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COASTAL PLANTS, WHOI SEA GRANT, CCCE, May 29, 2015

HABITAT RESTORATION
ENVIRONMENTAL MANAGEMENT

ALTERNATIVES FOR COASTAL EROSION EVENTS

ALTERNATIVE 1: NO RESPONSE

ALTERNATIVE 2: DIRECT NOURISHMENT

BREACH WAS RESTORED IN 10 DAYS BUT AT SOME COST

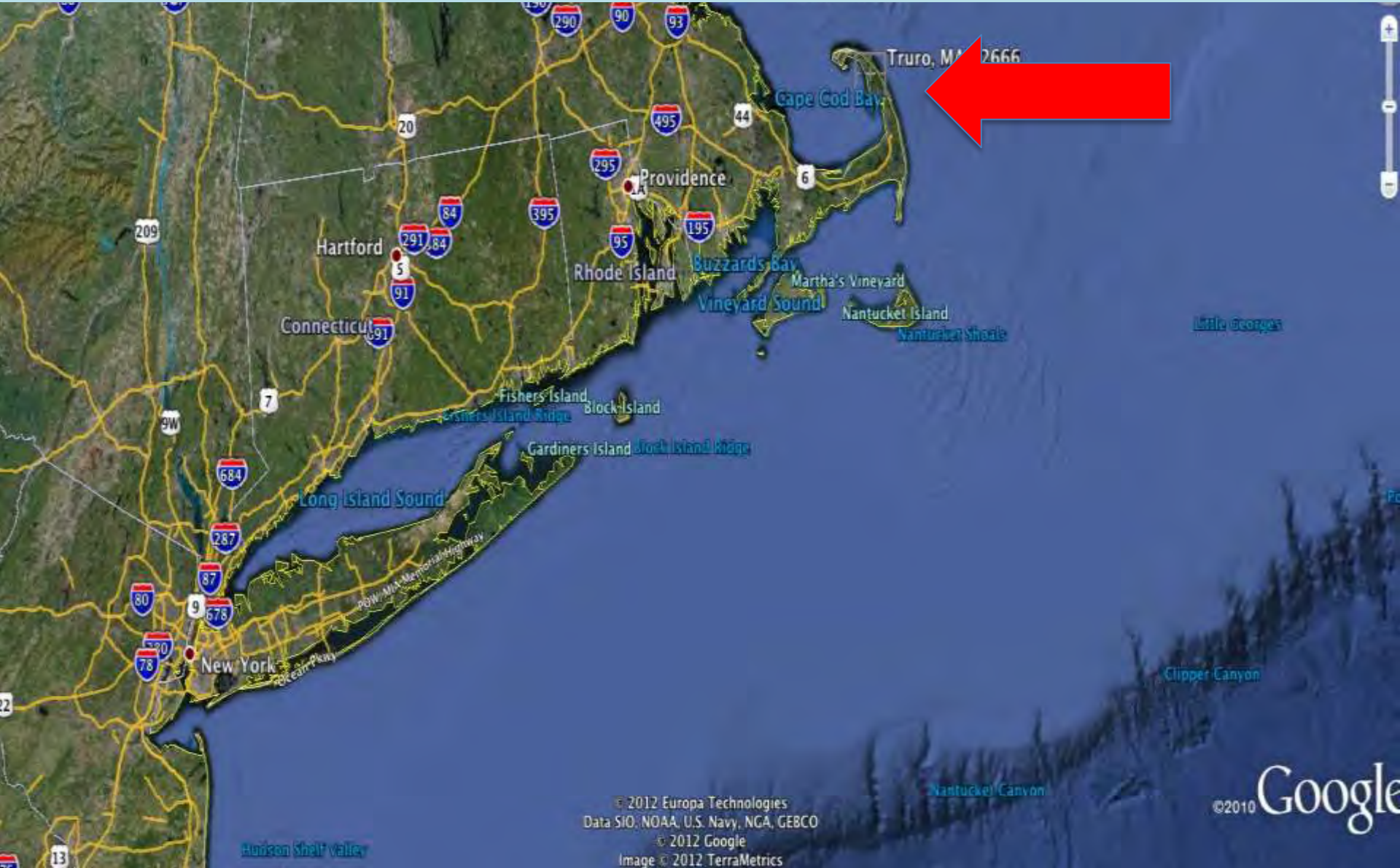
BIOMIMICRY WAS USED HERE IN WINTER ONLY, BECAUSE THIS IS POTENTIAL NESTING TERRITORY

ALTERNATIVE III: “OTHER” EXPERIMENTING WITH AEOLIAN SAND CAPTURE RESTORATION SYSTEMS

BIOMIMICRY: MAKING LAND FROM AIR

1. BIOMIMICRY: DEVELOPMENT AND STRATEGY
2. BIOMIMICRY: MODELS
3. BIOMIMICRY: SURPRISE RESULTS

1. BIOMIMICRY WAS DEVELOPED ON THE NORTH ATLANTIC COAST OF CAPE COD

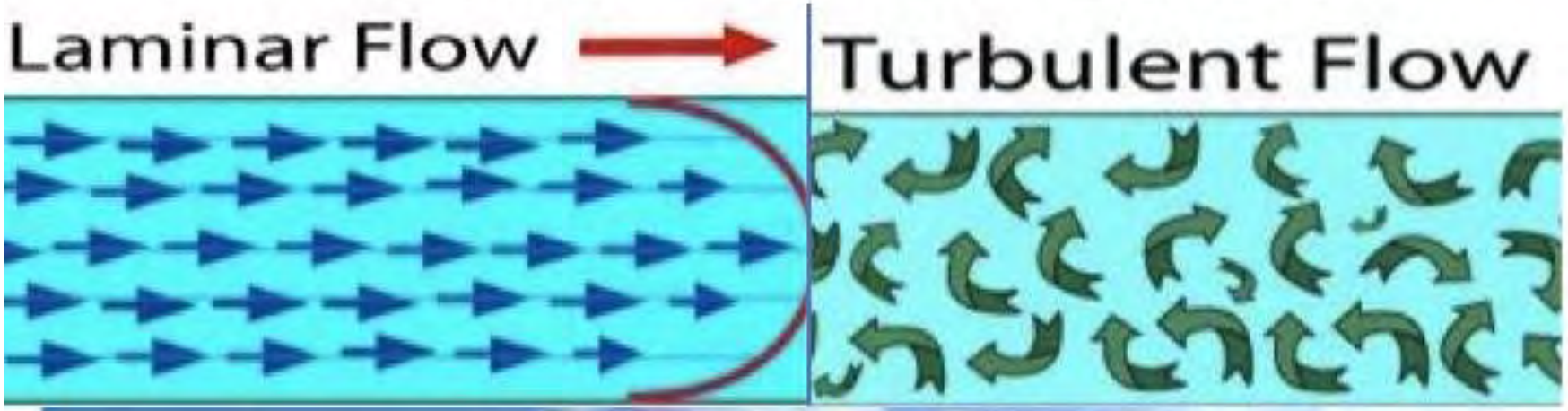


Obstacles cause deposition and erosion

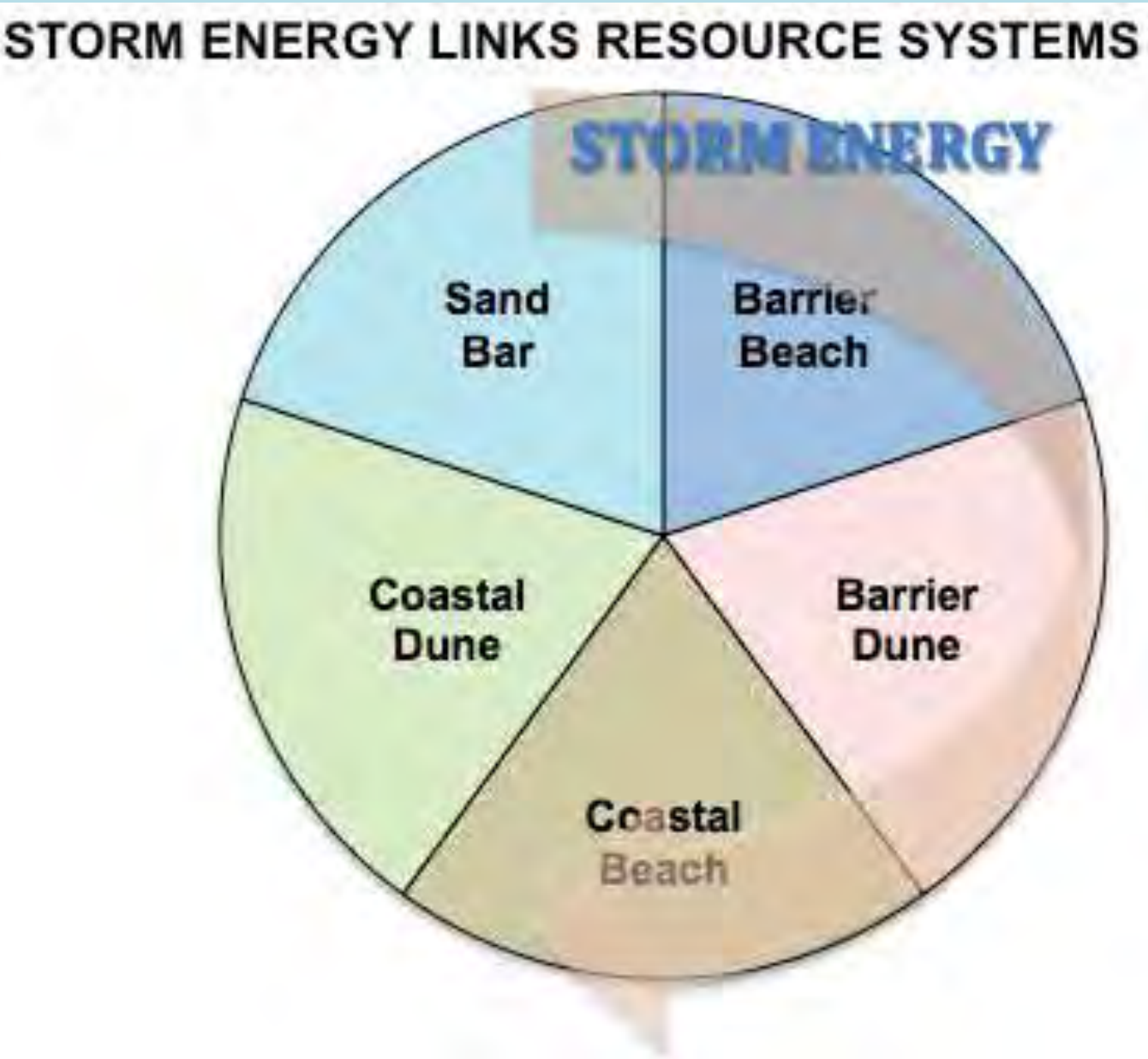
Vegetation performs by collecting sand

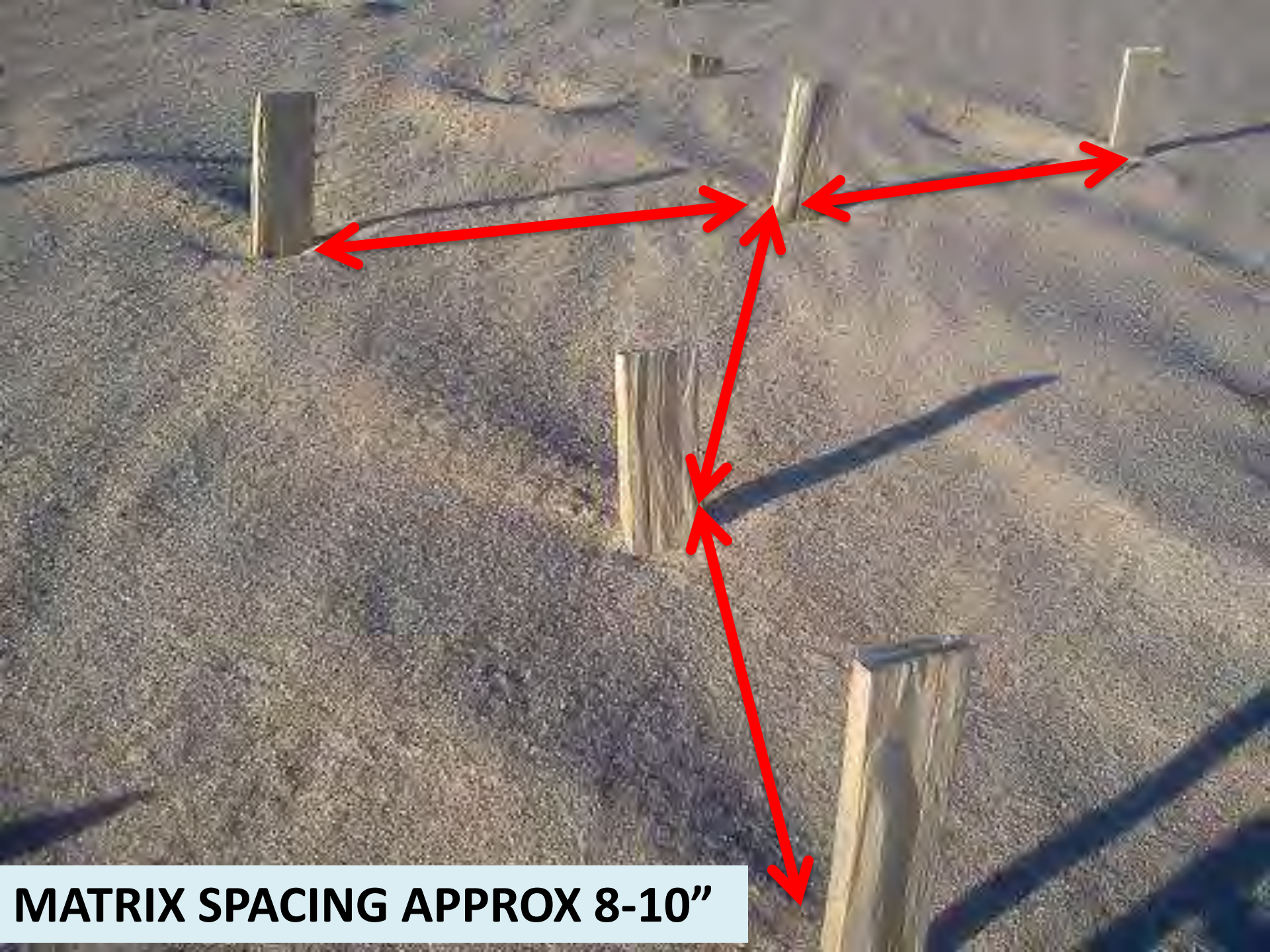
STEMS OF BEACH GRASS CREATE A RANDOM MATRIX, COLLECTING AND STABILIZING WIND BLOWN SAND

THE BASIC PRINCIPLES OF BIOMIMICRY



STORM ENERGY MOVES SAND THROUGH LINKED RESOURCE SYSTEMS INTO BIOMIMICRY SYSTEMS




MATRIX SPACING APPROX 8-10”

BIOMIMICRY CAPTURES AND STABILIZES NEW SAND

ON RECREATIONAL BEACHES, MULTIPLE USE RESOURCE AREAS OR NESTING AREAS, BIOMIMICRY IS EASILY REMOVED FOR STORAGE IN THE SPRING.

RESTORATION MODELS

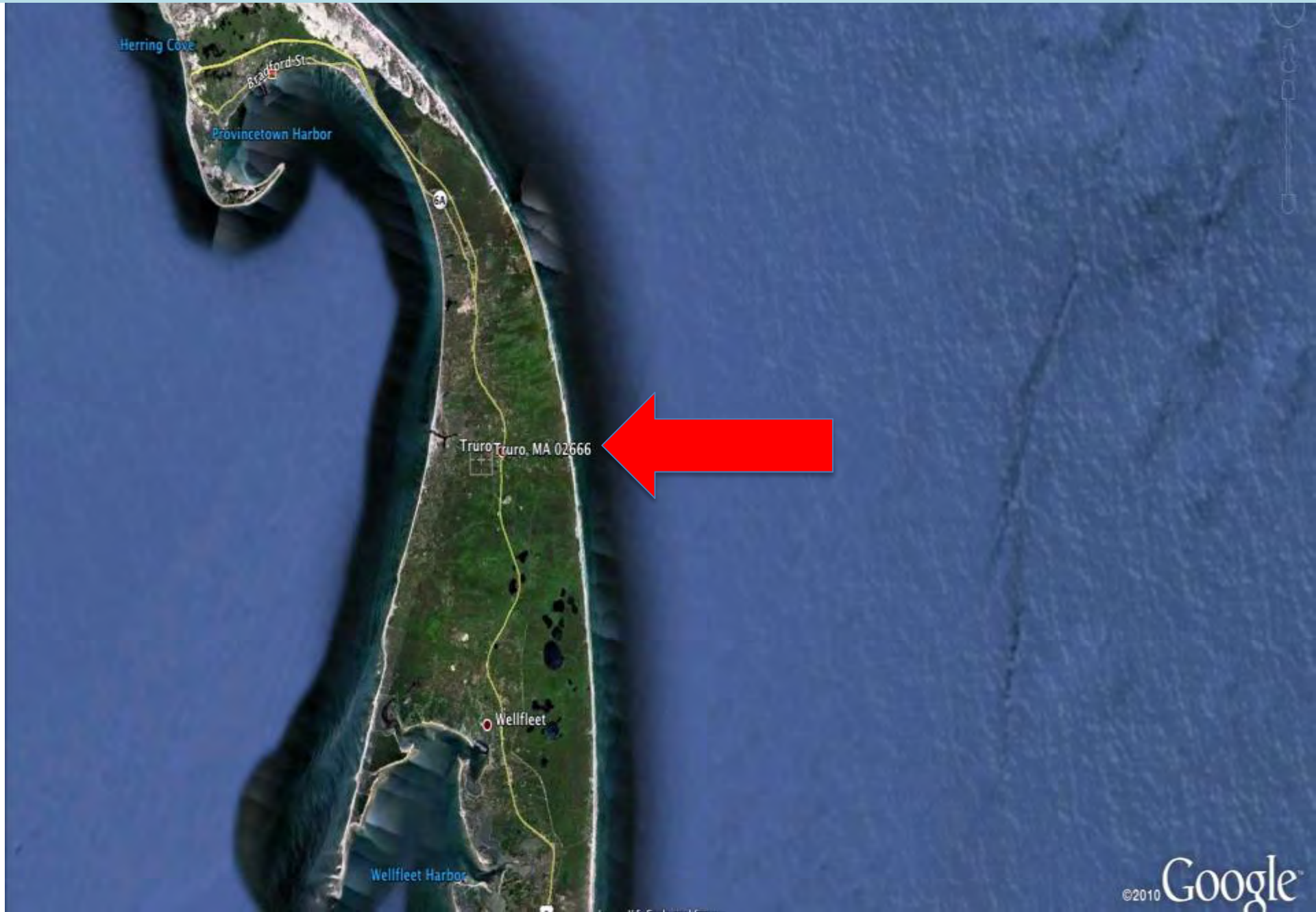
BARRIER DUNE

COASTAL DUNE

TOE OF COASTAL BANK

DUNE ACCESS PATHS

BIOMIMICRY MODEL: BARRIER DUNE RESTORATION



WE CHOSE A BARRIER DUNE BREACHED IN 1991

IT HAD OVER WASHED INTO A FW MARSH FOR 19 YRS

DECEMBER, 2010, BARRIER DUNE RESTORATION SITE WHERE BIOMIMICRY WAS EVENTUALLY DEVELOPED

DEC. 2010, A LINEAR GRID OF 24” SNOW FENCING

2 WEEKS LATER A NOR'ESTER DELIVERED 2 ' OF SAND WE KEPT ADDING NEW LAYERS OF 24" FENCING

THE WIRED FENCING KEPT FAILING AT THE TOE OF THE NEW DUNE, SO WE KEPT MINIMIZING THE COLLECTION SYSTEM

WE EXPERIMENTED WITH MODIFICATIONS

WE CONTINUED MINIMIZING OUR PROFILES

EVERYTHING WE TRIED WAS WASHED OUT

AFTER FIVE FAILURES WE TRIED JUST USING SLATS

RANDOM MATRIX PATTERNS WERE MOST EFFECTIVE

THE RANDOM MATRIX COLLECTED SAND AT THE TOE

Simple Adjustments Control Collection Levels

DEVELOPING MENTORSHIP PROGRAMS WITH HIGH SCHOOLS ENSURES AVAILABLE VOLUNTEERS

STUDENTS AND COMMUNITY GROUPS PARTICIPATED, ADJUSTING SHIMS TO CONTINUE SAND COLLECTION

RESTORATION AREA BEFORE HURRICANE SANDY 2012

SAME AREA AFTER SANDY, BEFORE NOR'EASTER

SAME AREA ONE DAY AFTER NOR'ESTER

SAME AREA, MORE NOR'EASTERS, JANUARY, 2013

2013 FEBRUARY BLIZZARD 18’” NEW SAND COLLECTED

SPRING 2014, ELEVATIONS RELINKED, REVEGETATED

BIOMIMICRY MODEL: COASTAL DUNE RESTORATION

BIOMIMICRY CAN STABILIZE CONSTRUCTED DUNES

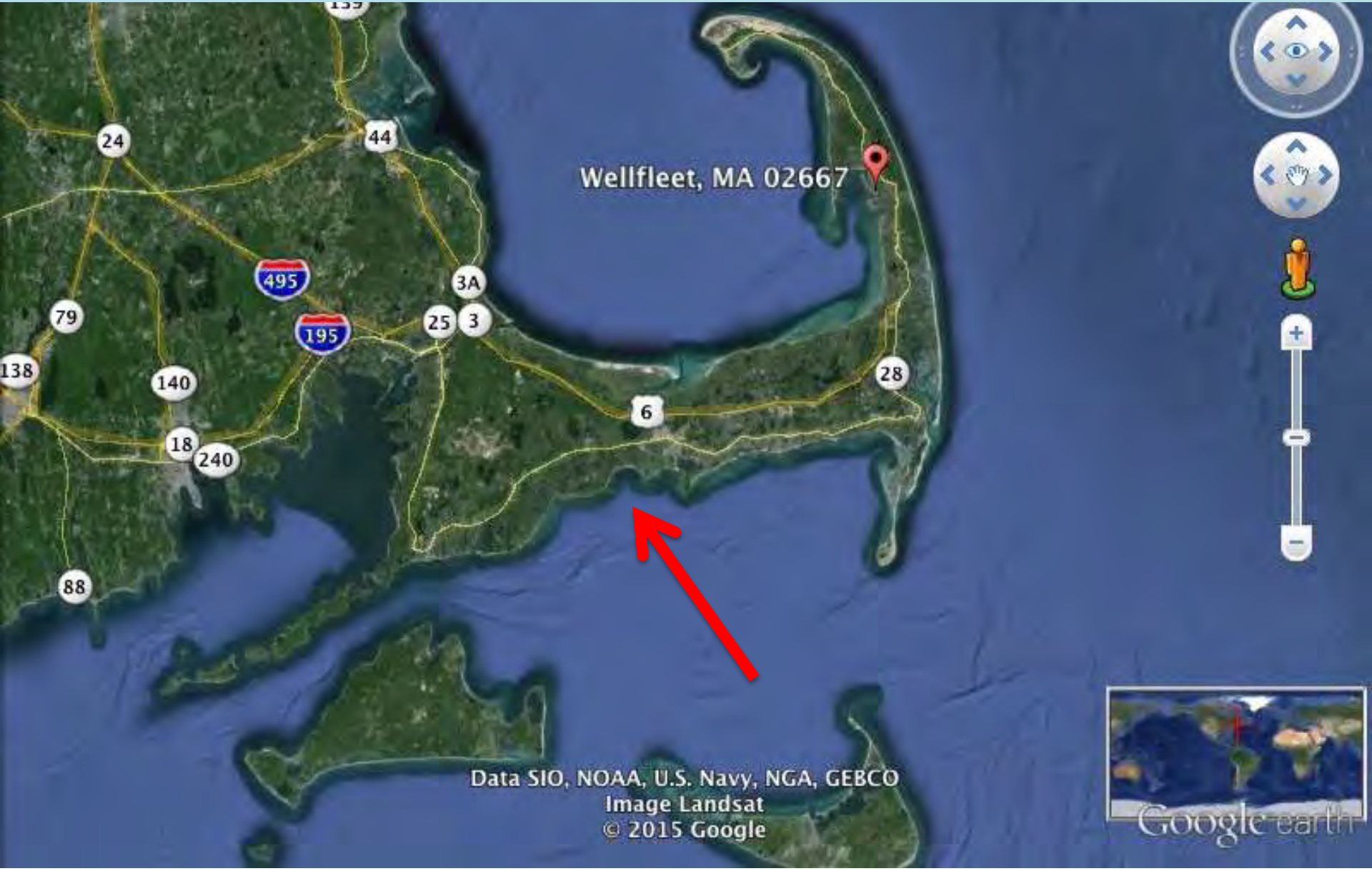
THIS SITE HAS SINCE BEEN PLANTED WITH BEACH GRASS

BIOMIMICRY MODEL: TOE OF BAYSIDE COASTAL BANK

BIOMIMICRY MODEL “D”: RESTORING ACCESS PATHS

30 DAYS AFTER INSTALLATION

UNUSUAL MODEL WITH UNEXPECTED RESULTS



KAYAK PATH CROSSING BARRIER DUNE CREATED RISK

SAME AREA IN 1995 (PRE-KAYAK)

NOVEMBER, 2013, BARRIER DUNE WAS MISSING

THIN BEACH WOULD NOT BE A SAND SOURCE BUT WE NOTICED NEAR SHORE SAND BARS (YELLOW ARROWS)

STRATEGY: STORM WIND ENERGY MOVES SAND

IS BIOMIMICRY TRANSFERRABLE TO WAVE ENERGY?

COULD BIOMIMICRY COLLECT SAND FROM WATER?

WE EXPERIMENTED WITH A “BROAD FIELD” SYSTEM

SAND WAS CAPTURED FROM STORM OVER WASH

POST STORM IMAGES DOCUMENTED COLLECTION

MARCH 2014 GRASS PLANTED ON NEW ELEVATIONS

JANUARY, 2015, SMALL BARRIER DUNE RE-EMERGES

APRIL 2015: VEGETATION AND BIOMIMICRY

OVER WASH BIOMIMICRY SYSTEM INCREASED BARRIER DUNE ELEVATION, ALLOWING PLANTING

SCUSSION: THIS BIOMIMICRY RESTORATION TEM WAS DEVELOPED UNDER THE HARSHEST NDITIONS IMAGINABLE, WHERE OTHER SYSTEMS LED. BUT IT MAY NOT WORK EVERYWHERE

SIGNAGE IS CRITICAL FOR INNOVATIVE SYSTEMS

RESTORING TEN FOOT ELEVATION IN 10’ X 100’ AREA: 5 LAYERS 24” FENCING $1,500 OR 10 PKGS SHIMS $30

FREQUENTLY ASKED QUESTIONS

- Cost Comparisons With Fencing? (2-5 %)
- Do Shims Get Stolen? (No, Use Signage)
- Do Shims Washout? (Yes, Recover Downdrift)
- Do Shims Disturb Nesting Birds? (Seasonal Use)
- Do Shims Interfere With Recreation? (Seasonal)
- Do They Work Everywhere? (Need Sand & Wind)
- Who Can Use Biomimicry? (Anyone, Public Domain)
- What About Biophysical Feedback? (Plant Veg)
- What Type of Permitting is Required? (Usually AR)

NOAA RESTORATION WEBINAR SERIES:

"MAKING LAND FROM AIR" SafeHarborEnv.Com

July 22, 2015, 2 PM
Gordon Peabody,
Director, Safe Harbor
Environmental Services

ACKNOWLEDGEMENTS

- NOAA Restoration Program
- USF&W Service Restoration Webinar Series
- Cape Cod National Seashore
- Friends of the Cape Cod National Seashore
- Truro Nonresident Taxpayer Association
- Town of Truro:Town Administrator;Recreation Department; Beach Commission; Department of Public Works
- Truro Conservation Commission
- Barnstable Conservation Commission
- Dr. Greg Berman, WHOI Sea Grant, CCCE
- Jamie Fitzgerald, Tulane University, Safe Harbor Coastal Resiliency Intern

THANK YOU, My Email: gordonpeabody@gmail.com