived the dredging process was not a point of contention. The assertions in Mr. Challenger's report, insofar as it questioned whether the scarred area had survived the dredging, were not maintained. The weight to be given to Challenger's evidence as to the location of the scarring is lessened by his not having visited the Rackham's Reef. There is an inconsistency in his evidence in respect of the location data on which he relies. The conflict is between the Resolve Report and the video text that he has viewed. I reject Mr. Challenger's evidence, insofar as he contends that the scarred area was removed as a part of the dredging process, and accept the Claimants to the effect that scarred areas existed post dredging.

[58] Counsel for the Claimant, in his written submissions, found it incredible that "Mr. Challenger would have performed a natural resource damage assessment without actually assessing the damage." Mr. Challenger is not a Marine Economist; he is a Marine Biologist and, additionally, a professional wetlands scientist. It is clear, from the long list of publications, that the assessments that his expertise commends itself to, is that to be expected of a marine biologist. His works deal with the assessment of injuries to the marine environment subsequent to ship groundings and oil spillages, etc, so that his clients can be made aware of the process which would be involved in restoring the marine environment. Thus, one of his works, he co-authored with G. Sery in 2007, was entitled, Sediment attenuation and vegetation recovery following a fuel oil spill in a *Carex lyngbyei* marsh in southern British Columbia. Mr. Challenger makes it plain that in assessing coral reef damage, his area of expertise, he considers it a science. It concerns an assessment of the state of health of marine life. However, in assessing the cost or assessment, Mr. Challenger opinion is, it becomes a non-science as it is done on a case by case basis.

[59] Challenger's Report states that they had examined "some possible costs" of restoration that could have been incurred by using cases in similar environments. He says;

" . . . Restoration cost in the US addresses all conceivable ecological losses, including structure, recreational use, biota, land protection, etc. Restoration also includes compensatory actions or replacement interim lost, reef services pending return to baseline conditions. As a measure of conservatism, we consider settlement costs to equal restoration costs. By doing so, we include all administrative oversight, planning, legal, assessment and long term monitoring costs."

[60] Mr. Challenger is reluctant to use comparative costs, since, according to him, many factors result in differences such as labour costs, logistics costs due to location, etc. According to Challenger, the costs of labour and the logistical costs very near a working port might be significantly lower in Jamaica than the United States. It is also not likely valid to examine costs of restoration for interim loss as these regulations may not apply in Jamaica.

[61] The evidence of the experts is crucial in the determination of the measure of damages that should be applied where the grounding of a vessel through negligence results in injury to natural resources such as coral reefs. The qualifications and experience of the two experts have not been challenged. The approach to be undertaken by a trial Judge was outlined in the **Jamaica Flour Mills Limited v West Indies Alliance Insurance Company Limited and others**, SCCA 92/94, delivered on the 21st 1997, where Rattray P. said at page 123;

"A trial Judge may well conclude that a theory or viewpoint expressed by one expert or another is flawed. Indeed, we are very much in the realm of theory in many aspects of this case. The flaw may emanate from several reasons. The expert may have strayed outside the specific areas of his expertise. He may have failed to take factors into account which, had he done so, could have led him either to a different conclusion or affected the certainty with which his opinion was proffered. Furthermore, since even experts can err, he may have been in error. None of this supports a conclusion of dishonesty which must rest almost ~~reliantly on the~~ most compelling indicators."

And at page 128;

“It is most important to identify the particular expertise of each witness so as to pinpoint the specific area in which the witness is qualified as an expert.”

[62] The Claimants, through the testimonies of Desai and Dr. Edwards, are contending for damages of \$346,100. Dr. Edwards, a marine ecologist and resource economist, is of the opinion that the “assessed rehabilitation cost of US\$346,320 which was based on the best available literature, was appropriate. This estimate is a reasonable lower bound of the compensatory damages for the incident. The Defendants, through Challenger, has indicated in their affidavit that no damages should be paid in respect of the grounding of Noella # 7. Challenger has also said that “For an area of 194 square metres, a reasonable compensation sum should fall within the region of \$30,000 to US\$75,000, and finally, that the median value of the cases he has attached to his report when applied to the damage created by the Noella # 7, would lead to a range of costs between \$30,912 to \$120,943. It is important to note that not only is this a median value, but this figure, according to Challenger, would not be appropriate because it would require a return to baseline conditions over a period of 11 months. Also noteworthy is that the range indicates a median value, although the list of cases offers no details as to the nature of the damages in order to allow for a determination as to their suitability to be compared to the instant case.

[63] The claim for rehabilitation (or partial rehabilitation is particularized in the Report of Desai on the 3rd August 2003, it is similar in scope to the components of work carried out in Spurgeon's case studies for the restoration and rehabilitation of the reefs. The components include removal of debris, stabilising the reef substrate, importing new substrate, transplanting corals and monitoring of results. The Defendants have not challenged that these are necessary for the rehabilitation of the reef. Spurgeon's work uses five coral restoration cases to give an overview of restoration costs and benefits. The comparison by Spurgeon uses cases from four countries and indicates that costs vary from US\$13,000 to over a hundred million dollars per hectare. Dr. Edward's opinion is that the \$18 million per hectare is on the lower end of the scale of awards and

would have preferred a per hectare award of \$40 million, which would lead to a final estimate of more than twice the sum assessed by Mr. Desai.

[64] I accept that the cost-benefit approach suggested by Dr. Edwards would prove more beneficial to the Claimants. However, it is based on the availability of certain data and the ability to ascertain the market value of services provided by Rackham's Cay, which includes provision of the habitat for both fin and shellfish. It is, therefore, of economic benefit to the fishing community of Port Royal and Rae Town. The court would require evidence of sales, persons involved in the business, whether as fishermen or fishmongers, in order to establish the level of contribution the habitats make. There was no such data or statistics. Neither were there any figures or reports of tidal movements to support the suggestion of the value of the reefs to coastline stability.

[65] The Claimants have brought this action in negligence or, in the alternative, allege that the principle *res ipsa loquitur* is applicable. The learned author of **Salmon on the Law of Torts, Fifteenth Edition**, R.F.V Heuston discusses torts against land under two heads, Trespass to Land and Conversion; at page 750, it says in respect of Trespass;

"When a trespass has caused physical damage to the land, the measure of damages is the loss thereby caused to the plaintiff, which in all ordinary cases is measured by the resulting diminution in the value of the property. The measure of damages is not the cost of reinstatement - the cost of restoring the land to the condition in which it formerly was - a cost which may greatly exceed the actual diminution in the value of the land."

In Ogus, *The Law of Damages*, notes at page 162 that;

"The common law has traditionally regarded remedies for injuries to real property as distinct from those applicable for injuries to personal property. The author notes the special characteristics of land, which may account for the divergence between the case law on the question of compensation for damages for chattel as different for land. Land is 'permanent,' almost indestructible and capable of almost infinite division and subdivision. (See Lawson, *Introduction to the Law of Property*, p10). Ogus states at page 163,

'In essence, it might be said that, apart from cases of 'special value' or 'capitalised potential,' the court had to choose between the selling price of the chattel, and the cost of replacing the chattel

(whether by purchasing an equivalent article, adapting a similar article or by reconstruction) In the case of damage to the land, rivalry between the two methods has been very much to the fore.”

[66] Coral reefs, by their description and the benefit that is derived by society from their presence, fall in that category, identified as ‘of special value’ by Professor Ogus. In cases of assessing damages to land, a variety of methods have been adopted.

- (a) Some consider the diminution in the saleable “value” of the land to be the only proper measure (*Hosking v Phillips*, 1848 3 Exch. 165. *Whitam v Kershaw* (1886) 16 Q.B.D 613).
- (b) Others have preferred the cost of replacement method (*Duke of Newcastle v Hundred of Broxstowe* (1832) 4 B& Ad 273).
- (c) A third group considers that “depreciation in value” is the basic measure, but the cost of replacement may be used as evidence of that depreciation.
- (d) Some regard them as alternative measures, the choice between which depends on the facts of the particular case. *Murphy v Wexford County Council* (1921) 21. R 230. *Hutchison v Davidson* 1943 SC 395, per Lord Moncrieff, p 410 - 411.

[67] Ogus suggests that although there is no principle of general application, compensation for damages in land cases, suggests that, “If the Plaintiff holds the land primarily as an economic asset, then the doctrine of restitution integrum requires that he be awarded a sum based on the diminution of the selling price.” The evidence from both sides is to the effect that the coral reef is an economic asset, although there is difference as to the methodology of assessing the asset and, consequently, its ultimate value. The governing principle of restitution integrum is consistent with the Claimants’ claim for rehabilitation or partial restoration.

[68] Spurgeon defines the umbrella term restoration to include several forms of human interference or “manipulation” of coral habitats. Coral habitat manipulation includes, inter alia;

“rehabilitation (or partial) of a damaged reef, whereby the original characteristics and qualities are either partially replaced, or are replaced by an alternative set, perhaps with emphasis on certain

functions such as fish habitat or coast protection. The restoration techniques can be carried out independently or in conjunction with each other.”

[69] Fixing the substrata. This may include clearing and consolidating loose rubble, and stabilising or filling cracks and hollows (Fox et al 1999; Hudson & Dias 1988, NOAA 1999).

Installing artificial reefs. A range of artificial structures can be placed on the seabed to provide a suitable surface or natural and human induced coral attachment. Structures include concrete blocks and mattresses (Clarke & Edwards 1995; Fitzharding & Bailey Brock (1989); and Harriot & Fisk 1988) and using electrolytically accreted carbonate on chicken wire (Van Treeck & Schmacher 1999).

Transplanting coral. Corals can be relocated and fixed to the substrata, using glue, nails or wire, or simply left to attach naturally (Auberson 1982; Birkeland et al 1979, Bowdwen – Kerby 1996; 199b; Clarke & Edwards 1995; Guzman 1991; Harriot & Fisk 1988; Kaly 1995 Maraagos 1974; Yap et al 1992). The main cost components can be divided into capital and operational costs. Capital costs include pre-construction costs, initial feasibility studies, site surveys, objective settings, and planning and design of the restoration. Construction cost are those needed to carry out the main restoration scheme itself and include costs for substrate preparation, equipment, labour materials, stocks and transport.

[70] Operational costs. These will include costs such as materials, equipment, staff wages, expenses and general administrative costs. These costs are not dissimilar to Administrative costs proposed by Challenger; all oversight, planning, legal assessment and long term monitoring costs. Spurgeon advises that operational costs are highly variable and cover a range of US\$5,000.00 to \$100,000.00 per activity. A factor embedded in both capital and operational costs is labour. There will be a cost for supervision and training. The range can be from expensive highly trained specialist to fishermen and divers. The simplest of activity requires that workers are trained and supervised. An examination of the cases relied on by Spurgeon supports Dr. Edward's view that Mr. Desai's choice of US \$18 million was at the lower rung of the scale. I find

that the study from Tanzania, Maldives and the Great Barrier Reef were not, to my mind, in the circumstances discussed by the author, suitable for Rackham's Cay.

Case Studies

[71] In the case studies involved ships groundings, the case of the **M/V ELPIS**, a 150m cargo vessel hit a reef in the Florida Keys. Funds of US\$1.66 million were awarded to restore 2,605m² of totally destroyed reef. The restoration involved removing debris, stabilising the reef substrata, importing new substrate, transplanting corals and sponges and monitoring of the results. This gave an overall cost of US\$5.5 million per hectare. There is no report of pre-construction costs or feasibility studies, site surveys, all costs identified by Challenger under the administrative head which, he says, includes all conceivable pre-construction costs, feasibility reports, legal assessments, etc. The case before the court has generated several reports to date, some of which we have benefitted from at this trial.

[72] In respect **R/v Columbus**, which ran aground and destroyed 345 m² of reef in the Florida Keys Natural Marine Sanctuaries, ship owners paid US\$3.76 million in natural resource damages. In addition to removal of debris, reinforcement and rebuilding, with a view to restoring to the extent practicable, the pre-existing habitat structure of the site, some of the funds were used to bring about a programme for the prevention of groundings elsewhere in the Sanctuary. The cost of the award was extrapolated at US\$100 million per hectare.

[73] In respect **of Maldives**, where coral reef had been mined. The studies evaluated different options to restore the reef through stabilization with artificial reefs. Costs ranged from US\$0.4 million to US\$1 million per hectare. Spurgeon indicated that the cost does not include pre-construction studies, transplantation and subsequent monitoring or other related costs. The exclusion of these costs, particularly transplantation and monitoring, would certainly make this model unsuitable for the Rackham's Cay restoration.

[74] Surgeon examined a study by Kaly, which compared methods of enhancing coral cover on the **Great Barrier Reef** only included labour and material used for the

reattachment. The findings did not include the obtaining of the coral or monitoring the donor site. Increasing the density on one acre of coral by 10 percent, costs US\$40,000 per hectare. Spurgeon notes that there was no need for substrata preparation or the use of artificial structures, which reduces the magnitude of the costs significantly. These costs could not be avoided at Rackham's Cay because of the structural damage. The major component of cost was for divers plus minor costs for glue and nails.

[75] A study in **Tanzania** concerned the methodology of enhancing degraded coral reef through transplantation of staghorn corals. Degrading would not require the removal of debris and the mending of fractures, or the compensatory approach of replacing interim measures to mitigate the loss whilst the coral re-grow. There is a one-time pre-construction costs restricted to US\$6,000 for surveys, planning and training of the staff. Spurgeon notes that subsequent monitoring costs would be only \$200 per year for a basic coral. Importantly, the study confirms that coral can be collected and relocated in low to moderately exposed shallow water without scuba diving and minimal attachment. This study involves a cost of \$7,000.00 per hectare. I am not satisfied that this methodology is suitable for Rackham's Cay, where all the corals were crushed, and were at a depth which required that any intervention would require the use of divers. There would also be the need to clear rubble and debris and the mending of the substrata. Spurgeon notes that some of the key factors creating significant costs in respect of the Florida Keys were the severe structural damage, the depth and exposure of the damaged site and the objective of restoring bio-diversity. These are factors relevant to the Rackham's Cay damage.

Did the grounding accomplish an act in the intention of the Claimants?

[76] The Claimants submitted that the dredging of the area cannot be considered an intervening act causing further damage to the coral reef, as prior to the dredging of any area, there has to be transplanting of coral. Mr. Desai testified that there was an Environmental Impact Assessment done in relation to the dredging in the Kingston Harbour. There is evidence in the report submitted by Challenger of the relocation of the corals, and of the implementation of a sophisticated scheme in transplanting and relocating the coral. It's important to note that the dredging of the Kingston Harbour has

a completely different impact from the grounding of the Noella # 7. Spurgeon identifies two categories of natural and human – induced categories, by the nature of their impact on the reefs. The first of these can cause direct structural damage, “where the corals and other sessile biota are crushed, dislodged or removed. Spurgeon states that, “This occurs from incidents such as storms, ship groundings, destructive fishing practices, coral quarrying, and careless diving.

[77] The Defendant's Counsel in his written submissions, stated, “Where it is no longer practical to restore the damaged area as in the instant case where the Claimant had intended to and indeed significantly modified the affected area, it is submitted that a more appropriate measure of damages would be based on diminution of value.” His submission continued, “That the Defendant in the instant case, if found to have been negligent, cannot, in circumstances where there is a supervening event, be liable for the full restorative costs of the reef as the Claimants subsequently modified the affected area in a significant way and had, prior to the grounding, intended such modification. As such, the damages recoverable, if any, must be limited.” Counsel relied on **Hole & Son (Sayers Common) v Harrison of Thurnscoe** 1 Lloyds Rep 354 and **Taylor (Wholesale v Hepworths)** [1977] 1 WLR 659 **Harrison of Thurnscoe** 1 Lloyds Rep 354.

[78] In **Hole & Son (Sayers Common) v Harrison**, the sole issue before the court was an assessment of damages; the Plaintiff company alleged that the measure of damages was the cost of repair of the building. It was not alleged, nor did any evidence adduce, that the measure of damages was the diminution in value of the property. The court enunciated the principle that “the Plaintiff company must . . . establish that the cost of the reinstatement as opposed to diminution in value, is the right approach in the circumstances prevailing.” The court found that the Plaintiff company, before the accident occurred, intended to demolish the cottages and rebuild new premises in place of them and when the opportunity presented itself, that the accident damage and the consequent departure of the statutory tenant provided them with that opportunity of implementing the planning permission they had obtained previously. They never had any intention of repairing the premises. That the estimates of repair that the Plaintiffs

had procured were to provide evidence in court. His Honour Judge Stabb said at page 348;

Although, in this type of case where a building is destroyed, as a result of the actions of another person, the measure of damages is the repair of the building, subject to the principle that the purpose of an award is to restore the injured party to his position before the loss occurred and that the injured party must act reasonably to mitigate his loss. The court, having found that the plaintiff company never had any intention of repairing the buildings, the court found;

'I fail to see how any alleged loss can properly be measured by the cost of repair

I think that this accident and its consequences provided the plaintiff company with the opportunity of doing that which they had previously had the intention of doing at their own expense, namely, to build themselves new premises and to demolish the existing cottages, and although it perhaps comes strangely from those responsible for doing considerable physical damage to the plaintiffs property, yet in the result I think they are right in their contention that the plaintiffs in all the circumstances had suffered little damage.'

[79] It is clear that in the case at bar, the Claimants had no intention of crushing the coral or impairing that 194 square metres that the Defendant's vessel damaged. The intention of the Claimants was to have a particular section of Rackham's Cay removed in order to develop the port and had planned, under the guidance of the Regulators, to remove corals to be relocated. The Defendants had originally, through the testimony of their witness, questioned whether the damaged area was a part of the Rackham's Cay that was removed. "We are unsure whether the channel dredging mitigation removed any fragments from the grounding." Any (coral) that were not removed would also have been crushed by the dredge and or buried in silt. See pg 3, 'Restoration costs Associated with the grounding of the Noella # 7 at Rackham's Reef prepared by Greg Challenger, on the 24th February 2010'. Dr. Edward's evidence is that he had visited the site of the grounding both before and after the grounding; his evidence is uncontradicted

that the area of scarring from the grounding of the vessel is still on Rackham's Cay. Mr. Challenger did not visit the grounding. I accept the evidence of the Claimant's witnesses that the scarred area still exist post the dredging, albeit, it's close to the edge of the dredging. See paragraph [57] supra.

[80] The Claimants, therefore, will incur expenses in rehabilitating the scarred site as closely as possible to its pre-grounding position. Dr. Edwards testified that the cost of restoration includes two streams. The physical costs in actually carrying out the restoration costs and the lost benefit cost which is to the effect that the reef has a dollar value to society. Because the cost of restoration as used in this assessment involved only one of those streams what Dr. Edwards describes as the physical cost of actually carrying out the restoration, the supervening event has not impacted that cost.

[81] Had the value been assessed on both streams, which would include the benefit cost approach, a court could find that there was some diminution in the value of the benefit by the dredging and, accordingly, reduced the amount to the extent of that diminution.

[82] I find that the grounding of the M/V Noella # 7 took place in Jamaican territorial waters. Edwards is a marine economist, whose education and experience in Jamaica gives him a grasp of the cost assessment of coral reef damage in Jamaica. I accept Dr. Edward's opinion that the cost of \$346,300.00 which was based on the best available literature was appropriate and reasonable in all the circumstances. That the estimate is a reasonable lower bound of the compensatory damages for this incident. Mr. Challenger is a marine biologist whose main experience, other than being an educator, has been in the area of marine biology. Based on the training and qualification of Dr. Edwards, I prefer his evidence to that of Mr. Challenger wherever there is a conflict between the two testimonies.

I make an award of US\$346,300.00 for damages.

(i) Interest at the rate of 3% per annum from the 3rd of August 2001 to the 17th May 2013, by reducing four years from 2013 to the 3rd August 2009.

(ii) Stay of execution granted for a period of six weeks from the 17th May 2013.

Costs to the Claimants to be agreed or taxed.