



Development of Native Plant Materials For National Parks

A cooperative program between the National Park Service and the Natural Resources Conservation Service

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Since the 1930's NRCS PMCs have developed techniques for the establishment, harvest and processing of native grasses, forbs and legumes.



Propagation Facilities



Containerized tree and shrub production



How the Program Works

- Start 2-3 years before seed/plants needed*
- Assist park personnel identify species desired*
- NRCS PMTA develops an Interagency agreement with the most appropriate PMC.*
- A revegetation plan and specs are prepared*
- Seeds or plants are collected (park or PMC), planted and reproduced for 2-3 years*
- Plants or seed returned to the park.*
- PMC continues technical assistance as requested*

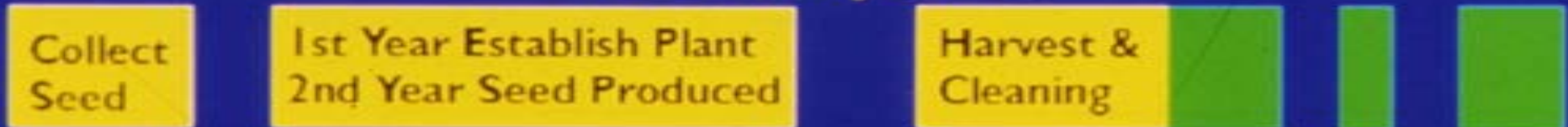
Seed and/or plant production must start 2-3 years before the product is needed

TIMELINE FOR FIELD SEED PRODUCTION OF PLANT MATERIALS

Calendar Year 3		Calendar Year 2				Calendar Year 1				Construction Period Revegetation Year																			
J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
FY 95		FY 96				FY 97				FY 98					FY 99														

Contract Award

Potted Transplants



Legend:  — transplanting windows at park sites

Seed Collection



- Can be labor intensive
- Timing is critical

Seed Collection-When, How & Why



Seed ripeness & harvest readiness

Color change (green to tan/straw color or dark brown)

Partial shattering (usually at tip of inflorescence)

Awns twisting and diverging

Dough stage (use fingernail clippers)



Endospermic seed

Non-Endospermic seed



Seed Processing and Testing



PMCs have specialized seeding equipment



Some not so specialized!



Greenhouse Propagation of Collected Seed



Continue Plant Growth and Hardening





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Seed Increase -Grasses



Seed Increase -Forbs & legumes



Grass & Forb Seed Harvesting



Direct Harvest



Swath and Combine



Seed Drying



Grass & Forb Seed Cleaning/Processing



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Temperature and Humidity Controlled Seed Storage

- The percent relative humidity plus the temperature in degrees F should not exceed a factor of 100

Life of the seed is reduced by 50%:

- for each 5 degrees C increase in storage temperature
- for each 1% increase in moisture content.
- This rule applies when seed moisture is between 5 and 14%

- **Seed testing**

- Test periodically
- Ideally seed should be tested for germination prior to use
- Seed testing laboratories



*Grass Seed Production Costs**

- *\$8,000 if established from seed*
- *\$9,000 if established from plugs. Reduced to \$8,000 after establishment year*
- *Minimum field size is $\frac{1}{4}$ acre. \$4,000 minimum cost regardless of field size*

* average annual cost per seed production acre per species per year. Does not include seed collection. Costs may vary depending ease or difficulty of propagation, weed control, harvesting, seed processing

includes:

Year 1- materials, equipment and labor for seedbed preparation, seeding and/or plant installation, weed control, roguing and irrigation

Year 2, 3 etc. - materials, equipment and labor for weed control, roguing, irrigation, harvesting, seed cleaning, storage, testing and delivery to park.

*Forb/Legume Seed Production Costs**

- *\$9,000 if established from seed (weed control)*
- *\$10,000 if established from plugs. Reduced to \$9,000 after establishment year*
- *Minimum field size is $\frac{1}{4}$ acre. \$4,000 minimum cost regardless of field size*

* average annual cost per seed production acre per species per year. Does not include seed collection. Costs may vary depending ease or difficulty of propagation, weed control, harvesting, seed processing

includes:

Year 1- materials, equipment and labor for seedbed preparation, seeding and/or plant installation, weed control, roguing and irrigation

Year 2, 3 etc. - materials, equipment and labor for weed control, roguing, irrigation, harvesting, seed cleaning, storage, testing and delivery to park.

*Containerized Plant Costs**

- *\$5-8 / one gallon or equivalent (40 CI "d" pots)*
- *\$5-6 / 20 CI tubling*
- *\$3-4 / 10 CI tubling*
- *Other sizes available upon request (tall pots). Cost will vary accordingly.*

* Costs may vary by species depending ease or difficulty of propagation. Does not include seed collection. Includes delivery to park and materials, supplies and labor to produce a containerized hardened- off transplant with a well developed root system.



Native Plants and Revegetation

Intranet and Internet site

- *Contracting for Revegetation Services*
- *Interagency PM Program*
- *Park Roads Revegetation Requirements*
- *Specifications*
- *Tools*

How to get there:

<http://inside.nps.gov/waso/waso.cfm?prg=440&lv=4>



Tools

- *Native Seed Collection/handling*
- *Plant Salvage*
- *Seed Storage*
- *Revegetation Cost Estimating Worksheet (Class B)*
- *Park Revegetation Contacts*
- *Soil Importation Guidelines*
- *Gravel & Fill Inspection Report*
- *Seed and Soil Testing Labs*
- *Website Links*
- *Monitoring protocols*
- *Seeding Worksheet in progress*

Revegetation Planting

Planning Sheet (Preliminary)

Park Unit/PMIS No.: _____

Project Name: _____

Location: /Planting Name: _____

Acres: 5.00

Season: Summer

Slope: 1.5:1

Precipitation: Light 6"-18"

Elevation range: 3000 - 4500

Planting Method: Drilled

Planned by: _____

Phone No.: _____

Seed Mix Development

Species/Variety <i>Scientific Name</i> (Common name)	Species # of seeds/lbs	Seeds/SF at 1 lb/ac rate	Target Seeds/ft ²	Percent of mix (%)	PLS Seeds/SF at % of Mix
Yucca elata (Soapweed)	15000	0.34	20	20.00%	4.00
Achnatherum hymenoides (Indian ricegrass)	161920	3.72	20	20.00%	4.00
Poa alpina (Alpine bluegrass)	1340000	30.76	20	22.00%	4.40
Panicum virgatum L. (Switchgrass)	259000	5.95	20	20.00%	4.00
Stipa viridula (Green needlegrass)	177000	4.06	20	18.00%	3.60
	0	0.00	20		0.00
	0	0.00	20		0.00
	0	0.00	20		0.00
			Totals:	100%	20.00

Planting Information

Species	PLS Rate (lbs/ac)	Total PLS (lbs)	Average Purity %	Average Germ %	Bulk Rate (lbs/ac)	Total Seeds Bulk (lbs)
Yucca elata (Soapweed)	11.62	58.08	0.45	0.9	28.68	143.41
Achnatherum hymenoides (Indian ricegrass)	1.08	5.38	0.40	0.9	2.99	14.95
Poa alpina (Alpine bluegrass)	0.14	0.72	0.60	0.8	0.30	1.49
Panicum virgatum L. (Switchgrass)	0.67	3.36	0.70	0.8	1.20	6.01
Stipa viridula (Green needlegrass)	0.89	4.43	0.80	0.7	1.58	7.91
0	0.00	0.00			0.00	0.00
0	0.00	0.00			0.00	0.00
0	0.00	0.00			0.00	0.00
*Total Rate to be Seeded:	14.39	71.97	0.59	0.82	34.75	173.76



*"We are loving our
National Parks to
death"*

*One step can damage
many native plants
that may never
recover!*

*Please Stay on
established trails!*

**PLEASE
DO NOT WALK HERE**



**Plants here were trampled by people.
The National Park Service is restoring
this area. Please help protect these
native plants. Stay on the trail and
walk on rocks whenever possible.**

