BOBBIN' FOR BIRDS The same adhesive foam that makes boats buoyant keeps these artificial ecosystems afloat.

BUILD WETLANDS FROM SCRATCH

Save coastal marshes and clean up polluted waterways with plant-covered rafts

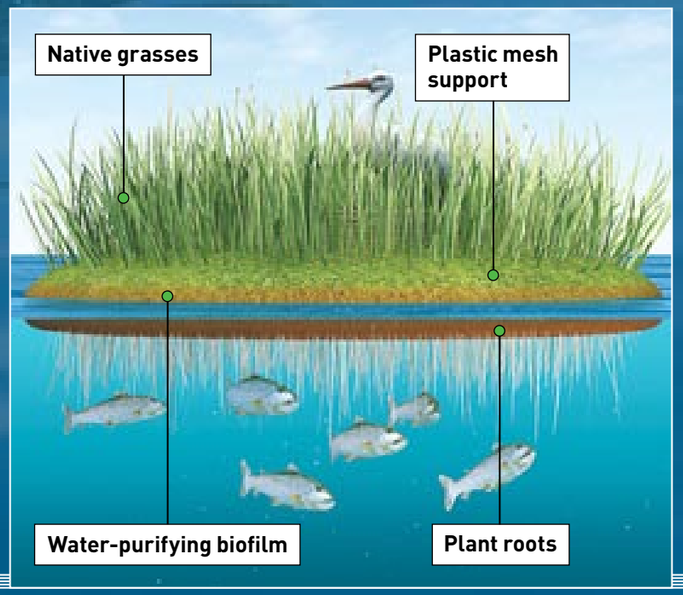
WHERE: COASTAL AREAS
COST: $800 MILLION PER SQUARE MILE OF ISLAND

THE PROBLEM: The wetlands are losing ground. Crops and condos are rapidly overtaking much of the water-logged land—home to thousands of bird and animal species—while pollution and sea-level rises take care of the rest. With this loss comes drastically reduced water quality, increased flooding of surrounding areas and the looming specter of the extinction of many species.

THE FIX: Construct archipelagos of boat-size to basketball-court-size islands out of recycled plastic and foam, plant habitat-specific vegetation, and set the islands afloat wherever natural wetlands once thrived.

Along with rainforests and coral reefs, wetlands are the most active and diverse ecosystems on the planet, serving as a home or breeding ground to one third of all bird species, 190 amphibians and more than 200 types of fish. Wetlands filter out excess nutrients and pollutants by trapping them in roots and soil where plants and bacteria break them down into less harmful substances.

To mimic wetlands, inventor Bruce Kania starts with layers of polymer mesh bonded together with adhesive foam and carpets them with sod and wetland vegetation. Plants are selected to attract insects, frogs, waterfowl, beavers or whatever wildlife is native to the area. As the plants grow, their roots weave their way through the plastic matrix to the water below. Microbes cling to the polymer fibers and colonize the root system, forming a slimy layer of "biofilm" that purifies the water and oxygenates it. (It is unclear whether the islands will help limit flooding.)



Kania first tested his "BioHavens" in algae-infested ponds on his farm in Montana. The BioHavens filtered fertilizer runoff and suppressed harmful algal blooms in the ponds. Now some 3,000 of these ready-made ecosystems are floating at trouble spots around the globe, including a chain of BioHavens in a reservoir in Singapore that absorb waterborne pollutants.

NEXT STEPS: Kania is confident that his islands work, but he may soon receive independent data that will prove it. Consulting engineer Frank Stewart, with a two-year grant from the state of Montana, is wrapping up water-quality tests conducted on the BioHavens in huge fish tanks. They could provide the first solid evidence that the islands clean water.

INSULATE THE GLACIERS

Huge blankets in the Alps could prevent a big thaw

WHERE: SWISS ALPS **COST:** $12 MILLION PER SQUARE MILE

THE PROBLEM: Glaciers—Earth's largest freshwater reservoir, collectively covering an area the size of South America—are melting away, shrinking by up to hundreds of feet per year in some places. The Alps alone stand to lose three quarters of its glaciers by 2050, and what's left by the end of the century.

THE FIX: Wrap thawing glaciers in football-field-size synthetic blankets that keep the cold in and the heat out. At least that's what ski resorts in the Swiss Alps are doing. Tired of risking the fate of their industry on the global community's ability to get a grip on rapid climate change, more than a dozen resorts turned to local textile company Fritz Landolt to stop the melting. Called the Ice Protector, Landolt's material is a tough but lightweight dual-layer composite. On top is polyester to reflect ultraviolet light, and on the bottom is polypropylene, a polymer used in military clothing and auto parts, to block heat. When wrapped around a glacier, it prevents the top snow layer—and, it's hoped, the permanent ice underneath—from melting in the summer sun.

After a small pilot project in 2005 on the shrinking Gurschen glacier proved hugely successful—the blanketed area had 80 percent less melt than surrounding ice and snow two years in a row—Landolt has been tackling bigger and bigger ice packs, including an area the size of six football fields (more than 300,000 square feet) on the Vorab glacier, home to one of Switzerland's largest ski resorts.

NEXT STEPS: Don't count on the blankets saving the snows of Kilimanjaro. With the ski resorts footing the bill, their use is limited to critical areas where melt directly interferes with skiing and snowboarding. But there's always the burgeoning beer market. "We had a guy throwing an outdoor party last summer," says Landolt product manager Marcel Stahle. "We sold him 100 square feet. His beer stayed cold all day."

EASY DOES IT Six people can roll out 15 of these 330-foot glacier blankets in two weeks.