

PERSPECTIVE

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Airports on Islands: Boon or Potential Bust?

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EXECUTIVE SUMMARY

- This paper examines the political ecology surrounding the development of large tourism infrastructure, as well as the potential financial losses that will come about from the damage that will inevitably arise, should airport construction and reclamation take place on Malaysia's east coast islands of Tioman and Redang.
- Studies have shown that there is a high economic value to natural habitats based on the ecosystem services that they provide.
- Legislative loopholes allow for land-based developments to have negative impacts on adjacent marine habitats. Effective protection and management of Marine Protected Area islands are difficult to achieve when there is fragmented jurisdiction over different components of a connected ecosystem.
- Islanders already suffering the loss of traditional livelihoods from the imposition of a Marine Protected Area may participate in tourism, but are usually relegated to menial positions. The local community in both these islands are in great need of basic services such as housing, adequate and consistent water supplies, sewage treatment, waste collection and within-island transport, and authorities should meet these demands rather than develop or extend airports.

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INTRODUCTION

With the return of Mahathir Mohamed to the premiership, Malaysians concerned about the environment and the country's biologically diverse natural areas have wondered how the situation may or may not change. Recognised as Malaysia's *Bapa Pembangunan* (Father of Development) his first stint as prime minister was marked with widespread forest clearing (almost 5 million hectares) and physical change in previously undisturbed natural habitats in the name of modernisation and infrastructural advancement.² While Tunku Abdul Rahman was the first leader to look into the needs of Langkawi locals, it was Mahathir that was credited with transforming it into a tourist haven, linking it to the world with an international airport and declaring it a tax-free destination; a legacy he leveraged to ensure a smooth return to leadership.³

His well-known support for Vincent Tan's Berjaya conglomerate⁴ allowed the latter to easily push through the development of expansive hotel and golf resorts on Redang and Tioman Islands; both as stunningly beautiful and pristine as Langkawi once was, but far smaller. The necessary land clearing, subsequent damage to surrounding coastal habitats and associated establishment of small airports on these east coast islands raised the ire of environmentalists and those familiar with the islands' unparalleled biodiversity.

Long-recognised for their natural assets, Coral Cay Conservation studies noted that Tioman had 183 species of coral and 233 species of fish, while Redang had 149 coral species and 209 fish species. These numbers are far greater than popular sites in the Caribbean and the Red Sea. Chagar Hutang on Redang Island is also one of Malaysia's densest turtle nesting beaches.⁵ On land, both islands host mangrove and coastal forests, but Tioman Island also has lowland dipterocarp forests and upper hill cloud forests. The island was gazetted a wildlife reserve in 1972, but of this protected area, only 8000 hectares remain.⁶ Studies overwhelmingly indicate that the main attraction of these islands are their natural assets, some of which have been lost in the pursuit of tourism.⁷

While state governments are often singled out as the culprits behind gratuitous land-based development, Tioman Island was accorded duty-free status in 2002, and plans were mooted for a new marina and airport in 2004 by the federal government.⁸ The latter plan was scuttled in 2009 by the then-Transport Minister Ong Tee Keat.⁹ In October 2016, Terengganu announced plans to extend the Redang airport runway,¹⁰ but these were shelved in July 2017 due to a "lack of funds".¹¹ Ten months after Mahathir's return to power, Berjaya announced its return to the airline business by reviving Berjaya Air and reinstating its shuttle flights between Kuala Lumpur and Redang Island.¹² In June 2018, Vincent Tan offered to build a new airport in Tioman at no cost to the new Pakatan Harapan (PH) government.¹³ While he mentioned that this contribution was to help the new PH administration, given the country's burgeoning debt, it is widely understood that Tioman's existing airport (when it was still functioning) largely served his Berjaya Tioman Resort.

This paper will examine the political ecology of large infrastructural development on Redang and Tioman Islands and the economic, environmental and socio-economic impacts of decisions made by those far removed from those destinations. The following section will briefly look into the legislative complications of Marine Protected Area (MPA) management in Malaysia; its links to developments in Redang and Tioman, and the

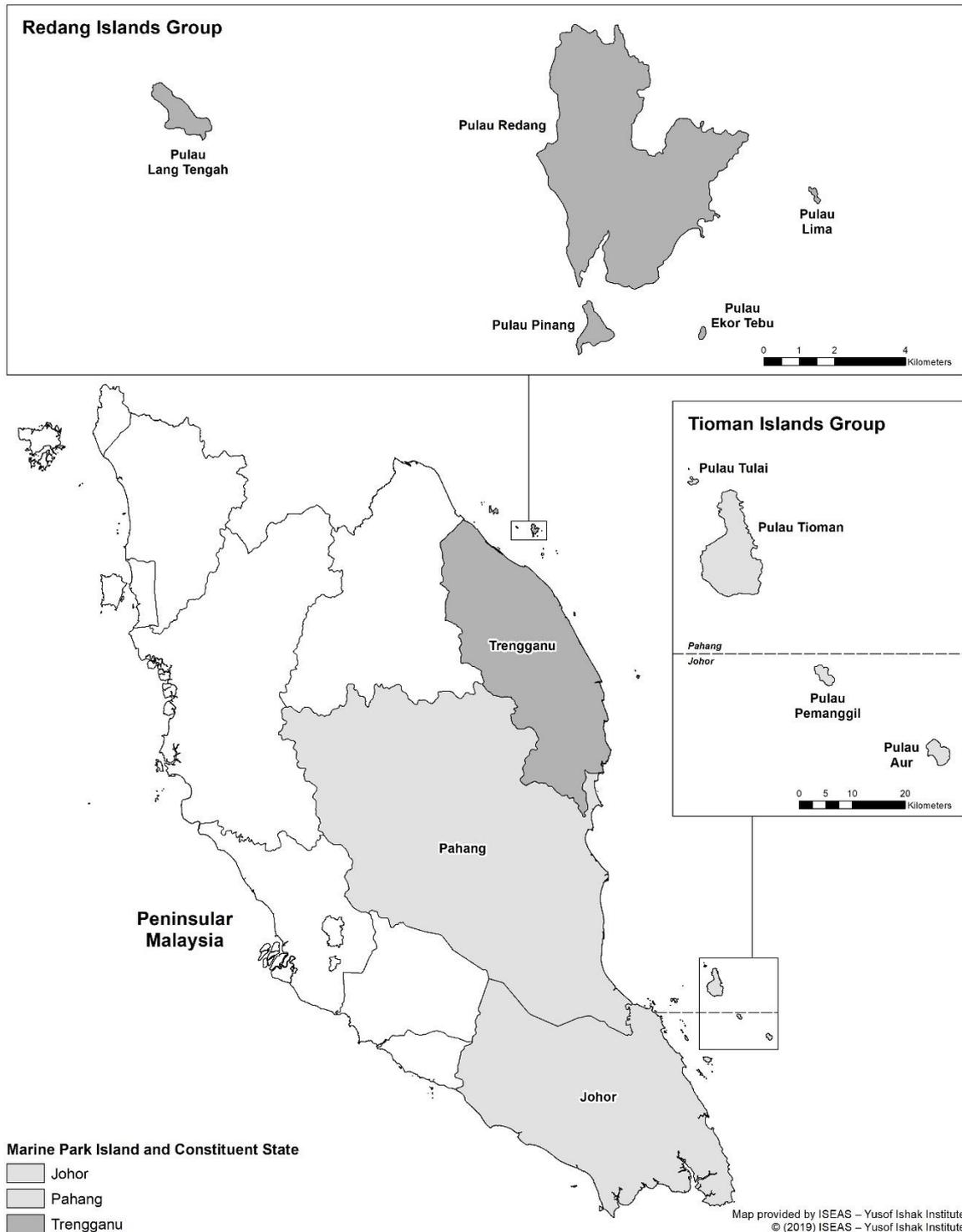
contradiction between ecotourism ideals and increased inequalities that come about as a result of tourism infrastructure driven by external entities.

LEGISLATIVE OVERLAPS

Both the Redang and Tioman archipelagos (as shown in Figure 1 below) are designated Marine Protected Areas under federal law.¹⁴ This means that the federal Marine Parks Department (currently under the Ministry of Agriculture)¹⁵ has jurisdiction over all living resources in marine and estuarine waters up to two nautical miles. Thus all fishing, resource extraction (including sand) or any other activities that may have negative environmental impacts are banned.¹⁶ However any adjacent landmass to the Marine Park (such as the islands) remain under the jurisdiction of state governments.¹⁷ This fragmentation between connected parts of a contiguous ecosystem has led to myriad bureaucratic complications when it comes to protection of the habitats as a whole. Territorial disagreements and the reluctance to approve expenses for efforts that may be attributed to other departments or to extend beyond one's jurisdiction has sometimes led to paralysis in action and problem resolution. These issues have not yet been rectified under the new government.

Studies have shown that the biggest threat to Malaysian marine parks are coastal developments, especially large resorts with golf courses, and the rapid growth of reef-related tourism and recreational activities.¹⁸ There is great pressure to develop islands to benefit from the MPAs' natural attractions. While there are policies in place to prevent development and ensure environmental protection, this is contradicted by economic practices and approvals given for development. This is a conflict between the use of a common space for both preservation of nature and the exploitation of that nature to earn a profit.¹⁹ Basiron notes that Malaysia has all the institutional requirements for sound MPA management, and the appropriate agency tasked to manage the protected areas.²⁰ However, fragmented implementation and critical overlaps in jurisdiction has led to inappropriate development on these islands. Open-access to MPA resources has led to over-use and environmental degradation which affects the sustainability of not just the islands themselves, but also the ecotourism that the island populations have come to depend on.²¹

Figure 1: Map of Malaysia's Marine Parks, highlighting the Redang and Tioman archipelagos



A CONTRADICTION IN IDEALS

In principle, ecotourism has a low impact on nature and involves efforts that enable local communities to benefit, with a view to generating income that would encourage the local protection of natural habitats. Ecotourism has also been used as a tool for rural development and community ownership of natural areas. Ideally, this means that communities have access to entrepreneurship opportunities and are involved in decision-making so that they can leverage on their local knowledge and unique relationship with the natural and cultural environment to benefit from tourism in their natural areas.²²

The unfortunate reality, however, is that such tourism is often taken over by external entities (this is especially so in Redang Island) and local communities are relegated to low-level employment in unskilled work such as housekeeping, gardening and waiting on tables.²³ On the other hand, Tioman Island has more local entrepreneurs who are able to participate in tourism, many of whom began as workers in large resorts, but managed to save and get loans to start their own chalets and other tourism-related businesses. Many former fishermen now use their boats for tourist shuttle services.²⁴

However, for most, tourism entrenches inequalities as external entities with far more capital and access than the wealthiest islander build resorts and take over coastal areas to exclude local communities who do not even benefit from marine park fee collections. This is especially so in Redang Island where the local community has been displaced several times and are located away from the main tourist stretch. Large resort complexes build fencing around their beaches to keep unwanted locals out and those who are able to participate in tourism remain mostly marginalised in menial tasks. The exclusion of the local is often done to ensure that the tourism offering remains true to the ‘pristine’ and orchestrated images of the perfect island getaway that attracts the visitor to the destination.²⁵

Far from being inclusive, ‘ecotourism’ and ‘conservation’ thus leads to further impoverishment as protected areas deprive locals from accessing traditional fishing grounds which provided them with food and a source of income.²⁶ As income disparities are felt more deeply by locals in the face of far wealthier visitors, they also suffer the ignominy of moving from subsistence to subsidies and from the autonomy and independence of their traditional livelihoods of fishing and smallholder agriculture to service provision and servitude to outsiders.²⁷ This is the unpleasant irony and unexpected side effect of converting islands and their surrounding waters into tourism-dependent MPAs.

THE IMPACT OF AIRPORTS ON ISLANDS

The justification for plans for airport runway extension or a completely new airport on the islands is to rejuvenate tourism and to increase visitor numbers. This is purported to be necessary for Redang Island because of its distance from the mainland, and especially useful for Tioman Island given its duty-free status.²⁸ However, biophysical and socio-cultural impacts on small islands and coastal ecosystems are greater than they would be on a large island (such as Langkawi) or on the mainland, given their finite resources and limited space. The intricacy of island ecosystems with regards to physical environment relationships and changes in human-nature interactions leads to heightened stress on island destinations.

There is hence a contradiction between tourism and sustainable development or protected area conservation.²⁹

Environmental damage to an island habitat has financial costs that lie in the loss of values those habitats provide as ecosystem services. These include direct values generated from resource use (such as water supplies, recreation, wild resources, genetic material and scientific or educational opportunities), as well as indirect values such as nutrient retention, erosion prevention and flood control, storm protection and a habitat for species. In addition to that, there are existence and bequest values which refer to cultural heritage values, the value of the resource for future generations and the value of the mere existence of wild spaces and charismatic species.³⁰ Table 1 (below) lists estimated values of each habitat present on both Tioman and Redang Islands. These are figures calculated for habitats elsewhere in the world, but serve as a good benchmark for local areas that do not yet have a financial value assigned to them. Note that these figures do not necessarily take into account local socio-economic variables and are hence conservative estimates (ie lower dollar values).

Table 1: General ecosystem services values (based on calculations elsewhere) for habitats available on Redang and Tioman Island.

Habitat	Estimated unit value (USD)/hectare/year (2011 value)
Open ocean	\$1,368
Estuaries	\$26,916
Seagrass meadows	\$28,916
Coral reefs	\$352,249
Tropical forest	\$5,382
Mangrove forest	\$193,843

Source: Adapted from Costanza, R., de Groot, R., Sutton, P., van der Ploeg, S., Anderson, S.J., Kubiszewski, I., Farber, S. and Turner, R.K. 2014. "Changes in the global value of ecosystem services." Global Environmental Change 26: 152-158. Note that the 2011 conversion rate for USD1 is RM3.16.

Selected regional ecosystem services values are shown in Table 2 below. These calculations provide an additional benchmark in terms of seasonal relevance, latitudinal proximity, and locally-defined ecosystem services and the value that these habitats could have on Malaysia's east coast.

Table 2. Regional calculations (with specific locations given) for habitats relevant to Tioman and Redang Islands. Note that 100 hectares is equivalent to 1 km².

Location (Habitat/ Parameter)	Estimated unit value (USD)/km²/year (year of valuation)	Source
Pulau Payar, Kedah, Malaysia (coral reefs/conservation fee)	\$390,000 (1998)	National Coral and Coral Reef Report (2006) – UNEP/GEF/Marine Parks, MNRE
Phi Phi Islands, Thailand (coral reefs/ recreational services)	\$624,300 (2001)	
Phi Phi Islands, Thailand (coral reefs/ use and non- use values)	\$1,511,800 (2001)	
Hon Mun Islands, Vietnam (coral reefs)	\$17.9 million (2004)	
Benut, Johor, Malaysia (mangroves / capture fisheries, tourism, shoreline protection)	\$1,375 per hectare (1999)	Bann, C. 1999. A Contingent Valuation of the Mangroves of Benut, Johor State, Malaysia. Johor State Forestry Department / DANCED
Mukim Tg Kupang, Johor, Malaysia (seagrass / socio-economic valuation)	\$57,731.80 per hectare (2018)	Rahman, S. and Yaakub, S.M. 2019. Socio-economic valuation of the seagrass meadow in the Pulai River Estuary through a well-being lens. Marine & Freshwater Research Journal (in review)

A study of the financial costs of the Tioman airport plan mooted in 2004 was conducted in 2007, as shown in Table 3 below. The table indicates potential economic losses should the airport be developed as initially planned (as calculated in 2007). Revised 2019 values for seagrass and coral habitats are given in the last two rows as these ecosystems were recently deemed to have higher economic values than initially estimated.³¹ These figures were derived from the exact location and area of the planned airport project.

Table 3. Calculations of economic losses specific to the 2004 Tioman Airport Plan.

Overall calculation for resource use within the airport project site	Estimated ecosystem service value USD /year (2007 value)
Fisheries (local consumption)	\$12,000 – 36,000
Fisheries (live fish export)	\$2,500 – 5,000
Coastal protection (erosion prevention)	\$5,500 - \$110,000
Tourism & recreation	\$700 – 111,000
Aesthetic/ biodiversity (willingness to pay)	\$2,400 – 8,000
Coral reefs (multiple ecosystem services)	\$14,080,000 (2019 value)
Seagrass value (multiple ecosystem services)	\$1,560,000 (2019 value)

Notes: These calculations are based on species calculations conducted on transects across the airport development site or on the estimated project area. These figures are an underestimate given that some information was only collected along a transect and species beyond the transect were not included. Other figures are calculated based on a projected 0.4km² development area at sea. This does not include all possible ecosystem service values that can be attributed to the marine habitats nor does it include economic costs of damage on land from hill destruction and forest clearing. The conversion rates used for the above values is USD1 = RM3.50.

An assessment of the Total Economic Value (TEV) of Tioman and Redang Island marine biodiversity generated values of USD1.13 billion and USD107.91 million respectively.³² This value is an indication of what stands to be lost should the habitat be damaged. 85 percent of the overall impact of development on islands and environmental problems are more severe during the construction stage, with long-standing effects on the surrounding coasts.³³ Add to that the high ecological cost of air travel and its impacts on climate change; the airports thus have more economic and environmental costs than accounted for in development planning.³⁴

Further economic losses will take place when damage sullies the natural attractions that are the draw of both the Redang and Tioman archipelagos. Visitor satisfaction with landscapes and wildlife are key to the success of an ecotourism destination. Attachment to such a destination (and hence return visits) stems from an appreciation of, connection to and familiarity with its biodiversity and pristine state. Any change to these habitats or damage, even as a result of efforts to better serve these visitors, can result in anger and tourist dissatisfaction.³⁵ The more attractive a site, the more popular it becomes, which then leads to it being degraded as a result of heavy traffic – which then diminishes the tourists' experience. Tourists then stop going to these places.³⁶ Studies have already shown that tourists to both Tioman and Redang Islands note dissatisfaction with the difference between their expectation of environmental conditions and the reality that they experienced; some observed a deterioration in conditions.³⁷

In an application of the Tourism Area Life Cycle Model to Tioman Island, Omar found that the island has reached consolidation stage and its popularity may stagnate and/or decline

depending on the steps taken to either revive it according to that which is its biggest draw (nature tourism), or allow it to slide into destruction in reported bids to draw in mass tourism duty-free shoppers through airport construction.³⁸ It is clear that the development of the airport, which will entail damage to both hillside and marine habitats, will be severely detrimental.

Given their status as MPAs, low-impact ecotourism approaches to reviving tourism in Redang and Tioman Islands should follow the principles of Malaysia's National Ecotourism Plan (2016-2025) and the Marine Park Management Plans. This entails a synergy between tourism and conservation and the empowerment of the local community so that they can participate in and benefit from tourism (as opposed to external high-capital entities). Climate change mitigation, visitor management to ensure numbers fall within the islands' carrying capacities and minimal low-impact infrastructural development that serve local needs also need to be implemented.³⁹ With recently improved ferry services to Tioman, and Berjaya Holding's announcement of small aircraft purchases to serve needs in Redang Island, it is highly doubtful that there is a need for extended runways or new airports that can allow Boeing 737s to land.⁴⁰ It also needs to be noted that the allure of island destinations lie in their separateness, difference from everyday life and isolation.⁴¹ Tourism on the islands would therefore gain if allowed to maintain an authentic 'island-feel'.

WILL THE AIRPORTS MATERIALISE?

Public responses to the news of the revival of the airport projects were swift and hostile.⁴² It is clear that the voice of civil society has strengthened since the 14th General Elections, and there is more local agency to protest and thwart unwanted or unwarranted top-down instructions. Mahathir on his part, now says that it is vital to conserve the environment,⁴³ but the state authorities have also stated that the development of a new airport will not have negative impacts on the island; the media reports did not specify how they came to this conclusion.⁴⁴ Suggestions to counter the proposed Tioman airport include building the airport in Rompin, Pahang or Mersing, Tioman and improve ferry services, including adding routes direct to Singapore as they did in the past.⁴⁵

The development of a new airport or the extension of the existing runway is known to better serve the luxury traveller. Studies have shown that these types of travellers produce more waste, use more resources and have a higher ecological footprint than local communities or lower-budget travellers.⁴⁶ Even with current tourism numbers, locals on both Tioman and Redang Islands suffer water and electricity shortages, with water resources often being diverted to ensure continued supply at the resorts while locals are left with water rationing or river and well-sourced water for their use at home.⁴⁷ Even if a new airport were 'sustainable,'⁴⁸ it must be asked whether 'conspicuous sustainability' is as effective as authentic action and prevention to preserve natural environments.⁴⁹

As of 2017, airport extension plans for Redang Island are on hold, and as of June 2018 the Minister of Transport, Anthony Loke, maintained that no official submission has been made on the Tioman Island airport.⁵⁰ No further news has been heard since. Given the new government's need to appease voters, especially fishermen acutely affected by cuts in subsidies and unrelenting rising daily costs, further aggravation could lead to a disruption of tourism activities and additional electorate unhappiness.⁵¹ The authorities would be far

better off meeting local needs (such as for stable water and electricity supplies, effective and functioning waste and sewage systems, better inter-island access, sustainable low-impact tourism efforts, off-season income opportunities and better community welfare)⁵² instead of approving large-scale projects in extremely environmentally-sensitive locations.

CONCLUSION

This paper has shown that the unnecessary development of large airport infrastructure is a costly exercise. Not only are island construction and reclamation expensive endeavours, there are also great economic costs in habitat damage or destruction. Legislative overlaps have led to loopholes through which development has been allowed on coastal land, without taking into consideration its environmental impacts on adjacent marine areas. In a fluid ecosystem, the fragmentation of territorial oversight of the varied components in an ecosystem leads to difficulties in the effective protection of natural habitats and their management. Focussing on fulfilling the needs of local communities for essential services would be far more effective in appeasing a vocal electorate than approving large-scale development that only meets the needs of the wealthy.

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² Tang, T. 13 May 2018, *Eco-Business*. “Mahathir is back – good news or bad for sustainability in Malaysia?” <https://www.eco-business.com/opinion/mahathir-is-back-good-news-or-bad-for-sustainability-in-malaysia/>

³ Latiff, R. 28 April 2018, *Reuters*. “Malaysia’s Mahathir banks on resort island legacy in come back bid.” <https://www.reuters.com/article/us-malaysia-election-mahathir/malysias-mahathir-banks-on-resort-island-legacy-in-comeback-bid-idUSKBN1HZ0CL>

⁴ Tan, J. 26 July 2015, *The Star Online*. “Cold war of the ‘birthday boys.’” <https://www.thestar.com.my/opinion/columnists/analysis/2015/07/26/cold-war-of-the-birthday-boys/>

⁵ Refer to Harborne, A., Lenner, D., Barnes, A., Berger, M., Harding, S. and Roxburgh, T. 2000. Status Report on the Coral Reefs of the East Coast of Peninsular Malaysia. Coral Cay Conservation Ltd, London, United Kingdom. And Sea Turtle Research Unit (SEATRU), Institute of Oceanography and the Environment, Universiti Malaysia Terengganu. <http://seatru.umt.edu.my/>

⁶ Tamblin, A., Turner, C., O’Malley, R., Weaver, N., Hughes, T., Hardingham, S. and Roberts, H. 2005. Malaysia Tropical Forest Conservation Project – Report of the Perhentian Phase. Perhilitan and Coral Cay Conservation Ltd, London, United Kingdom.

⁷ Refer to Salleh, N.H.M., Othman, R., Jaafar, A.H. and Norghani, B.M.N. 2012. “Tourist satisfaction of the environmental service quality for Tioman Island Marine Park,” *Indian Journal of Geo-Marine Sciences*, 41(2): 173-179; Omar, S.I., Othman, A.G., Mohamed, B. and Bahauddin, A. 2015. “Coastal resort life cycle: An overview of Tioman Island, Malaysia,” *Tourism Planning & Development* 12(3): 266-280.

⁸ *The Star Online*, 5 August 2004. “Pahang to discuss fears over new Tioman projects.” <https://www.thestar.com.my/news/nation/2004/08/05/pahang-to-discuss-fears-over-new-tioman-projects/>

⁹ Khoo, S. 8 March 2009. *The Star Online*. "Tioman airport extension is off."

<https://www.thestar.com.my/news/nation/2009/03/08/tioman-airport-extension-off/#IXpTLOLxfQhovOg.99>

¹⁰ Abdullah, Z. 31 October 2016. *New Straits Times*. "T'ganu looks to upgrade Redang airport to bring in the tourists." <https://www.nst.com.my/news/2016/10/184706/tganu-looks-upgrade-redang-airport-bring-tourists>

¹¹ David, A. 3 July 2017. *New Straits Times*. "T'ganu shelves plans to extend airport runway." <https://www.nst.com.my/news/nation/2017/07/254185/tganu-shelves-plans-extend-pulau-redang-airport-runway>

¹² *The Blue Swan Daily*. 21 February 2018. "Malaysia's Berjaya seeks to boost its resort business by resurrecting an airline." <https://blueswandaily.com/malaysias-berjaya-seeks-to-boost-its-resort-business-by-resurrecting-an-airline/>

¹³ Idris, W.N.M. 7 June 2018. *The Malay Mail*. "Vincent Tan offers to build Tioman Airport, says won't burden Putrajaya."

<https://www.malaymail.com/news/malaysia/2018/06/07/vincent-tan-offers-to-build-tioman-airport-says-wont-burden-putrajaya/1639532>

¹⁴ The Redang archipelago was the first marine protected area declared in Malaysia (in 1983), comprising Pulau Redang, Pulau Pinang, Pulau Lima and Pulau Ekor Tebu, and covers an area of about 12,750 hectares. The Pulau Redang Marine Park is about 45km away from Kuala Terengganu. The Tioman archipelago was declared a marine protected area in 1994 and is the largest group of nine islands and 5 outcrops on the east coast of Peninsular Malaysia covering an area of about 25,115 hectares. These islands are accessible from Tanjung Gemok jetty in Pahang and Mersing jetty in Johor. More information on these protected archipelagos can be found at: Department of Marine Park Malaysia, 2013. *Pulau Redang Marine Park Management Plan*. Ministry of Natural Resources and Environment: Putrajaya, Malaysia. And Department of Marine Park Malaysia, 2013. *Pulau Tioman Marine Park Management Plan*. Ministry of Natural Resources and Environment: Putrajaya, Malaysia.

¹⁵ The new PH government absorbed the Marine Parks Department into the Fisheries Department and parked it under the Ministry of Agriculture. Environmentalists raised concerns about this evolution as Marine Parks, which function under conservation principles, are a severe mismatch with the extractive approaches of its overseeing entities. Refer to Ismail, M. 17 December 2018. *The ASEAN Post*. "Looking out for Malaysia's marine resources."

<https://theaseanpost.com/article/looking-out-malaysias-marine-resources>

¹⁶ Put simply, this means that anything in the water up to the high-level mark falls under the purview of the Marine Parks Department. However, the seabed, the beach and island landmasses are under state legislation. Hence while sand extraction is not allowed in Marine Park areas due to its potential environmental impacts, the sand itself (beneath the Marine Park seas or estuaries) belongs to the state.

¹⁷ For more information on Marine Park legislative overlaps please refer to: Uychiaoco, A.J., Cheung, C. and Cabanban, A. 2002 Malaysia. in UP-MSI, ABC, ARCBC, DENR, ASEAN. *Marine Protected Areas in Southeast Asia*, ASEAN Regional Centre for Biodiversity conservation, Department of Environment and Natural Resources, Los Baños, Philippines. And Basiron, M.N. 2008. "Review of the institutional framework for the management of Marine Parks in Peninsular Malaysia," in Phang, S.M., Yang Amri, A., Ooi, J.L.S. and Mydin, A.J. (eds.), *Natural History of The Pulau Tioman Group of Islands. IOES Monograph Series 1*, p. 99-122. Institute of Ocean and Earth Sciences (IOES), University of Malaya, Kuala Lumpur.

¹⁸ Refer to Uychiaoco, A.J., Cheung, C. and Cabanban, A. 2002 Malaysia. in UP-MSI, ABC, ARCBC, DENR, ASEAN. *Marine Protected Areas in Southeast Asia*, ASEAN Regional Centre for Biodiversity conservation, Department of Environment and Natural Resources, Los Baños, Philippines and Sazali, M.F., Azlan, M.R.P and Mohamed, B. 2013. "Malaysia island development at the marine park: impact to the coral reef," Universiti Sains Malaysia ePrints, <http://eprints.usm.my/34980/1/HBP14.pdf> downloaded 17 May 2019.

¹⁹ Refer to Spears, E.K. 2018. "Closed for development? Jekyll Island's changing political ecology and geographic space," *Southeastern Geographer*, 58(4): 321-324.

²⁰ Refer to Basiron, M.N. 2008. "Review of the institutional framework for the management of Marine Parks in Peninsular Malaysia," in Phang, S.M., Yang Amri, A., Ooi, J.L.S. and Mydin, A.J. (eds.), *Natural History of The Pulau Tioman Group of Islands. IOES Monograph Series 1*, p. 99-122. Institute of Ocean and Earth Sciences (IOES), University of Malaya, Kuala Lumpur.

²¹ Refer to Yaacob, M.R., Radam, R. & Shuib, A. 2009. "A contingent valuation study of marine parks ecotourism: the case of Pulau Payar and Pulau Redang in Malaysia," *Journal of Sustainable Development* 2(2): 95-105.

²² Thompson, B.S., Gillen, J. & Freiss, D.A. 2018. "Challenging the principles of ecotourism: insights from entrepreneurs on environmental and economic sustainability in Langkawi, Malaysia," *Journal of Sustainable Tourism* 2(2): 257-276.

²³ Low average incomes from low-level jobs are enhanced by the draw of working in tourism; many youth on these islands drop out. However, even their meagre average RM800 monthly salary is higher than earnings from diminishing fishing returns. The high costs of living on the islands, exacerbated by high transport and petrol costs mean that many locals are unable to have savings. Also refer to: Abdul Ghani, N., Mohd Tahir, I. and Manaf, Z.A. 2011. "Does employment in the tourism industry affect the quality of life? A case study on Redang and Perhentian Islands, Terengganu, Malaysia," *International Journal of Arts & Sciences* 4(09):173-182. And Hill, A. 2017. "Blue grabbing: reviewing marine conservation in Redang Island Marine Park, Malaysia," *Geoforum* 79: 97-100. As well as Daldeniz, B. and Hampton, M.P. 2013. "Dive tourism and local communities: active participation or subject to impacts? Case studies from Malaysia," *International Journal of Tourism Research*, 15: 507-520).

²⁴ Refer to Mohd Tamin, N. and Tan W.H. 2008. "Tourist carrying capacity on Pulau Tioman an ecological and social perspective," in Phang, S.M., Yang Amri, A., Ooi, J.L.S. and Mydin, A.J. (eds.), *Natural History of The Pulau Tioman Group of Islands. IOES Monograph Series 1*, p. 99-122. Institute of Ocean and Earth Sciences (IOES), University of Malaya, Kuala Lumpur.

²⁵ Refer to: Mohd Salleh, N.H., Othman, R., Sarmidi, T. and Darawi, Z. 2011. "A comparison of local community sustainability of livelihood: a case study in Redang and Tioman Islands, Malaysia," APBITM 2011 – Proceedings of 2011 IEEE International Summer Conference of Asia Pacific Business Innovation and Technology Management. July 2011. P14-148. Dalian, People's Republic of China. And Kothari, U. and Arnall, A. 2017. "Contestation over an island imaginary landscape: the management and maintenance of touristic nature," *Environment and Planning A* 49(5): 980-998. As well as Mathis, A & Rose, J. 2016. "Balancing tourism, conservation, and development: a political ecology of ecotourism on the Galapagos islands," *Journal of Ecotourism*, 15(1): 64-77.

²⁵ Yaacob, M.R., Radam, R. & Shuib, A. 2009. "A contingent valuation study of marine parks ecotourism: the case of Pulau Payar and Pulau Redang in Malaysia," *Journal of Sustainable Development* 2(2): 95-105.

²⁶ Tourism development damages the habitats which are necessary for fishery survival and traditional livelihoods are thereafter supplanted by a dependence on tourism. This however leaves the community vulnerable during the off-season when there are few to no tourists on the islands because of seasonal monsoons. Further damage to an ecotourism destination from tourism infrastructure to attract or service more tourists then places the community's future at additional risk as tourists abandon the islands and move on to other destinations. Refer to: Connell, J. 2018. "Islands: balancing development and sustainability?" *Environmental Conservation* 45(2): 111-124. And Hill, A. 2017. "Blue grabbing: reviewing marine conservation in Redang Island Marine Park, Malaysia," *Geoforum* 79: 97-100. As well as Bryant, R.L. 1992. "Political ecology: an emerging research agenda in third-world studies," *Political Geography* 11(1): 12-36. Seminal work on political ecology – framework used for this analysis. And Stonich, S.S. 1998. "Political ecology of tourism," *Annals of Tourism Research*, 25 (1): 25-54.

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