Unwelcome guests: Stakeholder perspectives on non-native seagrasses and macroalgal 'nuisance' species in Bonaire

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Unlike coral reef and mangrove forest ecosystems, public recognition and multiple values of seagrass beds have only but recently been gaining increasing policy attention, particularly with regard to the urgency of their conservation and sustainable management. Dr. Lucy Gwen Gillis and Dr. Rapti Siriwardane-de Zoysa (researchers at the Leibniz Center for Tropical Marine Research/ZMT, Germany) arrived in Bonaire on fieldwork in January 2018, funded by an interdisciplinary project entitled CIRCULATIONS (Travelling Seagrasses in the Caribbean Sea), with Drs. Sabine Engel (via STINAPA) as their main cooperation partner in Bonaire. In combining insights from coastal ecology and multispecies anthropology, the team set out to explore dynamics around the arrival, spread and management of a non-native seagrass species *Halophila stipulacea* in Bonaire and Jamaica, in comparison with an older native and so-called 'nuisance' species - the macroalgae *Sargassum* sp.

The CIRCULATIONS project investigates contemporary examples of "positive" species invasions - or those that are perceived in more ambivalent terms. To this end, the scientists mapped stakeholder perspectives of the macroalgae *Sargassum* sp. (a suspected invasive) that has gained a lot more scientific and possibly media attention, as opposed to the relatively slower (and less politicized) 'creep' of the *Halophila stipulacea*, an invasive seagrass.

While tracing their ecosystem functions and services, including the trajectories of arrival and planned management strategies, they also studied similarities and differences between Bonaire and Jamaica, as countries that have been impacted by the spread of a *Sargassum* sp- i.e. the macroalgae that is deemed to be clearly problematic in more ways than one. Whilst only Bonaire has been affected by non-native seagrass *Halophila stipulacea* with a presence that is at times narrated more ambivalently. However, it is only a matter of time before Jamaica is affected by the invasive *H. stipulacea.*

They interviewed a range of stakeholders spanning state agencies, scientists, NGOs, community-based organizations and businesses which included representatives from the Ministry of Agriculture, Nature and Food Quality (LNV), the department of Spatial Planning and Development (unit Nature and Environment) of the Public Entity of Bonaire (DRO), the DCNA, STINAPA, a recently formed fisher cooperative- Piskabon, Sea Turtle Conservation Bonaire (STCB), a divers´ group, Jibe City, the WindSurf Place, and the Mangrove Centre. The stakeholders interviewed offered diverse and nuanced perspectives on marine invasive and nuisance species, offering both local as well as regionally embedded visions and management strategies. Meanwhile more interviews are being planned remotely, with stakeholders who the researchers could not meet during their first visit; the in-depth interviews were also combined with field visits to Klein Bonaire and a boat tour of mangrove spaces on the main island (organized by STINAPA).

The team presented their work at the DCNA on Tuesday evening as a public talk within the collaborative frame of the STINAPA-DCNA lecture series "Connecting People to Nature". The talk was entitled "Arrival Tales: Are stakeholder perceptions of the invasive seagrass *H. stipulacea* more positive compared to an older invasive predecessor the macroalgae Sargassum sp.?, followed by a lively discussion. They also worked closely with a Junior Rangers group, completing an interactive workshop at Lac Bay.

The diverse stakeholder perspectives revealed a high degree of ambivalence with regard to the management of *Halophila stipulacea*, which was first monitored by STINAPA between 2010/2011, and was earlier recorded in St. Maarten. What remains a core concern is the rapid increase and spread of this non-native seagrass particularly in spaces bereft of native *Thalassia testudinum* (turtle grass), together with its monitored encroachment into mangrove spaces around Lac Bay. Especially the effect this invasive species may have on ecosystem services and functions. Moreover, unlike the management of invasive and highly predatory lionfish across the Caribbean Sea, the removal of non-native seagrasses is perceived as being an immense challenge.

As *H. stipulacea* is interlaced with native species, thus selective uprooting could undermine existing efforts at controlling their spread as fragments will be dispersed in the process.

Moreover, unlike more aesthetically appealing and visible 'charismatic' ecosystems such as coral reefs and mangrove forests, there is scant public awareness (among locals and visiting tourists alike), when it comes to differentiating seagrasses from algae – particularly as they tend to be generically referred to as "seaweed". Indeed, public engagement in the eradication of lionfish (at least in shallower depths), were primarily successful due to the adventure and adrenaline rush that hunting was said to have brought.

The ecological importance of seagrass beds (and their public awareness) were linked to ongoing efforts in the conservation of turtles, as one of the island´s flagship species – rather than an ecosystem in its own right unlike Bonaire´s coral reefs and mangrove forests.

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Perceptions towards its arrival could be clustered into four distinct groups of narratives and viewpoints as diversely expressed by policymakers, scientists, local fisher groups, and tour operators entailing dive, kayaking and windsurfing operators:

a) Ecologically cautionary: its presence being classified as negative was often framed in relation to the rapidity and ease at which it spread, also in relation to colonizing connective coastal ecosystem spaces such as within and around mangrove forests and patches in existing seagrass beds; the macroalgae *sargassum* was in contrast seen as native but more as a 'nuisance' species because of its multi-sensory implications – mainly with regard to smell and its effect on shoreline aesthetics. Sea grass on the other hand is harder to be spotted and smelled (unlike *sargassum*), hence scientists may have to work harder in communicating its presence to policy makers and the wider public;

b) Ambivalent: *Halophila stipulacea* could well become a 'frontier species' (with positive benefits in offering more options for turtle feeding and as nurseries for fish), particularly sargassum and any seagrass were positively perceived as inviting fish diversity; in spaces in which *Thalassia* sp. is seen to be overgrazed. However comparisons of nutritional values between these native and non-native seagrasses across turtle species remain understudied;

c) Unselectively beneficial: Despite incidents of both *sargassum* and seagrasses getting entangled with motors and nets, seagrasses in this context remained undifferentiated;

d) Indifferent: *Halophila stipulacea* could only be seen below water, and was therefore not a core concern among wind and kite surfers; however the presence of any seagrass meant that accessibility to shallower spaces were limited, and often resulted in their trampling. Moreover recreational users tended to perceive seagrass not as a distinct ecosystem in itself but more as a terrestrial 'weed' – rather with the same degree of mundanity assigned to those on a garden lawn;

e) Opportunistically adaptable: a few dive-related and other tour operators insinuated the possibility of adding more socio-economic values/functions through activities such as "seagrass snorkelling", which may eventually become as popular as reef diving or mangrove kayaking.

The findings also revealed how perceptions of species invasion in general, came to be entangled within Bonaire´s existing landscape of policy concerns and challenges. Apart from concerns raised over the increasing population density after 2010 with cross-continental migrants and second-home owners moving to the island from Europe and North America, the exponential increase of cruise tourists en masse that contribute to further pressures placed on coastal ecosystems. Moreover, Bonaire´s historic overemphasis on managing more terrestrially-invasive and nuisance species – from neem tees and its birdlife, to its highly politicised feral mammal (e.g. donkeys, pigs) and free-roaming livestock (i.e. goats) may well change over time given the ongoing process in securing UNESCO World Heritage status for Lac Bay.

Moreover, the preliminary fieldwork findings draw attention to how nuances in meanings (and historic transformations) inherent in identifying, labelling and in selectively 'red-alerting' implications of non-native species shape public perceptions and policy priorities that in turn change over time. What makes a non-native an 'invasive' is not merely an ecological question, but also presents a host of socio-economic and political puzzles in terms of how the diverse futures of island seacoasts are eventually imagined and contested by its public, scientists and policymakers. As a marine researcher aptly stated during a public discussion, "*we (as scientists) always have to be careful why we say it, how we say it, and to whom we say it to - when you spin a story…*"

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Meanwhile, organizations and individuals interested in contributing to the ongoing study (by offering their insights and perspectives) are encouraged to contact Rapti Siriwardane (*rsi@leibniz-zmt.de*) or Lucy Gillis (*lucy.gillis@leibniz-zmt.de*).

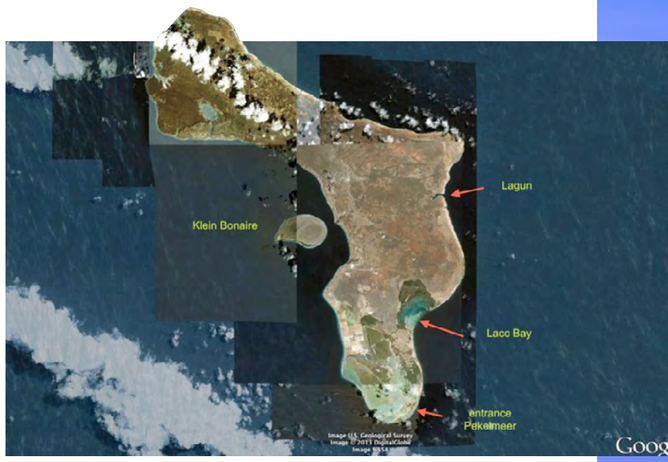

Fig 1: Reported sightings of Halophila stipulacea across Bonaire
(Map by © Sabine Engel)

Fig 2: A recent arrival – the seagrass Halophila stipulacea
(Photo by: © Sabine Engel)

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