

# ENGINEERING DESIGN CHALLENGE: BUILD AN OYSTER REEF



An oyster reef is a large community of oysters that form underwater on hard debris that has settled on the floor of a river bed. Oyster reefs form and self-propagate as the shells of deceased oysters act as the substrate for oyster larvae or spat. Due to overfishing, disease, and environmental issues such as increased algae, oyster reefs have been decimated over the last few decades. Oysters serve an important purpose in estuaries because they filter the water of organic and inorganic materials, keeping it habitable for other fish and wildlife. There is a large effort to restore the oyster population by creating new oyster reefs and by encouraging oyster gardening, where oysters are fostered by volunteers for 9 months before being planted on a reef, thereby increasing their chance for survival.



To support oyster reef restoration, your engineering design team must fabricate a means of carrying substrates to rivers and tributaries to encourage spat settlement and oyster population growth. Substrates for oysters include natural ones, such as oyster shells and limestone, and man-made ones like concrete. You will design and build, on time and on budget, a **device or process** that can transport as much substrate as possible to the soft river bottom for reef regeneration and, in the future, oyster reef planting with incubated spat. Approved supplies are provided in the list below. **Design an attachment for your SeaPerch ROV, build a prototype, and calculate the total cost.**

Submit picture or sketch of your design and final cost here.

Material	Cost	Material	Cost
Straw	\$3 million	Plastic bags (small)	\$5 million
Coffee filter	\$6 million	Plastic bags (large)	\$10 million
Balloon	\$20 million	Popsicle stick (small)	\$500k
Pipe cleaner	\$4 million	Popsicle stick (large)	\$1 million
Foil sheet	\$5 million	Rubber Bands	\$1 million
Paper bowl	\$7 million	Paper Plate	\$10 million
Masking tape	\$1 million/inch	Paper Cup	\$10 million
Duct tape	\$2 million/inch	String	\$1 million/inch
Plastic Fork	\$5 million	Twist tie	\$3 million
Cotton balls	\$1 million	Plastic Spoon	\$5 million

**SUBMIT TO: [usnastem@usna.edu](mailto:usnastem@usna.edu) by MARCH 21, 2021**