



The Framers's Manual

Edition I; The Narrative

Statement of Intent

Ecological traps are observed environments of spatial manipulation that result in pressures on natural species populations, as the harm they elicit is greater than the benefits the organism gains from inhabiting the environment. Ecological traps, therefore, are a new form of dangerous environmental condition that calls for the need for a greater protection of animal life in the face of human activity. The project proposes that these protections argue towards a new form of 'legalhood'. The way to enact this 'legalhood' in these trap contexts is through 'framing'. 'Framing' provides the narrative tool that exposes the agency, or lack thereof, of animals in their given context and, therefore, highlights the need for legal protection.

Ecological traps

Ecological traps perhaps provide the clearest, and one of the most critical, examples of a human ignorance to the behavioural capabilities, or agency, of animals. Ecological traps are resultant behavioural decisions of organisms in choosing an environment that is seen as beneficial by the cues that it elicits, but is in fact harmful through consequences hidden to the animal. These hidden consequences are the result of human interference, hence the naming of these conditions as 'traps'. The harm these spaces elicit can either directly cause organism mortalities (in the case of South Africa's Vulture population) or alter behavioural responses to cause a reliance on these human-made manipulations (in the case of Florida's Manatees). In either case, these 'trap' environments place pressures on natural populations as the harm they elicit is greater than the benefits the organism gains from inhabiting the environment. Ecological traps, therefore, expose a serious albeit not entirely new question; how can behavioural responses of animals to their environments be used in the ecological evaluation of human actions? And to a further point, how

can this evaluation lead to significant change? To this, a new 'legalhood' could emerge.

Towards a new 'Legalhood'

A level of capability, with regards to the legal system, correlates with a level of culpability. By this, I mean; once a theoretical threshold of capability is met, it moves criminal actions past a point to which an entity then becomes responsible for them. In a simplified sense, we see this with the juvenile legal system, in which humans from the ages of 10-17 are tried and prosecuted within a different legal system, with different legal weightings. This is because juveniles are considered fundamentally different from adults, resultantly having less agency and, therefore, less responsibility for their actions. It is outside of even this realm, in which we find animal life, to which we do not even provide this level of legal standing.

Therefore, when we consider the behavioural responses of organisms to the environments in which they live and the infrastructures, objects and entities in which they interact, the absence of a legal stance on these actions could, and I argue should, be questioned. The legal lens has an ability to act as a barometer on what is considered 'correct' and 'incorrect' with regards to human behaviour - and from this it has the ability to provide protections, or prosecutions, as required. The project argues towards a new form of animal/organism 'legalhood'; one that is able to provide the protections offered within our legal system, aligned with an understanding of situational agency and behavioural capability.

As suggested, any form of 'legalhood' has the capacity to work both ways. The system which is used to prosecute can also be used to protect. And this is an important point. The ability to understand that an organism is indeed responsible for the way in which it acts, and that it

acts with behavioural determinism, means that organisms should be held accountable for these actions; whilst they should also be protected for their actions as a result of other organisms. Perhaps to example this; the legal system affords actions against murder, theft, arson whilst also affording protections towards the coerced, the kidnapped. A prosecutor and a defendant. A criminal and a victim.

A 'legalhood', in loose terms, for animal life is perhaps not impossible to imagine. Historically, through Deodand and Noxal Law, an organism (among other, more inanimate, non-human objects) could be tried in a court of Law as a 'chattel', most commonly as the possession of a human. This trial allowed, in the majority of these instances, only for the prosecution of the animal, the owner, or the object itself - and the chattel to be turned over to the Crown. Despite this not being the 'legalhood' the project seeks to encourage, it highlights a history of animal involvement within the court and the legal system which has until recently, been fairly devoid. The Animal Welfare Bill in 2006 began to bring the legal lens back to animals, although focusing primarily on purely domesticated animals. The Bill also suggests that protection is only provided if; 'the suffering is unnecessary'. In 2021, a major step forward occurred with the Animal Sentience Act, a piece of legislation that recognises animals as 'sentient beings' capable of emotions such as happiness or sadness. Resultantly, any new legislation provided by the government would have to be considerate to the fact that organisms could be emotionally affected. How then, can these protections be taken further to consider how an animal may have the rights to legal representation in the courtroom?

Framing narratives

The project proposes that the method to contextualise this shift towards

a 'legalhood' for more-than-humans (for the focus of ScapeGoats, this is animals) is through 'framing' in the legal sense. In essence, framing is a form of storytelling, and it could be argued that our understanding of the world is through the narratives we create.

Framing is an important element of the methodology as it requires a shift in mentality. It requires the audience to consider two notions; that an action is plausible within its contextual environment and, more importantly, that the perpetrator is not only able to perform those actions but also behaviourally likely to do so.

Therefore, whether the framing is believed or not, convicted or not, the factual behaviour it is based on exposes a series of behavioural responses the organism in question can elicit, and therefore a series of behavioural responses that could be judged within a legal system. However, what these responses essentially equate to is the agency in which an organism has within any given environment. What the methodology of framing achieves is not only the exposing and understanding of an organism's agency, but also the alignment of this agency within a far broader set of legal parameters. By doing this, we, as the audience, not only understand the agency that an animal does have within an environment but also the agency it does not have; an agency that is, as yet, unafforded. The lack of agency to defend itself, both legally and environmentally. The most pertinent part of this juncture is when these behavioural responses are as a result of human interference.

Therefore, by affording them this legal definition and exposing their agency within environments of human interference, we then may perhaps be able to find a route out of ecological traps, as we begin to be able to correlate the behavioural agency of animal life within these human-made

infrastructure of spatial manipulation. Ecological traps, therefore, become the justification for such endeavours.

"We attempt to gain some kind of control over the world by telling stories about it: we attempt to master it through narratives."

'Documentary'

What the project, inadvertently, aims to achieve is the creation of a conspiratorial mindset; one in which the audience to the framing narrative is instinctively invited to immediately question what they are told. In part, this is perhaps afforded by the societal view of the legal system as a 'calibrator' of truth. It manifests as an environment where truth should 'prevail', and allows all, in part, to play the role of judge and juror. Also in part, this mindset is created through a morbid fascination with crime and truth. This has been seen most prevalently with the explosion of true crime documentaries on platforms such as Netflix. The project looks to utilise the ways in which this form of media is able to disseminate factual information alongside unconventional narrative tools.

This approach opposes the perhaps expected approach one might turn to to visually represent the information of an ecological trap; a nature documentary. The nature documentary sets out to tell the unquestionable truth, or at the very least to expose the audience to the facts of the natural world they may not have been aware of. The use of the true crime documentary instead, over this approach, seeks to promote a critical mindset with regards to information on the natural environment and to question authority and its legal institutions and systems. This then becomes a choice of visual representation that plays on, what could be perceived as, a growing lack of trust and faith that we have as

a contemporary society, and a questioning of whether a conspiratorial mindset, created through framing, can actually incite greater action and empathy than otherwise.

Agency

As suggested, the overriding goal of the 'framing' methodology is to expose an agency of organisms within given environmental contexts. The urgency to attempt these framings and to endeavour for such a 'legal hood' is to begin to consider how we can start to engage in a form of world building that is in the interest of a larger ecological web than purely human. Nature and animals, when protected, are often protected legally or by rights in line with the interests of humans, rather than a greater interest of the animal itself. By arguing towards giving animals this 'legal hood' will allow for any person, community or group to advocate on its behalf in a legal setting and potentially afford protective measures. This is where other forms of agency can emerge. The affordances granted by the 'legal hood' are not far removed from the idea of 'personhood', but rather than proposing a duplicitous meaning to that concept, the 'legalhood' I argue for suggests that animals, through the agency they have within the environments they reside, can be held accountable and have accountability taken for their actions based on behavioural decisions. What this affordance aims is to find protections for animal behaviours, conditions and actions that are derived from a direct interference with humans, be it directly or through manipulated space.

Concluding statement

Framing as a methodology has the potential to become a multifaceted approach to considering the ways we can protect animal species from

human-induced spatial manipulation. The project suggests that, through the legal lens framing provides, a new form of 'legalhood' could emerge. In the face of the fight to 'know' or 'tell' the truth, the project, through the utilisation of framing, argues that perhaps there is a benefit to taking the alternative side - at least in a narrative sense. The framing allows the framer to act as the prosecutor, positioning the conspiratorially-minded audience as the defence. The hope; that something far greater emerges than that of purely telling the truth. Rather than the sympathy that emerges from the harsh truth of the nature documentary, the framing within the true crime narrative calls to generate empathy.

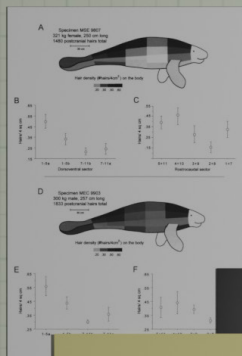
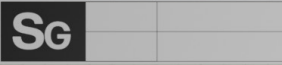
To come full circle, these animals are now ScapeGoats; we know their innocence, but action may finally emerge from us blaming them.

01

Stage 1; The Umwelt

01

Stage 1; The Umwelt



Manatee vibrissae: evidence for a "lateral line" function

Roger I. Reep¹, Joseph C. Gassner¹, Dora Sarkis¹, Frank L. Rice¹, David A. Mann¹, Gordon B. Bauer¹

1. *Journal of Experimental Biology*, 2011, April 22, 201-8. doi: 10.1111/j.1469-7580.2011.02992.x

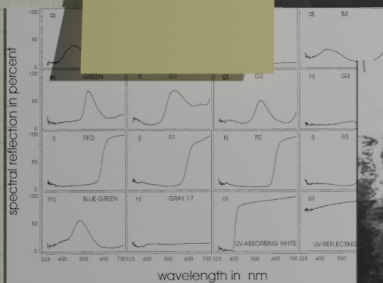
PMID: 21534977 DOI: 10.1111/j.1469-7580.2011.02992.x

Abstract

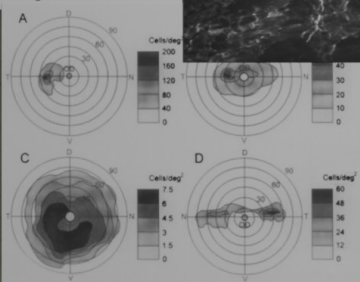
Aquatic mammals use vibrissae to detect hydrodynamic stimuli over a range from 0 to 100 Hz, similar to the range detected by lateral line systems in fishes and amphibians. Manatees possess ~5,000 vibrissae distributed over the body, innervated by ~200,000 axons. The extensive innervation directed to vibrissae follicles is reflected in enlarged, elaborate somatosensory regions of the gracile, cuneate, and Brodmann's brain stem nuclei, cerebellar hemispheres, and presomitic somatosensory cortex. Our preliminary psychophysical testing indicates that in Florida and Caribbean manatees the Weber fraction for detection thresholds for gratings between ranges from 0.075 to 0.14, at the lower end of this range.



- Likelihood
- Proximity
- Motive
- Means



- Likelihood
- Proximity
- Motive
- Means



Physical (and the sixth sense)

"Touch has been purported to be the primary sense that the manatee utilises in its behavioural motivations. They are very tactile creatures in that they explore their world through manipulating things primarily with their mouths, however, they also use the rest of their body as a sensory organ to take in information from the environment. They use their mouths for foraging and also for burrowing into the sea floor."

"This becomes increasingly more integral to the manatee with it's development of a hair and nerve cell system similar to vibrissae. Each hair is stimulated by up to hundreds of nerve cells and they work similarly to a lateral line system found in many species of fish. As manatees move through very murky water or during the night in the pitch dark, thousands of tiny hairs are stimulated by objects in their environment and actually give the animal an image of those objects without having to physically see them."

Manatees have a fused cervical vertebrae which means that they struggle to rotate their neck fully, making it more difficult for them to locate elements within their environment.

Manatees, as a mammal, are air breathing animals which requires them to come to the surface every 15 minutes."

Sight

"Manatees are supposedly near-sighted, they are unable to see objects close but have a reasonable visual acuity for longer distances. This is a key factor on how the manatee engages with its sensory environment. In part this is due to the turbidity of these environments where, in fact, sight might not be the easiest or most reliable of senses."

SG

EVOKED BRAIN POTENTIALS DEMONSTRATE HEARING IN A MANATEE
(*TRICHECHUS INUNGUIS*)

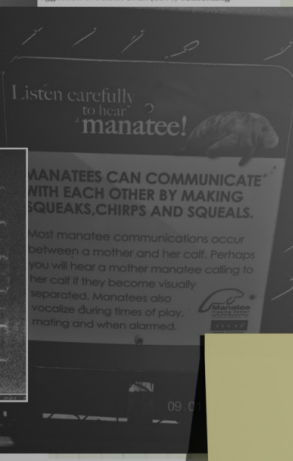
It is well known that sirentians produce underwater vocalizations. Some of these have been recorded and analyzed in two species of manatees, *Trichechus manatus* (Schevill and Watkins, 1965, Sonoda and Takemura, 1973) and *T. inunguis* (Evans and Herald, 1970, Sonoda and Takemura, 1973), and sounds of *Dugong dugon* have been recorded in air (Nair and Lal Mohan, 1977). Fleischer (1971) has analyzed the oscillation frequency of the dugong's ear ossicles in dry skeletal preparations (results obtained by this technique, however, must be viewed with caution).

Observations of wild manatees (e.g. Hartman, 1979) suggest that their hearing is sensitive (in agreement with the belief of hunters, Verissimo, 1885) and show that they produce audible sounds both when alone and when interacting socially, cows and calves in particular use vocalizations, presumably to stay in contact. Captive sirentians have also been observed to respond to sounds (Bertram, 1964; Domning and Best,

1978). The presence of acoustic centers in *T. manatus* (Verhaar, 1978) and the small visual centers suggest that vision is of secondary importance. The suggestion of Marsh et al. (1978) concerning



Manatee



- Likelihood
- Proximity
- Motive
- Means

Manatees, Bioacoustics and Boats

Hearing tests, environmental measurements and acoustic phenomena may together explain why boats and animals collide

Edmund R. Gerstein

It's 2 o'clock in the morning, and you wouldn't know it. Storm is "in the low" with that big Navy transducer span. Now I have to get in the cold

... of more controversy and polarization over conservation and protection than perhaps any other mammal. "Sea cows," as they are sometimes affectionately called, inhabit shallow coastal, estuarine and riverine habitats throughout

insular Florida, where they graze and are routinely and sometimes killed by collisions with recreational boats, barges, and merchant ships. These collisions are so frequent that the majority of manatees are identified by their

more than two decades of protective policies that have allowed manatees to flourish. The number of manatees and deaths associated with collisions has increased and reached

Navigating the human-animal divide: marine mammal hunters and rituals of sensory allurements

Ian J. McIven

- Likelihood
- Proximity
- Motive
- Means

Abstract
Hearing is often provided as an opportunity to investigate how humans and animals interact. However, it is often overlooked that humans and animals may interact through sound and sight. The human-animal divide is a blurred and permeable boundary. Founded upon the divergent nature of life in the world, human hunters also created divergent

"Manatees have two cones within their eyes, green and blue cones which does allow them to register colour but they are technically colour blind - unable to see red light. This allows them to differentiate what is edible food and what is random objects."

Hearing:

"The manatee has a low level of hearing, able to sense frequencies of around 3-24kHz. It is thought that this might be the case due to the inability of low frequency sounds to transmit well in low depth waters as the sound movement is limited through physical barriers."

"What allows humans, and as we believe many animals also, to be able to detect where sounds have come from is due to the amount of time it takes for sound waves to reach each ear. We as humans, have difficulties underwater locating where sounds have come from due to sound moving 5 times faster underwater than in air. Manatees are able to locate sound at a higher changing pace, allowing them to be more observant at lower frequencies."

Smell and taste;

"As with many mammals, the smell and taste senses operate on a similar semiotic landscape, due to the chemical sensors for smell and taste being in a similar location."

02

Stage 2; The Agency *(or lack thereof)*

Stage 2; The Agency (or lack thereof)

SG



- Means
- Proximity
- Likelihood

SEASONAL MOVEMENTS, MIGRATORY BEHAVIOR, AND SITE FIDELITY OF WEST INDIAN MANATEES ALONG THE ATLANTIC COAST OF THE UNITED STATES

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West Indian Manatees Use Partial Migration to Expand Their Geographic Range Into the Northern Gulf of Mexico

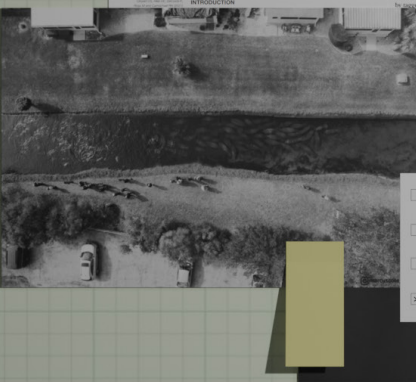
Charles Deutsch et al. (2014) *PLoS ONE* 9(12): e114000. doi:10.1371/journal.pone.0114000

Abstract: Manatees (Trichechus manatus) are distributed in coastal to near-shore environments throughout the range of the species in the western Gulf of Mexico. We investigated how migration between two winter range locations on adjacent major rivers may maintain diversity. We determined the distribution of winter range locations and site fidelity of manatees in the region to provide information for the development of effective conservation strategies. Most study animals were tracked routinely with the Argos satellite system, which yielded a mean 95% of 3.1 (n = 6) locations per day. We used registered tracking in the field using conventional radio-telemetry methods. The combined data collectors effort yielded ~91,000 locations over nearly 12,000 tag-days. The median distance of tracking was 0.5 km/day per individual, but seasonal movements were tracked over multiple years (max = 8 years).

Main findings: Manatees migrated seasonally over large distances between a northern winter-range and a southern winter range (median one-way distance = 280 km, max = 830 km), but 12% of individuals were resident in a relatively small area (<80 km) throughout. The movements of one adult male spanned 13,300 km of coastline between southern waters Florida and Rhode Island. No study animals resided in the Gulf coast of Florida. Regions heavily utilized by tagged manatees included: Fort Pierce, FL, in the western region; southern Brevard Bay, FL, in the western and central coastal Florida, especially the Banana River and southern Indian River, in all seasons. Daily travel was defined as the distance between successive winter daily locations, even when >17, but this varied with season, migratory pattern, and sex. Adult males traveled a significantly longer per day than did adult females for most of the warm season, which corresponded closely with the season from the spring to the end of summer.

INTRODUCTION

Manatees (Trichechus manatus) are distributed in coastal to near-shore environments throughout the range of the species in the western Gulf of Mexico. We investigated how migration between two winter range locations on adjacent major rivers may maintain diversity. We determined the distribution of winter range locations and site fidelity of manatees in the region to provide information for the development of effective conservation strategies. Most study animals were tracked routinely with the Argos satellite system, which yielded a mean 95% of 3.1 (n = 6) locations per day. We used registered tracking in the field using conventional radio-telemetry methods. The combined data collectors effort yielded ~91,000 locations over nearly 12,000 tag-days. The median distance of tracking was 0.5 km/day per individual, but seasonal movements were tracked over multiple years (max = 8 years).



- Likelihood
- Proximity
- Motion
- Means

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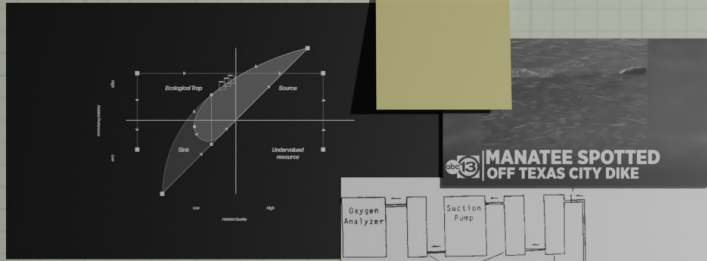
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Migrators

"November is the month when manatees begin their inland migration. It is at this time of the year when manatees search for warm water areas to stay during the duration of the winter and to help them survive the cold. These areas are usually freshwater springs, bays and rivers, and the outflows of power plants. Manatees travel to these areas through canals and rivers, using travel corridors or passageways to move back and forth between summer and winter months. This is why boaters and personal watercraft users should be cautious and slow their speed along these water bodies to avoid harming manatees."^[9]

^[9] Swimming with the manatees. *Why do manatees migrate?* Last accessed: 29/05/23. Accessible at: <https://swimmingwiththemanatees.com/why-do-manatees-migrate/>

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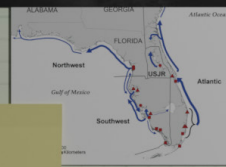


Manatee metabolism and its influence on distribution in Florida

A. Blair Irvine
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Abstract
The metabolic rate of three captive manatees was measured at different water and air temperatures. The animals responded metabolically to cold water (15–20°C), but not to cold air (10–20°C). Average metabolic rates in the thermal neutral zone (T_n ≈ 24 °C) were 15–22% of predicted weight-specific values, and thermal conductances were 117–229% of predicted levels. Body temperatures averaged 36±4°C. The low heat production and high thermal conductance suggest that manatees are poorly adapted energetically to winter water temperatures in much of Florida. These results support behavioural observations of captive and free-living manatees which suggest that 20°C is the minimum suitable water temperature for manatees. Manatees wintering in colder waters are probably in marginal habitat and are most susceptible to cold-related mortality. Warm water refuges reduce energetic maintenance costs and probably temper the effects of occasional periods of severely cold weather, particularly in northern Florida.



“Seasonal movement patterns of manatees along the Atlantic coast were largely driven by seasonal changes in temperature, but seasonal and spatial variation in the abundance and quality of forage was probably also important. Individuals generally occupied a few, relatively small seasonal ranges that were linked by lengthy travel corridors used briefly during migrations. The existence of traditional migrations and of strong philopatry to specific areas have a number of implications for management, including the design of protected area networks for manatees. Despite these conservative behavioral traits, individual manatees showed variability in other movement parameters, including the timing of migrations and duration spent in different regions within a winter. This behavioral flexibility has permitted Florida manatees to exploit some human habitat alterations to their advantage; for example, by using industrial thermal outfalls to extend their stay in northerly regions. Recovery of this endangered species will depend on our ability to reduce human-caused mortality, to protect essential habitats, and to keep the pace of habitat alteration within the time frame of the manatee’s capacity to adapt.”^[4]

^[4] Deutsch, Charles J., et al. “Seasonal Movements, Migratory Behavior, and Site Fidelity of West Indian Manatees along the Atlantic Coast of the United States.” Wildlife Monographs, no. 151, 2003, pp.1-77

^[5] Why do manatees migrate? Last accessed: 29/05/23 Accessible at: <https://swimmingwiththemanatees.com/why-do-manatees-migrate/>

^[6] [ibid]

The Search For Warmth

“Manatees migrate because they need warm water to survive. Though a typical manatee weighs half a ton and is 13 feet long, it has relatively little body fat and a very low metabolic rate compared to other marine mammals. Hence, manatees are not able to tolerate temperatures below 68 degrees Fahrenheit for an extended period of time. Actually, those affected by cold are not able to produce enough metabolic heat to make up for the amount of heat lost to the environment.”^[5]

“Extended exposure to cold temperatures causes a cascade of clinical disease processes called the cold stress syndrome (CSS).”^[6]

SG



SPECIAL THEME: PROTECTION AND RESTORATION—ARE WE HAVING AN EFFECT?

A Multiscale Approach to Seagrass Recovery in Tampa Bay, Florida

Holly S. Greening, Lindsay M. Cross and Edward T. Steward

ABSTRACT

Recovery of seagrass coverage in Tampa Bay, Florida, to levels observed in 1950 (15,380 ha) is a long-term goal adopted by local, state, federal, and private partners participating in the Tampa Bay Estuary Program. Nitrogen controls initiated in 1980 and continuing through present stormwater treatment facilities, stormwater treatment, land-use management, and power plants resulted in a 40% total nitrogen load reduction compared to the mid-1970s. As a result, annual water clarity (measured as light attenuation and chlorophyll concentrations) on the bay floor, and seagrass coverage in 2008 on the bay floor recorded since 1992 (the only data) is 38% less than the 1950 coverage. However, seagrass coverage in areas of the bay has not increased at the same rate. Water clarity and total water column nitrogen loading and its bay margin recovery in some areas. Localized water quality benefits, including increased dissolved oxygen content and habitat may impact on seagrass growth in other areas. Our work had an effect on seagrass recovery in Tampa Bay. We will take more time transferring a local-based management strategy to reach the recovery goal. A multiple adaptive research and application approach is currently underway to restore contributions of the seagrass forest to Tampa Bay estuary coverage.

Keywords: multiple restoration strategy, nutrient management, seagrass restoration, Tampa Bay, water quality improvements

Seagrasses have been identified as a service worth approximately \$3.16 billion and protect seagrasses in the

Sam the Sea Cow

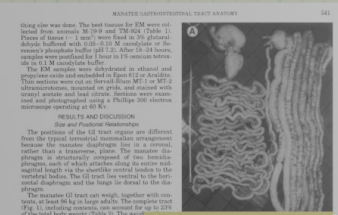


MAST FORAGING BY WEST INDIAN MANATEES (TRICHECH)

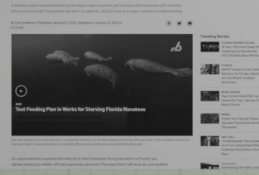
THOMAS J. O'SHEA
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Sirenians have been reported to eat a variety of aquatic and semi-aquatic plants (see review by Best, 1981), but no published accounts of foraging on mast are available. I observed extensive underwater feeding on live oak (*Quercus virginiana*) acorns by wild West Indian manatees (*Trichechus manatus*) at a clear Florida spring during autumn and early winter 1983. Here I describe these observations, and include remarks on the ecological influences of birds and fish on the patterns of underwater acorn availability.

Observations were made at Blue Spring Run, Volusia County, Florida, a 650 m long, 20 to 30 m wide artesian spring which flows directly into the St. Johns River at a point approximately 240 km from the Atlantic. Manatees use Blue Spring as a thermal refuge during cool winter weather. They spend the warm season in the St. Johns River and forage (Bergeson, 1967; Bergeson, 1968) on live oak and manate



Florida Manatee Feeding Experiment Starts Slowly as Cold Looms



This syndrome is characterized by a slow-down in metabolism, leading to digestion problems, reduced appetite and weight loss. In turn, affected manatees have weakened immunity, making them susceptible to environmental toxins and pathogens for a variety of diseases, such as intestinal infections, pneumonia and viral infections. Therefore, chronic exposure to cold is fatal to manatees and predisposes their entire population to danger and decline. Aware that they are susceptible to cold-related disease, manatees migrate away from cold areas and gather near warm water sources in winter, including natural springs and warm water effluents of power plants.^[6]

Foragers

*These aquatic creatures are mainly herbivorous, meaning they primarily consume plant-based materials. In order to fuel their large bodies, manatees need to consume a substantial amount of nutritious food every day.

The diet of a manatee primarily consists of a diverse range of aquatic plants found in both freshwater and saltwater environments. Some common types of plants consumed by these mammals include seagrasses, marine algae, water hyacinth, and mangrove leaves.

Occasionally, manatees have been observed consuming small fish, crustaceans, and mollusks while grazing on aquatic plant beds.

To effectively process their plant-based diet, manatees possess specialized hindgut digestive systems similar to horses, allowing them to break down the fibrous materials found in their food.

With the need to consume such large quantities of low-energy plant

[6] [bid]

Sg

material, these marine herbivores are uniquely adapted to their diet, which is essential for their survival in their natural habitats.”^[7]

Rubbing

“The findings prompted the scientists to probe the role of hairs on the rest of the manatee body – hairs that are so sparsely distributed their function clearly is not to keep the animal warm, Reep said. The scientists examined the anatomy surrounding individual hairs by dissecting carcasses of manatees that had been killed in boat collisions and stored at the Florida Marine Research Institute’s necropsy laboratory in St. Petersburg.

Sure enough, the scientists found that each hair on the body is a tactile hair, with a specialized follicle and dense nerve connections. If these are anything like tactile hairs in other animals, they are surrounded by motion detectors called mechanoreceptors, with nerves connecting to the brain, the researchers said. Margaret Stoll, a biological scientist at UF, participated with Reep and Marshall in the latest research.”^[8]

“A major killer of manatees is collisions with boats. Marshall said the animals’ unique antenna system is no help in these circumstances, because it is only sensitive to the environment near the animal, meaning if boats are traveling too quickly the animals will receive the information too late to respond.”^[9]

The Right To Move Slowly

“Besides, the animals have low metabolic rate. It takes them much more time to generate enough heat to keep their bodies warm. So they can’t afford to use a lot of energy swimming around at a faster, energy-intensive speed, unless it is extremely necessary. Therefore, manatees

^[7] American Oceans. **What do manatees eat.**

Last accessed: 29/05/23
Accessible at: <https://www.americanocceans.org/facts/what-does-a-manatee-eat/>

^[8] University of Florida. **A first for mammals: manatees use hairs as ‘underwater antennas’**

Last accessed: 29/05/23
Accessible at: <https://news.ufl.edu/archive/2002/03/a-first-for-mammals-manatees-use-hairs-as-underwater-antennas.html>

[9] [ibid]

03

Stage 3; The Trap

SG

Biological Sciences

MANATEE USE OF POWER PLANT EFFLUENTS
IN BREVARD COUNTY, FLORIDA

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Abstract: The relationship between manatees and power plants was investigated at 2 power plants on the Indian River in Brevard County, Florida from January 1986 to January 1988. Manatee presence in the power plant effluent zones was correlated with cold air and water temperatures. When air temperatures were below 50°F, most manatees in the survey were found in the effluent zones. Manatees in the effluent zones moved with the wind-blown warm water plume. Arriving at a manatee in a small change in water temperature. Some individuals were frequently caught at 1 plant, while others moved between the 2 plants. Because industrial warm water sources are few relative to natural warm water refuges, it is recommended that no



- Abundance
- Motive
- Proximity
- Likelihood

Trichechus manatus
winter waters in FL

MANATEE RESPONSE TO INTERRUPTION OF A THERMAL EFFLUENT

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Abstract: Manatees (*Trichechus manatus latirostris*) aggregate at warm industrial effluents during winter in Florida, raising concerns that cessation could expose individuals to cold and distribution of manatees in the Caloosahatchee River system in the cessation of the heated effluent at a power plant near Fort Myers, FL, significantly between winters (1984-85), as measured by 2 indices: changed significantly among 3 types of survey strata. When the lake in an area of deep water that cooled more slowly than river and returned to the discharge area when the heated effluent was restored. no other short-term alternative, the decision of the power company was warranted and averted probable mortality that otherwise would have occurred. of power plants may influence indices of manatee abundance based

- Likelihood
- Proximity
- Motive
- Abundance

The tropical distribution and seasonal aggregations of manatees at thermal refuges in temperate Florida appear related to their poor physiological mortality during winter.

Present address: Department of Wildlife Sciences, Texas A&M University



IS IT A CRIME TO PRODUCE ECOLOGICAL
DISORGANIZATION?

Why Green Criminology and Political Economy Matter in the Age of Global Ecological Harms

MICHAEL J. LYNCH, MICHAEL A. LONG, KIMBERLY L. BARRETT, PAUL B. STRETESKY*

In this paper for a political economic approach to the study of global ecological crimes. Ecological studies often employ case study approaches which help explain a particular crime; however, these studies lack a coherent theoretical basis. Based on ecological Marxism and production approaches, we outline a theoretical approach for green criminology on crimes of ecological disorganization—that is, green harms that are the result of the productive forces of the economy in a manner that is consistent with capitalism.

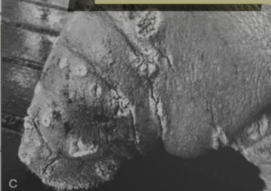
We conclude that, to truly understand and remedy green harms, a focus on political economy is necessary.

Keywords: green criminology, political economy, ecological disorganization, treadmill of production

Introduction

Historically, orthodox criminology¹ has drawn attention to the concept of the environment in limited ways, preferring to pitch the study of environment as a concept related to control of crimes that occur in public places (e.g. crime prevention through

- Likelihood
- Proximity
- Motive
- Abundance



artificial discharges in time, let alone how much it might cost. Decades of good public relations for the industry haven't led to a workable plan. During temporary shutdowns some plants have tried artificial heaters, at a cost of millions of dollars, but this isn't a long-term solution, and it won't work at Big Bend, whose canal is the largest in the state.^[14]

"On Tampa Bay's shores close to Apollo Beach is Tampa Electric Company's Big Bend Power Station. Today, it generates more than 1,700 megawatts of power from its four coal-powered units and one natural gas/oil unit, which were built between the 70s and the late '00s. They are all still in operation today. To cool down the unit, the company pulls water from the Tampa Bay and pumps it through the machinery. After cycling through the system, clean warm water is released back into a nearby discharge canal. After building their fourth coal-powered unit in 1985, TECO noticed a few heavy-set visitors flocking to their canal. Later, the Florida Fish and Wildlife Conservation Commission asked TECO to close off the canal to fishermen and boaters who might hurt the manatee guests and declared the area a wildlife sanctuary.

In December 1986, the company opened the viewing center for watching manatees and other marine life, including fish and rays enjoy the canal as well. Today, the Manatee Viewing Center at Big Bend sees an average of a quarter-million visitors a year. And it's much more than just a tourist trap. Having a concentration of manatees in one location helps researchers like Andy Garrett, a marine mammal biologist at the Florida Fish and Wildlife Conservation Commission. Manatees can often be identified by their scars, usually received from run-ins with boats, so photographing them at the visitor center allows biologists to follow manatees throughout their 40-year lifespan."^[15]

^[14] Frazier, M. *Nobody Knows How to Wean Manatees Off Coal Plants*. Florida Springs Institute. Last accessed: 29/05/23. Accessible at: <https://floridaspringsinstitute.org/nobody-knows-how-to-wean-manatees-off-coal-plants-a-tale-of-unnatural-symbiosis/>

^[15] Blittz, M. *The Future of the Florida Manatee Depends on a Decades-Old Coal-Burning Power Station*. Popular Mechanics. Last accessed: 29/05/23. Accessible at: <https://www.popularmechanics.com/science/animals/a24007/florida-manatee-coal-plant/>

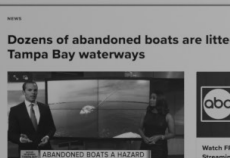
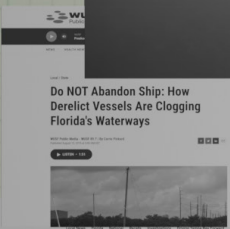
04

Stage 4; The Additional Interactions

Stage 4; The Additional Interactions

SG

Likelihood
 Proximity
 Motive
 Means



Likelihood
 Proximity
 Motive
 Means

Derelict
 At-Risk Vessel
 Public Resource Vessel
 Vessel Turn-In Program

Boats

"The introduction of anthropogenic sound to coastal waters is a negative side effect of population growth. As noise from boats, marine construction, and coastal dredging increases, environmental and behavioral monitoring is needed to directly assess the effect these phenomena have on marine animals. Acoustic recordings, providing information on ambient noise levels and transient noise sources, were made in two manatee habitats: grassbeds and dredged habitats. Recordings were made over two 6-month periods from April to September in 2003 and 2004. Noise levels were calculated in one-third octave bands at nine center frequencies ranging from 250 Hz to 64 kHz. Manatee habitat usage, as a function of noise level, was examined during four time periods: morning, noon, afternoon, and night. Analysis of sightings data in a variety of grassbeds of equal species composition and density indicate that manatees select grassbeds with lower ambient noise for frequencies below 1 kHz. Additionally, grassbed usage was negatively correlated with concentrated boat presence in the morning hours; no correlation was observed during noon and afternoon hours. This suggests that morning boat presence and its associated noise may affect the use of foraging habitat on a daily time scale."^[16]

"Florida wildlife officials have proposed new boating safety education requirements after another year of accidents and collisions took a deadly toll on people and the state's imperiled manatees. At least 593 Florida manatees died in 2020, including 90 from boat strikes, according to records obtained from state officials."

Florida has nearly 1 million registered boats, and thousands of out-of-state tourists rent boats in the state every year. But although more than two-thirds of boating accidents involve people at least 36 years old, current boater safety education requirements apply only to boaters under 32 years old.^[17]

^[16] Miksis-Olds, Jennifer L. et al. **Noise level correlates with manatee use of foraging habitats.** The Journal of the Acoustical Society of America vol. 121,5 Pt1 (2007)

^[17] Gledhill, S. **593 Florida Manatees Died in 2020, Including At Least 90 From Boat Strikes.** Center for Biological Diversity. Last accessed: 29/05/23. Accessible at <https://biologicaldiversity.org/w/news/press-releases/593-florida-manatees-died-2020-including-least-90-boat-strikes-2020-12-30/>

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FORENSIC METHODS FOR CHARACTERIZING WATERCRAFT FROM WATERCRAFT-INDUCED WOUNDS ON THE FLORIDA MANATEE (*TRICHECHUS MANATUS LATIROSTRIS*)

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- Likelihood
- Proximity
- Motive
- Means



Contents lists available at [Tandfonline.com](http://www.tandfonline.com)
Marine Pollution Bulletin
journal homepage: www.elsevier.com/locate/marpolbul

Fishery gear interactions from stranded bottlenose dolphins, Florida manatees and sea turtles in Florida, U.S.A.

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ARTICLE INFO
Keywords:
Fishery gear
Bottlenose dolphins
Florida manatees
Sea turtles
Florida, U.S.A.

ABSTRACT
Documenting the extent of fishery gear interactions is critical to wildlife conservation efforts, especially for endangered species and migratory species. The study examined three gear interactions involving common bottlenose dolphins (*Tursiops truncatus*), Florida manatees (*Trichechus manatus latirostris*), and sea turtles (*Chelonia mydas*) in Florida waters during 1998–2010. The study found that interactions with fishery gear were most common for Florida manatees during 1998–2010, with 15% of manatees interacting with fishery gear. Interactions with fishery gear were also common for sea turtles, with 15% of sea turtles interacting with fishery gear. Interactions with fishery gear were less common for bottlenose dolphins, with 5% of bottlenose dolphins interacting with fishery gear.

Environmental implications of plastic debris in marine settings—entanglement, ingestion, smothering, hangers-on, hitch-hiking and alien invasions
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Over the past five or six decades, contamination and pollution of the world's enclosed seas, coastal waters and the wider open oceans by plastics and other synthetic, non-biodegradable materials (generally known as 'marine debris') has been an ever-increasing phenomenon. The sources of these polluting materials are both land- and marine-based, their origins may be local or distant, and the environmental consequences are many and varied. The more readily recognized problems are typically associated with microplastics, ingestion, suffocation and general debilitation, and are often related to increasing oceanic and public perceptions. Among the less frequently recognized and recorded problems are global hazards to shipping, fisheries and other marine activities. Today, there are rapidly developing research programs that have emerged from the detection of plastic marine debris, commonly known as 'sea cow flippers being hauled', mechanisms leads one to reflect on the possibility of other coastal environments being near

- Likelihood
- Proximity
- Motive
- Means

1. INTRODUCTION
The environmental and other consequences of plastic marine debris are well documented and are often related to increasing oceanic and public perceptions. Among the less frequently recognized and recorded problems are global hazards to shipping, fisheries and other marine activities. Today, there are rapidly developing research programs that have emerged from the detection of plastic marine debris, commonly known as 'sea cow flippers being hauled', mechanisms leads one to reflect on the possibility of other coastal environments being near



Marine Debris/Entanglements

"Humans, for whatever reason and for many years, have either accidentally dropped, intentionally discarded or gleefully thrown items into water. Accidentally or intentionally introduced into rivers, bays or oceans, human-generated trash becomes marine debris, which can be a big problem for aquatic wildlife and habitats. Entanglement in and ingestion of marine debris by marine life can be fatal, and manatees are no exception. For example, discarded plastic packing straps or even bicycle tires can encircle an animal's body and, if not removed from the animal, will imbed into flesh as the animal grows.

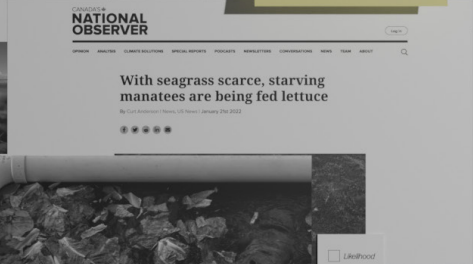
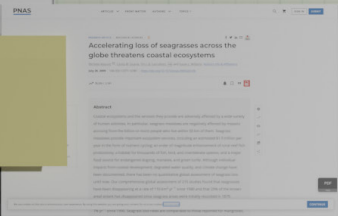
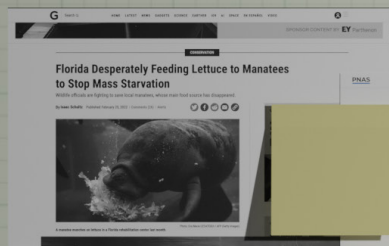
Shredding fishing line from reels when returning to the marina or throwing a "bird's nest" of snarled fishing line overboard not only creates problems for wildlife that swim into this mess, it may even impact other boaters (prop damage), divers and others recreating on or in the water who may also get entangled in the line."^[8]

"Some manatees unintentionally wrap their flippers with fishing line and lines from anchors or crab trap buoys. Manatees seem to be intrigued with items in their environment and often explore these items with their flippers or mouths. Their sense of touch or innate curiosity often gets manatees into trouble when the exploration leads to swallowing the object or when the animal is unable to remove the entangled item. The loss of a flipper or flippers is possible if the entangled animal is not discovered in time. Experienced rescuers are often able to remove the entanglement and either release the animal or send it to a rehabilitation facility to recover.

Monofilament fishing line and other plastics (bags, deflated balloons, etc.) can drift into seagrass beds or snag onto floating vegetation—a sure path to a slow death if a manatee ingests any of these items and is not able to pass it through its digestive system (manatee intestines are over 100 feet long). During necropsies, monofilament fishing line is the most common foreign object discovered in

^[8] Florida Fish and Wildlife Conservation Commission. **Human-related Impacts to Manatees.** Last accessed: 29/05/23. Accessible at: <https://myfwc.com/wildlifehabitats/wildlife/manatee/entanglement/>

SG



manatee digestive systems.^[19]

"According to researchers, in over 6,500 manatee necropsy reports from a 20-year dataset (1993 to 2012), over 11% of the animals that died either ingested or showed evidence of entanglement in marine debris (or both)."^[20]

Dietary Shortages

"Seagrasses have been identified as a key environmental resource in estuarine and coastal regions throughout the world because of their critical importance in providing habitat for large numbers of environmentally and economically important fish and shellfish species; as food sources for marine and estuarine mammals, sea turtles, and other wildlife; their sensitivity to water quality degradation; and their roles in nutrient cycling and improving the stability of bottom sediments (Summarized in Larkum et al. 2007). Primary productivity in seagrass habitats, by combination of seagrasses, macroalgae, and epiphytes, can reach levels that are similar to or greater than many cultivated terrestrial systems (Duarte and Chiscano 1999). In terms of monetary value, seagrass meadows and submerged algal beds have been estimated to provide ecosystem services worth approximately \$3,116 per ha per year (in 1994 U.S. dollars) (Constanza et al. 1997).

Seagrass coverage has decreased in many estuaries worldwide in recent decades, due to largely anthropogenically induced declines in water clarity and other human impact (Orth et al. 2006). Substantial reduction in seagrass acreage have also occurred in Tampa Bay, Florida USA, particularly during a period of rapid coastal development and bay eutrophication that took place between the 1950s and early 1980s (Johansson 1991, 2002; Crane and Xian 2006). Excessive nitrogen loading to Tampa Bay, a nitrogen limited system, can lead to increased density of phytoplankton and microalgae, measured as chlorophyll-a concentrations. In addition to depleting oxygen levels during decay processes, the increased density of the suspended organisms decreases water clarity by reducing light penetration.

^[19] Reinert, TR, Spellman, AC, Bassett, BL. *Entanglement in and ingestion of fishing gear and other marine debris by Florida manatees, 1993 to 2012*. *Endang Species Res* 32:415-427. (2017)

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- Likelihood
- Proximity
- Motive
- Means

Sirenia Shadows, a Short Film That Makes Manatees Look Pretty (Video)
CHARRA LARRELL · APRIL 26, 2015 · 1:49PM

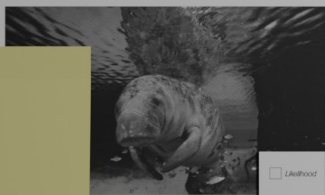
They're all pudgy and grey, with a face like a cross of the Elephant Man. Yes, they're precious and cute that they're endangered. (Don't email us, hippies.) I'd argue that they're so ugly that it comes back fogs of the sea.

I've called "sea cows" for a season.

So Bill By Williams has really done the responsible thing. The team shot underwater footage of manatees in the Crystal River on Florida's west coast, and they're so ugly that it comes back fogs of the sea.



From Mermaids to Manatees: the Myth and the Reality



- Likelihood
- Proximity
- Motive
- Means

Societal Perceptions

Manatees became rare and, perhaps consequently, were not widely understood by the public, many of whom were immigrants to Florida. This ignorance led to much ambivalence and even animosity toward the animals. According to Reynolds (1976), a research scientist whose dissertation research focused on Florida manatees, local myths negatively affected early perceptions of the creatures. One myth was that manatees consumed large quantities of fish leaving few for anglers and, another, that they would lunge out of the water on purpose to bite a person. Reynolds concluded, "It is obvious that these animals are, as yet, poorly understood. Lamentably, they are hurt by this lack of understanding" (p. 214). The result of such beliefs was a general disregard for their welfare and, at worse, malicious harassment and vandalism, that is, purposely injuring manatees for amusement.

Other characteristics of the manatee, grounded more in observable facts, served to make the animals unpopular with people who were more familiar with them. Moore (1951a, p. 10), recorded complaints from Florida boaters who "... found them to be somewhat of a nuisance in navigation." Similarly, Hartman (1971, p. 236), who completed the seminal work on the behavior and ecology of manatees in Crystal River, Florida, reported accounts from fishermen disgruntled about "breaking propellers on the backs of manatees." Hartman (1969) also described the frustration of anglers who disliked manatees who habitually rubbed on traps, embedding them into the muddy substrate. These negative associations did little to endear manatees to the public, and some people lashed out at them.²²

"Boat collisions with manatees (*Trichechus manatus latirostris*) account for about one-quarter of manatee deaths annually in Florida. This emphasizes the need to influence boaters' behavior through an understanding of their knowledge, beliefs, attitudes, and behavioral intentions toward manatees and their conservation."²³

²² Greening, Holly & Sherwood, Edward & Cross, Lindsay. *A Multiscale Approach to Seagrass Recovery in Tampa Bay, Florida*. Ecological Restoration. 29: 82-93. (2011)

²³ Goedeke, T. *In the eye of the beholder: Changing social perceptions of the Florida manatee*. Society & Animals 12:2 (2004): 99-116.

²⁴ Alpaniguly, S. Jacobson, S.K. and Flamm, R. *Conserving Manatees: Knowledge, Attitudes, and Intentions of Boaters in Tampa Bay, Florida*. Conservation Biology, 17: 1098-1105. (2003).

05

Stage 5; The Framing (example)

SG

FLORIDA
THANK YOU
Save the Manatee

New Times
Sirenica Shadows, a Short Film That Makes Manatees Look Pretty (Video)

Environmental implications of plastic debris in marine settings—entanglement, ingestion, smothering, hangerson, hitch-hiking and alien invasions
Maurice B. Gregory

Likelihood
 Proximity
 Motive
 Means

be able to find a route out of ecological traps, as we begin to be able to correlate the behavioural agency of animal life within these human-made infrastructure of spatial manipulation. Ecological traps, therefore, become the justification for such endeavours.

The framing suggests that a manatee is responsible for the boat accident in Hillsborough Bay. It is suggested that the manatee interacted with the outboard motor of the vessel, causing it to stray off path and into the piling. With water temperatures warming to a pre-winter level, the manatee would likely have moved from its 'sanctuary' at the Big Bend Power Station back to its regular site within McKay Bay. McKay Bay is at the northern end of the Tampa Bay and contains a site known as a 'manatee area' but is the only one of these sites that is not overly protected by boat speed restrictions. With no sea grass available to the manatees in this particular area due to human interference, the framing suggests the manatee was on a foraging trip to one of the known sea grass locations outside of McKay Bay, most likely 'The Kitchen'.

At this point, the manatee saw the vessel moving towards it with speed. As it moved towards it, the sounds (bioacoustic frequencies) and sights of the vessels triggered its memory responses. Having had previous incidents with vessels in this area, with scars from its previous interaction, the manatee didn't move out of its way. (*Intent to cause harm*) At this point, the boat dropped its cargo - fishing lines and lettuces - in which the manatee became entangled and took it with them. (*Theft*) The boat then careered towards the piling and suffered damage to its hull and motor.

The Manatee's of Tampa Bay, Florida, are tried for the charges of theft, vandalism, trespassing and the intent to cause harm.

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