

Seaweed in Nature Based Solutions

Facts, Potentials, Threats

Tiny Townhall, Audio-library and Outreach



Unbekanntes Album
Dr. Philipp Schubert (Seaweed researcher GEOMAR Kiel)
UNBEKANNTES GENRE

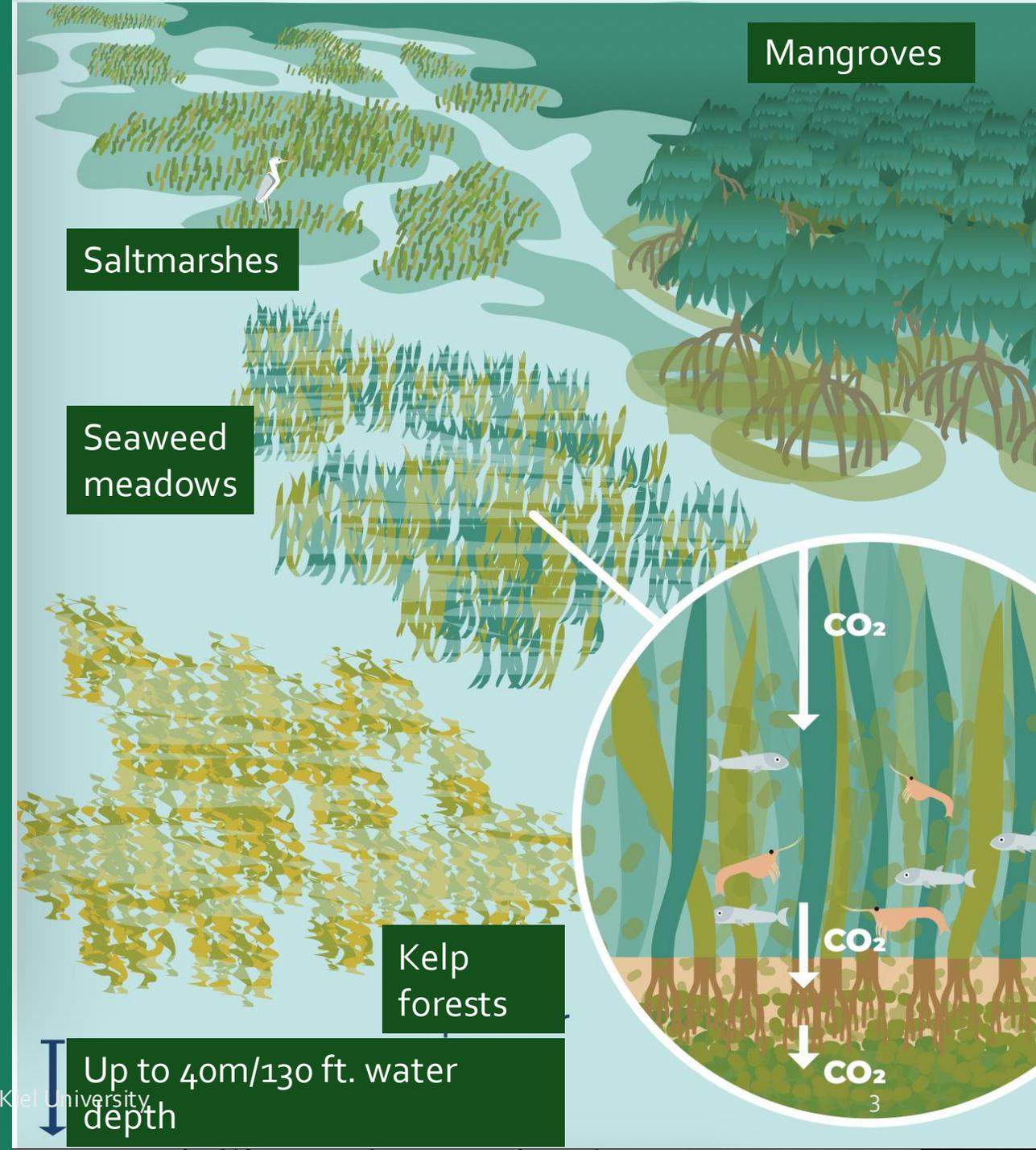
▶ Wiedergabe ↻ Zufällige Wiedergabe

PS_Can you reforest seaweed meadows under water?	2:25	⋮
PS_Risks of technically pressing CO ² unter Seaweedmeadows	1:01	⋮

A screenshot of a YouTube video player. The video title is "Unbekanntes Album" by Dr. Philipp Schubert, a seaweed researcher at GEOMAR Kiel. The video is categorized as "UNBEKANNTES GENRE". The player shows a video thumbnail of a man in a wetsuit standing in the ocean. Below the video are two video recommendations with their titles and durations.

Seaweed- what exactly are we talking about?

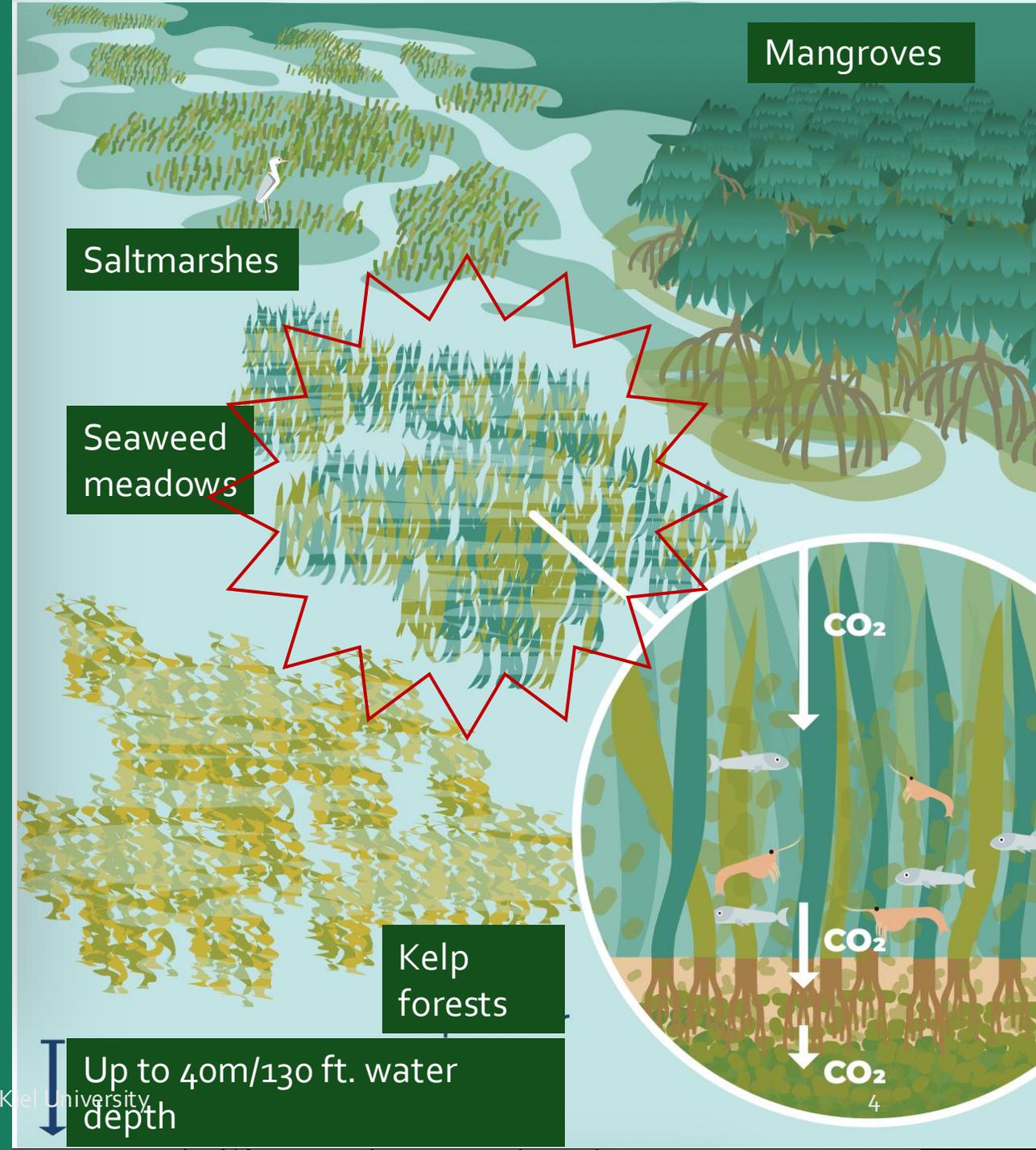
- *Zostera marina* and *Zostera noltei*
Evolutionary originating from land, moved into the water.
- So, seaweed is neither an algae nor kelp, it is grass!

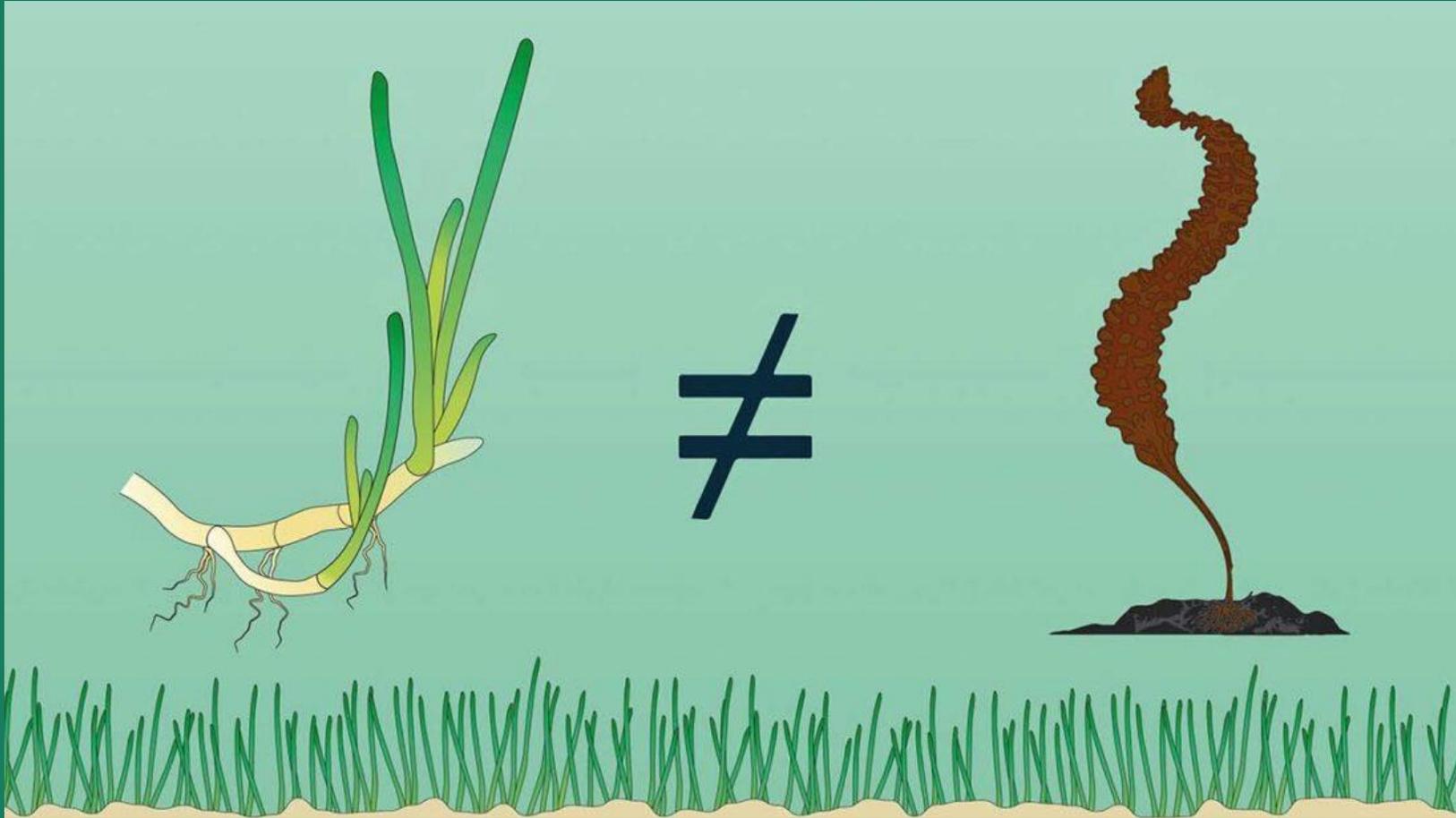


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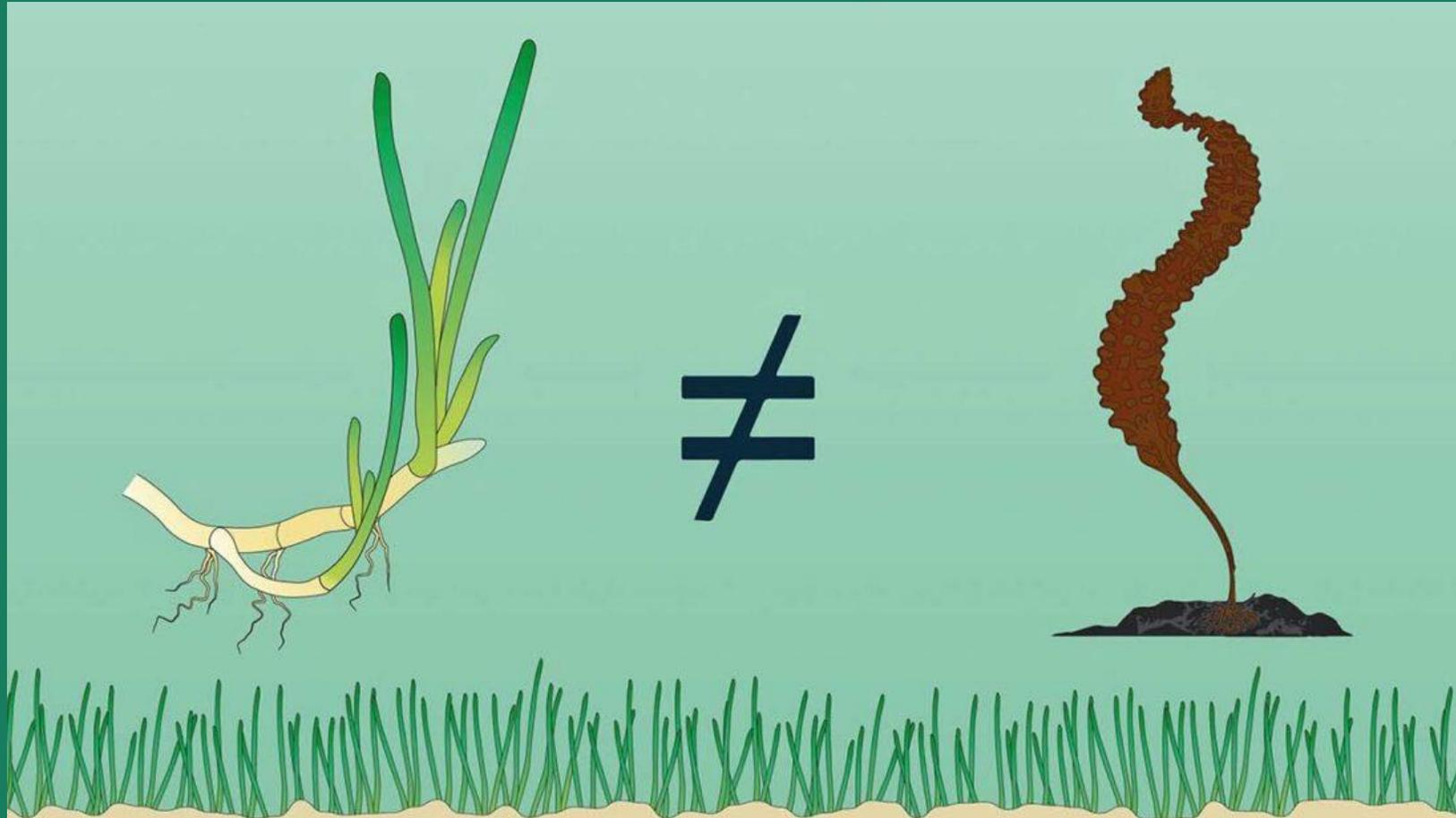


- Evolutionary originating from land., moved into the water (mostly 1-3 meters)

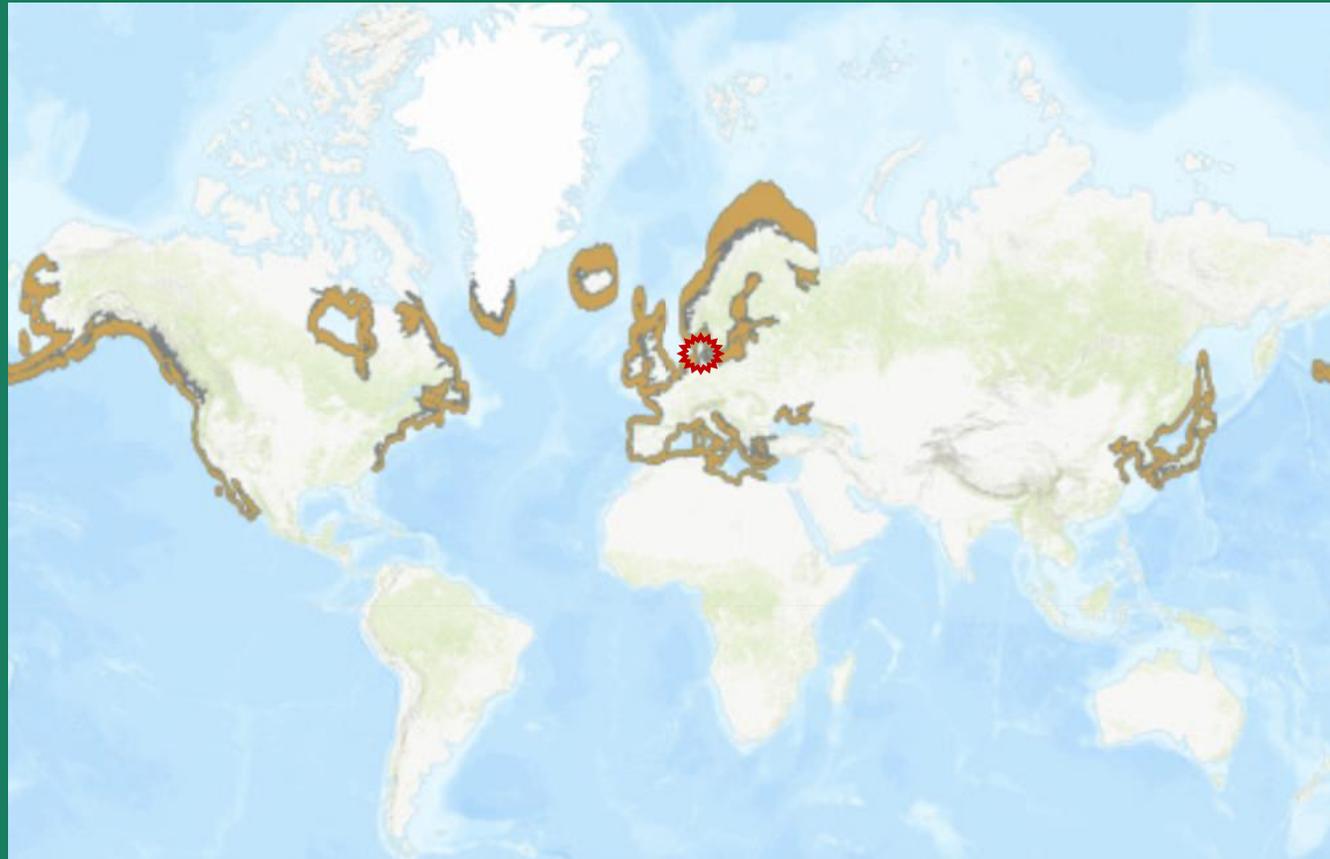




Ecosystem engineer and pioneer



Extension in the German Wadden Sea and Baltic Sea (*Zostera Marina*)



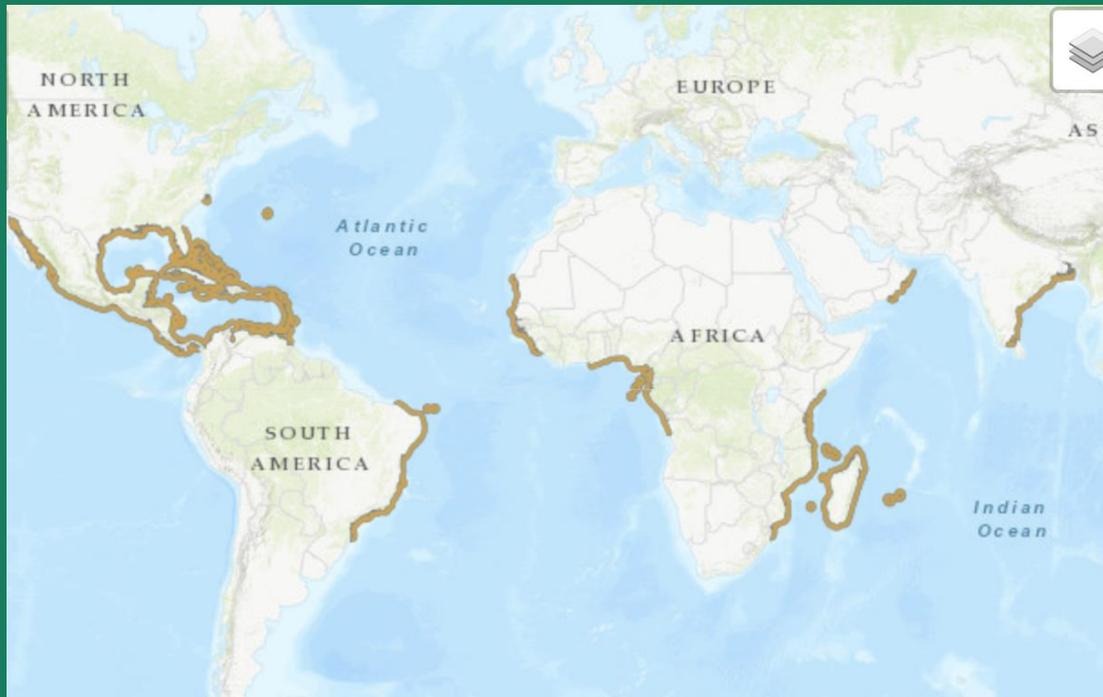
Seagrass in the Gulf

Table 1-1. Status and Trends in Texas Seagrass – Upper Coast

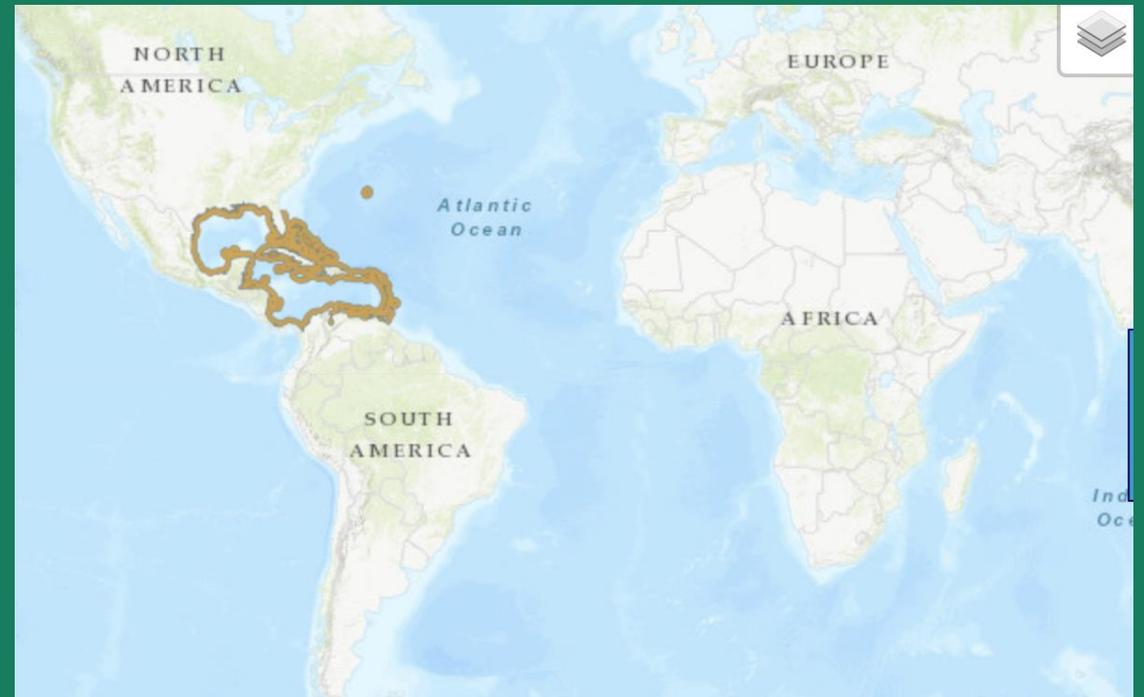
Bay System	Current Acreage	Percent of Coastwide	Species*	Trends
Galveston	280	0.1	Rup, (Hph, Hd, Th)	Gone (except in Christmas Bay)
Matagorda East Matagorda	3,830	1.6	Hd, Rup, Hph	Possibly decreasing
San Antonio Espiritu Santo	10,600	4.6	Hd, Rup, Hph	Fluctuates with inflows
Copano St. Charles Aransas	8,000	3.4	Hd, Rup	
			Hd, Rup	
			All five	
<p>Source: TPW (Pulich et al., 1991, 1994, 1997); TAMU (Adair et al. 1994). Acreage excludes freshwater SAV in/near bay deltas. *Hd = Halodule, Rup = Ruppia, Hph = Halophila, Th = Thalassia, Syr = Syringodium</p>				

Seagrass in the Gulf

Thalassia testudium (Turtlegrass?)



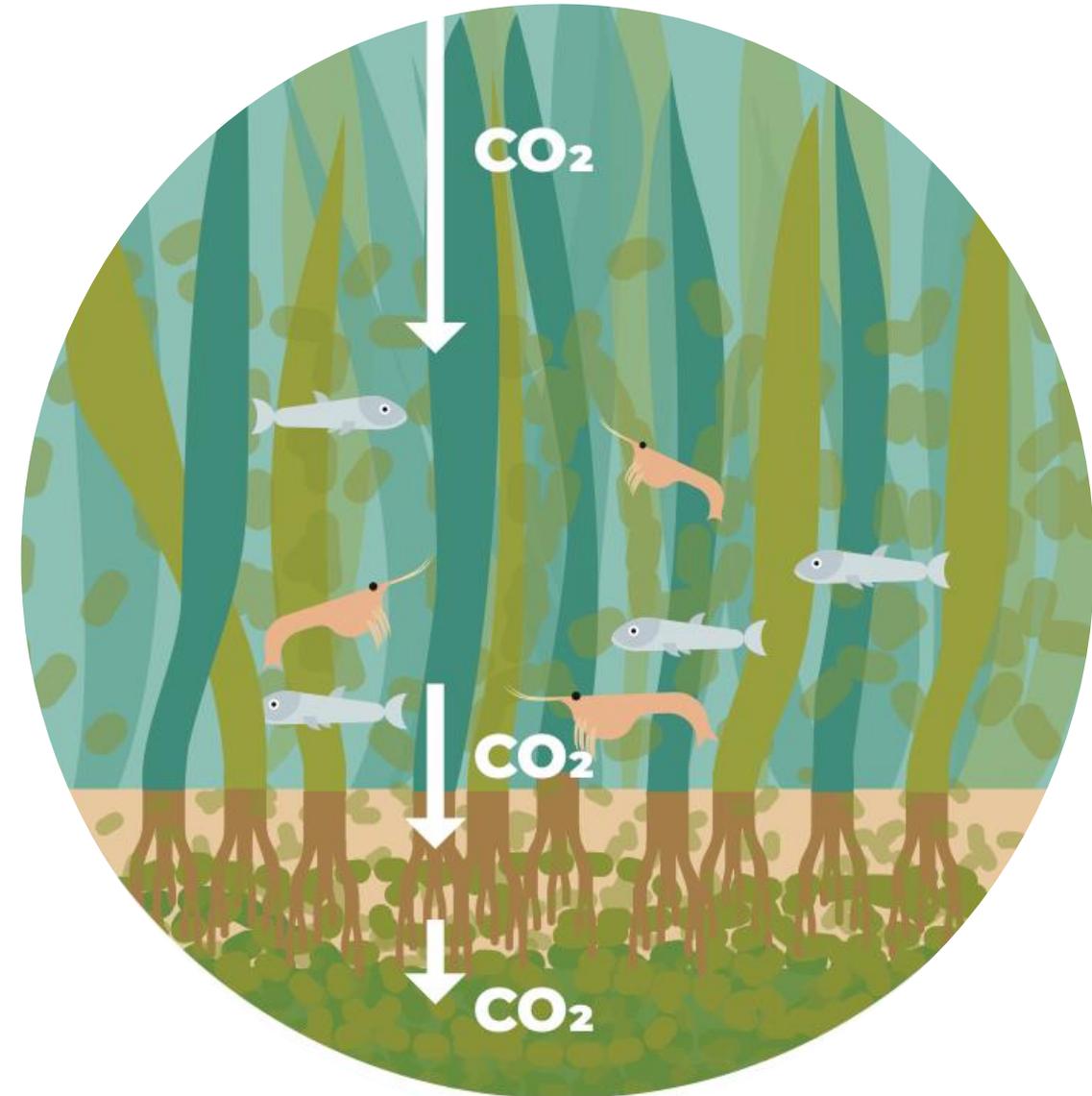
Halodule wrightii. (Shoal grass?)



Why should we care?

Ecosystem services

- CO₂-capturing and storage in leaves and the rhizomes (long-term and relatively anaerob), 35 times higher than pristine tropical rainforests
 - Home to marine species → biodiversity, feeding humanity
 - Coastal protection slowing down waves during storm surges (40% reduction in wave height) and rhizomes holding the sediments
 - Increasing water quality
 - Growing up to several centimeters per day, 1200 plants per square meter (10.7 square feet), producing 15 Liters of O₂ per day
-



But at the beach...

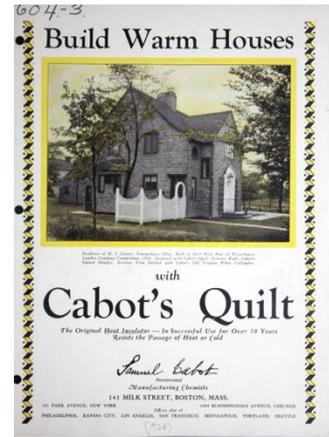
- 250,000 EUR/year just in a commune of 11,000 inhabitants to dispose seaweed from beaches



Traditional and future use for humans

- Building material (flame retardant, non-smelly, difficult to decompose)
- Insulation
- Fertilizer
- Wave protection





**Increases Your Comfort and Safety
Improves Health**

A Quilt insulated house increases your comfort at every season of the year. In the winter the chilling drafts which are apt to sweep down from a leaky and unheated attic, are very hard to bear. It is impossible to spend a comfortable evening in a chilly living room. But with Cabot's Quilt insulation, you can be sure that the temperature will be even and comfortable at all times.

Cabot's Quilt is a real Fire Retardant. It has saved many buildings from destruction by fire, for the *Zostera Marina* of which it is made, being a sea plant, is composed mainly of non-combustible silica. Insulators made of land plants or their fibers or of the bark of trees like cork are composed principally of carbon, and burn freely.

Cabot's Quilt promotes health. It is a well-known fact that many diseases are spread by insects, rats and other vermin. Vermin will not live in Cabot's Quilt as they will in so many other materials, because there is nothing for them to eat in it and because the natural iodine taken up from the sea water by the *Zostera Marina* in the Quilt actually repels them.



Building material

10/9/25

Alicia Wach Kiel University





Other Use



- Substrate for agriculture
- Pillows (hypoallergenic)



10/9/25

THREATS TO SEAGRASS ECOSYSTEMS

THREATS AFFECTING:
 🏠 HABITAT SUITABILITY
 💧 WATER QUALITY
 ⚙️ GRAZING/RECRUITMENT

TEMPERATURE INCREASE 🏠💧⚙️
 HABITAT LOSS THROUGH HEAT STRESS,
 INCREASED DISEASE RISK AND POTENTIAL
 DECREASED GRAZING ANIMAL COMMUNITIES

ALTERED RAINFALL 🏠💧⚙️
 SEAGRASSES AFFECTED BY CHANGING
 SALINITY, AND IN CATCHMENTS WHERE
 RAINFALL INCREASES, BY INCREASES IN
 SEDIMENT AND NUTRIENTS

EXTREME WEATHER EVENTS 🏠💧⚙️
 INCREASED FREQUENCY OF DESTRUCTION OF
 COASTAL SEAGRASS, DECREASING WATER
 CLARITY FOLLOWING MAJOR RAINFALL

AGRICULTURAL RUN-OFF 🏠💧⚙️
 EXCESSIVE NUTRIENT AND SEDIMENT INPUTS
 REDUCE LIGHT FOR PHOTOSYNTHESIS

BOATING 🏠💧⚙️
 SCARRING OF MEADOWS BY
 BOAT PROPELLERS AND
 MOORINGS, REDUCED WATER
 CLARITY THROUGH BOAT
 WAKE RESUSPENDING
 SEDIMENT

URBAN INFRASTRUCTURE 🏠💧⚙️
 DIRECT DESTRUCTION OF SEAGRASS MEADOWS
 AND FRAGMENTATION WITH LOSS OF
 CONNECTIVITY

URBAN & INDUSTRIAL RUN-OFF 🏠💧⚙️
 EXCESSIVE NUTRIENT INPUTS REDUCE
 LIGHT FOR PHOTOSYNTHESIS

DESALINATION PLANTS 🏠💧⚙️
 ELEVATED SALINITIES CAN CAUSE LOCAL
 STRESS AND SEAGRASS MORTALITY

SEA LEVEL RISE 🏠💧⚙️
 LOSS OF HABITAT AREA WHERE
 SEAGRASS MIGRATION UP THE
 SHORELINE IS INHIBITED

TRAWL AND SEINE NETS 🏠💧⚙️
 DIRECT DAMAGE FROM FISHING EQUIPMENT
 INCLUDING TRAWL NETS, ALTERED
 COMMUNITIES OF GRAZING ANIMALS

SHIPPING ACCIDENTS 🏠💧⚙️
 POLLUTION BY OIL AND OTHER
 CONTAMINANTS AFTER MAJOR AND MINOR
 SPILLS

AQUACULTURE 🏠💧⚙️
 HABITAT LOSS THROUGH DIRECT
 SHADING, REDUCED WATER
 CLARITY RESULTING FROM
 EXCESSIVE NUTRIENTS

HARVESTING 🏠💧⚙️
 LOCAL LOSSES DUE TO
 HARVESTING OF PLANTS

DREDGING 🏠💧⚙️
 DIRECT REMOVAL OF HABITAT,
 MORTALITY BY SMOTHERING
 FROM DISPOSED SEDIMENT

INVASIVE SPECIES 🏠💧⚙️
 SEAGRASS LOSS DUE TO INVASIVE
 PLANTS AND CHANGING RATES OF
 SEAGRASS GRAZING FROM INVASIVE
 ANIMALS

OCEAN ACIDIFICATION 🏠💧⚙️
 BALANCE BETWEEN POTENTIAL POSITIVE
 EFFECTS ON PLANT GROWTH AND NEGATIVE
 EFFECTS ON GRAZING FAUNA

MOST SEAGRASSES GROW IN DEPTHS LESS THAN 15 METERS

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ALTERED RAINFALL 🏠💧⚙️
 SEAGRASSES AFFECTED BY CHANGING SALINITY, AND IN CATCHMENTS WHERE RAINFALL INCREASES, BY INCREASES IN SEDIMENT AND NUTRIENTS



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INCREASED FREQUENCY OF DESTRUCTION OF COASTAL SEAGRASS, DECREASING WATER CLARITY FOLLOWING MAJOR RAINFALL

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 EXCESSIVE NUTRIENT AND SEDIMENT INPUTS REDUCE LIGHT FOR PHOTOSYNTHESIS



BOATING 🏠💧⚙️
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 DIRECT DESTRUCTION OF SEAGRASS MEADOWS AND FRAGMENTATION WITH LOSS OF CONNECTIVITY



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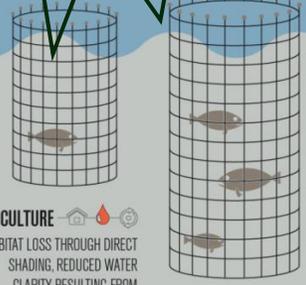
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 DIRECT REMOVAL OF HABITAT, MORTALITY BY SMOTHERING FROM DISPOSED SEDIMENT



MOST SEAGRASSES GROW IN DEPTHS LESS THAN 15 METERS



10/2025
 OBJECTS IN THIS VISUAL ARE NOT DRAWN TO SCALE
 SOME THREATS ARE EVEN CLOSER THAN THEY APPEAR

Alicia Wach Kier, University

Source: GRID-Arendal (2020).
 © William Robbins (2019, 2020). Source: <https://www.istock.com/illustration/3125>



Funded research projects but also potential for volunteering touristic divers and youth groups

Reforestation & Protection

Network and. Credits

- Dr. Phillip Schubert (GEOMAR)
- [Submaris](#)
- [CDR Mare](#)
- [Seastore](#)
- [Ocean-Summit](#)



Sources Pictures

- Slide 1: Uli Kunz <https://uli-kunz.com>
- Slide 2: Tiny Rathaus: Anne-Lena Cordts <https://anscharcampus.de/akteure/tiny-rathaus>
- Slide 3: cdr mare <https://cdrmare.de/factsheets/>
- Slide 4: Seegrass fotos by Sarah Uphoff, neé Kaehlert <https://fischundfang.de/seegrass-eine-erfolgsgeschichte/>
- Slide 5: <https://www.youtube.com/watch?v=6g2OsY-VqPI>
- Slide 7: IUCN Redlist <https://www.iucnredlist.org/species/153538/4516675>
- Slide 8: https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_ro400_0041.pdf
- Thalassia: <https://www.iucnredlist.org/species/173372/7001725>
- Halodule: <https://www.iucnredlist.org/species/173346/6995927>
- Slide 11: Scharbeutz: <https://www.luftbildsuche.de/info/luftbilder/meeres-kste-ostsee-scharbeutz-schleswig-holstein-561874.html>
Beach: https://www.beachwrack-contr.a.eu/wp-content/uploads/2021/06/Sterr_etal2019_Coastline-Reports.pdf
- Slide 12: Traditional Collection: https://www.beachwrack-contr.a.eu/wp-content/uploads/2021/06/Sterr_etal2019_Coastline-Reports.pdf, Landesarchiv Schleswig
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- Slide 13: Use for Humans: https://www.beachwrack-contr.a.eu/wp-content/uploads/2021/06/Sterr_etal2019_Coastline-Reports.pdf
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- Tiny House: [noordskstudio.com](https://www.noordskstudio.com)
- Fence: Michael Packschies
- Slide 14: Substrate: https://www.beachwrack-contr.a.eu/wp-content/uploads/2021/06/Sterr_etal2019_Coastline-Reports.pdf
- Pillow: <https://strand-manufaktur.de/produkte/kopfkissen/>
- Slide 15 Threats Infographic: <https://www.grida.no/resources/13583>
- Slide 17: Planting Seaweed: Sean Romanowski and Kathi Baschin for Sea Shephard <https://sea-shepherd.de/news/9-000-seegrass-pflanzen-eingepflanzt/>
- Broad-nosed pipefish: <https://www.fotocommunity.de/photo/grasnadel-heikohfot0/41675033>