



## Restoring the Great Meadows Under the Sea

By Pam Haynes



SEAGRASSES are marine flowering plants that are found in shallow waters around the world, from the tropics to the Arctic Circle. When grown in large areas they are called seagrass MEADOWS, yes, like a grassy meadow you might pass by on land, and are essential to nature and people. They contribute to community well-being, whether through food security from fish production, improved quality of water filtered by seagrasses, protection of coasts from erosion, storms and floods, or carbon SEQUESTRATION (removal) and storage.

### SPELL FOUND SPELL PARTS SPELL QUALITY

The marine flowering plants are known as what? SEAGRASSES They are found in \_\_\_\_ waters in many parts of the world. SHALLOW Name three things that seagrass meadows contribute to. COMMUNITY WELL-BEING, FOOD SECURITY, FISH PRODUCTION, IMPROVED QUALITY OF WATER, HELP FILTER WATER, PROTECTION OF COASTS/EROSION/STORMS/FLOODS, CARBON SEQUESTRATION/ REMOVAL/ STORAGE, NATURE, PEOPLE...

What is something that seagrasses do with carbon? SEQUESTERS IT, HELPS REMOVE IT, STORES IT, INVOLVED WITH STORAGE... Name an animal that lives

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in the Arctic Circle. REINDEER, POLAR BEAR, ARCTIC FOX, NARWHAL, WALRUS, SEAL, MOOSE, SNOWY OWL... VAKT: watch this 19 second video clip of seagrass <https://www.youtube.com/watch?v=Bh2zY0gA4U0>

What is one word you would use to describe the seagrass?

However, seagrasses have been declining globally since the 1930s, with the most recent CENSUS (count, tally) estimating that seven percent of this key marine habitat is being lost worldwide per year, which is equivalent to a football field of seagrass lost every thirty minutes! So why is something so beneficial to our world declining? Well, seagrasses are among the least protected coastal ecosystems and often face CUMULATIVE (increasing, growing) pressures from coastal development, nutrient run-off, PATHOGENS (organisms that can cause disease), and climate change.

SPELL HOWEVER SPELL PARTS SPELL QUALITY The most recent \_\_\_ estimated that seven percent of this marine habitat is being lost per year? CENSUS Seagrasses are among the least \_\_\_ coastal ecosystems? PROTECTED Seagrasses have been declining since what year? 1930

Name two of the growing pressures that seagrasses face. PRESSURES FROM COASTAL DEVELOPMENT, NUTRIENT RUN-OFF, PATHOGENS, CLIMATE CHANGE...

This passage mentioned a football field, name another type of sports field? If the rate of loss continued at 7% per year, what would be the % of seagrass loss in decimal form after 8 years? CONVERT 7% TO .07 AND MULTIPLY BY 8 WHICH EQUALS 0.56/  $.07 \times 8 = 0.56$  LOSS VAKT: Tap the table 7 times, alternating hands with each tap.

For the last 20 years now, Virginia Institute of Marine Science and The Nature CONSERVANCY (an organization or area dedicated to preservation of nature) have been conducting the world's most extensive seagrass meadow restoration project, successfully creating about 9,000 acres of new seagrass beds on formerly barren LAGOONS (shallow bodies of water). To achieve that, the team of researchers and volunteers had to actively plant more than 70 million seeds of

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EELGRASS (a grass-like marine plant having ribbon-like leaves) on a 490 acre plot just off the southern end of Virginia's Eastern Shore.



*A researcher collects seeds from a restored seagrass meadow in a coastal Virginia bay.*

SPELL CONDUCT SPELL NEW SPELL BEDS

Virginia Institute of \_\_\_ Science is involved in the restoration project.

MARINE

70 million seeds of what was actively planted on a plot? EELGRASS The location of eelgrass planting was off Virginia's Eastern what? SHORE Describe eelgrass. GRASS-LIKE MARINE PLANT, HAS RIBBON-LIKE LEAVES...

If the restoration continued at the same pace, how many total acres could we expect after an additional 40 years?  $9,000 + 18,000 = 27,000$   $9,000 \times 3 = 27,000$  ACRES

Name a word that rhymes with lagoon. SWOON, GOON, LAMPOON, CROON...

If you could plant something in a garden, what would it be and why?

Well, the results of the long-term research are finally in and have been published in the SCIENCE ADVANCES journal! The success of the seagrass restoration project shows the high RESILIENCE (ability to withstand or adjust to challenges) of this ecosystem and has led to improvements in water quality and an increase in the abundance of fish, shellfish, and other local BIODIVERSITY (variety of life) such as seahorses.

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SPELL RESULTS SPELL FINALLY SPELL WATER What is the name of the journal, in which the results were published? SCIENCE ADVANCES

The success of the seagrass restoration project shows the high \_\_\_ of this ecosystem? RESILIENCE

Tell me two positive results from the restoration project? IMPROVEMENTS IN WATER QUALITY, INCREASE IN THE ABUNDANCE OF FISH/ SHELLFISH/ LOCAL BIODIVERSITY/ SEAHORSES...

Name a type of shellfish. SHRIMP, CRAYFISH, CRAB, LOBSTER, CLAMS, SCALLOPS, OYSTERS, MUSSELS...

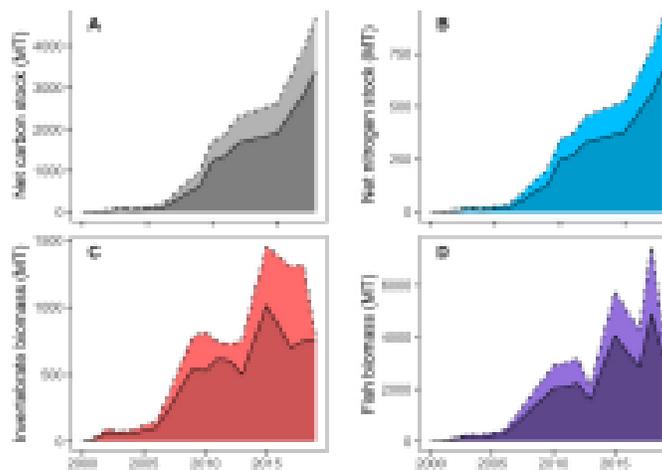
VAKT: Try out the Seahorse yoga pose!

<https://www.youtube.com/watch?v=Y7Kcy7sKNyY>

Use seahorse(s) in a sentence.

In this passage, I mentioned a resilient ecosystem. In what way are you resilient?

We already learned that seagrass ecosystems SEQUESTER (capture, trap) carbon from the water and atmosphere and store it. However, this is the first study to put a number on how much carbon restored meadows take out of the atmosphere and store in the extensive root systems of the grasses and in the sediment below. Any guesses? Well, the beds were very successful, sequestering about 3,000 metric tons of carbon and more than 600 metric tons of nitrogen per year. This is important to MITIGATING (lessening, reducing) global climate change.



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Fig. 5 Ecosystem services associated with the restoration of eelgrass over time. Mean (solid lines) and 95% confidence intervals (dotted lines) over time (mT = metric tons).

### SPELL CONDUCT SPELL NEW SPELL BEDS

Seagrass ecosystems are very successful at sequestering this from the water and atmosphere? CARBON

What kind of extensive systems is carbon stored? ROOT Where might carbon from the water and atmosphere be stored? EXTENSIVE ROOT SYSTEMS OF THE GRASSES, GRASSES, IN THE SEDIMENT BELOW, SEDIMENT...

Another word for mitigating is? LESSENING, REDUCING, ALLEVIATING...

This passage mentioned carbon and nitrogen, name another element on the periodic chart using its two letter symbol?

VAKT: Trace along the dotted line on Graph D in the Figure above.

Describe your ideal climate.

This project's BLUEPRINT (guide for making something, plan) for restoring and maintaining healthy seagrass ecosystems can be adapted by others elsewhere in the world, hopefully having a positive effect on coastal communities. ROBERT J. ORTH, the lead author of the study, hopes that this project will be a BEACON (light or visible object acting as a guide or signal) in the dark for other devastated marine ecosystems and highlights that "once the water is cleaned up, our work suggests that seagrasses can recover rapidly." The authors added that the seahorses now thriving in the lush seagrass are certainly an uplifting sign!

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*Reestablished eelgrass beds off Virginia not only store carbon efficiently, they also support rich biodiversity, such as the seahorse seen here.*

### SPELL HEALTHY SPELL WORLD SPELL NOTE

Who was the lead author of the study? ROBERT J. ORTH Orth hopes that the project will be a what in the dark? BEACON What thriving in the lush seagrass are an uplifting sign? SEAHORSES Name something that the author feels is a hopeful outcome of the project? HELP OTHER DEVASTATED MARINE ECOSYSTEMS, THAT SEAGRASSES CAN RECOVER RAPIDLY, THRIVING SEAHORSES... This passage mentioned the author of the study. What else might someone author? POEM, SCREENPLAY, PLAY, NOVEL,...

What helps you to thrive?

Creative Writing:

Write a story about the adventures of a sea creature who experiences the restoration of the seagrass meadows firsthand!

The anthropologist Margaret Mead once said, “Never doubt that a group of thoughtful committed citizens can change the world; indeed it’s the only thing that ever has.” Do you believe that’s true? Give examples of what you think a small group of thoughtful citizens can do to help our environment?

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Pam Haynes is currently an S2C Practitioner in Training who lives in Virginia with her husband and 3 children- one of whom is a nonspeaker who uses S2C. She loves hiking with her family, listening to music, and growing things!

#### Sources:

[https://www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=301462&org=NSF](https://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=301462&org=NSF)

<https://www.geographyrealm.com/the-worlds-biggest-seagrass-restoration-project-is-good-news-for-marine-life-and-climate/>

<https://advances.sciencemag.org/content/6/41/eabc6434>

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