31 December 2019

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IN THIS BULLETIN

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NEWS

Relocation of US base in Okinawa threatens marine life and now costs double its initial budget (Japan)

28 December 2019, by Daniel Wolfe, Quartz

Okinawa's governor, Denny Tamaki, demanded on Thursday that the United States halt plans to relocated one of its controversial bases to another part of the island, citing the will of the people, out-of-control costs and environmental damage. In a local referendum in early February, voters rejected the relocation of the base, which the US military plans to move from the densely populated city of Ginowan to the less populated town of Henoko. Japan's central government, however—which is essentially another occupying power—ignored the indigenous referendum, allowing the base to remain and move to its new location.

The relocation efforts, meanwhile, are proving more costly than anticipated. The Japanese defense ministry says the cost could end up being more than twice the original estimate, or about $8.5 billion. The United States wants to build landing strips along the sea floor, but experts say the sea bed is "as soft as mayonnaise," requiring reinforcement. The defense ministry has proposed using 77,000 pilings along the coast, in a region where only 1% of the coral remains alive. Damage to the area also threatens the feeding grounds of the dugong. The soft seabeds on Okinawa's eastern shore provide a suitable habitat for such seagrass to grow.
more……https://qz.com/1776097/relocation-of-us-base-in-okinawa-threatens-endangered-dugong/

Conservationists are petitioning for an dugong emoji (NSW, Australia)

27 December 2019, by Amanda Yeo, Mashable

This November, Pig the dugong celebrated his 21st birthday at SEA LIFE Sydney Aquarium. The birthday boy was presented with a bean sprout cake and new toy at a party thrown in his honor, complete with conical hats and party games.

The IUCN Red List categorizes dugongs as vulnerable, with a population on the decline. According to SEA LIFE Sydney Aquarium's dugong supervisor Kerrie McDonald, conservation campaigns are hampered by the simple fact that many people don't know what dugongs are. A wild dugong's diet is comprised almost exclusively of seagrass, which grows in the shallow, relatively gentle water of sheltered bays and estuaries. Unfortunately, humans also enjoy these areas, putting grazing dugongs in danger of boat strikes and shark net entanglements. Seagrass can also be disturbed by human activity, torn up by dropped anchors.

Though Pig's future is safe, not every dugong has a team of dedicated staff ensuring they never go hungry. Therefore, to raise awareness for dugong conservation as well as celebrate Pig's 21st year, SEA LIFE Sydney Aquarium is petitioning for a dugong emoji to be added to our lexicons. The petition started in late October hasn't quite gathered the signatures they were hoping for, but the aquarium intends to keep it open until it has. On top of signing the petition and being mindful of their own pollution, McDonald said people can help by donating to the aquarium's SEA LIFE Trust, which works to conserve and protect marine habitats and wildlife. They can also visit Pig at SEA LIFE Sydney Aquarium, and "just [share] the message of what a dugong is." However, to ensure a future for dugongs, seagrass, and all marine life, it's most essential that we fight climate change.
more……https://mashable.com/article/dugong-conservation-sydney-sea-life-aquarium/

Fighting Climate Change With Ocean-Based Solutions (FL, USA)

25 December 2019, by Fred Pearce, The Maritime Executive

This year has seen a growing call among environmentalists to restore natural ecosystems as a win-win for the twin environmental perils of our times – the collapse of biodiversity and the runaway threat to humans and nature alike from the climate crisis. The emphasis of this search for "nature-based solutions" has been on forests. But an equally important route to climate salvation may lie with the mangrove swamps, salt marshes, seagrass meadows and kelp forests that stretch along many shores all the way from the tropics to the Arctic.

Coastal ecosystems typically sequester carbon dioxide from the air at a rate of between 12.5 and 8 tonnes per hectare each year – several times faster than the net rate by mature tropical forests. Despite their diminishing range, recent estimates suggest that surviving mangroves absorb from the air around 30 million tonnes of carbon a year, while salt marshes extract as much as 80 million tonnes and seagrasses maybe 100 million tonnes.

Nobody is saying we don't need to eliminate carbon-based fossil fuels from our energy system. Halting the billions of tonnes of carbon dioxide they emit each year remains the top priority for stabilising climate. But, with temperatures already 1C warmer than in pre-industrial times, the UN's Intergovernmental Panel on Climate Change (IPCC) has warned that meeting the commitment of the 2015 Paris climate conference to halt that warming well below two degrees will also require restoring nature's ecosystems, so they can draw more carbon dioxide from the atmosphere.

So their future health is likely to depend on active intervention – not just to protect what remains but to restore what is being lost. The UN has designated the 2020s as the Decade of Ecosystem Restoration. Its Convention on Biological Diversity will establish a framework for action over the coming decade when it meets in Kunming next year.
more…….https://www.maritime-executive.com/editorials/fighting-climate-change-with-ocean-based-solutions

Scientists struggle to save seagrass from coastal pollution (NH, USA)

23 December 2019, by Michael Casey and Andrew Selsky, The New York Times [Associated Press]

Peering over the side of his skiff anchored in the middle of New Hampshire's Great Bay, Fred Short liked what he saw. Just below the surface, the 69-year-old marine ecologist noticed beds of bright green seagrass swaying in the waist-deep water. It was the latest sign that these plants, which had declined up to 80% since the 1990s, were starting to bounce back with improved water quality. Their comeback in the Great Bay gives hope for recovery elsewhere.

Seagrasses, which cover less than 0.2% of the world's oceans, have declined roughly 7% annually since the 1990s. Some seagrass declines have occurred with stunning speed. Central California's scenic Morro Bay has lost more than 90% of its eelgrass since 2007. "It's certainly not a pretty picture and may not get any prettier because of the climate change issues we are all dealing with," said Virginia Institute of Marine Science's Robert Orth, a professor who has studied seagrass for decades. In parts of the United States and other developed countries, there is growing recognition of the importance of seagrass and its sensitivity to nitrogen-rich runoff from sewage treatment plants and other sources. Too much nitrogen can spike algae growth, which clouds the water and blocks the sunlight seagrass needs to grow.

"We think this is a problem that has to be solved," said Ken Moraff, water division director for U.S. Environmental Protection Agency's New England region. Communities around the Great Bay have spent about $200 million to upgrade wastewater treatment plants, resulting in some cutting nitrogen releases by up to 70%, according to EPA and officials in several Great Bay communities. "We've seen other areas where reductions in nitrogen do result in the ecosystem starting to come back," Moraff said. Studies have documented seagrass recovery in Boston, Tampa Bay and Long Island Sound.

In New Hampshire, eelgrass has recovered about 20% in parts of the Great Bay, though it hasn't returned to several areas. Some conservationists argue that bayside communities need to further reduce nitrogen releases through tens of millions of dollars in treatment plant improvements. The EPA is considering allowing communities to hold off on treatment plant upgrades while they try to reduce nitrogen from stormwater runoff and septic tanks. Some communities upgraded sewage treatment voluntarily while others made upgrades to settle EPA enforcement actions.
more…….https://www.nytimes.com/aponline/2019/12/22/us/ap-us-saving-seagrass.html

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FEFU scientists have developed vitamin drink consisting of whey, juice and seagrass (Russia)

19 December 2019, EurekAlert

Scientists of the Department of Food Science and Technology, School of Biomedicine, Far Eastern Federal University (FEFU) have developed a drink rich in vitamins and minerals that based on whey, pectin from seagrass *Zostera*, and fruit juice or nectar. The drink helps to quench thirst, stave off hunger, as well as to recharge the body strength after fitness routine or illness. Scientists propose to release the product in three tastes: apricot, peach, and pineapple.

Due to the sea pectin zosterin obtained from *Zostera* seagrass, the drink has received a saturated, dense structure. Gel-like inclusions formed in it are similar to those in the aloe vera drink, which is popular in the Far East. In addition, zosterin is an excellent natural adsorbent. It takes out heavy metals, radionuclides, etc. from the body.

"Whey is a very valuable product rich in biologically complete proteins and minerals that are easily absorbed by the human body. Whey contains useful milk sugar lactose, which is also completely absorbed, and, very importantly, contains no fats. However, there is a problem. A taste of a pure whey leaves much to be desired, so people usually don't want to drink it. Our idea was to make a tasty and healthy drink with a pleasant texture and high consumer properties. We additionally "strengthened" the drink by including marine pectin in its composition, which makes our product a unique one", said Oksana Tabakaeva, professor of the Department of Food Science and Technology of the FEFU School of Biomedicine. According to the scientist, a new drink supposed to be cost-effective within mass production that leads to the affordable prices in the store. The product has a fairly long shelf life. Poured in sealed in the aseptic package, the drink will preserve its beneficial properties for more than a month. It can be stored in an ordinary refrigerator at home.
more……https://www.eurekalert.org/pub_releases/2019-12/fefu-fsh121919.php

Jupiter in 2030: 3 key issues to watch (FL, USA)

18 December 2019, by Sam Howard, Palm Beach Post

Jupiter (south east Florida) faces a number of issues in the near future, one of the priorities is the health of its waterways. The town faces two challenging trends pertaining to its waterways: The decline of seagrass and the continued onslaught of shore erosion.

Over the last five years at the Jupiter Inlet Lighthouse, the property's shoreline has lost about seven feet annually — up from a historic rate of two feet each year. During Hurricane Dorian alone, a dune on the property's eastern shoreline lost four to six feet. And farther south, along Jupiter and Juno Beach's coastline, Palm Beach County and the U.S. Army Corps of Engineers have projects planned for the next year to replenish eroded beaches with sand.

On the Loxahatchee River, many are concerned about the declining presences of seagrass. The vegetation provides marine life, such as fish and manatees, with habitats and food. Early this summer, researchers with the Loxahatchee River District didn't find any seagrass in a site they've studied for years on the river's northwest fork. The district's researchers said a range of factors, including extreme rainfall and boating activity, could be contributing to the decline.
more……https://www.palmbeachpost.com/news/20191218/jupiter-in-2030-3-key-issues-to-watch

Carcass of Dugong found washed ashore (India)

17 December 2019, The Hindu

Its population in the region had been estimated to be 70 to 140. The carcass of a male Dugong was found washed ashore at Anandapuram seashore near Azhagankulam on Tuesday. On being alerted by local people, a team from the Ramanathapuram Forest Range Office, led by T.K. Ashok Kumar, Wildlife Warden, Gulf of Mannar Marine National Park, inspected the carcass and made arrangements for burying it on the seashore after postmortem.

Mr. Ashok Kumar said the marine mammal weighed about 320 kg. It measured 3.15 meter in length, 1 meter in width and 2 meter in circumference, he added. It had injuries on the mouth part and it could have died after hitting against a boat or propeller, he said. It could have died on Monday, Forest Range Officer S. Sathish said. Dugong habitat in the Gulf of Mannar and Palk Bay and its population in the region had been estimated to be 70 to 140, he said.

The Gulf of Mannar of Marine National Park of the Forest department launched 'Save Dugong' project with a special focus on protecting the mammals in the Palk Bay. The forest department has also launched capacity building training programme after recruiting 'Friends of Dugong' from the fisherfolk.
more……https://www.thehindu.com/news/cities/Madurai/carcass-of-dugong-found-washed-ashore/article30330873.ece

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Saving the bay (WA, Australia)

17 December 2019, by Michelle Wheeler, Particle

"Roebuck Bay is extraordinarily beautiful, with its calm, blue waters fringed by blood orange coastal cliffs ," says local Kandy Curran. The bay's waters are frequented by thousands of shorebirds that migrate from Roebuck Bay to the northern hemisphere each year. Roebuck Bay is an international Ramsar site and is on the National Heritage List –

thanks to the largest assemblage of dinosaur trackways in the world on its coastline. It's one of the most biodiverse places on the planet. "There are the invertebrates in the intertidal mudflats and extensive seagrass meadows and mangroves."

Kandy is the acting project manager of Roebuck Bay Working Group, a 35-strong collective who have been advocating for the bay since 2004. The working group is made up of Yawuru Traditional Owners, scientists and passionate community members. There are also representatives from government agencies and industry, including Shell and the Kimberley Port Authority. Kandy says the group started in 2004 to develop management plans for the bay.

The working group recently won the 2019 State & Territory Virgin Coastcare Award. This recognised their 14-year campaign to prevent algal bloom-causing nutrients from entering Roebuck Bay. Kandy says it's important to work closely with Traditional Owners from whoa to go. She also advises to always use the science and be informed about any environmental issue you want to improve. Finally, bring the community along.
more……https://particle.scitech.org.au/people/saving-the-bay/

Blue carbon is not the silver bullet the Coalition wants it to be (Australia)

17 December 2019, by Oli Moraes, The Conversation AU

The only Australian achievement on display at last week's COP25 conference was "blue carbon", paraded in three minor side events on including carbon stored in coastal ecosystems in national carbon reporting. Blue carbon, which is the storage of organic carbon in mangroves, seagrasses and tidal salt marshes, is irrefutably important. But it is not a panacea for climate change. Australia has been using it as a smokescreen for inaction and a tool to bully our Pacific island neighbours.

Ecosystems like mangroves, seagrasses and tidal salt marshes are very good at storing carbon. They pull it out of oceans and atmosphere and store it in their roots and mud. It can remain there for thousands of years. Beyond carbon storage, these landscapes provide habitat, spawning grounds and nurseries for fish, invertebrates and turtle species. They also provide protection for coastal communities from extreme weather events and rising sea level. When mangroves, seagrasses and tidal marshes are cut down, cleared or degraded, the carbon that was safely stored in mud is released back into the ocean and atmosphere as blue carbon emissions, further contributing to global warming.

During 2017's COP23 climate summit presided over by Fiji, the then Australian minister for foreign affairs, Julie Bishop, announced Australia would invest A$6 million in protecting and managing Pacific blue carbon ecosystems. This pledge has been cited often over the past two years to demonstrate Australia's commitment to action on climate change. Throwing money at blue carbon projects generates carbon credits, which nominally offset Australia's emissions. Meanwhile, Australia remains one of the world's largest polluters per capita and the third-largest exporter of fossil fuels.

A UN oceans report released earlier this year highlights problems with countries depending on blue carbon as their main form of climate change mitigation. The report says blue carbon would offset only about 2% of current global emissions and would not be an effective replacement for the "very rapid reduction of greenhouse gas emissions" required to avoid catastrophic climate change.
more……https://theconversation.com/blue-carbon-is-not-the-silver-bullet-the-coalition-wants-it-to-be-128925

The future of East Africa's last 'mermaids' hangs in the balance (Mozambique)

17 December 2019, by Tony Carnie, Daily Maverick

The clear and shallow waters off the coast of East Africa were once home to a multitude of dugongs that have all but vanished from the western part of the Indian Ocean. Today, the last viable population in this region clings to life in the vicinity of the Bazaruto Archipelago, a cluster of tropical islands off the central Mozambican province of Inhambane. It is here that the South African chemical and energy giant Sasol is exerting renewed pressure on the Mozambican government, seeking permission to deploy oil and gas drilling rigs to dig test wells, as well as a seismic ship to conduct loud underwater sound-blasting surveys in the heart of the last East African dugong stronghold.

Should Sasol strike it lucky, marine conservation groups fear that petroleum leaks could be devastating for dugongs, dolphins, whales and other animals. This has spurred the world's top marine mammal experts to sound the alarm and to declare a 16,280 km2 stretch of the Mozambique coastline as one of the world's most important living spaces for dugongs and other marine mammals. At a meeting in Barcelona on 9 December 2019, the Marine Mammal Protected Areas Task Force of the International Union for Conservation of Nature (IUCN) designated the area around Bazaruto as one of the world's 37 new "Important Marine Mammal Areas" following a rigorous scientific peer-review process. Though these areas do not have legally-protected status, the IUCN suggests that their designation is "an important first step toward greater protection efforts".

The Bazaruto Archipelago to Inhambane Bay IMMA is home to fewer than 300 of these extraordinary creatures, but, unlike elsewhere along the continent's coast, this population of dugongs is at least still viable. Quite apart from oil exploration, illegal gill netting and poaching have created additional threats. The IUCN estimates that this dugong population can only sustain a maximum of two human-caused deaths of productive females per year before numbers crash. Ironically, perhaps, Sasol has been aware of the plight of the species for more than a decade, having sponsored a population assessment study of the Bazaruto dugongs from 2006 to 2008. Following a meeting on 18 November 2019 at Dugong Lodge at Inhassoro, the IUCN task team reported that: "It should be noted that Sasol was once supportive of this population of dugongs, supporting substantial research, and they could be supportive again."
more…….https://www.dailymaverick.co.za/article/2019-12-17-the-future-of-east-africas-last-mermaids-hangs-in-the-balance/

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East Africa: The Future of East Africa's Last 'Mermaids' Hangs in the Balance (17 December 2019, AllAfrica.com)
https://allafrica.com/stories/201912170253.html

A bipartisan bill could save the manatees (FL, USA)

15 December 2019, by Preston Robertson, Citrus County Chronicle

Floridians love our manatees, the gentle, lumbering aquatic mammals that gather by the hundreds each winter at freshwater springs replete with warm water and seagrass. Unfortunately, the future of the manatee cannot be taken for granted. Today, many places where manatees congregate for the winter are facing an ongoing problem. Invasive algae grows into thick mats and smothers eelgrass and other plants manatees depend on. Algae blooms are also problematic for fish, scallops and even people.

This is an economic as well as environmental problem. In Citrus County, manatee viewing is reportedly the main reason visitors come to the county, while scalloping and fishing place second and third. Algae outbreaks place all these activities at risk. Statewide, economic activities that depend on wildlife such as fishing, hunting and wildlife viewing generate nearly $15 billion in economic activity. The Florida Fish and Wildlife Conservation Commission (FWC) works to protect and restore the places where manatee congregate, but the FWC lacks the funding to fully implement its plan to help manatees and the nearly 700 other wildlife species that face threats.

Just as we invest in a business, we need to invest in the future of Florida's wildlife, including manatee-watching sites like Crystal River and Homosassa Springs. That's why a bipartisan group of nine Florida House Representatives — Crist, Demings, Gaetz, Hastings, Lawson, Mast, Rutherford, Shalala and Soto — have gotten behind a bill called the Recovering America's Wildlife Act. This bill would send more than $40 million annually to the FWC to support proactive, locally led voluntary wildlife conservation.
more…….https://www.chronicleonline.com/opinion/columnists/a-bipartisan-bill-could-save-the-manatees/article_c59a0640-1dd7-11ea-94a6-8f1e5cd67aae.html

Tasman Peninsula residents fear fish pens to blame for slimy algae at bay near Port Arthur (TAS, Australia)

15 December 2019, by Alexandra Humphries, ABC News

Tasman Peninsula residents have been left "devastated" by an influx of slimy, slippery, odorous algae that has blanketed the area of Long Bay and Stingaree Bay, near Port Arthur. Dr Coughanowr believes the algae, primarily a filamentous kind known as catgut weed, is a result of the nearby fish farm. "The nutrients from those fish pens is a very large amount of nutrients … it's probably in the order of 150 tonnes of dissolved nitrogen, which is essentially like a liquid fertiliser," Dr Coughanowr said. Dr Coughanowr is worried the algae is damaging important seagrass and fringing reef habitat.

In 2017, salmon giant Tassal reintroduced fish pens to its 15-hectare Long Bay lease after it had gone unused for more than a decade. There is no nitrogen cap or biomass cap to limit the tonnes of salmon permitted on the lease, which is instead regulated by monitoring the impact on the seafloor. Tassal said its water-quality monitoring, including biological monitoring, showed full compliance, and pointed out the health of the system could be influenced by factors beyond its control. EPA officers have conducted environmental monitoring to compare with previous data collected on the salmon farm in 2017 and 1999.

Tasman Mayor Kelly Spaulding said recent low rainfall and an increase in the area's population could also be impacting the waterway. The Tasman Council has warned against swimming or fishing in the area, but said it was not one of the municipality's primary recreation areas.
more…….https://www.abc.net.au/news/2019-12-15/tasman-peninsula-bays-filled-with-algae-near-tassal-salmn-pens/11796332

Eel grass 'expanded significantly' around coast (Isle of Man)

12 December 2019, Energy FM

Eel grass, also known as seagrass, has 'expanded significantly' in Manx waters, since the creation of the Island's first marine nature reserve. Eel grass is found in four areas around the Island's coast including Ramsey Bay. Since the

1930s, marine scientists estimate that eel grass meadows have declined by 90% in the North Atlantic; initially due to disease, but subsequently due to pollution, poorly-managed coastal development and other human activities. A recent survey by the Department of Environment, Food and Agriculture, using specialist underwater camera equipment, revealed this special plant had 'expanded significantly' in Ramsey Bay Marine Nature Reserve (MNR).

In 2011, when Ramsey Bay was designated a MNR, the area set aside to protect eel grass was about 0.5 km2, in the south-west corner of the bay. The new survey found its coverage is now around 2 km2, and stretches from above Queen's pier eastwards to beyond Stack Mooar. Eel grass is also found in Baie ny Carrickey, near Port St Mary, in Laxey Bay and in Langness Marine Nature Reserves where it grows in shallow waters on sandy seabeds, in which they form a root network, binding the seabed together and enabling the plants to form large underwater green meadows.

Building on the success, the Isle of Man is also assisting a UK-based restoration project by Swansea University, which aims to collect one million sea-grass seeds from around the British Isles, germinate them and restore some of Britain's sea grass beds lost in the last century. The Manx work is being undertaken by the volunteer organisation Isle of Man Seasearch under strict DEFA controls with divers harvesting seeds from Ramsey Bay before they are sent to Wales for germination. It is hoped the collaboration will lead to seeds being collected and germinated on island and reintroduced in areas where the plant has disappeared completely, such as Port Erin Bay MNR.
more……https://www.energyfm.net/cms/news_story_608724.html

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A Perfect Storm Hits Bay Scallops (NY, USA)
12 December 2019, by Christopher Walsh, East Hampton Star

Warming water temperatures, hypoxia (a deficiency in oxygen), ocean acidification, and harmful algal blooms, said Christopher Gobler of Stony Brook University's School of Marine and Atmospheric Sciences, are each a stressor to the bay scallop. The occurrence of more than one at one time, he said, may be responsible for the die-off of between 90 and 100 percent of bay scallops in areas throughout the Peconic Estuary, which has prompted Gov. Andrew M. Cuomo to ask the United States Commerce Department for federal action to help the fishery.

The bay scallop fishery is "notorious for booms and busts," Stephen Tettelbach, a shellfish ecologist who conducts population surveys as part of Cornell Cooperative Extension's shellfish restoration efforts, said at the symposium, which was held at the Stony Brook Southampton campus. But a series of brown tides decimated the population beginning in 1985. Restoration efforts by the Cornell Extension were demonstrably succeeding through last year, Dr. Tettelbach said. "There was a great set of scallops in 2018, so expectations were high for a good harvest season for this year. And then things changed." "This was a warm year," he continued. "The lethal limit for scallops has got to be about 88 degrees, so we're getting pretty close to that red line." Dissolved oxygen levels were low, he said.

Bradley Peterson, a professor at the School of Marine and Atmospheric Sciences, discussed bay scallop habitat and predation in the context of the die-off. There was no significant change in the abundance of seagrass, an important habitat for juvenile scallops, this year. One possible sign of hope, Dr. Tettelbach said, is "a really good set of scallops this year," juvenile scallops that could be harvested next year, "and especially in the eastern part of the bays. The number of juvenile scallops is well above what we've seen in the last five years. That's the good news. We'll see what happens going forward, but at least there are some juveniles."
more……https://www.easthamptonstar.com/government/20191212/perfect-storm-hits-bay-scallops

With a population under a dozen, Okinawa dugongs labeled 'critically endangered' by IUCN (Japan)
12 December 2019, The Japan Times

The International Union for Conservation of Nature has updated its Red List of Threatened Species, moving the dugong that dwell in waters off Okinawa Prefecture to the critically endangered category and putting it a step away from extinction. The organization warned that the number of dugongs off Okinawa has fallen to 10 or less and is in decline. The critically endangered category is the highest among the IUCN's five categories, reflecting a high degree of extinction risk.

The IUCN also cited the threat to the marine mammal posed by construction work related to the relocation of U.S. Marine Corps Air Station Futenma. Under a controversial plan, the base is set to be relocated to the Henoko coastal area in Nago in Okinawa from its current site in Ginowan in the island prefecture. "The loss and damage to these seagrass beds (near the construction site) is likely to be a serious impediment to the recovery of the dugong population in Okinawa," it said. The construction project involves landfill work off Henoko.

Investigations by the Defense Ministry's Okinawa bureau had previously confirmed three dugongs near the main island of Okinawa. But one of them was found dead in March this year, while the other two have not been seen since September 2018.
more……https://www.japantimes.co.jp/news/2019/12/12/national/science-health/okinawa-dugongs-critically-endangered/#.XfLMW_xS-Uk

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Largest bivalve mollusc in Mediterranean in critical danger of extinction (Spain)
12 December 2019, Majorca Daily Bulletin

The largest bivalve mollusc in the Mediterranean is in critical danger of extinction according the the International Union for the Conservation of Nature, or IUCN. The nacra or *Pinna nobilis* can live for 20 years, its shell can exceed 120 centimetres and it lives half buried between the *Posidonia* seagrass.

"In 2016 an anomalous number of dead nacra began to be detected in Spain and shortly after that mortalities exceed 80%," said Jorge Moreno, who's head the Protection of Species Department at the Ministry of Environment. By 2018, the only live specimens to be found were in the Mar Menor, which has very high salinity and at the mouth of the Ebro which has very low salinity. Since then, four live specimens have been found in Cabrera and two in Minorca.

Anyone who spots a nacra is asked to take a photograph of it and inform the Department of Medi Ambient of its location but not to touch it. Technicians will then be deployed to the area to confirm that it is a *Pinna nobilis*, assess its status and decide the best way to protect it.
more……https://www.majorcadailybulletin.com/news/local/2019/12/12/60485/largest-bivalve-mollusc-mediterranean-critical-danger-extinction.html

Posidonia and beaches worth 80 million a year (Spain)
12 December 2019, Majorca Daily Bulletin

According to the professor of applied economics at the University of the Balearics, Antoni Riera, the 65,000 hectares of *Posidonia* seagrass around the Balearics and the 486 hectares of beaches and coves in Majorca generate environmental and tourist services that can be valued at 80 million euros per annum. At a conference in Palma to coincide with the climate change convention in Madrid, Riera said yesterday that this valuation should enable public authorities to improve decision-making and to justify spending equivalent sums on protection.

He stated that the objective was to go beyond the valuing of urban development and to take into the account the capacity that ecosystems have in providing essential services for people's well-being and for economic development and the relationship with the impact of tourism. Conservation is therefore not just for cultural reasons, but for social and economic ones as well. Studies show that the *Posidonia* meadows have a value of 12.4 million euros in terms of coastal protection service in that these meadows help to prevent erosion. They contribute 5.5 million euros to improving biological productivity and 3.2 million euros to improving seawater quality.

With regard to beaches and coves, their value centres on cultural as well as recreational services. The value for tourists is estimated to be 59.2 million euros in all. A further aspect of the studies is that "loyal" tourists would pay 1.12 euros per day in order to prevent the loss of a metre of beach, 0.27 euros per day to stop the loss one per cent of posidonia, and 0.82 euros per day so that beaches aren't red-flagged, e.g. because of the presence of jellyfish. German tourists are said to be more willing to make such payments than their British counterparts.
more……https://www.majorcadailybulletin.com/news/local/2019/12/12/60477/posidonia-and-beaches-worth-million-year.html

Hurricane-damaged turtle grass recovery may take many years (TX, USA)
11 December 2019, South Jetty

University of Texas Marine Science Institute researchers recently found out that Texas turtle grass could take several years to return to its levels pre-Hurricane Harvey as a result of the storm. The study published in Limnology and Oceanography Letters showed evidence that climax seagrass species suffered far more than the "weedy" pioneer species, *Halodule*, a narrow-leaf seagrass, during Hurricane Harvey. Turtle grass is typically thought to be more resilient to extreme storms due to their wide leaves and robust root system. During other big hurricanes like Wilma

and Georges, turtle grass did not significantly decrease, while in Texas, Hurricane Harvey caused a turtle grass bed decline of 33 percent.

Despite damage to their homes and laboratories, Congdon and her coauthors, Christina Bonsell, Meaghan Cuddy and Ken Dunton, all from UTMSI, were on the water two weeks after the hurricane. Seagrass monitoring stations were established before Harvey and, of those, Congdon's team was able to sample 126 stations after the storm.

They reported that the reason Texas seagrass experienced a different impact from hurricane force winds and waves may be directly related to the width of their blades. Texas is unique in that barrier islands create sheltered bay systems with less wave action. One idea that emerged is with more protection from the waves, turtle grass blades are much thinner than their counterparts throughout the Gulf of Mexico and the Caribbean. More research is needed to fully understand the full scope of the reasons for the blade width in Texas, but one thing is for certain – the loss of turtle grass is significant for the Texas coast.
more…….https://www.portasouthjetty.com/articles/hurricane-damaged-turtle-grass-recovery-may-take-many-years/

Chesapeake Bay: Record-setting freshwater flows made 2019 a challenging year (MD, USA)

10 December 2019, by Julia Rentsch, Salisbury Daily Times

In 2019, after historic rains the previous year, fresh water poured into the Chesapeake Bay at an unprecedented rate. On average, more fresh water than could be contained in an Olympic-sized swimming pool gushed into the bay every second of the year, and the bay will feel the effects for years to come, The Chesapeake Bay Program reports. From May 2018 through October 2019, the entire bay was seeing below-average salinity levels, and in February the mid-bay hit a record low, the CBP reports. While conditions returned to normal in October, this 17-month-long extra-fresh period harmed underwater grasses and increased the presence of oyster-killing parasites, while also allowing invasive species to gain a foothold and contributing to the bay's "dead zone," the CBP reports.

In 2018, the bay supported an estimated 108,960 acres of underwater grasses, according to a CBP survey. Though 2019 acreage data is not yet available, CBP estimates that around 20,000 acres of underwater grasses were lost. "While we're still analyzing the data, the general expectation is that underwater grasses will take a pretty big step backwards," said Brooke Landry, a biologist at the Maryland Department of Natural Resources and chair of the Chesapeake Bay Program's underwater grasses workgroup.

Not only was the fresh water a poor environment for the eelgrass, which likes saltier water, but so was the plume of nutrients and sediments that accompanied the deluge. High temperatures this year caused further stress, Landry wrote in an email to The Daily Times. "Eelgrass can withstand some heat stress in clear, salty water, but it doesn't thrive in warm waters that are also affected by nutrient and sediment loading that decreases light availability for the plants," Landry wrote. "With water quality improvements, eelgrass could recover in the next several years, although that also depends if the surviving plants were reproductive adults." , widgeon grass will bounce back and take the place of eelgrass throughout the bay, she said. "There's a hope among experts that widgeon grass will provide the same benefits to the ecosystem that eelgrass does, but only time will tell," she said.
more…….https://www.delmarvanow.com/story/news/2019/12/10/chesapeake-bay-year-review-record-rains-continued-have-impact/2589604001/

Report highlights severe threats to Earth's largest carbon sink (United Kingdom)

09 December 2019, Ekklesia

A landmark Greenpeace report highlights our reliance on the ocean as Earth's largest carbon sink. It warns that our changing climate, biodiversity loss and habitat destruction are endangering the processes which underpin the ocean's ability to sequester and store carbon.

The report, In Hot Water: The Climate Crisis and the Urgent Need for Ocean Protection, makes the case for a global network of ocean sanctuaries, off limits to human activity. These would build the resilience of marine ecosystems, protect natural 'blue carbon' stores, and safeguard the systems that underpin them. The report identifies ocean ecosystems at the frontline of the climate crisis and recommends priority areas for governments to protect within a global network of ocean sanctuaries. These include both poles, whale hotspots, coral reefs, mangroves, seagrass meadows, the Sargasso Sea in the Atlantic, the mesopelagic zone (between 200 and 1000 metres)and the deep ocean, which Greenpeace believes should remain off-limits to the nascent deep sea mining industry.

Greenpeace is urging the world's governments to take urgent and concerted action to tackle the ocean crisis and safeguard the ocean's ability to store carbon. Governments must seize on a series of events over the next 12 months which present a 'window of opportunity' to address the crisis. Governments should agree a strong new Global Ocean Treaty at the United Nations before the end of 2020, and commit to protecting at least 30 per cent of the world's ocean at the Convention on Biological Diversity summit in China in October 2020.
more…….http://www.ekklesia.co.uk/node/29138

Task force examines impacts of higher acid levels in LI waterways (NY, USA)

08 December 2019, by Mark Harrington, Newsday

Efforts to reduce the impact of increased ocean acidification are being examined for the waterways around Long Island and New York City as increases in carbon dioxide change the chemical makeup of bays, coves and creeks and threaten rebounding shellfish populations. New York's Ocean Acidification Task Force held one of its regularly scheduled meetings at Stony Brook University last week as the 14-member commission works to finalize a report that will outline ways to address the problem for New York.

"It's more a problem in our localized waterways, in our creeks and coves, where you have the combination of high temperatures and acidification," said Chris Pickerell, marine program director of the Cornell Cooperative Extension and a task force member. The cascading impact to local bays is something "we're more concerned about," because it's "more drastic and more dramatic than what we're seeing in the ocean itself." Pickerell said documented impacts of acidification's effect locally are just beginning to the recorded.

Brad Peterson, an ecologist and associate professor of Marine and Atmospheric Sciences at Stony Brook University, said his studies of seagrass in waterways from Long Island Sound to Shinnecock Bay have already shown favorable changes in the pH of the water as oxygen levels increase. Large patches of seagrass in waterways can create "sanctuaries from ocean acidification," Peterson said. Local seagrasses such as eel grass are rooted, produce seeds and completely submerged. Their high photosynthetic levels make them good candidates for drawing CO2 out of the ocean. They are also "really important habitats for juvenile shellfish," which can be affected more than other species by ocean acidification.

more…….https://www.newsday.com/long-island/environment/ocean-acidification-shellfish-1.39283610

Residents call for action over smelly sea grass covering pristine Busselton beach (WA, Australia)

09 December 2019, by Kate Stephens, ABC News

Residents in a regional West Australian city are calling on the State Government to do more to prevent smelly seagrass from ruining their pristine beach every year. For more than two decades, thousands of cubic metres of seagrass has washed ashore on a large section of beach in Busselton, in the state's south-west. This year some 20,000 cubic metres of seagrass wrack has accumulated on Western Beach, which has created three-metre cliffs into the waters edge.

While sea grass washes up on many shores in winter, it is naturally pushed back out to sea by storms. In 2018 seagrass swamped the iconic Busselton Jetty, but most years the wrack is washed back out to sea by the time summer rolls around. But marina and canal development in Port Geographe in the early 1990s has caused the seagrass to get trapped and prevents it from being washed back out in late winter. In 2013 the WA Government spent $28 million on a reconfiguration of the groynes, which reduced the amount of seagrass washing ashore. The Department of Transport's director of coastal facilities, Donna West, said about 100,000 cubic metres of wrack would wash up annually before the reconfiguration. In the years following the project, the number dropped to around 20,000 cubic metres.

The Department of Transport's management plan of the seagrass shows that if levels reach 60,000 cubic metres, works will begin to remove the wrack. But residents and the City of Busselton consider that number to be too high. More than 400 residents attended a rally on the weekend to vent their frustration over the issue. Following a meeting with the City of Busselton and resident representatives earlier this month, the Department of Transport said it will push the wrack back away from the beach to try to restore the coastline. The Department will also create a technical working group to assess the performance of the groynes and make recommendations about what can be done to improve the situation.

more…….https://www.abc.net.au/news/2019-12-09/sea-grass-swamps-pristine-busselton-beach/11778374

Related article
Wracked by weed problem (07 December 2019, Dunsborough Times)
https://thewest.com.au/news/busselton-dunsborough-times/wracked-by-weed-problem-ng-b881402661z
Busselton locals sick of dangerous, smelly seagrass built up on beach (09 December 2019, Perth Now)
https://www.perthnow.com.au/news/south-west/busselton-locals-sick-of-dangerous-smelly-seagrass-built-up-on-beach-ng-b881405486z
Port Geographe residents unleash over seagrass wrack (09 December, Busselton Dunsborough Mail)
https://www.busseltonmail.com.au/story/6533414/geographe-residents-fury-over-seagrass-wrack/?cs=801

High levels of metal found in Queensland turtle blood (QLD, Australia)

07 December 2019, Livingston Ledger

Turtles along northern Queensland's nearshore waters have tested positive for a metal at potentially harmful levels, according to a Queensland study. Cobalt is a naturally occurring mineral found in most invertebrates, however testing of green turtles along Upstart, Cleveland and Shoalwater Bay found elevated cobalt levels associated with adverse

health outcomes, Queensland Alliance for Environmental Health Services researcher Alex Villa said. A quarter of the 161 turtles examined at Upstart Bay this year had mild to severe eye lesions.

Mr Villa, lead author of the study published in Environmental Pollution, was called in with a group of researchers and veterinarians to evaluate the levels of metal in coastal green sea turtles in the same area. The team took 49 samples of green turtles at Howick Group of islands in far north Queensland's Great Barrier Reef, removed from industrialised, urbanised and agricultural areas, to serve as a baseline against the populations from Cleveland, Upstart and Shoalwater Bay. "The levels we found at the Howick Group of islands correspond with most animals, most animals are between 2 and 20 (parts per billion of cobalt) and with the turtles at an upper range we were seeing 33-36, whereas on average we were seeing 470 parts per billion of cobalt in the turtles at Upstart Bay," he said. "The elevated levels we have at Cleveland average about 150.

The team also found a strong correlation at Cleveland and Upstart Bay between the elevated presence of cobalt and active low grade inflammation, Mr Villa said. "At Upstart Bay, the specific inflammation markers are associated with systemic liver dysfunction and that is pretty meaningful because the liver is a detoxifying organ," he said. Other metals observed above the baseline at the three locations included molybdenum, manganese, magnesium, sodium, arsenic, antimony and lead. According to veterinarian and co-author Dr Mark Flint, a quarter of 161 turtles examined at Upstart Bay also had mild to severe eye lesions. The extent and exact effects of metal exposure on the health of coastal populations of sea turtles remains unknown, however Mr Villa said James Cook University researchers would now be testing seagrass and sediment in the same areas to find out if there is a link between the levels of metals found in the sampled turtles and their surroundings.
more……https://livingstonledger.com/high-levels-of-metal-found-in-queensland-turtle-blood/

Carbon sinks will lose impact the more humans emit (Spain)
06 December 2019, Climate Home

Nature-based solutions, such as planting trees, rehabilitating seagrass beds, or restoring mangroves, can help solve the climate crisis by removing carbon dioxide from the atmosphere. But such carbon sinks will be become less and less effective the longer humans continue to emit greenhouse gases, Louis Verchot, lead author of the Special Report on Climate Change and Land, cautioned during the COP25 in Madrid.

Verchot, one member of a panel of experts at the event, said that for now nature-based solutions (NBS) are a "free subsidy from the environment in response to the pollution that's going on because we're stimulating plant growth." That situation will not persist, he said: At some point the planet will reach such temperature extremes that forests will begin to decline, and a key carbon sink will be lost.

Scientists have known for years that NBS can be part of the solution to climate change. As a result, financial mechanisms like the Global Environment Facility (GEF) and the Green Climate Fund (GCF) have a made significant investments in NBS. Over the last five years, the GCF has dedicated a total of $1 billion to a variety of projects that focus on NBS for both climate change mitigation and adaptation, said Pa Ousman Jarju, Country Programing Director at the GCF. The restoration of marine ecosystems, he argued, is essential "to improve adaptation of vulnerable coastal populations." Other initiatives, such as seagrass rehabilitation or the mangrove reforestation, are being carried out in countries like Mozambique, Madagascar, South Africa, and Tanzania, among others.
more……https://www.climatechangenews.com/2019/12/06/carbon-sinks-will-lose-impact-humans-emit/

23rd dead dugong found off Krabi for 2019 (Thailand)
06 December 2019, The Thaiger

Dr. Thon Thamrongnawasawat, marine biologist and academic, has posted about the region's 23rd dugong found dead this year. The dugong was 2.7 metre long and 51 centimetres wide. The dugong's body parts were still intact and there was no trace of physical attack or damage. The dugong body was found in Moo 1, Ban Hua Laem, Koh Lanta Yai sub-district, Krabi. It was found by Moo Koh Lanta National Park Officers and the body was sent to Andaman Marine Biological Centre for a full autopsy.

Dr. Thon mentioned that this year has seen the highest number of dead dugongs in the Andaman region, from Trang to Phang Nga. There have been 23 dead dugongs in Thailand over the year and it's estimated that there are about 250 dugongs across the country. "Looking into the specific areas – Krabi, Trang, and Phang Nga Bay – there are about 200 dugongs and about 21 of them have died, which is more than 10% and places the local species at high risk. Uusually, it should be about 5%, number at which the repopulation can take place naturally."

"The solution shall still be pushing forward the Mariam Project, which has been approved by the National Marine Committee, to get approval of the cabinet in order to make the project work most effectively and I wish this dugong is the last dead dugong of this year." "We have lost so many of them already this year."
more……https://thethaiger.com/hot-news/environment/23rd-dead-dugong-found-off-krabi-for-2019

Related articles
Dead dugong found ashore at Koh Lanta, 23rd to die in Andaman this year (06 December 2019, The Phuket News)
https://www.thephuketnews.com/dead-dugong-found-ashore-at-koh-lanta-23rd-to-die-in-andaman-this-year-73901.php#mVxCSLAXlYakZg8c.97
Another dugong found dead on Koh Yao Noi, Phang Nga Bay (01 December 2019, The Thaiger)
https://thethaiger.com/hot-news/environment/another-dugong-found-dead-on-koh-yao-noi-phang-nga-bay

Improving Estimates of Coastal Carbon Sequestration (Spain)

05 December 2019, by Sarah Stanley, Eos

Coastal ecosystems capture large amounts of carbon from the atmosphere, sequestering it in soils for years. Estimates of how quickly this "blue carbon" accumulates influence climate predictions, but such values often suffer from uncertainties. Now Belshe et al. demonstrate how combining two computational modeling strategies could boost the accuracy of blue carbon estimates.

The new method builds on age-depth models, which are widely used to calculate blue carbon accumulation according to sedimentation rates gleaned from soil cores. To overcome limitations of the age-depth approach, the researchers combined it with a "carbon pool" strategy. Carbon pool models also estimate the age of carbon in a system and the time it remains in the system, which provides more detailed pictures of organic carbon dynamics within soils. When applied to soil cores collected from a seagrass ecosystem in Spain's Balearic Islands, the new two-model strategy outperformed an age-depth-only approach, reducing uncertainties in blue carbon accumulation estimates.

According to the authors, the two-model approach might also generate better estimates in other coastal ecosystems, such as tidal marsh and mangrove habitats. Moreover, it could enable identification of spatial and ecological patterns in blue carbon accumulation that inform estimates in locations where extensive core sampling has not been done.
more…….https://eos.org/research-spotlights/improving-estimates-of-coastal-carbon-sequestration

Lagoon health report card shows minimal improvement (FL, USA)

05 December 2019, by Brittany Mulligan, Hometown News

Groups from around the county such as the Indian River Lagoon National Estuary Program and Marine Resources Council have been working to restore our precious lagoon back to its former glory. Unfortunately, due to the high levels of phosphorous, nitrogen and other chemicals, the lagoon has many years to go until its natural balance is restored. The Marine Resources Council, with support from its partner, Applied Ecology Inc., recently gave patrons of a fundraising event an inside look at its second annual Indian River Lagoon Health Update Report Card.

The report card takes an in depth look at the Indian River Lagoon's health based on water and habitat quality by scoring different regions from 0-100. A score under 50 equates to "extremely poor." "This report is a comprehensive look at 10 regions in the lagoon in terms of these healthy indicators from water quality and seagrass health," said Dr. Leesa Souto, executive director of Marine Resources Council. In the inaugural 2018 report, the Marine Resources Council made a serious study of the Indian River Lagoon from the past 20 years. The grades cover Mosquito Lagoon to the South Indian River Lagoon. This data, along with future records, will be able to help scientists look at a trend line and get a sense of where the contaminated water is coming from, according to Dr. Souto.

Although the 2019 report is due to be released soon, it is important for readers to note that it actually is scoring the Indian River Lagoon from the data looking at 2017. While the water quality seemed to improve, habitats along the lagoon continued to decline, Dr. Souto added. "One of the challenges that we're facing is dealing with a system that's changing because of a changing climate," Dr. Souto said. "What has been damaging to the lagoon in its simplest form has been the demise of seagrass." The driving factor behind this decline is the algae blooms that continue to block the sunlight from reaching seagrass.
more…….http://www.hometownnewsbrevard.com/news/lagoon-health-report-card-shows-minimal-improvement/article_7f834f7c-16e3-11ea-a122-978923552792.html

CONFERENCES

The 14th International Seagrass Biology Workshop (ISBW14) (Annapolis, Maryland, USA on 09–14 August 2020)

Theme: " Signs of Success "

The International Seagrass Biology Workshop (ISBW) is the only international meeting specifically tailored to seagrass scientists, professionals and students. The International Seagrass Biology Workshop (ISBW) provides an excellent opportunity for the scientists working on various aspects of seagrass ecosystems to come together and discuss their latest findings. The ISBW14 Chesapeake Bay 2020 will be held in August 2020 at the Graduate Annapolis Hotel, Annapolis, Maryland. This will be the first time ISBW has been hosted in the U.S.A. and the iconic

Chesapeake Bay is the logical setting. Chesapeake Bay is an iconic estuary with a strong scientific and management history. The resurgence of seagrasses (including brackish water submersed aquatic vegetation) in the bay is the largest documented in the world, and clearly a "sign of success" to inspire seagrass scientists globally.

More information:
To get important updates, visit: https://isbw14.org/
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14th International Coral Reef Symposium (ICRS 2020) (Bremen, Northern Germany, 5 – 10 July 2020).

Theme: Tackling the Challenging Future of Coral Reefs

The ICRS is the leading global conference on coral reef science, management and conservation, sanctioned every 4 years by the International Coral Reef Society (ICRS). For the first time in its history, an ICRS will be held in Europe. ICRS 2020 will be the key event to develop science-based solutions addressing the present and future challenges of coral reefs, which are globally exposed to unprecedented anthropogenic pressures. The five-day program will present the latest scientific findings and ideas, provide a platform to build the essential bridges between coral reef science, conservation, politics, management and the public, and will promote public and political outreach.

Key Themes which include seagrass ecosystems:
Theme 3: Ecosystem functions and services
Theme 6: Unexplored and unexpected reefs
Theme 9: Global and local impacts
Theme 10: Organismal physiology, adaptation and acclimation

More information:
To get important updates, visit: https://www.icrs2020.de/program/session-program/

SEAGRASS-WATCH on YouTube

Seagrass: Pastures of the sea *http://www.youtube.com/watch?v=66Y5vgswj20* or *http://www.seagrasswatch.org/seagrass.html*
Presentation on what seagrasses are and why they are important (over 50,723 views to date)

Seagrass & other matters

World Seagrass Day http://wsa.seagrassonline.org/world-seagrass-day/

A global campaign for World Seagrass Day: Raising public awareness on the importance of seagrass meadows is central to efforts in the protection and conservation of seagrass meadows worldwide. The international seagrass research and conservation community, together with the undersigned, call on the United Nations to declare a World Seagrass Day to recognize the importance of seagrass meadows to the health and well-being of the planet, as well as the people, communities, flora, and fauna that rely on them. Show your support by signing the petition.

SeagrassSpotter https://seagrassspotter.org/

SeagrassSpotter seeks to expand the number of people studying seagrass from a handful of scientists to hundreds and potentially thousands of 'citizen scientists.'. As part of efforts to build a sustainable monitoring network, and by leveraging the enthusiasm of everyone from fishers to SCUBA divers to people on vacations at the beach, we'll create a more comprehensive picture of seagrass meadows around the globe. This in turn will inspire new scientific research and practical conservation measures that can help protect ocean habitats. Working together with citizen scientists all over the world, we'll accomplish big things for seagrass and other vulnerable marine species, but only with your help.

World Seagrass Association http://wsa.seagrassonline.org

Keep up to date on what's happening with the around the world from the WSA. The World Seagrass Association is a global network of scientists and coastal managers committed to research, protection and management of the world's seagrasses. WSA members come from many countries and include leading scientists in marine and seagrass biology. The association supports training and information exchange and raises global awareness of seagrass science and environmental management issues.

World Seagrass Association on Twitter @Seagrass_WSA

Everything seagrass related. World Seagrass Association official account. Follow to stay up-to-date with global seagrass info. Moderator: LM Nordlund

Dugong & Seagrass Research Toolkit http://www.conservation.tools/

Dugongs and seagrass are under threat from human activities. By using this Toolkit you should be able to gather information to:
understand better the status of dugongs, seagrass and communities at your research site;

understand threats to dugongs and seagrasses and help find solutions to those threats;
understand the communities that value or may affect dugongs and seagrasses.

The toolkit will guide you to the techniques and tools most suitable to your team capacity, budget and timeline. By using the toolkit, you will also be helping to standardise data sets and methods across different countries and sites, allowing for better comparison of global dugong and seagrass conservation status. The Toolkit is designed for use by marine natural resource managers and decision-makers (government and non-government) and for dugong and seagrass researchers. The Toolkit will assist organisations to assess funding proposals by describing the scope of work, choice of techniques and tools, and budget.

FROM HQ

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Seagrass-Watch E- Bulletin is compiled by Len McKenzie & Rudi Yoshida.