

Ecological Revitalization Resources at NOAA

27 November 2007

Ken Finkelstein
Tom Brosnan
NOAA



Topics for Today

- Overview of NOAA Role and Responsibilities Under CERCLA
- NOAA Remediation and Restoration Technical Support
- Site Examples



Things happen...



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During the production and transport of goods and services, Things happen...and the public's resources (or the use of them) can be injured.



noaa

National Oceanic and Atmospheric Administration • NOAA Ocean Service • Office of Response and Restoration

NOAA's Trustee Mission

- **Protect and restore coastal and marine resources harmed by releases of hazardous materials or oil or ship groundings**
- **Via:**
 - Coordinate w/response agencies (e.g., EPA, DOD, etc.) to achieve protective remedies
 - Assess injuries & service losses
 - Evaluate restoration alternatives for
 - Returning resources to baseline (but for...)
 - Compensating for interim losses
 - Oversee and/or implement the restoration



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Trustees are stewards of the public's natural resources, now and for the future.

As part of this responsibility, trustees may pursue claims for natural resource damages for injury to, destruction of, or loss of publicly held natural resources resulting from the discharge of hazardous substances to the environment. Trustees do not seek compensation for private party claims. Claims may be pursued against those responsible for the discharges.

Using the NRDA process, the trustees will:

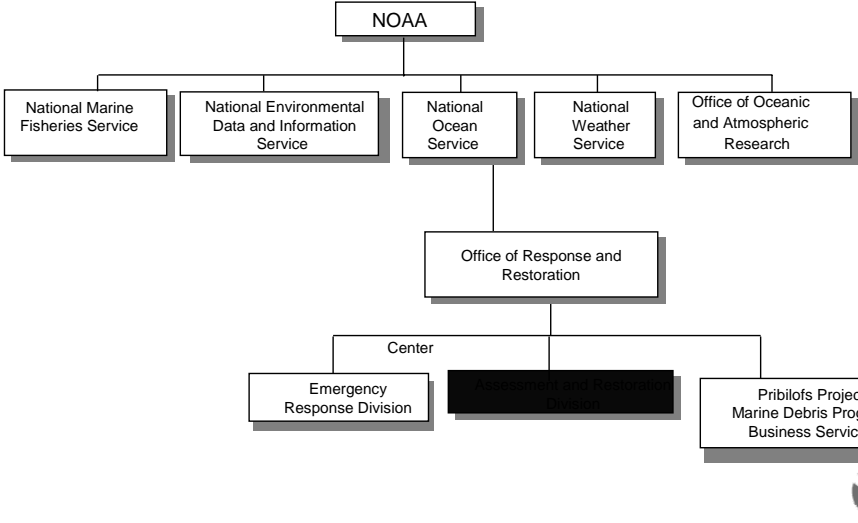
- Assess the effects of PCB contamination on the Hudson's natural resources
- Identify and evaluate alternatives for:
 1. Returning injured resources to baseline (that is, the condition of the resource in the absence of the release)
 2. Compensating for the lost resources from the time they were injured until restoration to baseline.
- Implement the restoration projects.

Theme Areas for Protection of NOAA Trust Resources

- Reducing loading of contamination to coastal waters
- Protecting sensitive species from contaminant effects
- Protecting the function of sensitive habitats such as wetlands and streams
- Restoring lost public uses of resources, e.g., re-opening fisheries closed due to contamination
- Allowing full use of port areas where dredging or development may be affected by the presence of contaminated sediments



Office of Response & Restoration



CERCLA

Addresses releases of hazardous substances through two types of liability:

- 1) Cleanup of sites by lead response agencies (EPA, DoD, etc.)
- 2) Restoration of injured natural resources by trustee agencies.



CERCLA §104(b)(2) - Coordination of Investigations

The President shall promptly notify the appropriate Federal and state natural resource trustees of potential damages to natural resources ... and shall seek to coordinate the assessments, investigations, and planning under this section with such Federal and state trustees.



CERCLA § 122(j) – NRDA Settlements

Trustees may grant a covenant not to sue

if:

“the potentially responsible party agrees to undertake appropriate actions to protect and restore the natural resources damaged by such release or threatened release ...”



CERCLA Remediation/Restoration Coordination

- As Congress intended under CERCLA, NOAA seeks to coordinate with EPA to use our combined efforts and tools, as a unified governmental effort, to maximize cleanup, protection, and restoration for the long-term benefit of the public and achieve Global Settlements to resolve both cleanup and restoration liabilities.



MOU between EPA and NOAA

- Facilitate coordination on cleanup
- Provide technical assistance for all aspects of the cleanup, especially for ERA
- Help coordinate co-trustees for global settlement

Unfortunately funding under this MOA was cut 50% in FY2008 to \$1M





**NOAA's Office of Response and Restoration
Field Presence**



4/26/06

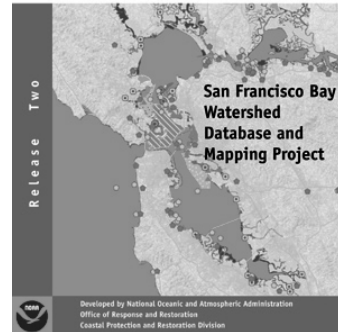
Environmental Sensitivity Index (ESI) Maps

- **Designed for spill responders and coastal managers**
- **Indicate shoreline types and sensitivity**
- **Show locations of sensitive species & habitats**
 - Seabird colonies, shellfish beds, spawning areas, nesting beaches...
 - T & E species
- **Population numbers**
- **Seasonal information**
 - Life stages info for each month
 - Breeding season dates
- **Identify sensitive human-use areas**
 - Water intakes, marinas, swimming beaches
- **Available for most of U.S.**
 - Print & electronic formats
 - Download from OR&R Web Site
 - www.response.restoration/esi



Watershed Database and Mapping Projects

- Contaminant Data – EPA Coastal Regions
(Sediment, Tissue, Toxicity)
- Guidelines/Criteria
(ERL/ERM, PEL/TEL, SQG, others)
- Standard GIS Basemap/Custom Data
- Delivered via CD publication and Online
(<http://response.restoration.noaa.gov>)



Watershed Database and Mapping Projects

- **Provide Decision Support Tool for:**

- **Remediation**

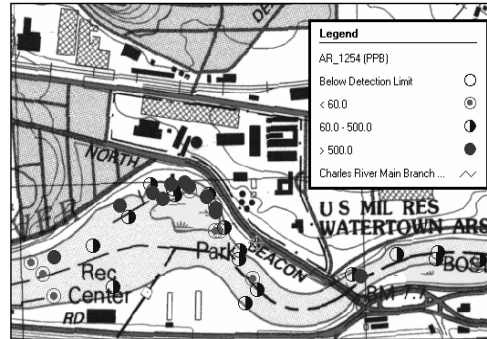
- Extent/magnitude of contamination
 - Source identification

- **Restoration**

- Habitat/site identification

- **Dredging**

- Maintenance
 - Beneficial re-use



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Another important initiative that ORR has pursued in recent years is the development of Decision Support Tools for Restoration Planning, such as CPRD's WDMP.

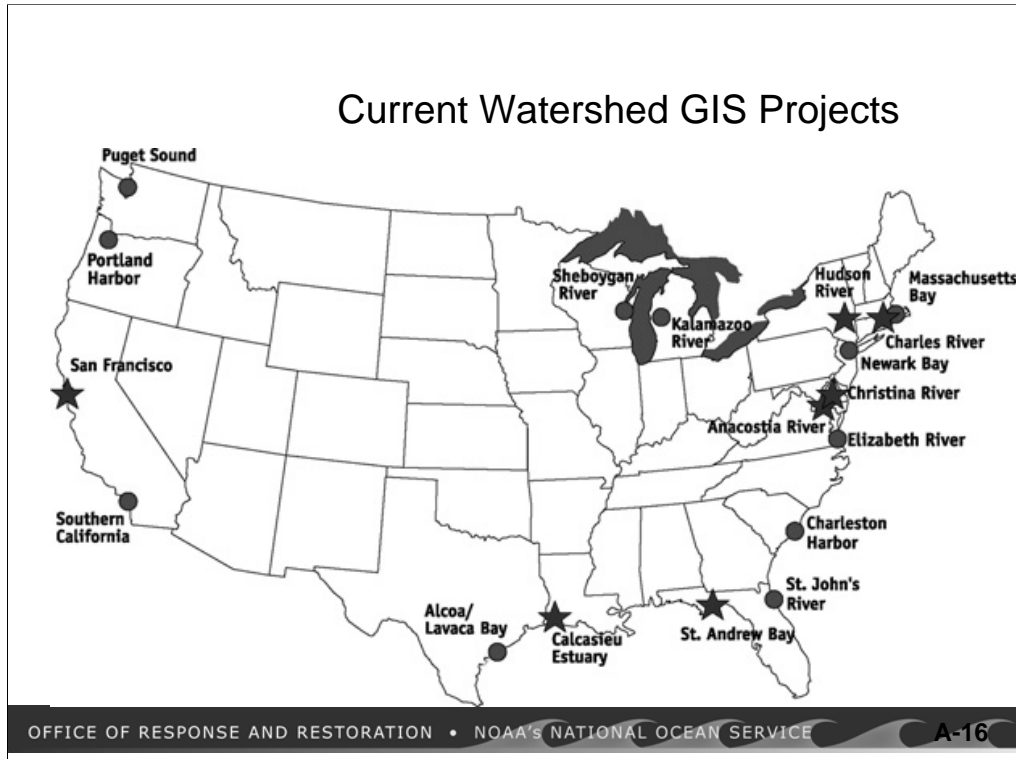
-facilitates evaluation of complex env. Issues by combining scientific data and watershed characteristics into a GIS.

-this database mapping allows users to:

- evaluate multiple data sets w/in a geographic area
- ID chemical concentrations and tox gradients
- prioritize problem areas
- ID data gaps
- catalog and evaluate potential habitats for restoration
- inventory planned, ongoing, and completed restoration

projects.

Map shown is concentrations of Aroclor 1254 in the back channel near the AMTL site compared to concentrations up-and downstream.



23 currently, not shown is Vieques and Pearl Harbor, St. Lawrence R.



Screening Quick Reference Table for Inorganics in Sediment

These tables were developed for internal use for screening purposes only; they do not represent official NOAA policy and do not constitute criteria or clean-up levels. All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.

Analyte	All concentrations in parts per billion unless specified otherwise	Freshwater Sediment										Marine Sediment					
		Background ^a	ARCS H. azteca TEL ^a	Consensus TEC ^a	TEL ^b	LEL ^c	Consensus PEC ^a	PEL ^b	SEL ^c	UET	T20 ^e	TEL ^d	ERL ^f	T30 ^e	PEL ^d	ERM ^f	AET ^h
Aluminum (%)	Al	0.26%	2.55%														1.8% N
Antimony	Sb	160								3,000 M	630			2,400			9,300 E
Arsenic	As	1,100	10,790	9,790	5,900	6,000	33,000	17,000	33,000	17,000 I	7,400	7,240	8,200	20,000	41,600	70,000	35,000 B
Barium	Ba	700										130,100#					46,000 A
Cadmium	Cd	100-300	563	990	596	600	4,900	3,530	10,000	3,000 I	380	600	1,200	1,400	4,210	9,600	5,000 N
Chromium	Cr	7,000-13,000	36,286	43,400	37,300	26,000	111,000	90,000	110,000	95,000 H	49,000	52,300	81,000	141,000	160,000	370,000	62,000 N
Cobalt	Co	10,000				50,000+											10,000 N
Copper	Cu	10,000-25,000	28,012	31,600	35,700	16,000	149,000	197,000	110,000	86,000 I	32,000	18,700	34,000	94,000	108,000	270,000	390,000 MO
Iron (%)	Fe	0.93-1.8%	18.84%			2%				4%	4% I						22% N
Lead	Pb	4,000-17,000	37,600	35,800	35,000	31,000	128,000	91,300	250,000	127,000 H	30,000	30,240	46,700	94,000	112,000	218,000	400,000 B
Manganese	Mn	400,000	630,000			460,000				1,100,000	1,100,000 I						260,000 N
Mercury	Hg	4-51		180	174	200	1,060	486	2,000	560 M	140	130	150	480	700	710	410 M
Nickel	Ni	9,900	19,514	22,700	18,000	16,000	48,600	36,000	75,000	43,000 H	15,000	15,900	20,900	47,000	42,800	51,600	110,000 EL
Selenium	Se	290															1,000 A
Silver	Ag	<500				500 +				4,500 H	230	730	1,000	1,100	1,770	3,700	3,100 B
Strontium	Sr	49,000															
Tin	Sn	5,000										48 *					> 3,400 N
Vanadium	V	50,000															57,000 N
Zinc	Zn	7,000-38,000	98,000	121,000	123,000	120,000	459,000	315,000	820,000	520,000 M	94,000	124,000	150,000	245,000	271,000	410,000	410,000 I
Lead 210 I ¹⁴ , du						0.5 *			< 9.7 *								
Polonium 210 I ¹⁴ , du						0.6 *			< 8.7 *								
Radium 226 I ¹⁴ , du						0.1 *			< 13 *								
Sulfides										130,000 M							4,500 MO

- Based on SLC approach using sensitive species HC5%; ES&T 2005 39(14):5148-5156.
 * - Based upon EOP approach using current AWQC CCC.
 ^ - Based on SLC approach to derive LEL and SEL; Env'l Monitor & Ass'tment 2005 110:71-85.
 + - Carried over from Open Water disposal Guidelines; treated as if LEL for management decisions.
 I - Intermal community impacts.
 Biossary endpoints: M - Microtox; B - Bivalve; E - Echinoderm larvae; O - Oyster larvae; A - Amphipod;
 j - EPA 005-R06-008
 b - Arch. ET&C 2000, 39(1)20. Also known as Canadian ISQOs and PELs
 c - ET&C 2002, 21(0)1003.
 d - Ecotox, 1995, 5(4):253.
 e - EPA 926/R-000/07.
 f - Env'l Mang 1995, 19(1):81.
 g - Guidelines for the protection and management of aquatic sediment quality in Ontario Aug 1993

Logistic Regression Model $p(\text{toxicity})$

- Predicts probability of amphipod mortality from surface sediment concentrations
- Based on 10-d survival tests for *Ampelisca abdita* and *Rhepoxynius abronius*
- Logistic regression models were developed for 37 chemicals of potential concern
- Combined into single models:
 - P-Max: maximum probability of mortality
 - P-Avg: average probability of mortality

From: Field, L. et al. Predicting amphipod toxicity from sediment chemistry using logistic regression models. *Environmental Toxicology and Chemistry / SETAC* 21(9):1993-2005 September 2002



Hazardous Waste Site Reports

- Provide initial evaluation of potential ecological risk to NOAA trust resources.
- Four major sections:
 - Site Exposure Potential –site background
 - NOAA Trust Habitats and Species –including fisheries
 - Site-Related Contamination –COPC's, screening levels, locations, etc.
 - Summary recaps the information that suggests there is a threat to NOAA trust resources.
- Over 700 reports available at:

http://response.restoration.noaa.gov/resource_catalog.php



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The Coastal Hazardous Waste Site Reports are an initial evaluation of the potential for injury to NOAA trust resources resulting from recently identified hazardous waste sites. NOAA uses this information to establish priorities for investigating sites.

contain four major sections:

"Site Exposure Potential" describes activities at the site that caused the release of contaminants, local topography, and potential contaminant migration.

"NOAA Trust Habitats and Species" describes the types of habitats and species at risk of injury from releases at the site. The life stages of organisms using habitats near the site are discussed, as are commercial and recreational fisheries.

"Site-Related Contamination" identifies contaminants of concern to NOAA, the maximum concentrations of these contaminants in soil, water, and sediment, and where on the site the contaminants were found.

"Summary" recaps the information that suggests there is a threat to NOAA trust resources.

The Atlas Tack Superfund Site: an Example of Ecological Enhancement



A-20





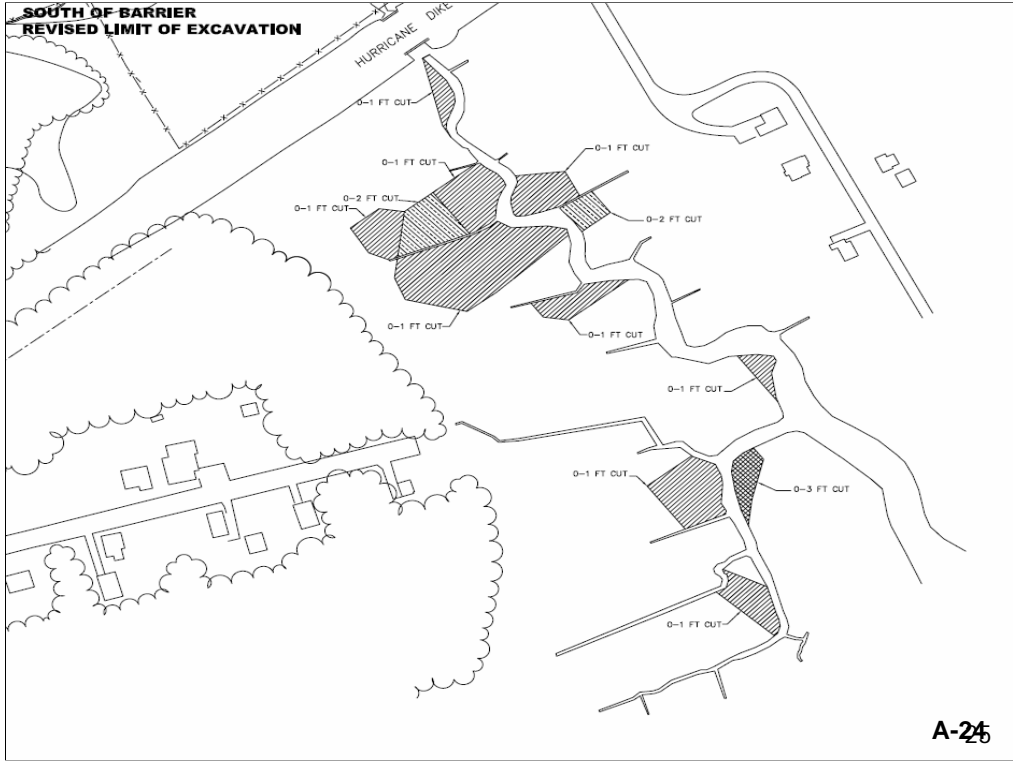


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A-23





A-25

Phase III: Marsh Area – 5.4 acres

- Excavation of 36,400 cy contaminated marsh soil and creek bed sediment
- Restoration of the marsh
- Cost \$5,300,000



Restoration Plan

- Fresh water wetland
- Salt water wetland
- Phragmites control
- Islands
- Man-made berm
- Spillways







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4. Northeast Upland Native Warm Season Grass Mix

Code: STCMX-3

\$17.20 Per Pound

1 pound will cover 2,200 sq. ft. @ 150 seeds per sq. ft.

This mix is appropriate in areas where warm season grasses are adapted by virtue of habitat and range of the component species. We do not recommend seeding this mix in areas where the component species are not native. The mix can be modified to be consistent with local floristic requirements. We recommend a seeding rate of 20 pounds per acre.

Percent by No. of seeds (not weight)	Scientific Name	Common Name
49.9%	N <i>Panicum clandestinum</i>	Deertongue
46.5%	N <i>Panicum virgatum</i>	Switchgrass
3.6%	N <i>Andropogon virginicus</i>	Broom Sedge

Source: <http://www.southerntierconsulting.com/seedmix.htm>

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DARRP: Integrating Remediation and Restoration – Some Examples

- Working with EPA and DOD on design assistance on remedial sites to combine remediation and restoration
- Working jointly with EPA and PRPs to achieve cooperative settlement and capture restoration through NRD –i.e. global settlements
- Enhancing or extending restoration above and beyond remediation with other NOAA funds (Community Restoration Program)



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Project Types



Fish passage



Oyster planting

Remove river blockages
Restore oiled wetlands
Construct oyster reefs & shellfish habitat

Acquire, restore & protect waterfowl habitat
Enhance Public Access

Dam removal



after

before

A-38

Belle Isle Fish Company Site, East Boston

- 21 E Site – MBTA Station
- ~ 1 acre total
- ~1/2 acre wetland creation
- ~ 1/2 acre upland buffer and walking trail
- NOAA CRP Funds
- EPA Brownfields funds



A-39

Norfolk Naval Ship Yard, Norfolk, VA



- 1.3 acre site – Navy
- 45,000 tons of Calcium Hydroxide
- Cresote debris
- Filled in former tidal cove
- Worked with Navy to design wetland restoration



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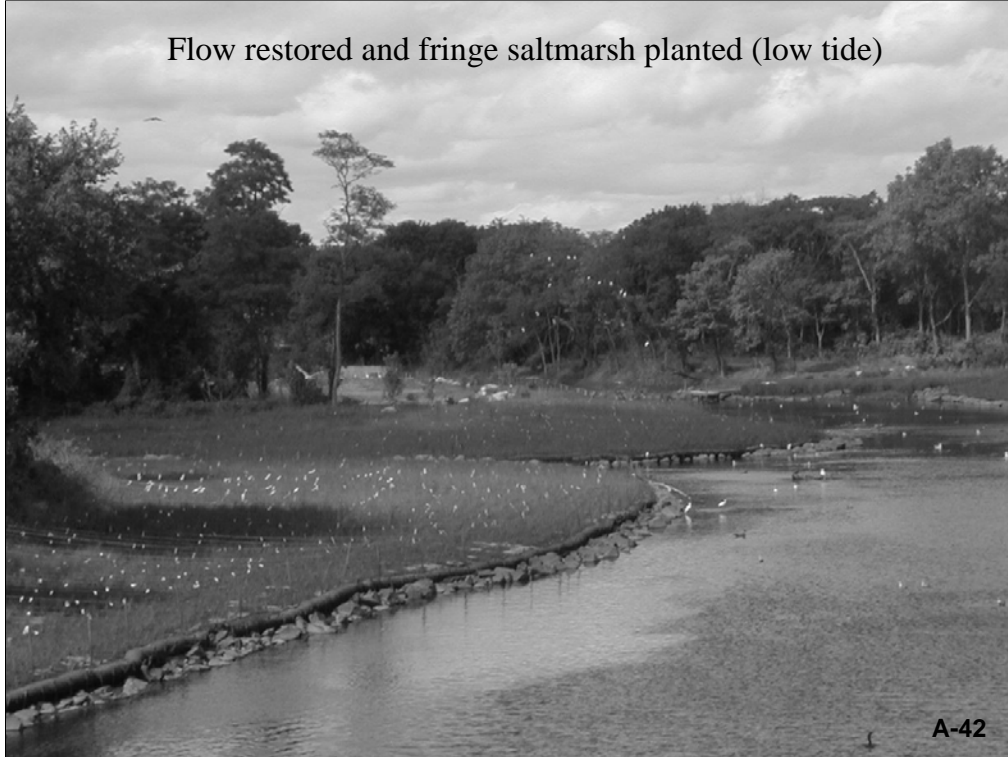
New Bedford, MA



Excavation “in the dry”

A-41

Flow restored and fringe saltmarsh planted (low tide)



A-42



Windrows to manage areas and tidal movement of sediment

Later moved and used to backfill behind



Post backfill beach

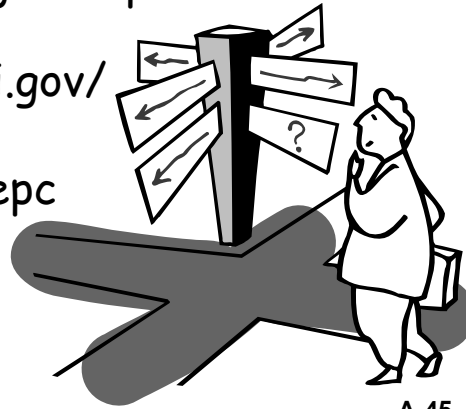
Websites

<http://www.darp.noaa.gov>

<http://www.darp.noaa.gov/cap.htm>

<http://restoration.doi.gov/>

<http://www.doi.gov/oepc>



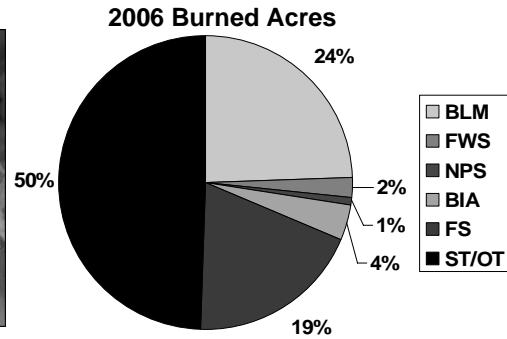
A-45



Native Plant Materials Development and Conservation Program

**Mary Byrne
Bureau of Land Management**

Native Plant Materials Development and Conservation Program



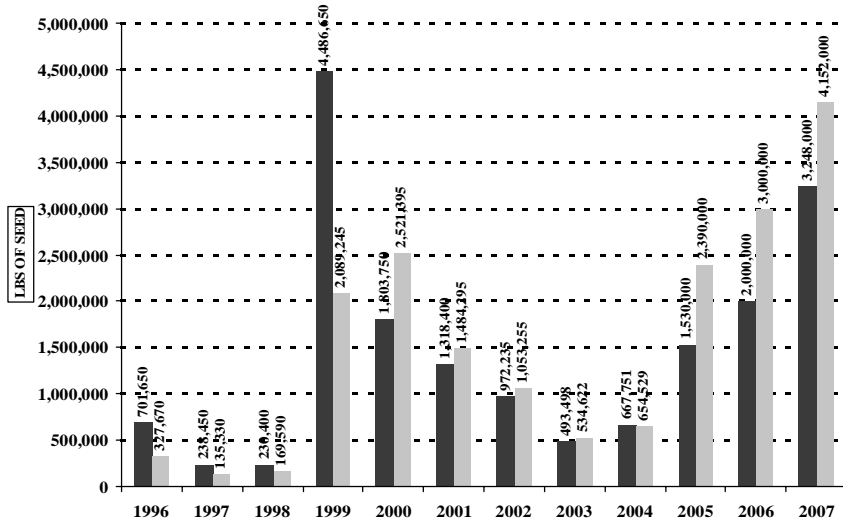
House of Representatives' FY2001 Conference Report

- Directs "...the agencies to develop a long-term program to manage and supply native plant materials for various Federal land management restoration and rehabilitation needs.
- Recommends "... the interagency Plant Conservation Alliance lead this effort."

B-2

BLM CONSOLIDATED SEED BUYS QUANTITY

■ Non-Native Seed
 ■ Native Seed



B-3

What is SOS?

**National Native Seed Collection
Program**

Coordinated by BLM

**Part of the National Native Plant
Materials Development and
Conservation Program**

B-4

Collecting Teams



CHICAGO BOTANIC GARDEN

New England Wild Flower Society



NEW YORK CITY
DEPT. OF PARKS & REC.

THE NORTH CAROLINA BOTANICAL GARDEN

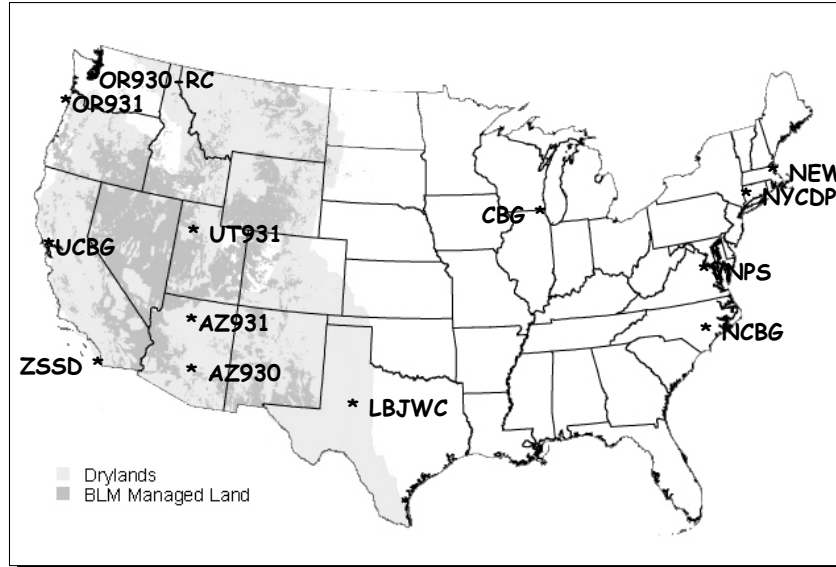


THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL



B-5

Collecting Teams



B-6

Fire



Emergency Stabilization and Rehabilitation

B-7

Energy Development



B-8

Energy Development



Wildlife Comes Back!

B-9

Recreation



B-10

Recreation



Photo Credit: BLM

Rare Species

B-11

Priority Species



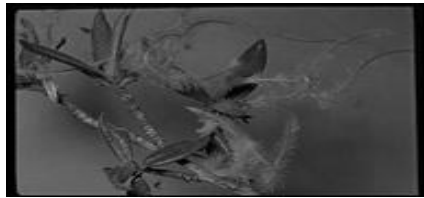
- Restoration Value
- Early, late and mid successional species in classic climax theory.
- Shrubs, forbs, trees, and grasses.

B-12

Priority Species



- Browse and Forage Value



B-13

Culturally Significant Species



B-14

Species Excluded from SOS

T & E species

Candidate or Proposed
species under the
ESA

G1, G2, S1, or S2



Arabis mcdonaldiana

B-15

Collect



B-16

Millennium Seed Bank Project

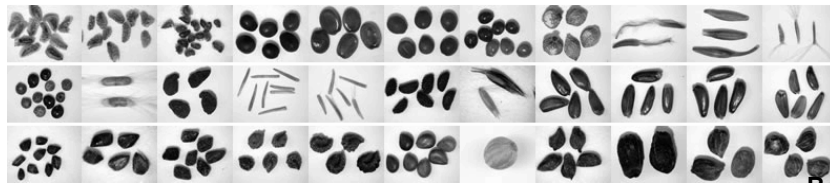


USDA Forest Service Bend Seed Extractory



- Cleans restoration collections
- Photographs collections
- Posts inventory on website

<http://fswb.f01.r6.fs.fed.us/seedextractory/extractory.shtml>



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USDA Forest Service Bend Seed Extractory



B-19

National Plant Germplasm System



Long-term Storage and Distribution

B-20

Long-term Storage



B-21

Distribution



Working Collections for Research

B-22

Great Basin Restoration Initiative



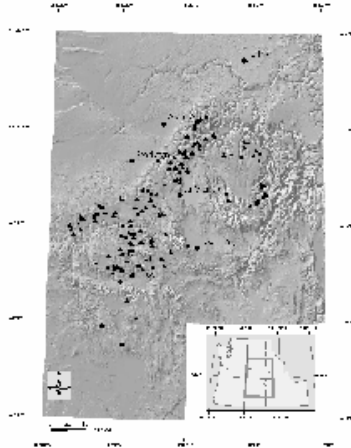
Owner	Acres
BLM	73 million
Private	29 million
FS	19 million
State	4 million
D.Def.	3 million
Tribes	2 million
Other	5 million
Total	135 million

B-23

Seed Development Process

**> 20 populations
across the species
range**

**Collect from
populations with
> 50 individuals,
sampling the
entire population**



B-24

NRCS-Plant Materials Centers Common Garden Studies



Great Basin Plant Material Center, Fallon, NV

B-25

Chicago Botanic Garden

Penstemon in the Great Basin

Penstemon rostriflorus



Penstemon pachyphyllus v. *congestus*



Penstemon deustus v. *pedicellatus*

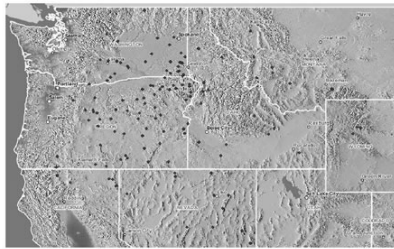


B-26

U.S. Forest Service Seed Zone Research

Bluebunch wheatgrass (*Pseudoroegneria spicata*)

- PNWRS/RMRS/ARS/Region 6 (St.Clair, RC Johnson, Shaw, Erickson; FS/BLM funding)
- 127 populations, 5 cultivars
- 3 sites, 2 yrs of measurements
- Study sites established this September



B-27



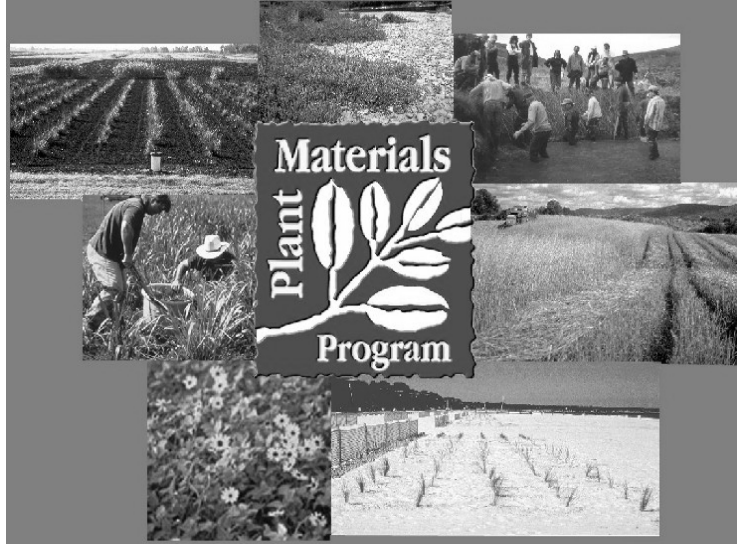
Plant Conservation Alliance

www.nps.gov/plant

Mary Byrne
mary_byrne@blm.gov

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The USDA-NRCS Plant Materials Program





History



- In the 1930's the Soil Conservation Service established nurseries to grow and distribute plants for the stabilization of severely eroding lands.
- USDA-NRCS Plant Materials Program has evolved over 70 years in developing plant technology to address changing ecosystem/environmental needs.

C-2



Plant Materials Program - Today

- **Develops plants and plant technologies for the successful conservation of our nation's natural resources.**
- **Provides vital information to private landowners and public land managers to address critical land management problems.**
- **Is a network of 27 Plant Materials Centers and 19 Plant Materials Specialists strategically located throughout the United States. Each Center has a service area defined by ecological boundaries.**

C-3

Locations of Plant Materials Centers



C-4

The Program's Mission



**Finding Plant Solutions for
Conservation Needs**

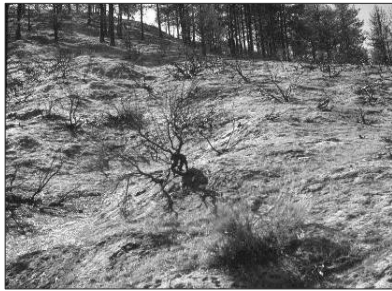
C-5

Conservation needs

include:

Critical Habitats

- Wetlands →
- Riparian corridors
- Disturbed areas →
- Fire Rehab ↘



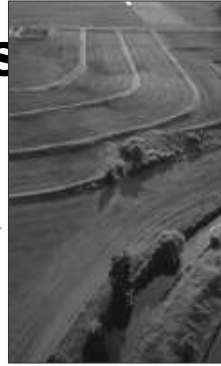
C-6

Management Practices

- Buffer strips

- Soil bioengineering

- Biofuels



C-7

Environmental Concerns

- Native plants
- Noxious/invasive plants
 - Yellow starthistle
- Drought / Flooding
- Habitat for threatened and endangered species



C-8

Environmental Concerns

- **Soil erosion and sediment control** →



- **Carbon sequestration**

- **Coastline stabilization** →



C-9



Selection of a Plant Materials Release

- Resource Concerns identified at the local/field office/state level (Advisory Committee)
- Field collection of targeted species occurs within the service area of a Plant Center
- On-Center evaluations of those accessions/local ecotypes
- Off-Center field plantings on actual problem sites

PLANT RELEASES

- Pre-varietal (local ecotype) plant releases for general conservation and restoration use for a limited geographic area (wide genetic diversity)
- Cultivars for specific uses such as: mineland reclamation, livestock forage or soil bioengineering, adapted to a wide geographic area. (limited genetic diversity)

C-10



The Plant Selection Process

- Define
- Collect
- Select
- Test
- Increase
- Release

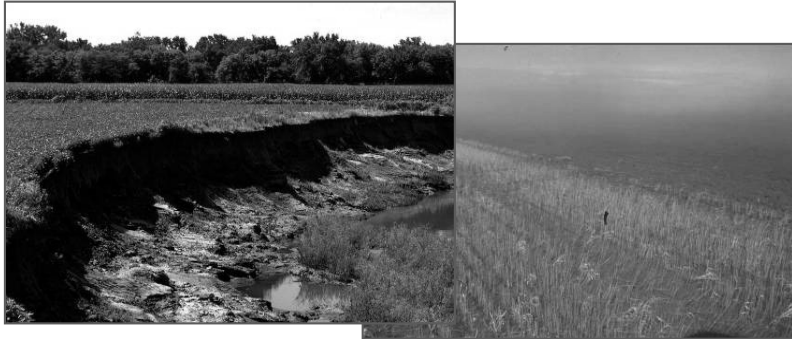


C-11



The Plant Selection Process

- Define a need and area



C-12



The Plant Selection Process

- Collect germplasm



C-13



The Plant Selection Process

- Select for the desired traits



C-14



The Plant Selection Process

- Test for adaptation and applicability



C-15



The Plant Selection Process

- Increase for demonstration and distribution



C-16

The Plant Selection Process

- Release to commercial growers for large-scale production



C-17



Plant Releases – The foundation of the Plant Materials Program

- **Plant Selection includes:**
 - **Pre-varietal: Source-Identified, Selected, Tested**
(primarily natives)
 - **Varietal: Cultivar**
* Native and Introduced

C-18



“Nature does nothing uselessly.”

➤ *Aristotle*

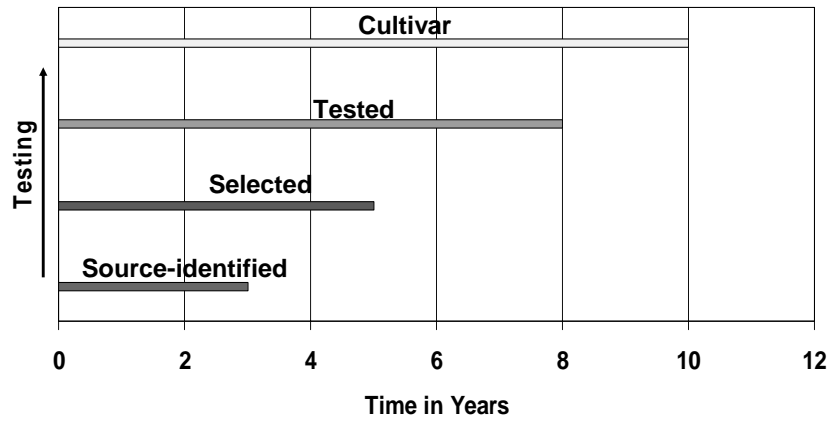
“Nature has evolved a
plant for every purpose.”

➤ *Franklin J. Crider*

C-19



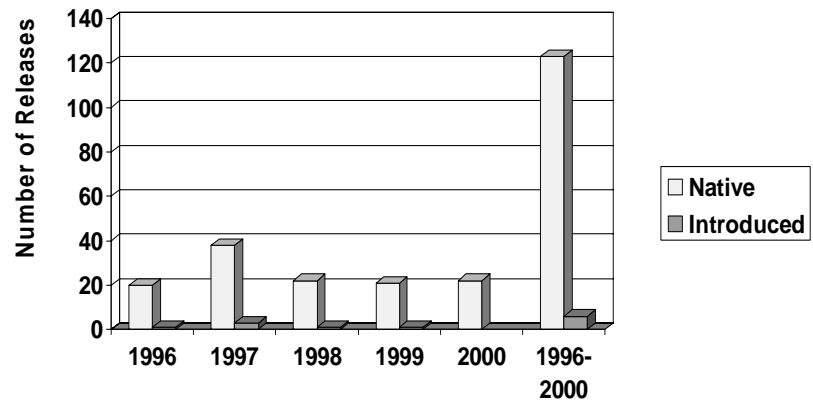
Releases



C-20



Origin of Plant Releases Over the Past 5 Years



C-21



**Work with a broad range of species,
including grasses, legumes, forbs
(wildflowers),**

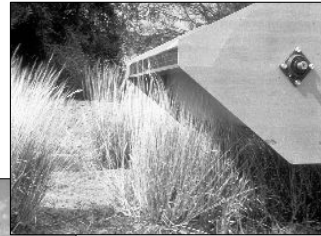


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C-22



Interface with the commercial seed and nursery industries to develop and release plant material for commercial availability



C-23



Cape May Plant Materials Center

United States Department of Agriculture
Natural Resources Conservation Service

Plant Materials Program

Proudly Serving the Conservation Needs of the U.S. Mid-Atlantic Region in Massachusetts, Connecticut, Rhode Island, Coastal New York, New Jersey, Delaware, Maryland, Virginia and North Carolina.

Commercial value of Cape May Plant Center Products

Vegetative Production- \$ 3,200,000

Cape american beachgrass
Avalon saltmeadow cordgrass
Emerald Sea shore juniper
Ocean View beach plum,
Wildwood bayberry,
Sandy rugosa rose

Seed Production - \$ 150,000

Atlantic coastal panicgrass
VA-70 shrub lespedeza

C-24



Native, Sustainable Plant Communities

- Native cool season grasses/legumes for enhancing wildlife habitat
- Biofuels-screen germplasm for biomass production
- Carbon sequestration of native warm season grasses
- Plant adaptation for riparian buffers, filter strips, stormwater basins (aerenchyma roots)
- Soil Biology-mycorrhizal fungi effects on plant establishment/growth in critical area plantings
- Agroforestry applications for air/water quality
- Sustainable, low maintenance landscapes

C-25



Plant Materials Program Conservation Plant Releases

- Total of over 650 releases over the past 70 years (about 2/3 are native)
- About 450 of these are still active
- About 350 of the releases were commercially produced within the past 3 years
- Annual commercial certified seed production is enough to cover an estimated 2,000,000 acres

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Commercially Released Plant Materials

- What is the **demand** for Plant Material development and releases?
 - Agriculture
 - Conservation
 - Urban Development
 - Critical Habitat
 - Recreation
 - Other

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Other

- **Native American Issues – Culturally significant plants (food, ceremony, basket weaving, etc.)**
- **Limited Resource Farmers**
- **Public Lands and Other Agency Needs**
 - USFS EPA DOE
 - BLM USGS FEMA
 - NPS BIA DOD
 - BOR DOT USFWS
- **State and Local Needs**

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Conservation Plant Information from the Plant Materials Program



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Technical Information

- Conservation Plant Releases
- Technical Documents
- Resource-Specific Web Pages
 - Coastal Restoration
 - Fire Restoration
- Conservation Plant ID Guides
- Related Web Sites

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http://plant-materials.nrcs.usda.gov

NRCS Plant Materials Program - Microsoft Internet Explorer

Address http://plant-materials.nrcs.usda.gov/

United States Department of Agriculture
Natural Resources Conservation Service

Plant Materials Program

Plant Materials Home | About Us | News | Centers | Plant Releases | Technical Resources | Contact Us

Search
Plant Materials
Enter Keywords

Quick Access
Plant Solutions newsletter
Plant Solutions video -- NEW!
Publications
Plants Database
Staff Directory
Plant Releases Photo Gallery
Site Map

Find a Service Center
States and Regions
Centers and Institutes

Welcome to the NRCS Plant Materials Program web site.

May 2006 Plant Solutions Newsletter:
Switchgrass Isn't Just for Growing Anymore
During the State of the Union Address last January, President Bush made a passing reference to a little-known grass that has the potential to produce enormous energy. That now famous grass's popular name is switchgrass. [...More Info](#)

Chinese Delegation Touring Plant Materials Centers
A delegation from China of specialists in water, soil conservation and plant buffers is touring the country and visiting USDA NRCS Plant Materials Centers (PMC) in Tucson, Arizona; Beltsville, Maryland and Lockeford, California to learn best practices in conservation from these PMCs. [...More Info](#)
[Past Features](#)

Across America: See What Plant Materials Centers Are Doing

Lockeford, CA Plant Materials Center
The Lockeford Plant Materials Center offers a 60-plus-year track record of finding plant solutions for the diverse Californian landscape. The Center has released over 30 conservation plants including varieties of blue wildrye, sulfur flower buckwheat, inland saltgrass and fourwing saltbush. [...More Info](#)

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

Information For:
Coastal Areas
Communities
Farmers and Ranchers
Homeowners
NRCS Plant Materials Staff
Policy Makers

Information About:
Plant I.D. Tools and Guides
Seed & Plant Production
Seeding & Planting

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Trusted sites



Technical Documents

Publications | Rose Lake Plant Materials Center - Microsoft Internet Explorer

Address: <http://plant-materials.nrcs.usda.gov/nrnc/publications.html>

Other Publication Types

- Find a Service Center
- States and Regions
- Centers and Institutes

Technical Notes

- Leif, J. and T. Bush. 2004. [Native Grass Establishment for Wildlife](#). Michigan PMC, East Lansing, MI. September, 2004. 8p. (582 KB) (ID# 5652)

Plant Fact Sheets

- Leif, J. 2003. [Rush Farm Windbreak Study- Shrub Performance on Organic Soils- Follow-up](#). Rose Lake Plant Materials Center, East Lansing, Michigan. September, 2003. 2p. (198 KB) (ID# 5115)
- Bush, T. 2001. [Plant Fact Sheet: Sweet Flag](#). Oct. 2001. 2p. (240 KB) (ID# 3081)


Information Brochures and Flyers

- Burgdorf, D., J. Rissler, J. Leif, E. Gerona. 2003. [Plant Releases Available to Commercial Growers](#). Rose Lake Plant Materials Center, East Lansing, MI. September, 2003. 2p. (998 KB) (ID# 5100)
- Rissler, J. and E. Gerona. 2003. [Riverbend Germplasm Silky Willow](#). Rose Lake Plant Materials Center, East Lansing, Michigan. September, 2003. 2p. (256 KB) (ID# 5120)
- Rissler, J., D. Burgdorf, and E. Gerona. 2002. [Affinity Northern White Cedar Brochure](#). USDA-NRCS Rose Lake Plant Materials Center, East Lansing, MI. 2p. (ID# 4523) (215 KB)
- Rissler, J., T. Bush, E. Gerona, and D. Burgdorf. 2002. [Leelanau Germplasm Highbush Cranberry Brochure](#). USDA-NRCS Rose Lake Plant Materials Center, East Lansing. 2p. (609 KB) (ID# 4524)
- Burgdorf, D.W., J. Rissler, T. Bush and E. Gerona. 2002. [Southlow Michigan Germplasm Big bluestem](#). East Lansing, MI. Feb. 2002. (210 KB) (ID# 594)

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Trusted sites

Resource-Specific Pages



The screenshot shows a web browser window displaying the NRCS website. The page title is "Information for Coastal Areas - Microsoft Internet Explorer". The address bar shows the URL: <http://plant-materials.nrcs.usda.gov/coastalareas.html>. The page header includes the NRCS logo and the text "United States Department of Agriculture Natural Resources Conservation Service". The main navigation menu includes "Plant Materials Home", "About Us", "News", "Centers", "Plant Releases", "Technical Resources", and "Contact Us".

The main content area is titled "Coastal Restoration and Protection Resources". It features a search box on the left with a "GO" button. Below the search box is a "Quick Access" section with links to "Plant Solutions newsletter", "Plant Solutions video -- PDF", "Publications", "Plants Database", "Staff Directory", "Plant Releases Photo Gallery", "Site Map", "Find a Service Center", "States and Regions", and "Centers and Institutes".

The main text on the page reads: "Many scientists predict another 40 to 50 years of severe Atlantic-basin storm activities. With hurricanes like Katrina and Rita possibly becoming more commonplace, the National Plant Materials Center has developed this storm-damage prevention database." Below this text is a photograph of a beach with dunes and vegetation. The caption reads: "Mississippi Beach Planting Post Hurricane Katrina" and "Credit: Golden Meadow PMC, Galliano, LA 2005".

Below the photograph, there is a link to "contact us" and a note: "Downloadable publications are available in Adobe Acrobat format". At the bottom of the page, there is a section titled "Plants Useful for Coastal Stabilization" with a note: "Clicking on the scientific name will take you to detailed information in the PLANTS database." The page number "C-33" is visible in the bottom right corner.

Conservation Plant ID Guides

The screenshot shows a web browser window with the address bar displaying <http://plant-materials.nrcs.usda.gov/technical/idguides/>. The page title is "Conservation Plant Identification Tools and Guides | NRCS Plant Materials Program - Microsoft Internet Explorer". The NRCS logo and "Natural Resources Conservation Service" are visible at the top. A navigation menu includes "Plant Materials Home", "About Us", "News", "Centers", "Plant Releases", "Technical Resources", and "Contact Us". A search box is present with a "GO" button. The main content area is titled "Conservation Plant Identification Tools and Guides" and includes the instruction: "Select from the options below to find information on identifying conservation plants." There are three main categories of guides:

- Herbaceous Species**:
 - Conservation Plants Pocket ID Guide**: Features a cover image of a grass-like plant.
 - Central Region Seedling ID Guide for Native Prairie Plants**: Features a cover image of a daisy-like flower.
- Trees and Shrubs**:
 - Conservation Trees and Shrubs Pocket ID Guide**: Features a cover image of a rural landscape with trees and a house.

On the left side, there is a "Technical Resources" section with a list of links: Publications, Plant I.D. Tools & Guides, Seed & Plant Production, Seeding & Planting, Bioengineering & Riparian, PLANTS Database, Related Web Sites, and References. Below this is a "Find a Service Center" section with links for "States and Regions" and "Centers and Institutes". The browser's status bar at the bottom right shows "Trusted sites" and the page number "C-34".

Program Products



**Printed
Materials**



**Workshop
Presentations /
Training
Sessions / Site
Visits**



**Conservation
Plant
Releases**

C-35

Check back on this slide *****



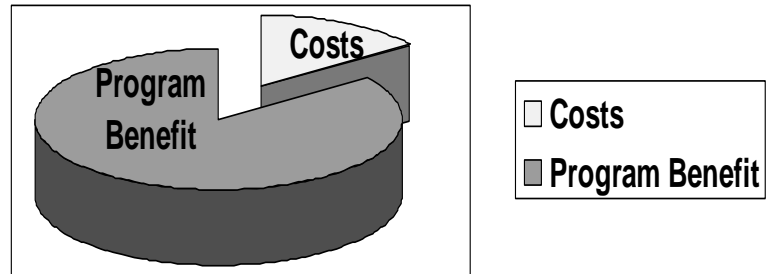
What is the VALUE of the *Plant Materials Program*

- The ability to develop plant materials to meet the ever-changing environmental and landowner demands.
- Established Plant Materials Centers to accommodate regional plant needs
- Unique nationwide network of PMC's/PMS's to address all geographic/climatic variables
- 70 years of plant technology expertise
- Alternative enterprise for commercial growers and end-users who are unable, individually, to test and monitor plant

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Economic Program Benefit

6:1 ratio



C-37

*The Plant Materials Program can be
the most efficient and effective solution
to your plant conservation needs...*

