



SEED BANKING FOR RESILIENCY

Seed Collections for Coastal Restoration in the
Eastern United States

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BACKGROUND

Hurricane Sandy



- Landfall
 - New Jersey-October 29, 2012
 - Record storm surge-13.9ft at Battery Park, New York (NOAA 2016)
- Second costliest Atlantic Hurricane on record - \$71.4 billion (NOAA 2015)
 - Extensive flooding
 - Loss of electricity
 - Destruction of businesses and homes and coastal marshes from Maine to Virginia



BACKGROUND



- The Hurricane Sandy Disaster Relief Appropriations provided \$892 million to the DOI
- MARSB, NEWFS and NCBG, through our partnership with SOS, received \$3.2 million for a two year coastal seed collection program
- Other partners include the Chicago Botanic Garden and their CLM internship program as well as the Plant Material Center in Cape May NJ as the primary seed cleaning facility

USDA **NRCS**
 United States Department of Agriculture
 Natural Resources Conservation Service

CHICAGO BOTANIC GARDEN

NEW ENGLAND
WILD FLOWER SOCIETY

M·A·R·S·B
 Mid-Atlantic Regional Seed Bank

NORTH CAROLINA BOTANICAL GARDEN

Restoration

31 USFWS projects
(\$102 million)

Restore marshes,
wetlands and
shorelines

Create habitat
connectivity

Reduce flood risk

Living Shorelines

Limited seed resources
for local ecotypes

Spartina alterniflora –
recalcitrant

National Seed Strategy


The right seed at the
right place at the right
time.



THE NEED FOR SEED

PROJECT GOALS

- Develop priority species lists
- Hire 14 interns each year for two years through CBG's CLM program
- Make 700 seed collections each year for 2 years
- Clean and distribute seed to SSMF Projects



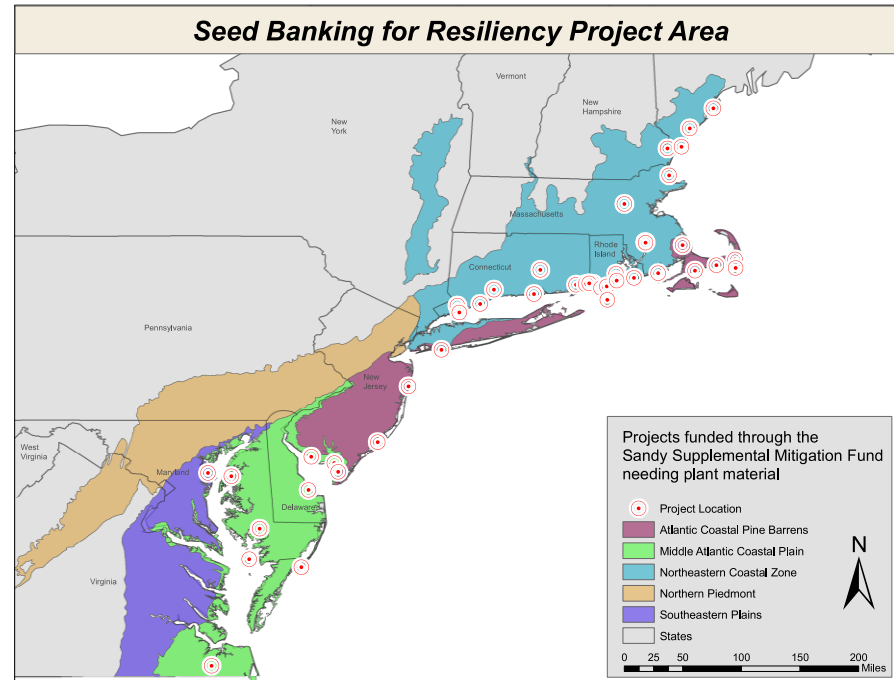
“The right seed at the right place at the right time.”

Prime Hook National Wildlife Refuge. Credit: USFWS

- Develop germination protocols for all species on the priority collection list
- Work to expand partnerships throughout the eastern US that will contribute to SOS and the NSS

GEOGRAPHIC AREA

- Hurricane Sandy - State of Emergency in States from Maine to Virginia
- NEWFS - ME, NH, MA, RI and CT
- MARSB - NY, NJ and DE
- NCBG - MD and VA
- 7 Level III EPA Ecoregions
- 64 SSMF projects were initially identified as possibly needing plant material
- 20 projects responded to outreach efforts and began working with the Project Liaison to ensure collections would be secured



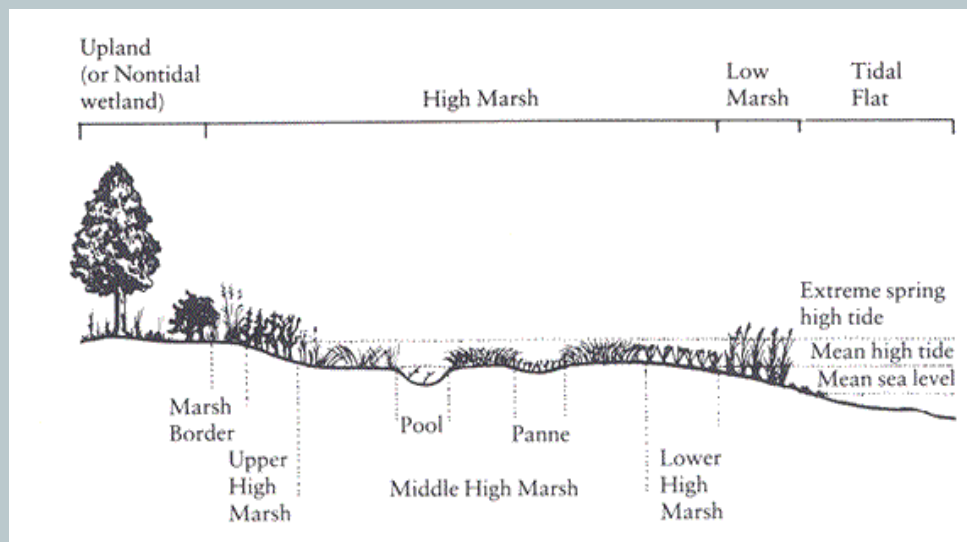
PROJECT EXAMPLES

- Prime Hook NWR, DE
 - 50 acres of Back Dune habitat, 800 acres of mudflats
- Blackwater NWR, MD
 - 45 acres high marsh
- Dyke Marsh Wildlife Preserve, VA
 - 40-50 acres freshwater tidal marsh
- Narrow River Estuary Resiliency Restoration
 - 50 acres of salt marsh



SPECIES

- Target species:
 - Identified most common habitats based on projects that might need seed.
 - Low and high marsh, primary dune, forested wetlands, freshwater tidal marsh, inland rivers and streams
 - Based on these habitats, each institution identified the foundation species as well as the most common restoration species
 - NCBG: 104
 - NEWFS: 267
 - MARSB: 179
 - 44 species of most importance across entire range - 'Foundation List'



SPARTINA ALTERNIFLORA



- Smooth cordgrass, Saltmarsh cordgrass
- Dominant species of low marsh
- Environmental engineer

- Extremely large quantities needed
- Recalcitrant
- Direct seeding vs. plugs
- Demand outstrips supply



COLLECTION AND DISTRIBUTION

- Seeds of Success collection protocol
 - >50 individuals
 - < 20% of available seed per day
 - 10,000 seeds per collection min.
 - Data sheet
 - Voucher specimens
- Distribution



SEEDS OF SUCCESS FIELD DATA FORM

Form Number: NC06 383 Collector Code: NC06
 Collector Name(s): JAKE CHASE & MARGARET MASON
 Collection Number: 383
 Alt. Collection Number: 30-136

DATE: 10/2/15
 Species: Panicum, Sphaeralcea, CYNOSURUS
 No. of Plants Sampled (min. 50): 75
 No. of Plants Found (approx.): 3000
 Area Sampled (acres): 2
 Seeds Collected From: Plant Ground Both Unknown
 Tree Shrub Forb Succulent Grass/Grasslike Plant Height (feet): 10-12

Name of Plant(s): Big COLEGRASS NRCS PLANTS Code: SPCN

Ecogeon (Onemik Level III): US State: VA County: KING GEORGE
 Subunit (BLM area, park name, etc.): CALEDON STATE PARK Area within Subunit (trail name, etc.): CALEDON MARSH TRAIL
 Land Owner: VA STATE PARKS Non-BLM Permission Filed: (Y) N

Location Details: FROM VISITORS CENTER, FOLLOW BOYD'S SEATTLE HOLE TRAIL NORTHWEST, CONTINUE LEFT AT TRIANGLE FIELD AND FOLLOW THE CALEDON MARSH TRAIL. POPULATION LOCATED AT THE END OF TRAIL ALONG CALEDON MARSH EDGE TOWARDS THE BEACH

Source Used: GPS Map None Accuracy: GPS Approx 20m 6-20km More than 20km
 GPS Datum: NAD83 NAD27 WGS84 Other:

Latitude (deg/min/sec): 38° 20' 38.7" N Elevation: 8
 Longitude (deg/min/sec): 77° 10' 05.9" W Unit (ft or m): FT

HABITAT DATA
 Associated Species (Scientific Name): LIQUIDAMBAR STYRACIFLUA, QUERCUS CERRIFERA, QUERCUS SP., JUNIPERUS VIRGINIANA, Sphaeralcea, BACCHARIS HALIMIFOLIA, CLEMENS SP., SMILAX BURNINGFORDII
 Ecological Site Description, Habitat Type and/or National Vegetation Classification: FRESH BRACKISH MARSH
 Modifying Factors: Mowed Burned Grazed Flooded Seeded Trampled Other:
 Land Form: MARSH Slope (degrees): 0-2°

(Revised July 1, 2013)

Total PLS Collected	ARS	Working Collection
<2,500	None	Total Collection
2,500-7,500	2,500	Remainder
7,500-30,000	1/3 of total	2/3 of total
>30,000	10,000	Remainder

COLLECTIONS



- 1,678 collections
- 301 species
- 169 genera
- 20 projects
- 848.04 LBS of *Spartina alterniflora*

GERM TRIALS

- Research or establish protocols for species on the “Foundation List” – 44 Species
- 35 protocols are already established
- *Dichanthelium scoparium*, *Eryngium aquaticum*, *Gaylussacia frondosa*, *Lechea maritima*, *Packeria aurea*, *Pleucea odorata*, *Symphotrichum tenuifolium*, *Teucrium canadense*, and *Vaccinium pallidum*
- Make publicly available



PROJECT OUTREACH

- Project Liaison
- Introductory letter to project managers
- Identified 64 projects that might need plant material
- Working closely with 20 projects
- Delays and lack of information has been challenging





NETWORK DEVELOPMENT

- Communications Coordinator
- Expanding Seeds of Success in the East
- Developed a database of native plant users and producers
- Surveys in support of the National Seed Strategy
- Implementation of a more formal structure among eastern partners

CONCLUSIONS

Collaboration is key
Project delays
Conserving habitats
Spartina Seeding
Procurement Process
Extension – third year



THANK YOU



NYC Parks

