USDA NRCS
Natural Resources Conservation Service

Aberdeen Plant Materials Center

2012 Annual Technical Report

United States
Department of
Agriculture

Natural Resources
Conservation Service

Aberdeen, Idaho

March 2013

Contents

INTRODUCTION

The Plant Materials Center at Aberdeen is part of a national plant materials program operated by the United States Department of Agriculture, Natural Resources Conservation Service. The purpose of the Plant Materials Center is to develop and communicate new technology for the use and management of plants. We also assemble, evaluate and release plant materials for conservation use and develop new techniques for establishment of conservation plants. The Aberdeen Plant Materials Center was established in 1939 and currently maintains 14 cultivars and 4 pre-variety (Selected Class) releases. The Aberdeen Plant Materials Center serves portions of Nevada, Utah, Oregon, Wyoming and Idaho. This document is a compilation of progress reports for activities by the Aberdeen Plant Materials Center during FY 2012.

The following documents and presentations were developed during FY 2012 and may be obtained by contacting the Aberdeen Plant Materials Center:

DOCUMENTS

Tilley, D.J., Ogle, D.G., St. John, L., Waldron, B., and R.D. Harrison 2012. Plant Guide for forage kochia (*Bassia prostrata*). Aberdeen PMC, Aberdeen, ID. 7/23/2012. 5p.

Tilley, D., St. John, L., Ogle, D., and N. Shaw 2012. Plant Guide for gooseberryleaf globemallow (*Sphaeralcea grossulariifolia*). Idaho Plant Materials Center, Aberdeen, ID. 1/18/12. 4p.

Tilley, D., St. John. L., Ogle, D., and N. Shaw 2012. Plant Guide for blue penstemon (*Penstemon cyaneus*). Idaho Plant Materials Center, Aberdeen, Idaho. 1/19/12. 3p.

Tilley, D., St. John, L., Ogle, D., Shaw, N., and J. Cane 2012. Propagation protocol for fernleaf biscuitroot (*Lomatium dissectum*). Idaho Plant Materials Center, Aberdeen, Idaho. 1/4/12. 3p.

Tilley, D., St. John, L., Ogle, D., Shaw, N., and J. Cane 2012. Propagation protocol for nineleaf biscuitroot (*Lomatium triternatum*). Idaho Plant Materials Center, Aberdeen, ID. 1/4/12. 3p.

Tilley, D., St. John, L., Ogle, D., and N. Shaw 2012. Propagation protocol for Gray's biscuitroot (*Lomatium grayi*). Idaho Plant Materials Center, Aberdeen, ID. 1/4/12. 3p.

Tilley, D., St. John, L., and N. Shaw 2012. Plant guide for arrowleaf balsamroot (*Balsamorhiza sagittata*). Aberdeen Plant Materials Center, Aberdeen, Idaho. 4/2/12. 5p.

Tilley, D., St. John, L., and D. Ogle 2011. Plant Guide for Gooseberryleaf Globemallow (*Sphaeralcea grossulariifolia*). Idaho Plant Materials Program, Aberdeen, ID. 11/9/11. 3p.

Tilley, D., St. John, L., and D. Ogle 2012. Plant Guide for whitebark pine (*Pinus albicaulis*). Idaho Plant Materials Center, Aberdeen, Idaho. 1/19/12. 4p.

Tilley, D., St. John, L., and D. Ogle 2011. Plants for Riparian Buffers. IDPMC, Aberdeen, Idaho. 12/2/11. 8p.

Tilley, D., St. John, L. 2012. Plant Guide for yellow rabbitbrush (*Chrysothamnus viscidiflorus*). Idaho Plant Materials Program, Aberdeen, ID. 5/24/12. 4p.

Tilley, D., Ogle, D., St. John, L., Hoag, C., and J. Scianna 2012. Technical Note 32: Native Shrubs and Trees for Riparian Areas in the Intermountain West. Idaho Plant Materials Program, Boise, Idaho. 8/9/12. 63p.

Tilley, D., Ogle, D., Blaker, P. and St. John, L. 2012. 2011 Annual Technical Report. Aberdeen Plant Materials Center, Aberdeen, Idaho. March 1, 2012. 187p.

Tilley, D., Ogle, D., and B. Cornforth 2012. The Pop Test: a quick aid to estimate seed quality. Native Plants Journal, Madison, WI. 12 (3): fall 2011. 6p.

Tilley, D., Ogle, D. 2011. Using historic bushel weights to estimate seed quality. Native Plants Journal, Madison WI. 12 (2) Summer 2011. 4p.

Tilley, D., Jensen, S., and L. St. John 2012. Plant Guide for tapertip hawksbeard (*Crepis acuminatus*). Aberdeen Plant Materials Center, Aberdeen, Idaho. 4/3/12. 3p.

Tilley, D., Cane, J., St. John, L., Ogle, D., and N. Shaw 2012. Plant Guide for yellow beeplant (*Cleome lutea*). Idaho Plant Materials Center, Aberdeen, Idaho. 1/19/12. 3p.

Tilley, D., and L. St. John 2012. Plant Guide for barestem biscuitroot (*Lomatium nudicaule*). Aberdeen PMC, Aberdeen, ID. 6/22/12. 3p.

Tilley, D., and L. St. John 2012. Plant Guide for black sagebrush (*Artemisia nova*). IDPMC, Aberdeen, Idaho. 2/14/12. 4p.

Tilley, D., and L. St. John 2012. Plant Guide for lambstongue groundsel (*Senecio integerrimus*). Idaho Plant Materials Center, Aberdeen, ID. 1/18/12. 3p.

Tilley, D., and L. St. John 2012. Plant Guide for low sagebrush (*Artemisia arbuscula*). Idaho Plant Materials Center, Aberdeen, ID. Idaho. 2/14/12. 4p.

Tilley, D., and L. St. John 2012. Plant Guide for multilobed groundsel (*Packera multilobata*). Idaho Plant Materials Center, Aberdeen, ID. 1/18/12. 2p.

Tilley, D., and L. St. John 2012. Plant Guide for multilobed groundsel (*Packera multilobata*) and Rocky Mountain groundsel (*P. streptanthifolia*). Aberdeen PMC, Aberdeen, ID. 6/22/12. 3p.

Tilley, D., and L. St. John 2012. Plant Guide for tall blacktip ragwort (*Senecio atratus*). Aberdeen PMC, Aberdeen, ID. 6/6/12. 2p.

Tilley, D., and L. St. John 2012. Plant Guide for wooly groundsel (*Packera cana*). Aberdeen PMC, Aberdeen, ID. 6/6/12. 2p.

Tilley, D. C. Bair 2011. The Jet Harvester: a shop-built tool for harvesting forb and shrub seed. Native Plants Journal, Madison, WI. 12 (2), Summer 2011. 4p.

St. John, L., Tilley, D., Ogle, D., Johnson, D., and S. Bushman 2012. Propagation protocol for searls' prairie clover (*Dalea searlsiae*). Idaho Plant Materials Center, Aberdeen, ID. 1/4/12. 3p.

St. John, L., Tilley, D., Ogle, D. 2011. Plant Guide for Venus penstemon (*Penstemon venustus*). Aberdeen Plant Materials Center, Aberdeen, Idaho. December 2, 2011. 4p.

St. John, L., Tilley, D. Winslow, S. 2012. Plant Guide for Canada Bluegrass. Aberdeen Plant Materials Center, Aberdeen, Idaho. January 19, 2012. 4p.

St. John, L., Tilley, D. Goodson, D. 2012. Plant Guide for James' Galleta. Aberdeen Plant Materials Center, Aberdeen, Idaho. April 20, 2012. 4p.

St. John, L., Tilley, D. 2012. Plant Guide for Hooker's Balsamroot (*Balsamorhiza hookerii*). Aberdeen Plant Materials Center, Aberdeen, Idaho. June 21, 2012. 3p.

St. John, L., Tilley, D. 2012. Plant Guide for Purple Onion Grass. Aberdeen Plant Materials Center, Aberdeen, Idaho. March, 2012. 3p.

St. John, L., D. Tilley, D. Ogle 2012. Plant Guide for Firecracker Penstemon (*Penstemon eatonii*). Aberdeen Plant Materials Center, Aberdeen, Idaho. November 29, 2011. 4p.

St. John, L., D. Ogle, and D. Tilley 2011. Tips for Successful Conservation Seeding. Aberdeen Plant Materials Center, Aberdeen, ID. October 3, 2011. 2p.

St. John, L., D, Tilley, D. Ogle, J. Jacobs, L. Holzworth, L. Wiesner 2011. Technical Note No. 13 Principles of Seedbed Preparation for Conservation Seedings. Aberdeen Plant Materials Center, Aberdeen, ID. October 3, 2011. 13p.

St. John, L. Tilley, D., Hunt, P., Wright, S. 2012. Plant Guide for Red Fescue. Aberdeen Plant Materials Center, Aberdeen, Idaho. January 19, 2012. 5p.

St. John, L. and Tilley, D. 2012. Plant Guide for cutleaf balsamroot (*Balsamorhiza macrophylla*). Aberdeen Plant Materials Center, Aberdeen, Idaho. June 28, 2012. 3p.

St. John, L. and D. Tilley 2012. Plant Guide for Annual Agoseris (*Agoseris heterophylla*). Aberdeen Plant Materials Center, Aberdeen, Idaho. May 18, 2012. 3p.

St. John, L. and D. Tilley 2012. Plant Guide for shortspine horsebrush (*Tetradymia spinosa*). Aberdeen Plant Materials Center, Aberdeen, Idaho. April 26, 2012. 3p.

St. John, L. and D. Tilley 2012. Plant Guide for Silky Lupine (*Lupinus sericeus*). Aberdeen Plant Materials Center, Aberdeen, Idaho. May 18, 2012. 4p.

St. John, L. and D. Tilley 2012. Plant Guide for spineless horsebrush (*Tetradymia canescens*). Aberdeen Plant Materials Center, Aberdeen, Idaho. April 25, 2012. 4p.

M. Winger, A. Moore, C. Falen, G. Shewmaker, K. Beckmann, S. Hanks, L. St. John, D. Ogle, R. Johnson 2011. NRCS and Partners Expand Cover Crop Technology in Idaho. American Agronomy Society, October, 2011. 1p.

Winger, M. and L. St. John 2012. Mulching Conservation Practice 484 Idaho Job sheet. Boise, Idaho State Office, Boise, Idaho. July 23, 2012. 4p.

M. Winger, A. Moore, C. Falen, G. Shewmaker, K. Beckmann, S. Hanks, L. St. John, D. Ogle and R. Johnson 2011. Natural Resources Conservation Service and Partners Expand Cover Crop Technology in Idaho. Boise, ID. October 14, 2011. 1p.

Hoag, JC, Tilley, D, Ogle, D. and L. St. John 2011. Technical Note 38: Description, Propagation, and Establishment of Wetland-Riparian Grass and Grass-like Species of the Intermountain West. Boise, Idaho. 10/6/11. 68p.

B. Waldron, K. Jensen, A. Palazzo, T. Cary, J. Robbins, M. Peel, D. Ogle, L. St. John 2011. ‘Recovery’, a New Western Wheatgrass Cultivar with Improved Seedling Establishment on Rangelands. Journal of Plant Registrations Vol. 5 No. 3, online. September, 2011. 7p.

B. Waldron, K. Jensen, A. Palazzo, T. Cary, J. Robbins, M. Peel, D. Ogle, L. St. John 2012. 'Recovery', a New Western Wheatgrass Cultivar with Improved Seedling Establishment on Rangelands. ARS Forage and Range Lab, Logan, UT and Aberdeen PMC, Aberdeen, ID. October 3, 2011. 18p.

Tilley, Derek, Dan Ogle 2011. Field and Demonstration Plantings. USDA NRCS, Boise, Idaho. October 2011. 16p.

Scianna, Joe, Larry Holzworth, Dan Ogle, Loren St John 2011. Restoration of Plant Communities with Woody Plants. USDA NRCS, Boise, Idaho. October 2011. 9p.

Ogle, Dan, Pamela Pavek, Richard Fleenor, Mark Stannard, Tim Dring, Jim Cane, Loren St John, Derek Tilley 2011. Plants for Pollinators in the Inland Northwest. USDA NRCS, Boise, Idaho. October 2011. 65p.

Ogle, Dan, Loren St John, Mark Stannard, Larry Holzworth 2011. Conservation Plant Species for the Intermountain West. USDA NRCS, Boise, Idaho. October 2011. 57p.

Ogle, Dan, Loren St John, Mark Stannard, Jim Cornwell, Larry Holzworth 2011. Pasture and Range Seedings. USDA NRCS, Boise, Idaho. October 2011. 35p.

Ogle, Dan, Loren St John, Mark Stannard, Brendan Brazee 2011. Guidelines for Determining Stand Establishment. USDA NRCS, Boise, Idaho. October 2011. 8p.

Ogle, Dan, Loren St John, Derek Tilley 2011. Plant and Seed Vendors. USDA NRCS, Boise, Idaho. October 2011. 18p.

Ogle, Dan, Loren St John, Craig Stange 2011. Tree and Shrub Planting, Care and Management. USDA NRCS, Boise, Idaho. October 2011. 35p.

Ogle, Dan, Derek Tilley, Jim Cane, Loren St John, Karen Fullen, Mark Stannard, Pamela Pavek 2011. Plants for Pollinators in the Intermountain West. USDA NRCS, Boise, Idaho. October 2011. 40p.

Ogle, Dan 2011. Glossary of Terms for Use in Plant Materials. USDA NRCS, Boise, Idaho. October 2011. 57p.

Hoag, Chris, Dan Ogle 2011. The Stinger. USDA NRCS, Boise, Idaho. October 2011. 10p.

PRESENTATIONS

Title: Area East Stream Planning and Assessment
Presenter: D. Tilley **Location:** Pocatello, ID
Date presented: 10/17/2011

Title: 2011 PMS Report
Presenter: D. Tilley **Location:** Boise, Idaho
Date presented: 2/7/2012

Title: 2011 Activities at the Aberdeen Plant Materials Center
Presenter: L. St. John **Location:** Boise, Idaho
Date presented: 2/7/2012

Title: IDPMC report to GBNPSIP
Presenter: D. Tilley **Location:** Salt Lake City, UT
Date presented: 2/21/2012

Title: 2011 PMS Report
Presenter: D. Tilley **Location:** Provo, UT
Date presented: 2/23/2012

Title: 2011 Activities Aberdeen Plant Materials Center
Presenter: L. St. John **Location:** Provo, Utah
Date presented: 2/23/2012

Title: Idaho/Utah Field Planting Program
Presenter: D. Tilley **Location:** Dutch John, Utah
Date presented: 3/28/2012

Title: PMC Update to Yellowstone National Park Revegetation Group
Presenter: L. St. John **Location:** Livingston, MT
Date presented: 3/29/2012

Title: Happy Birthday USDA, Celebrating 150 years
Presenter: L. St. John, B. Simonson, D. **Location:** Aberdeen Plant Materials Center
Date presented: 5/15/2012

Title: Wetland Plant Identification
Presenter: D. Tilley **Location:** Aberdeen PMC
Date presented: 6/14/2012

Title: Plant Materials for Sage Grouse
Presenter: PMC Team **Location:** Aberdeen, Idaho
Date presented: 6/20/2012

Title: PMC plant testing, technology transfer and operations training
Presenter: Tilley, Simonson, St. John **Location:** Aberdeen, Idaho
Date presented: 6/26/2012

Title: Curlew off-center planting tour
Presenter: Tilley and St. John **Location:** Curlew National Grassland
Date presented: 7/10/2012

Title: Range Drill Calibration and Operation workshop.
Presenter: St. John, Simonson **Location:** Snake River Birds of Prey, Idaho
Date presented: 7/18/2012

Title: Pollinator Planting Tour
Presenter: St. John and Tilley **Location:** IDPMC, Aberdeen Idaho
Date presented: 8/16/2012

Note: *Trade names are used solely to provide specific information and should not be considered a recommendation or endorsement by the Natural Resources Conservation Service.*

ON-CENTER STUDIES

FOUNDATION SEED PRODUCTION AT ABERDEEN PLANT MATERIALS CENTER

A major responsibility of the Aberdeen Plant Materials Center is the production of Foundation quality seed of the plant releases from the Center. Foundation seed is made available to the University of Idaho Agricultural Experiment Station, Idaho Crop Improvement Association, Utah Crop Improvement Association, other plant materials centers and cooperating agencies. Seed is distributed as provided for by allocation and exchange or other written agreements. Foundation seed of recent releases may also be provided to soil conservation districts for registered or certified seed production under the District Seed Increase (DSI) program.

The following table illustrates seed shipments from the Aberdeen Plant Materials Center for Fiscal year 2004 through 2012:

Cultivar	2004	2005	2006	2007	2008	2009	2010	2011	2012	TOTAL POUNDS
					POUNDS PLS					
Anatone bluebunch wheatgrass	20	250	350	400	775	450	155	125	80	2605
Appar blue flax	0	848	955	150	150	200	120	175	150	2748
Bannock thickspike wheatgrass	0	1110	900	240	150	0	0	100	850	3350
Delar small burnet	1250	945	490	100	1225	0	0	300	0	4310
Ephraim crested wheatgrass	200	0	1300	300	500	605	0	0	300	3205
Goldar bluebunch wheatgrass	200	200	170	250	450	300	250	100	400	2320
Magnar basin wildrye	245	0	0	490	50	0	50	0	150	985
Maple Grove lewis flax	240	280	70	-	-	-	0	0	65	655
Nezpar Indian ricegrass	0	300	500	700	150	100	0	0	200	1950
P-27 Siberian wheatgrass [1/]	0	0	0	200	200	0	-	-	-	400
Clearwater selection penstemon	4	8	0	0	0	1	4	20	0	37
Richfield selection penstemon	3	11	25	6	4	11	9	5	10	84
Paiute orchardgrass	0	0	75	200	50	300	0	0	0	625
Recovery western wheatgrass						400	0	450	425	1275
Regar meadow brome	50	0	650	50	400	0	50	100	100	1400
Rush intermediate wheatgrass	0	800	300	500	0	0	0	0	50	1650
S.R.P. fourwing saltbush [2/]	2	16	0	0	0	0	0	0	0	18
Sodar streambank wheatgrass	0	625	775	250	400	50	0	0	300	2400
Tegmar dwarf intermediate wheatgrass	200	0	0	0	0	250	250	150	0	850
Northern Cold Desert winterfat [2/]	8	20	5	4	0	0	2	0	0	39
Vavilov II Siberian wheatgrass	-	-	-	-	600	300	635	320	230	2085
TOTAL POUNDS	2,422	5,413	6,565	3,840	5,104	2,967	1,525	1,845	3,310	32,991

[1/] Release discontinued in 2009.
[2/] Release discontinued in 2012.

March 19, 2012

Aberdeen Plant Materials Center

2012 FIELD ANNUAL PLAN OF OPERATION
HOME FARM

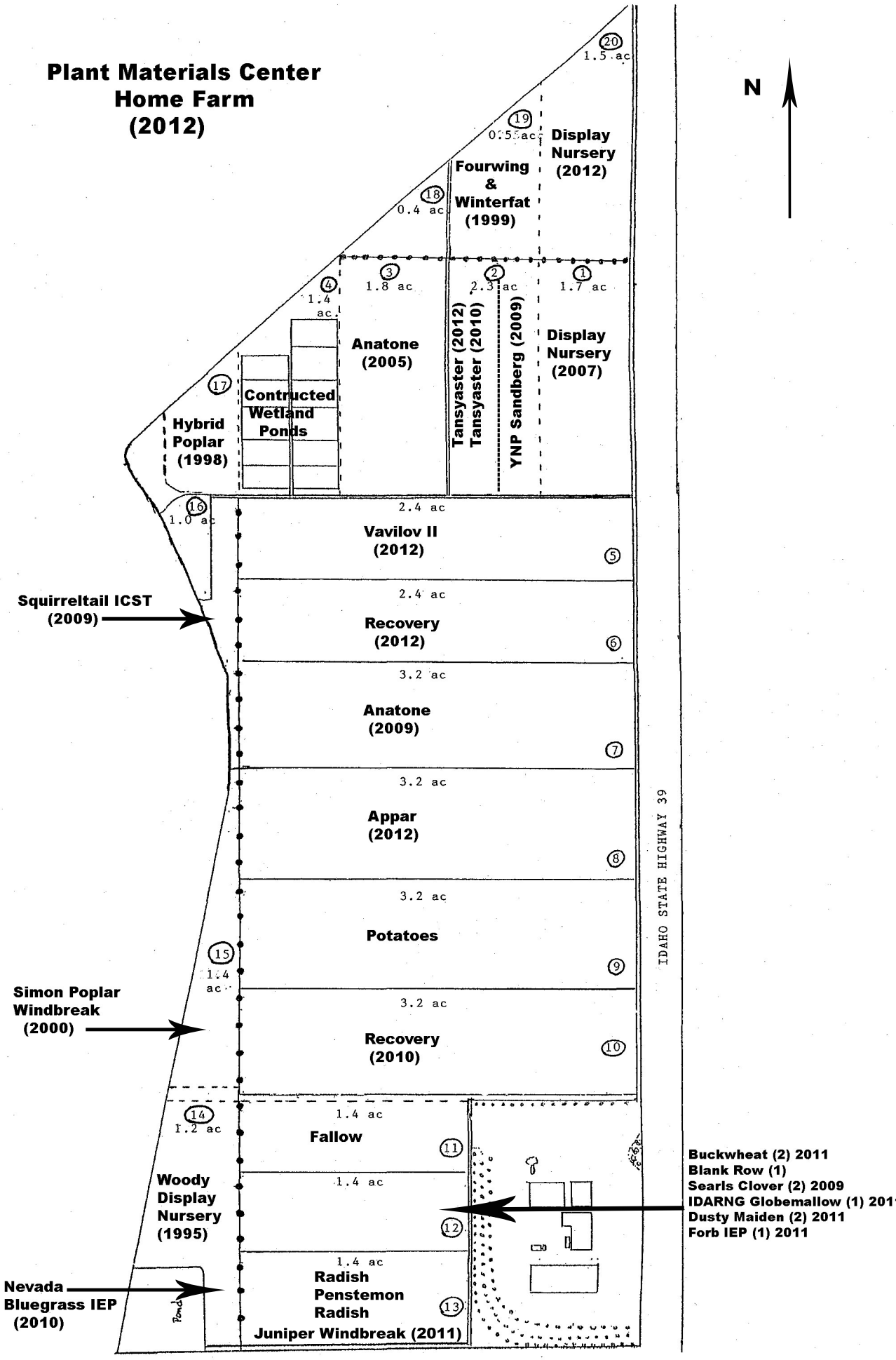
Field	Acres	Crop	Operation
1	1.7	Display Nursery (2007)	Manage for display. Plant data to be collected for CEAP/ALMANAC.
2E	1.3	Sandberg Bluegrass (2009) (Yellowstone NP)	Manage for seed production.
2W	0.5	Tansyaster (2010-11)	Manage for Certified seed production and release.
	0.5	Tansyaster (2012)	Establish direct seed increase this spring.
3	1.8	Anatone Bluebunch (2005)	Manage for Certified seed production.
4	1.4	Constructed Wetland Ponds	Irrigate to June 1 and evaluate.
5	2.4	Vavilov II	Establish for Foundation seed in August.
6	2.4	Recovery	Establish for Foundation seed in August.
7	3.2	Anatone (2009)	Manage for Certified seed production.
8	3.2	Appar	Establish for Foundation seed this spring.
9	3.2	Potatoes	U of I will plant potatoes.
10	3.2	Recovery (2010)	Manage for Certified seed production.
11	1.4	Fallow	Fallow as needed for weed control.
12		Buckwheat (2) 2011 Blank row Searls' clover (2) 2009 IDARNG globemallow 2011 Dusty Maiden (2) 2011 Forb IEP 2011)	Manage for Certified seed production/ evaluation.
13N	0.6	Radish	Plant radish in August.
13M	0.2	Penstemon (2003)	Maintain for pollinator habitat.
13S	0.6	Radish	Plant radish in August.
13S	0.2	Juniper windbreak (2011)	Maintain windbreak.
14	1.2	Woody Display Nursery (1995)	Maintain display of woody conservation plants. Manage Durar/Covar cover crop.
14S	0.3	Nevada Bluegrass IEP (2010)	Evaluate and manage according to study plan.

Aberdeen Plant Materials Center

2012 FIELD ANNUAL PLAN OF OPERATION

HOME FARM (Continued)

Field	Acres	Crop	Operation
15	1.4	Field windbreak (2000)	Maintain Simon poplar field windbreak.
16	1.0	Squirreltail ICST (2009)	Evaluate according to study plan.
17	0.5	Hybrid Poplars (1998)	Manage for long term survival evaluation.
18-19	0.9	Fourwing and winterfat (1999)	Maintain cover.
20	1.5	Display Nursery (2012)	Establish new grass display nursery in August.


Plant Materials Center
Home Farm
(2012)
N
20
1.5 ac
19
0.5 ac
Display Nursery (2012)
Fourwing & Winterfat (1999)
18
0.4 ac
4
1.4 ac.
3
1.8 ac
2
2.3 ac
1
1.7 ac
Anatone (2005)
Tansyaster (2012)
Tansyaster (2010)
YNP Sandberg (2009)
Display Nursery (2007)
17
Contructed Wetland Ponds
Hybrid Poplar (1998)
16
1.0 ac
2.4 ac
Vavilov II (2012)
5
Squirreltail ICST (2009)
2.4 ac
Recovery (2012)
6
3.2 ac
Anatone (2009)
7
3.2 ac
Appar (2012)
8
3.2 ac
Potatoes
9
15
1.4 ac
Simon Poplar Windbreak (2000)
3.2 ac
Recovery (2010)
10
14
1.2 ac
1.4 ac
Fallow
11
Woody Display Nursery (1995)
1.4 ac
12
1.4 ac
Radish
Penstemon
Radish
13
Juniper Windbreak (2011)
Nevada Bluegrass IEP (2010)
Pond
IDAHO STATE HIGHWAY 39
Buckwheat (2) 2011
Blank Row (1)
Searls Clover (2) 2009
IDARNG Globemallow (1) 2011
Dusty Maiden (2) 2011
Forb IEP (1) 2011

Aberdeen Plant Materials Center

2012 FIELD ANNUAL PLAN OF OPERATION

FISH AND GAME FARM

Field	Acres	Crop	Operation
21W	0.7	Forage kochia trial (2012)	Establish for evaluation/demonstration.
21W	0.3	Idaho Fescue (Grand Teton NP – 2008)	Manage for seed production.
21M	1.3	Maple Grove (2010)	Manage for Certified seed production.
21E	1.4	Pipe yard (2004)	Maintain permanent yard for pipe storage.
21N	1.3	Bozoisky Cover crop (1985)	Maintain as needed for permanent cover.
22W	4.1	Alfalfa (2008)	Manage for hay production and wildlife benefits.
22E	1.3	Willow IEP (1984)	Maintain for wildlife cover.
23W	2.4	Bozoisky Cover crop (2007)	Maintain as needed for permanent cover.
23M	--	Windbreak	Maintain and irrigate as needed.
23E	2.2	Goldar (2011)	Manage for Foundation seed production.
24W	1.1	Windbreaks	Maintain and irrigate as needed.
24 M	2.2	Wildlife Food Plot	Establish and maintain wheat for wildlife use.
24E	1.5	Wildlife Food Plot	Establish and maintain wheat for wildlife use.
25W	1.5	Wildlife Food Plot	Establish and maintain wheat for wildlife use.
25E	3.5	Goldar (2009)	Manage for Foundation seed production.
26W	1.0	Bozoisky Cover crop (2005)	Maintain as needed for permanent cover.
26E	2.7	Willow Cutting Nursery (1994)	Maintain as needed.
27W	2.2	Bozoisky Cover crop (2005)	Maintain as needed for permanent cover.
27M	1.2	Bozoisky Cover crop (2007)	Maintain as needed for permanent cover.
27E	1.0	Wildlife Food Plot	Establish and maintain millet for wildlife use.
28W	0.2	Wildlife Food Plot	Establish and maintain millet for wildlife use.
28E	5.0	Pollinator Plot	Maintain and evaluate pollinator display planting.
29W	1.3	Willows (1994)	Manage for cuttings.
29E	3.7	Alfalfa (2008)	Manage for hay production and wildlife benefits.

Aberdeen Plant Materials Center

2012 FIELD ANNUAL PLAN OF OPERATION
FISH AND GAME FARM (continued)

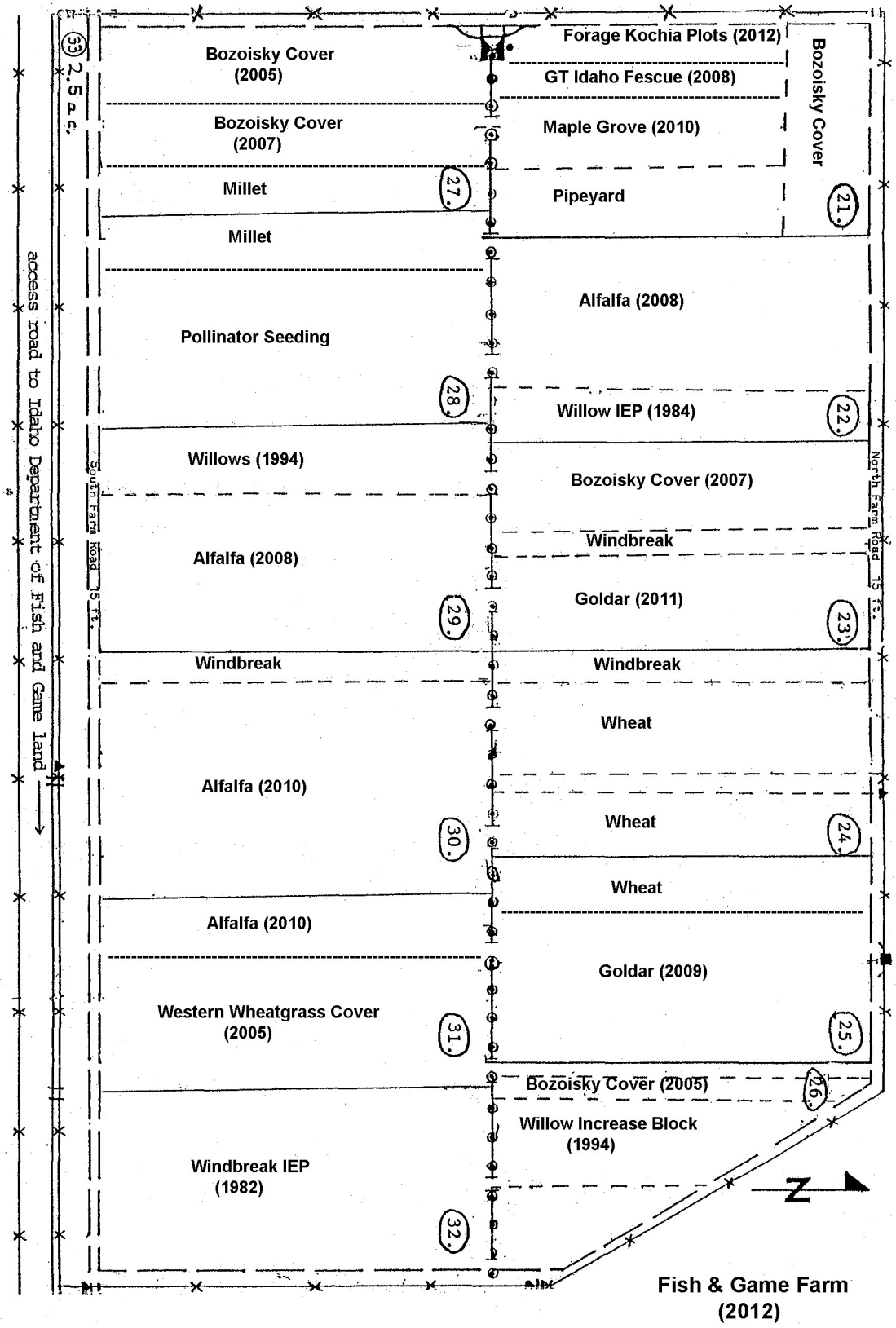
Field	Acres	Crop	Operation
30W	0.7	Windbreak	Maintain and irrigate as needed.
30E	4.8	Alfalfa (2010)	Establish and manage for hay and wildlife benefits.
31W	1.5	Alfalfa (2010)	Establish and manage for hay and wildlife benefits.
31E	3.75	Western w.g. (2005)	Clip and spray for noxious weeds.
32	6.2	Windbreak IEP (1982)	Maintain as needed.

Any hay grown will not be cut prior to June 15 and not after September 1. Hay will be irrigated after last cut to first fall frost to achieve regrowth prior to winter dormancy.

Irrigated, permanent grass cover seedings will not be mowed prior to July 1 and not after August 1 and will be irrigated a minimum of 3 times. Non-irrigated grass cover seedings will not be mowed. Early mowing or mowing of non-irrigated grass cover requires notification to and inspection by Fish and Game.

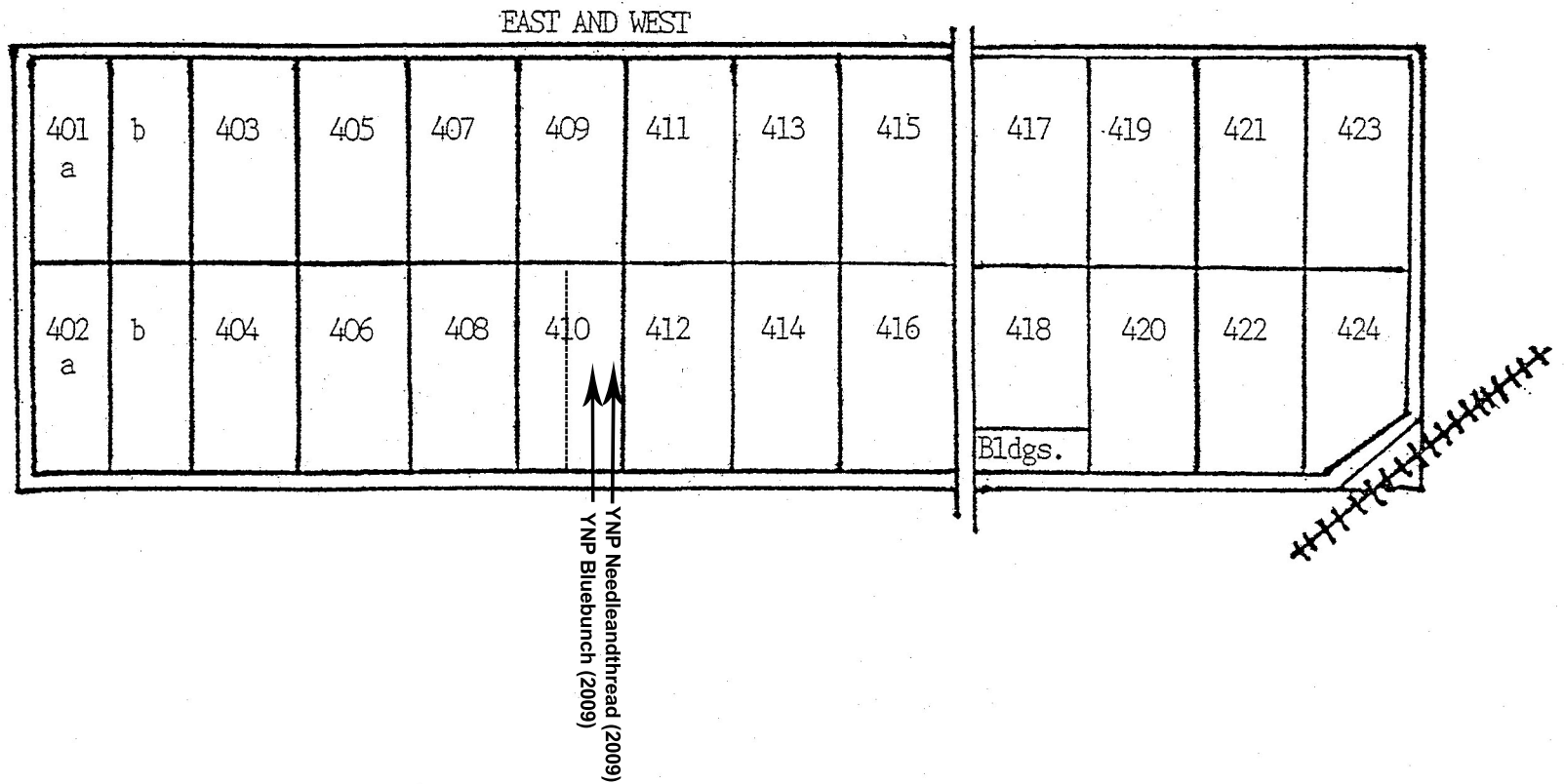
BREWINGTON FARM (U of I)

Field	Acres	Crop	Operation
410M	1.0	Bluebunch Wheatgrass (2009) (Yellowstone NP)	Manage for seed production.
410E	1.0	Needleandthread (2009) (Yellowstone NP)	Manage for seed production.



Fish & Game Farm
(2012)

University of Idaho
Brewington Farm
(2012)



Aberdeen Plant Materials Center

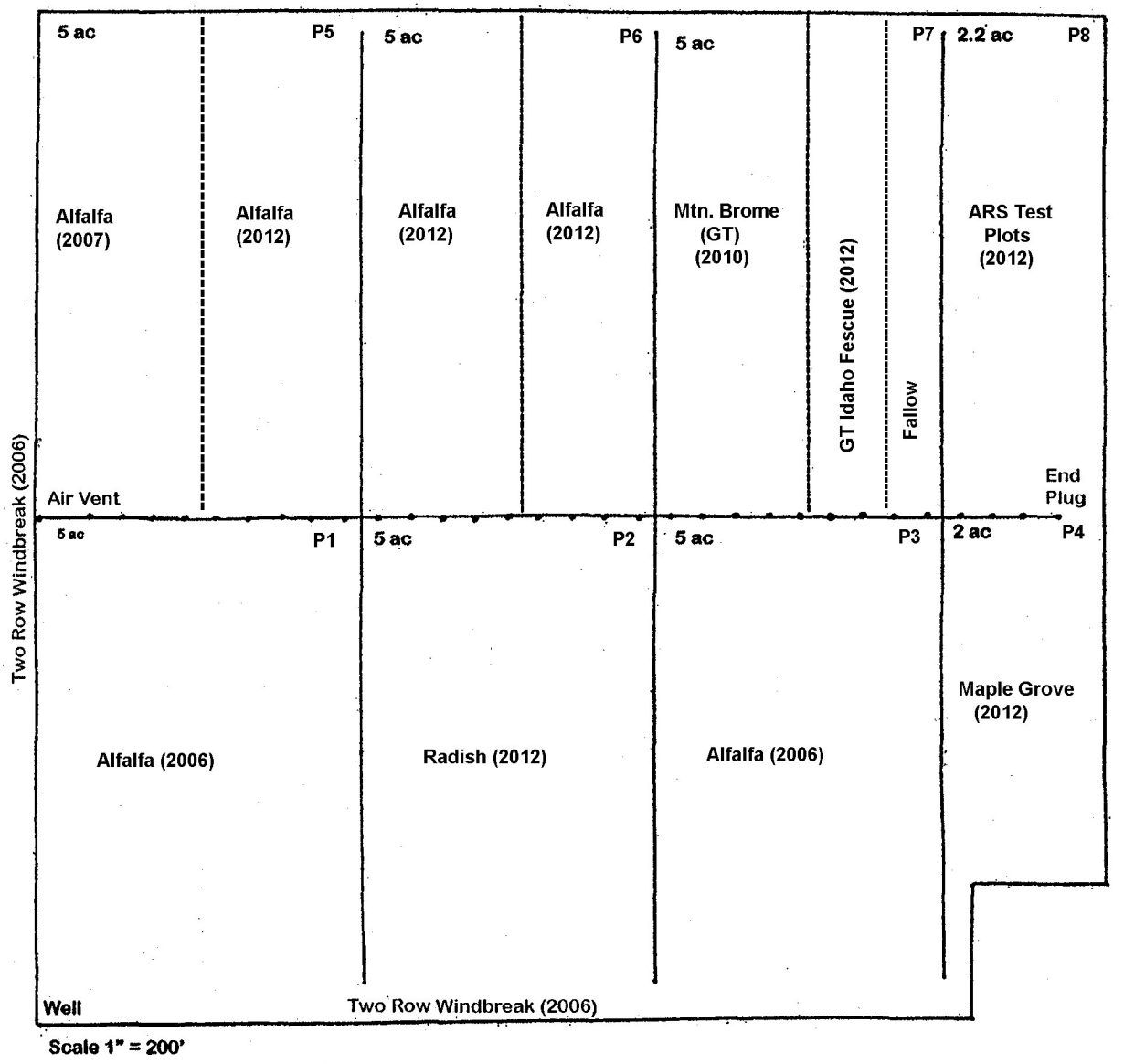
2012 FIELD ANNUAL PLAN OF OPERATION (continued)

PEARL FARM

Field	Acres	Crop	Operation
P1	5.0	Alfalfa (2006)	Maintain for hay production and to improve soil quality.
P2	5.0	Radish	Plant radish for cover crop in August.
P3	5.0	Alfalfa (2006)	Maintain for hay production and to improve soil quality.
P4	2.0	Maple Grove	Establish and maintain for Certified seed production.
P5W	2.5	Alfalfa (2007)	Maintain for hay production and to improve soil quality.
P5E	2.5	Alfalfa	Establish for hay production and to improve soil quality.
P6	5.0	Alfalfa	Establish for hay production and to improve soil quality.
P7W	2.5	Mountain Brome (2010) (Grand Teton NP)	Manage for seed production.
P7M	1.0	Idaho Fescue (2012)	Establish for seed production.
P7E	1.5	Fallow	Fallow for weed control.
P8	2.2	ARS test plots	Establish and evaluate plots.

Maintain two-row windbreak (Rocky Mountain Juniper and Simon Poplar established on south and west farm borders.

PLANT MATERIALS CENTER
PEARL FARM
(2012)



Project Title: Cooperative Work between the Great Basin Native Plant Selection and Increase Project and the Aberdeen Plant Materials Center

Project: USADA-NRCS Aberdeen Plant Materials Center, Aberdeen, Idaho

Principal Investigators and Contact Information:

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Highlights:

- Development of NRCS Plant Guides
- Progress towards release of Douglas' dustymaiden
- Progress towards release of hoary tansyaster
- Propagation Protocols for Douglas' dustymaiden, hoary tansyaster, nineleaf biscuitroot, fernleaf biscuitroot, Gray's biscuitroot and Searls' prairie clover

Project Description:

Plant Guides

The Aberdeen PMC is gathering information on significant/important/notable/ selected plant species to create NRCS plant guides. Plant guides offer the most recent information on plant establishment methods as well as seed and plant production suggestions. General information for the species can also be found in the plant guide, including information on potential uses, ethnobotanical significance, adaptation, and pests and potential problems. In 2011 plant guides were completed or revised for fernleaf biscuitroot (*Lomatium dissectum*), Gray's biscuitroot (*L. grayi*), nineleaf biscuitroot (*L. triternatum*), hoary tansyaster, and Douglas' dustymaiden. In 2012, Aberdeen PMC will produce plant guides for gooseberryleaf globemallow (*Sphaeralcea grossularifolia*), blue penstemon (*Penstemon cyaneus*), yellow beeplant (*Cleome lutea*), and tapertip hawksbeard (*Crepis acuminata*). Plant guides are available at the PLANTS database, www.plants.usda.gov, and at the Aberdeen Plant Materials Center website, www.id.nrcs.usda.gov/programs/plant.html.

Douglas' Dustymaiden

Fifteen accessions of Douglas' dustymaiden were evaluated at Aberdeen PMC from 2009 to 2010. The accessions were evaluated for establishment, growth and seed production. Following evaluation, accession 9076577 was chosen for selected class release. Accession 9076577 was

originally collected in Boise County, Idaho near Arrow Rock and Lucky Peak Reservoirs, approximately 0.5 miles west of the dam on Forest Road 268. The site is a mountain big sagebrush/bitterbrush community in coarse granitic soils at 3150 ft elevation. Accession 9076577 ranked at or near the top for percent establishment, plant vigor, height, flower production and seed yield. In the fall of 2010, a 500 foot row of weed barrier fabric was planted to accession 9076577; however problems encountered during planting resulted in poor germination and establishment. In 2011, 1,000 new feet of fabric were seeded. Release documentation is being developed and official release will occur once the PMC has produced a sufficient amount of early generation seed.

Hoary tansyaster

Nine accessions of hoary tansyaster were evaluated from 2009 through 2011 for establishment, plant growth and seed production. This accession had the best establishment and stands for 2009 and 2010, and had the best rated vigor in 2010. This accession also had the tallest plants in the study. Although we were not able to evaluate seed production in 2010 due to wind storms, 9076670 was observed to be an excellent seed producer. The population for 9076670 is located near the St. Anthony Sand Dunes in Fremont County, Idaho at 5,000 ft elevation. The site has sandy soils and supports a bitterbrush, Indian ricegrass, rabbitbrush, scurfpea plant community. The location receives on average between 10 and 15 inches of mean annual precipitation. In 2010, the site was revisited to collect additional seed to use in a seed increase planting at IDPMC. In 2010, 500 feet of row of weed barrier fabric was planted. An additional 1,000 feet of row was planted in 2011. Next spring, we plan to establish an additional non-fabric field for seed increase. Release documentation is being developed and official release will occur once the PMC has produced a sufficient amount of early generation seed.

Propagation Protocols

Seed production information obtained during collection evaluation and seed increase of native forb species was used to develop propagation protocols for Douglas' dustymaiden, hoary tansyaster, nineleaf biscuitroot, fernleaf biscuitroot and Gray's biscuitroot and Searls' prairie clover. These protocols provide information on seed collection, planting, management, harvest and cleaning. Propagation protocols are available at http://nativeplants.for.uidaho.edu.

Publications:

St. John, L.; Ogle, D. 2011. Cooperative Work between the Great Basin Native Plant Selection and Increase Project and the Aberdeen Plant Materials Center. Great Basin Native Plant Selection and Increase Project FY2010 Progress Report. p. 69-76. http://www.fs.fed.us/rm/boise/research/shrub/projects/documents/2009_Progress_Report.pdf

St. John, Loren; Tilley, Derek.; Ogle, Dan.; Johnson, Doug.; Bushman, Shawn. 2012. Propagation protocol for production of *Dalea searlsiae* (A. Gray) Barneby seeds; USDA NRCS - Aberdeen Plant Materials Center, Aberdeen, Idaho. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 13 January 2012). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

Tilley, Derek 2011. Propagation protocol for production of *Machaeranthera canescens* (Pursh) A. Gray seeds; USDA NRCS - Aberdeen Plant Materials Center, Aberdeen, Idaho. In: Native

Plant Network. URL: http://www.nativeplantnetwork.org. Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.
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Tilley, D., D. Ogle, and L. St. John. 2010. Plant guide for Doulas' dusty maiden (*Chaenactis douglasii*). USDA-Natural Resources Conservation Service, Idaho Plant Materials Center. Aberdeen, ID. 83210.
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Tilley, D., D. Ogle, and L. St. John. 2010. Plant guide for hoary tansyaster (*Machaeranthera canescens*). USDA-Natural Resources Conservation Service, Idaho Plant Materials Center. Aberdeen, ID. 83210.
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Tilley, D., St. John, L. Ogle, D., and N. Shaw. 2011. Plant guide for Gray's biscuitroot (*Lomatium grayi*). USDA-Natural Resources Conservation Service, Idaho Plant Materials Center. Aberdeen, ID.
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Tilley, D., St. John, L. Ogle, D. and N. Shaw. 2010. Plant guide for nineleaf biscuitroot (*Lomatium triternatum*). USDA-Natural Resources Conservation Service, Idaho Plant Materials Center. Aberdeen, ID. 4 p.
www.plants.usda.gov

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www.plants.usda.gov

Tilley, Derek; St. John, Loren.; Ogle, Dan.; Shaw, Nancy.; Cane, Jim. 2012. Propagation protocol for production of *Lomatium dissectum* (Nutt.) Mathias & Constance seeds; USDA NRCS - Aberdeen Plant Materials Center, Aberdeen, Idaho. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 13 January 2012). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

Tilley, Derek; St. John, Loren.; Ogle, Dan.; Shaw, Nancy. 2012. Propagation protocol for production of *Lomatium grayi* (J.M. Coult. & Rose.) J.M. Coult. & Rose seeds; USDA NRCS - Aberdeen Plant Materials Center, Aberdeen, Idaho. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 13 January 2012). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

Tilley, Derek; St. John, Loren.; Ogle, Dan.; Shaw, Nancy.; Cane, Jim. 2012. Propagation protocol for production of *Lomatium triternatum* (Pursh) Coulter & Rose seeds; USDA NRCS - Aberdeen Plant Materials Center, Aberdeen, Idaho. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 13 January 2012). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

Presentations:
Tilley, D. St. John, L., and D. Ogle 2011. Aberdeen PMC report of activities, 2010. Great Basin Native Plant Selection and Increase Project Annual Meeting; 2011 February 21-22; Salt Lake City, UT.
http://www.fs.fed.us/rm/boise/research/shrub/GBNPSIP/GBNPSIPpresentations2011.shtml

St. John, L. 2011. Joint Fire Science Seeding at Wildcat Hills, UT. June 2, 2011.

St. John, L. 2011. Orchard Experimental Restoration Site Field Day. June 28, 2011

Management Applications and Seed Production Guidelines:
Douglas' dustymaiden and hoary tansyaster are feasible for commercial seed production. Douglas' dustymaiden establishes well using fall dormant seedings. Hoary tansyaster has no seed dormancy issues and can be established with fall or spring seeding. Weed control in seed production fields of native forbs remains an obstacle, and various control methods are being evaluated. The use of weed barrier fabric is encouraged. Seed ripening is indeterminate and poses problems for a single harvest system; however high yields can be obtained with multiple harvests conducted by hand or with a vacuum type harvester followed by a final combining.

Products:
1. Plant Guides are available for royal penstemon, hotrock penstemon, sharpleaf penstemon, fernleaf biscuitroot, nineleaf biscuitroot, Gray's biscuitroot, Douglas' dustymaiden, and hoary tansyaster.

2. Propagation Protocols are available for Douglas' dustymaiden, hoary tansyaster, nineleaf biscuitroot, fernleaf biscuitroot and Gray's biscuitroot and Searls' prairie clover.

3. Early generation Certified seed of hoary tansyaster and Douglas' dustymaiden is being produced and will be available through Utah Crop Improvement and University of Idaho Foundation Seed Program when release is approved.

GRAND TETON NATIONAL PARK

FY2011 Annual Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
ABERDEEN, IDAHO

INTRODUCTION - The Aberdeen Plant Materials Center (PMC) entered into an interagency agreement with Grand Teton National Park (GTNP) in 2006 to produce seed of four native grasses for use in revegetation of disturbed areas following road construction. Seed fields of slender wheatgrass (*Elymus trachycaulus*), Sandberg bluegrass (*Poa secunda*), blue wildrye (*Elymus glaucus*) and mountain brome (*Bromus marginatus*) were planted in 2006, and seed was harvested in 2007 and 2008. New fields of Idaho fescue (*Festuca idahonensis*) and bluebunch wheatgrass (*Pseudoroegneria spicata*) were planted in May, 2008. Seed from these fields were harvested in 2009 and 2010. The bluebunch wheatgrass field was removed in late 2010 because of poor seed yield. In 2010, a new field of mountain brome was planted for seed production in 2011 and 2012. The Idaho fescue field was also harvested in 2011.

ACCOMPLISHMENTS – Seed fields are sprinkler irrigated to supplement natural precipitation to approximate 18 to 20 inches of total annual moisture. Weeds were controlled during the growing season. Requested seed was delivered to GTNP on Sept. 14, 2011. The following table lists species grown for GTNP, field acreage, current seed inventory and seed shipped during 2011.

Species	Harvest year	Field size (ac)	Inventory PLS pounds	Lbs. shipped 2011	Seed Test date
Mtn. brome	2011	2.5	66	2210	9/19/11
Idaho fescue	2011	0.3	83		2/22/12
Idaho fescue	2010	0.3	0	82	3/21/11
Bluebunch wht.g.	2010	0.17	0	1.57	3/21/11
Slender wht.g.	2009	1.0	489.8		5/17/10
Slender wht.g.	2008	1.0	499.4		4/14/09
Slender wht.g.	2007	1.0	0	567	3/20/08
Sandberg b.g.	2007	0.25	0	2.98	3/19/09
Sandberg b.g.	2009	0.25	0	4.15	6/4/10
Blue wildrye	2008	2.7	389.2		4/22/09
Blue wildrye	2007	2.7	598.9	100	3/10/08

DIGITAL PHOTOS

Grand Teton National Park Idaho fescue seed increase field at Aberdeen PMC. July 2011.

Grand Teton National Park Mountain brome seed increase field at Aberdeen PMC. July 2011.

YELLOWSTONE NATIONAL PARK - WETLAND PLANT PROPAGATION

FY2011 Annual Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
ABERDEEN, IDAHO

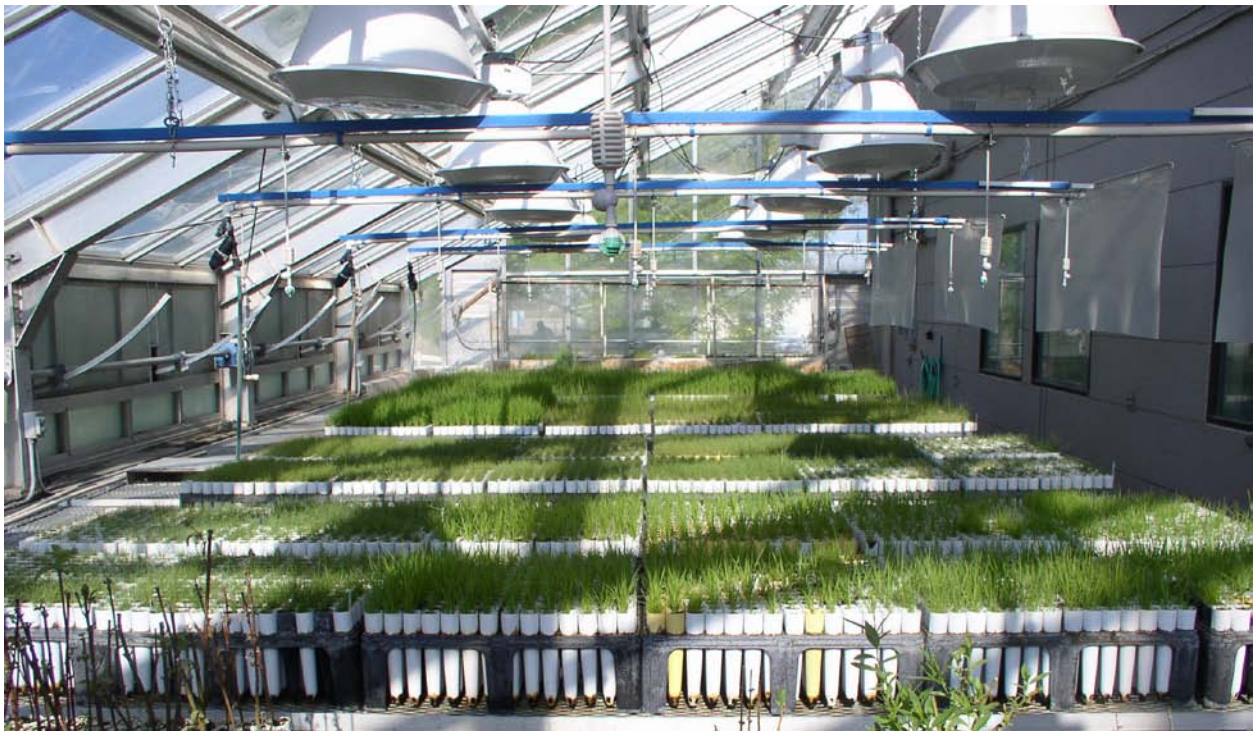
INTRODUCTION - In 2008, the Natural Resources Conservation Service (NRCS), Aberdeen, Idaho Plant Materials Center (PMC) entered into an interagency agreement with the National Park Service (NPS), Yellowstone National Park (YNP) to propagate and deliver approximately 35,000 wetland plants in 10 cubic inch conetainers. Delivery took place over a three year period (targeting approximately 12,000 plants per year) beginning in the fall of 2009. Species grown were *Carex aquatilis, C. rostrata, Juncus ensifolius, Calamagrostis canadensis,* and *Deschampsia caespitosa*. Seed for propagation was provided from YNP collections stored at the Bridger, Montana PMC. 2011 was the final year of the agreement.

ACCOMPLISHMENTS – The following table outlines the number of plants requested, greenhouse planting date, survival and number of plants delivered to YNP in 2011:

Species	Requested #	# Planted	Planting Date	# Delivered	% Survival
Deschampsia caeaspitosa	3,038	3,234	3/30/10	3,170	98
Calamagrostis canadensis	1,274	1,470	3/30/10	2,050	95
Carex rostrata	1,960	2,156	4/1/10	2,134	99
Carex aquatilis	3,038	3,136	4/1/10	3,136	100
Juncus ensifolious (2009 planting)	2,058	3,038	8/23/11	2,125	70
Total	11,368	13,034		12,615	92

TECHNOLOGY DEVELOPMENT – *Deschampsia caeaspitosa, Calamagrostis canadensis, Juncus ensifolious, and Carex aquatilis* were direct seeded into conetainers with no pre-treatment of the seed. The *Carex rostrata* seed was stratified in a "sphagnum moss tea" at 5º C for 14 days and 40 days respectively prior to planting. All seed was surface planted, and pressed into soil surface to maximize seed-to-soil contact. Irrigation was by overhead spray with water applied 2 minutes every hour from 9 am to 6 pm daily. Supplemental lighting was provided from 8 pm to 8 am each day until May 27. Plants were fertilized with liquid Miracle Grow® once weekly from April 21 – July 7. Greenhouse temperature was kept at 90 -100º F. The plants were delivered to Stevens Creek Nursery at YNP on July 27.

DIGITAL PHOTOS



Wetland plants for Yellowstone National Park at Aberdeen Plant Materials Center greenhouse June 10, 2011.

Wetland transplants along Gibbon River, Yellowstone National Park Summer, 2011.

YELLOWSTONE NATIONAL PARK – GRASS SEED PRODUCTION

FY2011 Annual Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
ABERDEEN, IDAHO

INTRODUCTION - In 2008, the Natural Resources Conservation Service (NRCS), Plant Materials Center (PMC), Aberdeen, Idaho entered into an interagency agreement with the National Park Service (NPS), Yellowstone National Park (YNP) to produce seed of Sandberg bluegrass (*Poa secunda*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and needleandthread (*Hesperostipa comata* ssp. *comata*) for use on restoration sites at YNP. Seed was harvested from these fields in 2011 and will be harvested again in 2012 after which agreement is scheduled to terminate.

ACCOMPLISHMENTS - The seed fields were planted in spring 2009. Sandberg bluegrass was planted in field 2E at the PMC Home Farm and the bluebunch wheatgrass and needleandthread were planted in field 410E at the University of Idaho Brewington Farm. Each seed increase block is approximately 1 acre. Soils at the PMC Home Farm are Declo silt loam with pH of 7.4 to 8.4. Soils at the Brewington Farm are also classified as Declo loam but these soils have a high percentage of sand. Average annual precipitation is 9.39 inches and seed fields are sprinkler irrigated to supplement natural precipitation to approximate 18 to 20 inches total annual precipitation. Establishment of the seed production fields were rated fair to good. In 2010, the fields at the Brewington Farm suffered from herbicide damage and no seed was harvested from the bluebunch wheatgrass field. A bale of needleandthread hay containing seed and weighing 195 pounds was harvested and delivered to YNP in September, 2010. The Sandberg bluegrass (which was not sprayed in April) produced 58.2 PLS pounds of seed in 2010. The bluebunch wheatgrass and needleandthread fields recovered from the herbicide damage by late summer 2010 and produced seed in 2011. The following table lists all species grown for YNP, field acreage, current seed inventory and seed shipped during 2011.

Species	Harvest year	Field size (ac)	Inventory PLS pounds	Lbs. shipped 2011	Seed Test date
Sandberg b.g.	2011	1.0	118		2/22/12
Sandberg b.g.	2010	1.0	58.2		3/28/11
Bluebunch wht.g.	2011	1.0	95.57		2/8/12
Needleand thread (hay)	2011	1.0		2520	N/A

DIGITAL PHOTOS

Swathing YNP Sandberg bluegrass at Aberdeen PMC. July 2011.

YNP needleandthread bales ready for delivery from Aberdeen PMC. July 2011.

YNP bluebunch wheatgrass growing at Aberdeen PMC. July, 2011.

Nevada Bluegrass Initial Evaluation Planting

2012 Progress Report
Study Number: IDPMC-P-0816-RA
Derek J. Tilley, PMC Agronomist
Loren St. John, PMC Team Leader
Natural Resources Conservation Service
Plant Materials Center
Aberdeen, Idaho

Introduction

Nevada bluegrass (*Poa secunda* ssp. *nevadensis*) is a large statured subspecies of the Sandberg bluegrass complex (Majerus et al., 2011). It can be found in the foothills and mountains of southern Idaho, northern Utah and Nevada, eastern Oregon and Washington and western Montana and Wyoming. Nevada bluegrass is similar to Sandberg bluegrass, but is considerably larger in stature, approximating the size of big bluegrass (*Poa secunda* ssp. *ampla*). This subspecies is a perennial bunchgrass with culms as much as 100 cm (40 in) tall. Basal leaves typically reach a length of 25 cm (10 in) with a width of 1 to 3 mm (1/16 to 3/32 in). Nevada bluegrass has distinctive long acuminate ligules from 1.5 to 6 mm (1/16 to ¼ in) long. The narrow panicles are 10 to 18 cm (4 to 7 in) long with yellowish-green to purplish-tinged spikelets. Nevada bluegrass can be distinguished from Sandberg bluegrass by its glabrous (hairless) to scabrous (rough) lemma, long decurrent ligules and large stature. The species can be wind pollinated, self-fertile, or apomictic (Monsen et al., 2004).

Nevada bluegrass is found in 10 inch and greater rainfall areas in sagebrush steppe plant communities including mountain foothills and mountains from Alaska to southern California, through Nevada to Arizona and Colorado. In the Intermountain Region plants are commonly found in the lower foothills into the mountains of southern Idaho, northern Nevada and Utah, eastern Oregon and Washington and western Montana and Wyoming.

There are no releases of Nevada bluegrass selected specifically for use in the Aberdeen PMC service area. Bridger PMC has recently released Opportunity Germplasm Nevada bluegrass for use in mine spoil contaminated soils in Wyoming and Montana (Majerus and Majerus, 2008).

Because of the small stature and early maturity, most species of Sandberg bluegrass complex do not provide much usable forage; however, Nevada bluegrass can be an important forage producer for larger animals. Sandberg bluegrass and its subspecies are usually minor components of many grassland communities, but are considered among the six most important rangeland grasses of the Intermountain and Pacific Northwest regions (USDA Forest Service 1937).

The anticipated use of commercially available Nevada bluegrass seed is for inclusion in native mixtures for wildlife habitat, reclamation of disturbed sites, restoration of native rangeland, and conservation plantings. Nevada bluegrass is a good forage producer and has value in native species rehabilitation and site recapture.

Materials and Methods

Seed was collected from native sites during the summer of 2008. Seed was air dried and then cleaned to approximately 97% purity. Cleaned seed was placed in cold-dry storage (ca 50º F, 20% RH) until planting. Viability was estimated in January 2010 using the kerosene heater "popping" method outlined in Tilley et al., (2010) and in-house germination tests.

Greenhouse Trial

On January 14, 2010 Aberdeen PMC initiated a greenhouse trial to evaluate seedling emergence. Seed was sown into 12 x 18 inch greenhouse trays filled with a soil mix containing 1 part coconut fiber peat, 1 part compost and 1 part perlite. The seed was sown into rows at 50 seeds/linear foot. Seeding depth was 0 to ¼ inches. The trays were watered with overhead irrigation. Temperatures in the greenhouse averaged between 50 and 75 degrees with a 17 hour photoperiod.

Three germination indices were calculated in this trial. A germination rate was determined by using the method described by Maguire (1962). The number of seedlings obtained at each counting was divided by the number of days after planting, and the values obtained at each count were summed at the end of the test as follows:

$$\text{Germination rate} = \left(\frac{\text{Number of seedlings}}{\text{Days after planting}}\right) + \ldots + \left(\frac{\text{Number of seedlings}}{\text{Days after planting}}\right)$$

Days to 50% germination (D_{50}) and days between attainment of 10% and 90% germination ($D_{10\text{-}90}$) were obtained by plotting percent germination versus days after planting, in a quadratic regression. Germinants were counted upon visual detection of the cotyledon. Values obtained were then subjected to an analysis of variance with an alpha of 0.05 to determine significance. Means were separated using a LSD (least significant difference) test. Average total germination percentages are also reported but were not analyzed for significance.

Field Trial

Experimental design of the field trial was a randomized complete block with four replications. Individual plots were 20 feet long and contained a single row with rows planted on three foot centers. The trial contains primarily Nevada bluegrass, but also includes several collections of Sandberg bluegrass and big bluegrass. The experimental design also included plots of known industry standards (Mountain Home, Opportunity, Hanford Source, Sherman, and High Plains) for comparison.

Soil at the site is a Declo silt loam with pH of 7.4 to 8.4. Average annual precipitation is 9 inches. The planting site was prepared in the fall of 2009 and spring of 2010 with herbicide and tillage applications. Plots were planted with a belt-seeder on June 14, 2010 at a depth of 0-1/4 inch. The plots were planted at a target seed rate of 50 seeds/linear foot using an estimated 1 million seeds per pound based on Ogle et al. (2009), which lists an estimated 925,000 seeds/pound and USDA (2009) which lists 1,049,000.

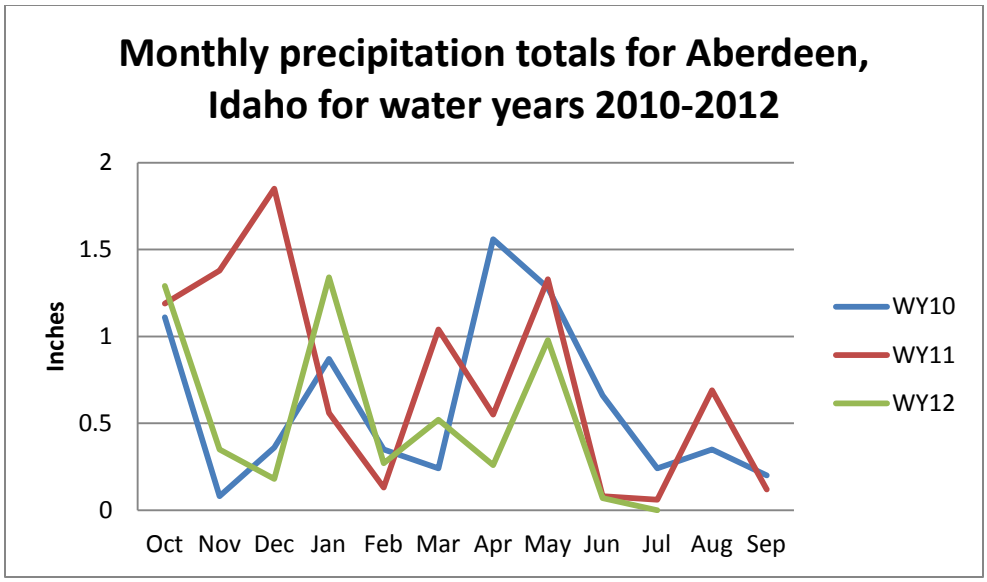
On September 12, 2010 the plots were evaluated for percent stand, plant density and seedling vigor. Percent stand was measured using a twenty foot rope marked with one foot increments stretched the length of the plot and anchored at either end. Plants intercepting the one foot increments were summed and recorded as a percentage. Plant density was measured by counting seedlings found in the middle two feet of row and converted to average number of plants per foot of row. Representative plants in each plot were measured for plant height. Plant heights were not analyzed for significance. Only accessions with measureable plants are reported for 2010.

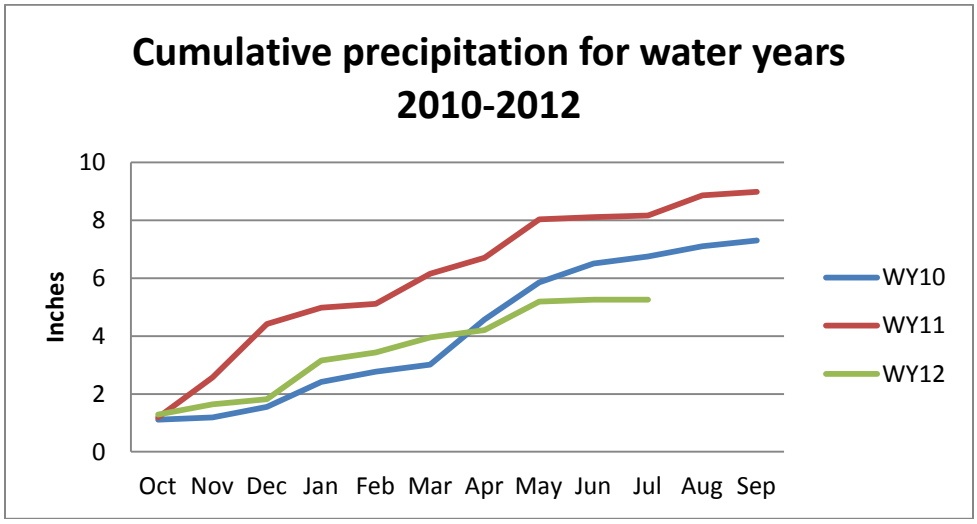
In 2011, percent stand, plant density and height were evaluated on May 2. Seed and forage harvests were timed to maximize the yield in each individual plot. This occurred between July 12 and 18. For biomass and seed yield, all plants in a plot (including seed) were hand harvested using a scythe. The material was then air dried for 2 weeks. Dried weights were then obtained from the total material before the seed was cleaned off and weighed.

In 2012 the plots were evaluated for plant density on June 15 and then harvested for seed yield and forage yield on July 18. Plant density was recorded by counting all of the plants in the plot and converting to average plants per foot. Other data were obtained as in 2011. Many plots in 2012 contained very few plants. Only those accessions with good stands were analyzed in 2012.

All data were analyzed using an Analysis of variance. Means of statistically different data were separated using a least significant difference (LSD) test. Accessions are listed in the table from best percent establishment to worst.

The plots were watered to provide approximately 14 to 16 inches of total accumulated water for the year; the typical moisture requirement for seed production of the species. Cumulative natural precipitation totaled 7.3 inches in water year 2010 and 8.98 inches in water year 2011. By the end of July 2012, Aberdeen had received a total of 5.26 inches of precipitation.





Results

Greenhouse Trial

There was a wide range of germination percentages and rates of germination detected between accessions (table 2). Accession 9076611 had the best recorded germination, the shortest D_{10-90} and the second shortest D_{50} rating in the trial. Accession 9076622 had the shortest D_{50} rating and the fourth highest germination.

Table 2. Germination characteristics

Accession	Germination	Germination rate[1]	D_{50}[2]	D_{10-90}[3]
	---%---		--days--	--days--
9076611	91	22.89 a	8.32 a-b	4.08 a
9076592	100	21.89 a-b	9.17 b-e	5.15 a-f
9076586	92	20.34 a-c	9.02 a-d	5.00 a-e
9076622	76	19.84 a-d	8.04 a	6.08 d-j

9076584	87	18.87 b-e	9.12 b-e	5.09 a-e
9076638	68	17.46 c-f	8.43 a-b	4.80 a-c
9076646	81	17.28 c-f	9.19 b-e	5.17 a-f
9076593	75	17.10 d-f	8.87 a-c	4.44 a
9076616	73	17.10 d-f	9.14 b-e	5.33 a-g
9076639	79	17.10 d-f	9.05 b-e	4.70 a-b
9076655	84	15.86 e-g	9.77 c-i	6.23 e-k
9076642	74	15.25 f-h	9.28 b-f	4.97 a-d
9076608	67	15.04 f-h	8.89 a-c	4.96 a-d
9076596	62	13.34 g-i	9.10 b-e	4.99 a-e
9076653	67	12.78 g-i	9.70 c-h	5.83 b-h
9076606	61	12.27 h-j	9.28 b-f	5.02 a-e
9076618	51	11.31 i-j	9.01 a-d	4.88 a-d
9076587	52	11.05 i-k	9.19 b-e	5.29 a-g
9076605	45	9.12 j-l	9.56 c-g	5.93 b-h
9076624	48	7.90 k-l	10.54 g-i	5.94c-h
9076602	40	6.39 l-m	10.55 g-i	6.64 h-k
9076650	29	6.35 l-m	9.05 b-e	5.94 b-h
9076594	36	6.07 l-n	10.23 f-i	6.33 f-k
9076609	28	4.54 m-o	10.66 h-i	7.29 j-k
9076623	22	4.40 m-o	9.62 c-g	5.30 a-g
9076604	23	4.24 m-o	9.89 d-i	5.72 b-h
9076615	19	3.67 m-o	9.77 c-i	6.00 c-i
9076628	22	3.58 m-o	10.72 i	7.43 k
9076649	21	3.25 m-o	10.70 i	7.23 i-k
9076654	15	3.11 n-o	9.90 d-i	5.72 b-h
9076610	17	2.85 n-o	10.03 e-i	6.52 g-k
9076621	12	2.15 o	9.71 c-h	5.78 b-h
LSD (0.05)		3.22	0.99	1.24

[1] Germination rate is a comparative value with no associated unit of measure; larger # means faster germ.
[2] Days to 50% germination.
[3] Days between 10% and 90% germination

Field Trial

Opportunity germplasm had significantly better initial year establishment in the field trial than any other accession (table 3). Opportunity also had the highest plant density with 19 plants/ft², which was significantly better than any other accession. The best performer of the non-released accessions was 9076622 with 57% establishment and 8 plants/ft².

Table 3. Field establishment evaluation Sept. 12, 2010

Accession	Establishment	Density	Height[1]
	----%----	Plants/ft²	cm
Opportunity	88 a	19 a	4.0
9076622	57 b	8 b	2.75
Sherman	37 bc	5 bcd	6.0
9076615	36 c	4 bcd	5.5
9076610	33 c	9 b	1.75
9076618	33 c	5 bcd	2.0
9076609	29 c	6 bc	2.3

9076649	21 cd	4 bcd	2.0
9076623	17 cde	2 cd	4.0
9076605	1 de	1 cd	4.0
LSD (0.05)=	varies	varies	

[1]Height not analyzed for significance.

In 2011 Opportunity continued to have the highest rated stand and plant density (table 4). Opportunity also had the greatest seed yield at 25 lbs/ac and the third greatest forage yield with 324 lb/ac. Accession 9076622 performed comparably to Opportunity in most aspects; however accession 9076622 had significantly lower forage and seed production.

Table 4. Field trial evaluations 2011

Accession	% stand	Density	Height	Seed Yield	Forage Yield
	----%----	Plants/ft²	cm	Lb/ac	Lb/ac
Opportunity	86.9 a	8.4 a	4.5 b-c	25 a	324 a
9076622	76.3 a-b	7.5 a-b	4.5 b-c	15 b	216 b
9076615*	65.8 a-c	6.1 a-e	8.8 a	15 b	328 a
9076609	64.5 a-c	6.9 a-d	5.3 b	13 b-c	216 b
9076610	63.2 a-c	7.1 a-c	4.3 b-d	8 c-d	204 b-c
9076618	63.2 a-c	6.5 a-d	4.3 b-d	7 c-e	192 b-c
9076623	63.2 a-c	5.5 a-g	3.0 d-f	5 d-f	90 d-e
Sherman*	60.5 b-d	3.5 d-i	9.3 a	13 b-c	394 a
9076649	56.6 b-e	6.6 a-d	3.5 c-e	8 c-d	124 c-d
High Plains	55.3 b-f	3.6 d-i	2.8 e-g	0 f	0 f
9076602	46.1 c-g	6.4 a-d	1.8 f-g	0 f	0 f
9076654	46.1 c-g	3.6 d-i	2.5 e-g	0 f	0 f
9076605	43.4 c-h	4.5 b-h	3.0 d-f	1 e-f	60 d-f
9076586	42.1 c-i	5.6 a-f	2.3 e-g	0 f	0 f
9076606	38.2 d-j	2.1 g-i	2.0 f-g	0 f	0 f
9076584	35.5 e-j	4.5 b-h	2.3 e-g	0 f	0 f
9076650	34.2 e-j	5.0 a-h	1.8 f-g	0 f	0 f
Mt. Home	34.2 e-j	4.1 b-i	2.0 f-g	0 f	0 f
9076593	34.2 e-j	5.1 a-h	2.5 e-g	0 f	0 f
9076616	31.6 f-j	4.1 b-i	2.5 e-g	0 f	0 f
9076653	31.6 f-j	3.8 c-i	2.3 e-g	0 f	0 f
9076631	30.3 g-j	4.6 b-h	2.8 e-g	0 f	0 f
9076611	29.0 g-j	3.5 d-i	2.5 e-g	0 f	0 f
9076638	28.9 g-j	5.0 a-h	1.5 g	0 f	0 f
9076608	27.6 g-j	4.4 b-i	3.0 d-f	1 f	30 e-f
Hanford Source	26.3 g-j	2.8 e-i	1.8 f-g	0 f	0 f
9076642	25.0 g-j	1.8 h-i	2.3 e-g	0 f	0 f
9076604	25.0 g-j	2.5 f-i	2.3 e-g	0 f	0 f
9076587	21.1 h-j	2.1 g-i	2.1 e-g	0 f	0 f
9076596	18.4 i-j	1.0 i	2.0 f-g	0 f	0 f
9076592	17.1 j	1.9 h-i	2.3 e-g	0 f	0 f
9076646	17.1 j	2.6 f-i	2.0 e-g	0 f	0 f
9076639	15.8 j	1.9 h-i	2.5 e-g	0 f	0 f
9076655	15.8 j	1.9 h-i	2.3 e-g	0 f	0 f
LSD (0.05)=	24.2	3.5	varies	7	84

* *Poa ampla*

In 2012 six accessions including Opportunity and Sherman had significant stands in all four replicates. No statistical differences were detected among the accessions for plant density, seed yield or forage yield. Plant densities were significantly lower than those reported from 2011. This is likely a reflection of the larger size and increased competition of individual plants.

Table 4. Field trial evaluations 2012

Accession	Density	Forage Yield	Seed Yield
	Plants/ft²	Lb/ac	Lb/ac
Opportunity	2.7	1323	271
9076622	1.9	581	112
Sherman*	1.9	1391	189
9076618	1.8	525	67
9076649	1.7	682	103
9076615*	1.4	883	132
LSD (0.05)=	NA	NA	NA

* *Poa ampla*

Discussion

First year seedling establishment was low for all accessions with the exception of Opportunity. Only 10 of forty accessions had visible germination. In 2011 stands were detected in more plots. Several accessions increased significantly in establishment and density and compared favorably with Opportunity during 2011. In 2012 no statistically significant differences could be detected between Opportunity, Sherman and the four accessions evaluated.

2012 is the final year of evaluation. The four accessions remaining in 2012 show promise enough to warrant further evaluation. All have shown good persistence for a minimum of two years of seed production, and all produced fair to good forage and seed yields. All were ranked high during the 2011 and 2012 evaluations for forage and seed yield. Accession 9076622 also ranked among the highest for germination characteristics and initial stand. See the appendix for additional information on the original collection locations of the accessions.

An advanced evaluation planting will be established in 2013 to compare the top accessions with Opportunity Germplasm and Sherman. Maternal affects will be avoided by using seed collected from the Initial Evaluation Planting during the 2011 and 2012 growing seasons. Viability and purity tests will be performed to calibrate pure live seed (PLS) for the advanced evaluation planting. Since the species is apomictic, seed harvested from these plots can also be used for stock seed if one or more accessions is chosen for official release or for additional studies.

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Accession	Species	State	County	Lat. / Long.	El. (ft)	Location	Plant community
9076584	POSE	ID	Bingham	43 6' 41", -112 50' 54"	4560	Powerline rd, N of Aberdeen	Basin big sage, rabbitbrush
9076586	POSE/PONE	ID	Bingham	43 6' 41", -112 50' 54"	4560	Powerline rd, N of Aberdeen	Basin big sage, rabbitbrush
9076587	POSE	ID	Power	42 15' 40", -112 45' 44"	5000	Curlew Ntl Grassland, S of Twin Springs in rocky roadside post burn	ARTR, PUTR, PSSP, POSE
9076592	POSE	NV	Elko	41 4' 4", -114 31' 31"	6400	Road to Pequop summit ca 1 mi W of Oasis	ARTR, POSE
9076593	POSE	NV	Elko	41 6' 57", -114, 47' 33"	6200	N side of I-80 at Moor exit (360) near train tracks	PJ
9076594	POSE	NV	Elko	41 2' 27", -115 1' 49"	6600	Road to Angel Lake, exit 351 from Wells, NV	ARTRV, black sage, Juniper, LECI
9076596	POSE	NV	Elko	40 18' 56", -115 29' 36"	6700	FR 113 from Ruby Lake, top of low hill opposite large granite batholith	ARTRv, PUTR
9076602	POSE	UT	Juab	39 24' 43", -111 53' 23"	5900	Off UT hwy 28, E of Yuba state park near small cabin	PJ
9076604	PONE	UT	Box Elder	41 56' 15", -112 28' 34"	6000	N of Valley, UT off hwy 84 exit 20, E of crop field on rocky knob	ARTR, Stipa commata
9076605	PONE	ID	Bingham	43 7' 1", -112 48' 40"	4400	Coffee Point Rd, ca 600 m N of 600 S	ARTRtr, STCO, ELEL
9076606	POSE	ID	Bingham	43 7' 1", -112 48' 40"	4400	Coffee Point Rd, ca 600 m N of 600 S	ARTRtr, STCO, ELEL
9076608	POSE	ID	Power	42 11' 17", -112 45' 6"	4990	Meadowbrook Rd in post burn	PSSP, STCO, POSE, CHVI
9076609	PONE	ID	Power	42 11' 17", -112 45' 6"	4990	Meadowbrook Rd in post burn	PSSP, STCO, POSE, CHVI
9076610	PONE	ID	Power	42 9' 34", -112 49' 36"	5670	Cow Canyon Rd jct w/ Meadowbrook rd	PONE, AGCR, PSSP
9076611	POSE	ID	Power	42 5' 39", -112 50' 15"	5100	Cow Canyon in burned PJ	PJ, STCO, POSE
9076615	POAM	UT	Box Elder	41 48' 41", -113 35' 12"	5860	Dove Creek, W of Rosette	ARTRtr, CHNA, CHVI, PJ
9076616	POSE	NV	White Pine	41 3' 57", -114 31' 23"	6400	Pequop (east exit) N of I-80 on rd to summit	PJ, ARTR
9076618	POSE	NV	White Pine	41 2' 27", -115 1' 49"	6600	Angel Lake Rd, SW of Wells	ARTRV, black sage, Juniper, LECI
9076621	POSE	NV	White Pine	39 32' 3", -115 47' 17"	6250	Diamond Mts, W of Newark Valley, S of Goicochea ranches	one needle pinyon, cliffrose, ARTRtr
9076622	PONE	NV	Eureka	39 29' 8", -115 56' 54"	6900	Windfall Cyn off hwy 50	ARTR, CHNA, LECI
9076623	PONE/POAM	NV	White Pine	39 11' 49", -114 41' 42"	7300	Cave Lake Loop, S of Ely in disturbed area	PJ, ARTR, LECI
9076624	POSE	UT	Millard	38 55' 11", -112 12' 22"	7000	FR100, E of Fillmore on road cut	Cercocarpus, Acer, Juniper, Quercus
9076628	POSE	UT	San Pete	39 30' 36", -111 44' 5"	6000	Chicken Creek Cyn, E of Levan on red rocky slopes	Acer, Quercus
9076631	POSE	UT	Duchesne	40 25' 15", -110 22' 54"	7160	21000 W (road to Moon Lake) N of Mountain Home, UT in rocky soil	Juniper, black sage, PSSP, needlegrass
9076638	POSE	ID	Lincoln	42 54' 52", -113 45' 53"	4300	Kamima to Carey Rd N of Kamima in rocky knoll	ARTR, AGCR, POSE
9076639	PONE	ID	Lincoln	43 8' 12", -113 46' 5"	4300	Kamima to Carey Rd, N of Kamima above Laidlaw Corrals	ARTR, AGCR, POSE
9076642	PONE	ID	Blaine	43 25' 29", -114 0' 57"	5200	Little Wood River, 0.5 mi SE of dam	ARTR, PONE
9076646	POSE	ID	Lincoln	43 6' 22", -114 4' 49"	4460	N of Richfield	ARTR
9076649	PONE	ID	Camas	43 20' 32", -114 35' 19"	5000	Roadside on Hwy 20. Possible seeding	ARTR
9076650	PONE	ID	Ada	43 36' 30", -115 57' 0"	3070	Lucky Peak Res on FR 268 (Side Gulch Rd)	PUTR, chokecherry
9076653	PONE	ID	Elmore	43 37' 9", -115 42 48"	4400	Arrow Rock Res. Side Gulch Rd.	ARTR, PUTR
9076654	PONE	ID	Elmore	43 33' 30", -115 36' 53"	4700	Long Gulch Rd. (FR 113)	
9076655	POSE	ID	Owyhee	42 59' 2", -116 28' 28"	3720	Triangle Rd from Oreana	ARTRwy, POSE, BRTE

Using pre-germinated seed for field establishment of Nebraska sedge
June 18, 2012
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Nebraska sedge (*Carex nebrascensis* Dewey) is a major vegetative component in many wetland plant communities in western North America (Ball and Reznicek, 2003). Its above ground biomass provides valuable forage for both livestock and wildlife and cover for nesting waterfowl (Hoag and others, 2011). The extensive dense fibrous and rhizomatous root system of Nebraska sedge provides excellent erosion control and site stabilizing characteristics making it very desirable for wetland and riparian revegetation projects (Hoag and others 2011; Manning and others 1989). Nebraska sedge has been most successfully established by planting transplants from existing populations and by propagating containerized material from seed under greenhouse conditions. Very limited success has been observed from direct seeding in the field (Hoag and Sellers 1995). Direct seeding methods are desirable to provide more flexibility to revegetation efforts and to reduce overall project costs (Kettenring and Galatowitsch, 2007; Shaw and Hurd 1992).

Planting pre-germinated seed of Nebraska sedge and other wetland species for wetland restoration and creation has potential to improve establishment success. Sowing seed which has been pre-germinated into a moist field condition allows roots to penetrate the soil more rapidly than waiting for seed to germinate in the field. This enables the seed to immediately take up available water, and should reduce the incidence of seedlings washing away in flood events.

Pre-germination of seed has been used in a variety of vegetables, fruit trees and grasses (Khan, 1992). Native grasses, sown with pre-germinated seed resulted in faster emergence and greater root biomass in 3 native cool-season grasses, and greater root length in 2 wheatgrass species compared to untreated seed (Mueller and Bowman, 1989).

These techniques are commonly used in rice production. Pre-germinating the seed increases the rate and percentage of seedlings established (Rice Knowledge Bank, 2010). It also reduces the time required for seed to uptake sufficient moisture to initiate the germination process. In the pre-germination process, seed is submerged in a bag in water for 24 to 36 hours or until small shoots appear at end of seed. The seed is then dried in the bag for 24 hours and then broadcast or seeded with a drum seeder (Rice Knowledge Bank, 2010). Pre-germinated seed is normally directly sown into wet, puddled seedbeds or standing water.

Materials and Methods

The Aberdeen, Idaho Plant Materials Center (IDPMC) conducted a wetland seeding trial investigating the effectiveness of various seed pretreatment protocols and delivery methods including pre-germinated seed and hydroseeding. We also examined two seedbed preparation techniques.

The study was conducted in two, 61 x 15 m (200 x 50 ft) unlined ponds at the Aberdeen PMC. Soils are a Declo silt loam with pH of 7.4 to 8.4. The study was planted on July 7, 2011 and was evaluated through September 26. The study was created using a randomized complete block design with four replications. Each plot measured 3.7 x 12.2 m (12 x 40 ft).

Nebraska sedge seed was purchased from Granite Seed Company, Lehi, Utah. The seed had intact perigynia, (a sack-like structure found in *Carex* spp) which is known to inhibit germination (Hoag and others, 2001; Jones, 1999). Perigynia were removed with a hand-made corrugated seed rubbing board, and then processed with a Westrup LA-LS air screen cleaner with a 1.40 mm screen and light air to an estimated 98% purity. The cleaned seed contained approximately 1.76 million seeds/kg (800,000 seeds/lb).

Seedbed preparation

Two ponds were used to investigate alternative methods of seedbed preparation. One pond was prepared using traditional agronomic practices (traditional method), while the other was prepared for planting to take place in wet muddy conditions (slurry method) similar to conditions used in rice production. The traditionally prepared pond was tilled, then smoothed and packed leaving a human boot print approximately 13 mm (0.5 in) deep. The first pond was flooded on July 1 to get the soil to moisture holding capacity and then allowed to draw down until the soil was firm enough to walk on at the time of planting. The second pond was not packed after tilling and left a human boot print 5 cm (2 in) deep. The non-packed pond was flooded on July 1 and July 5 to create a muddy slurry at the time of planting.

Seed treatment

Two seed pretreatments were examined, stratification and pre-germination. Stratified seed was treated for 32 days at 3° C (37° F) in a sphagnum moss substrate following Hoag and others (2001). The pre-germinated seed was soaked in a warm water bath aerated for 13 days at a constant 35° C (95° F) with 24 hr light. The pre-germination treatment was completed in a Hoffman® growth chamber with 6, 34 watt, lite white fluorescent bulbs and four Profile® 1500 aquarium air pumps fitted with 2.5 cm (1 in) bubbling air stones. Growth chamber photosynthetically active radiation (PAR) was measured at 45 µmols/m²s using an AccuPAR LP-80 ceptometer from Decagon Devices, Inc., Pullman, Washington. At the end of the pre-germinating process approximately 5 % of the seed had visible growth breaking the seed coat.

Seed delivery

Two seed delivery methods were evaluated, hydroseeding and dry broadcasting. Seed that was dry broadcast was allowed to dry for 4 hours following pre-germination and stratification to prevent clumping. The hydroseed application was performed with a rented commercially available 1136 liter (300 gallon) trailer mounted hydroseeder. The hydroseed mixture included a paper based mulch at a rate of 560 kg/ha (500 lb/ac). This is 1/4 the recommended rate for hydroseeding turf grass. The lighter rate of mulch was used to prevent the seed being covered and blocking sunlight required for germination. “Turbo Tack” tackifier from Turbo Technologies Inc., Beaver Falls, Pennsylvania, was added at the standard rate of 3.4 kg/ha (3lb/ac). Table 1 lists the rates of water, seed, mulch and tackifier applied in this study. Figure 1 is a photograph of the hydroseed mixture. Trade names are used solely to provide specific information and

should not be considered a recommendation or endorsement by the Natural Resources Conservation Service.

Table 1. Hydroseed mixture[1]

	Amt/load	Amt/ac
Water	1136 l (300 gal)	12,500 l (3,300 gal)
Seed	0.34 kg (0.75 lb)	3.6 kg (8.0 lb)
Mulch	22.7 kg (50.0 lb)	227 kg (500 lb)
Tackifier	0.14 kg (0.30 lb)	1.36 kg (3 lb)

[1] A 300 gallon load covers 372 m² (4,000 ft²)

Figure 1. Hydroseed mixture of paper mulch, tackifier and seed.

Planting took place on July 7, 2011 (Figure 2). The pond prepared with the slurry method had areas of ponded water up to 2.5 cm (1 in) deep. Walking through the plots to spread seed created a thin muddy layer on the surface. All treatments were seeded at an approximate rate of 1,600 PLS/m² (150 PLS/ft²), or 9 kg/ha (8 lbs/ac). Daily maximum and minimum temperatures are shown in figure 3.

Each pond was watered independently with the use of perforated pipe. The ponds were irrigated to a depth of 2.5 to 7.6 cm (1 to 3 in) each time the water had receded, leaving a moist bare surface. The watering depth was increased as the established plants developed. Water was applied to stand just over the leaf tips and then allowed to recede attempting to follow the precepts suggested in Hoag and Tilley (2007).

Figure 2. Hydroseeding into slurry prepared pond. The hydroseed mixture sank into the water and settled on the muddy surface.

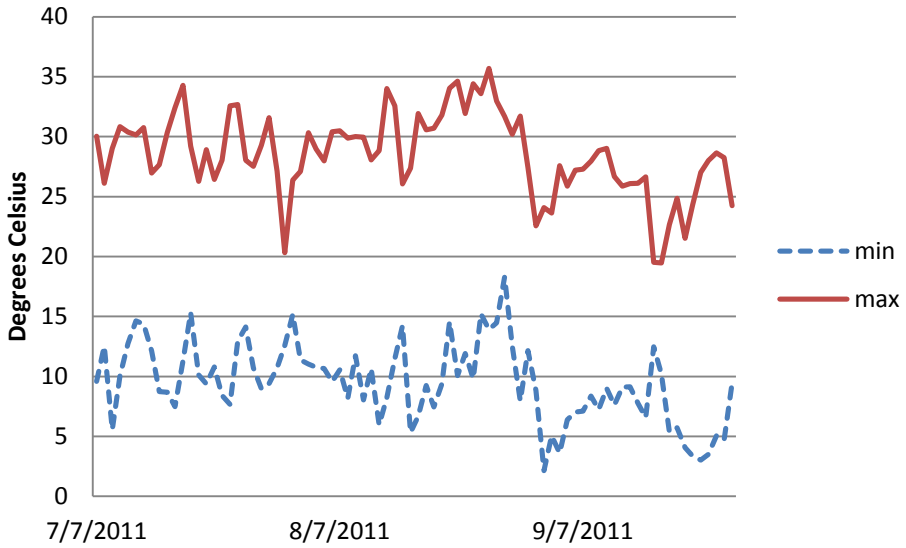

Figure 3. Daily minimum and maximum temperatures at Aberdeen, Idaho during the establishment season from July 7 to September 26, 2011.

Evaluations

Plant density evaluations were conducted on August 8 and September 26, 2011 and again on June 4, 2012 using a 1 m^2 (10.76 ft^2) metal grid to obtain density measurements. The grid was divided into 20 cells, each measuring 26 x 20 cm (10 x 8 in). Plant counts were taken in the first, tenth, and twentieth cells of the grid. The grid was placed three times in the plot on the long axis 1, 5 and 10 meters into the plot, thus a total of nine counts were made per plot. The counts were combined and extrapolated to plants/m^2. The data were analyzed as a split-plot arrangement with the main plot factor being seed delivery technique and the subplot factor being the seed pre-

treatment method. The result was 4 split plots (broadcast x stratified, broadcast x pre-germinated, hydroseed x stratified and hydroseed x pre-germinated). Seedling densities were subjected to analysis of variance procedures in Statistix 8 (Analytical Software, 2003). When significant differences were detected, means were separated using a least significant difference (LSD) test at $p<0.05$. Seedbed preparation methods were not compared statistically because the treatments could not be replicated.

Results

No significant differences were detected for pre-treatment or delivery x pre-treatment for either evaluation. Significant differences were observed between delivery methods for both evaluations in the slurry prepared pond ($p=0.002$ and $p=0.046$ on August 8 and September 26 respectively) and at the August 8 evaluation in the traditionally prepared pond ($p=0.001$). Table 2 shows the statistical analysis for plant establishment between seed delivery methods. No significant differences were detected in 2012. Tables 3 and 4 show overall plant densities separated for all treatments in the slurry and traditionally prepared ponds.

Table 2. Statistical differences in establishment plant densities at August 8 (32 days after planting) and September 26 (81 days after planting) in slurry prepared bed and traditionally prepared bed.

Slurry prep.	Aug. 8	Sep. 26	Traditional prep.	Aug. 8	Sep. 26
	Plants/m²	Plants/m²		Plants/m²	Plants/m²
Hydroseed	891 a	288 a	Hydroseed	745 a	107
Broadcasting	354 b	62 b	Broadcasting	253 b	11
LSD	170	217	LSD	124	N/A

Means followed by the same letter are not different at 0.05 probability level.

Table 3. Overall densities per treatment (slurry)

	Aug. 8, 2011	Sep. 26, 2011	Jun. 4, 2012
	Plants/m²	Plants/m²	Plants/m²
Broadcast x Stratified	294	64	20
Broadcast x Pre-germinated	415	60	32
Hydroseed x Stratified	966	252	18
Hydroseed x Pre-germinated	816	323	19

Table 4. Overall densities per treatment (traditional)

	Aug. 8, 2011	Sep. 26, 2011	Jun. 4, 2012
	Plants/m²	Plants/m²	Plants/m²
Broadcast x Stratified	296	10	0
Broadcast x Pre-germinated	210	12	0
Hydroseed x Stratified	766	65	0
Hydroseed x Pre-germinated	723	150	0

Discussion

No significant differences were detected regarding seed pre-treatment (pre-germinated versus stratified); however significant differences were found comparing seed delivery techniques.

Applying seed via hydroseeding had 2 to 3X greater establishment than broadcasting the seed (Figure 4). Hydroseeding resulted in essentially 100 % of PLS establishment regardless of seed pre-treatment, while broadcasting seed resulted in 47 to 66 % establishment based on an anticipated 1600 PLS/m². In the hydroseed plot evaluations of August 8, more plants were observed than was anticipated by the target seeding rate. This is most likely due to the difficulties in calibrating seed delivery from the hydroseeder.

The two seedbed preparation treatments could not be analyzed for statistical differences, but establishment means were higher in the slurry prepared pond than the pond with the traditionally prepared seedbed. Seeding into a slurried seedbed places the seed in a wet environment and allows the seed to be drawn down into the moist surface. This provides excellent conditions for germination and growth at the time of planting.

We observed a marked decrease in establishment from the August 8 evaluation to the September 26, 2011 evaluation. The June 2012 evaluation also found a continued decrease. We believe this is due to over irrigation which prevented adequate oxygen exchange to the establishing seedlings. This highlights the precise requirement for the amount and timing of water application to facilitate sedge establishment and growth. If water levels cannot be precisely controlled during seedling establishment, revegetation by direct seeding will probably fail. In 2012 many of the plots had become invaded by Kentucky bluegrass (Poa pratensis), which was most likely brought into the plots via the rented hydroseeder.

Conclusions

Our data showed no difference between stratified and pre-germinated seed establishment. This gives the planter two options for seed pretreatment based on their available resources. Pre-germinating seed takes 7 to 14 days while stratifying can take 30 to 90 days depending on the species. However, when a growth chamber or greenhouse is not available for achieving pre-germination temperatures, cold stratification is a viable alternative

Figure 4. Nebraska sedge seedlings emerging from a hydroseed mix.

Hydroseeding is applied wet, giving the seed and new seedlings less chance of drying during the first few days after sowing. It provides immediate water as opposed to having to wait for water to enter the system via flooding or rains. In our trial, hydro-mulch applied to standing water sank and stayed in place with little movement. However wave action was minimal in the controlled environment of the study. Broadcast seed also sank. The slurry bed prep method also provides insurance against drying without the risk of seed loss from the initial flooding or watering. These results indicated that hydroseeding may be an acceptable alternative to greenhouse grown transplants for wetland plant establishment; however the precision of water control required to establish new seedlings may limit the applicability of this technique in many wetland and riparian situations. Precise irrigation levels are nearly impossible to achieve in created wetlands, let alone restored wetlands.

Establishment densities decreased dramatically from August to September and again to the following June. We believe that the mortality was caused primarily due to hydrologic conditions in the pond, i.e. too much or too little water. Maintaining the proper water levels as suggested by Hoag and Tilley (2007) proved very difficult even under the controlled conditions found in the constructed ponds. The necessary water control needed for wetland species establishment and growth is likely unobtainable in most seed production and wetland establishment situations. In such cases, more mature transplants are recommended. Successful, direct seeding of Nebraska sedge into wetlands is not feasible with current technology.

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2011 Pollinator Planting, 2012 Progress Report
Fish and Game Farm, Field 28
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Introduction

The Conservation Reserve program of the 2008 USDA Farm Bill promotes the establishment of pollinator friendly habitat. The desired goal in these pollinator plantings is to establish a variety pollinator species (some flowering in each of the three flowering periods – early, mid and late growing season). The mixture can also include native grasses not to exceed 25 % of the total mixture.

Establishment of grasses and grass-dominant plantings including forbs and shrubs are common and largely successful; however, pollinator plantings consisting predominantly of forbs pose problems not typically encountered with grass plantings. Forbs, especially native forbs, are in many cases not competitive against weed species. Forb plantings also severely limit the herbicides available for controlling broadleaf weeds. Healthy rangeland in the Intermountain West consists of approximately 5 to 25% shrub cover, 40 to 60% grasses and 5 to 20% forbs. There is concern that the 25% grass composition requirement may not provide the necessary competitive ability needed to persist in weed prone sites. More information is needed to understand pollinator planting dynamics and management.

Materials and Methods

In 2011, the PMC established 5 acres of pollinator habitat for display and to research management requirements involved in pollinator friendly plantings. The planting was established in field 28 of the PMC Fish and Game farm 5 miles northeast of Aberdeen.

In 2010, the year prior to planting, the field was planted to field corn and managed for wildlife habitat. The stubble was mowed spring 2011. Soil at the planting site is a Declo silt loam with pH of 7.4 to 8.4. Average annual precipitation is 9.39 inches. The field was irrigated in early spring to get weed seeds to germinate. The field was then sprayed with 64 oz Glyphosate/ac on May 11 prior to planting on May 18. The western 2.5 acres of the field were planted to mix 1 (25% grass), while the eastern 2.5 acres were planted to mix 2 (50% grass).The field is irrigated through the growing season to approximate 14 to 16 inches of annual precipitation, the suitable range for the species in the seed mixture. In 2011, the establishment year, the fields were mowed three times after planting to prevent weeds from going to seed.

Two pollinator mixes were developed to compare forb establishment and persistence with varying grass composition. The mixes were designed to provide blossoms for foraging insects in all three flowering periods (table 1). Each mixture has the same species components, but they have different proportions of forbs and grasses. The first mix follows NRCS guidelines and contains a 25% grass component and 75% forbs (Tables 2). The second mix is designed to more closely approximate natural healthy rangeland conditions. This mix contains the same species components, but the grasses are doubled to comprise 50% of the total mix, and the forb amounts are halved. The mixtures contain only 7 pollinator species. This reflects the limited number of available forb species suitable for use in arid to semi-arid environments, especially those with late summer bloom periods.

Table 1. Pollinator planting mixture components

			Bloom Color and Time			
Scientific Name	Common Name	Variety	spring	summer	late summer	Origin
Pseudoroegneria spicata	Bluebunch wheatgrass	Anatone				Native
Leymus cinereus	Basin wildrye	Magnar				Native
Poa ampla	Big bluegrass	Sherman				Native
Achillea millifolium	Western yarrow	Great Northern				Native
Linum perenne	Blue flax	Appar				Introduced
Medicago sativa ssp. *falcata*	Falcate alfalfa	Don				Introduced
Sanguisorba minor	Small burnet	Delar				Introduced
Onobrychis vicaeifolia	Sainfoin	Common				Introduced
Helianthus annuus	Sunflower	Common				Native
Machaerranthera canescens	Hoary tansyaster	Common				Native

Table 2. Seed mixture percentages

#	Variety	Common Name	25% grass	50% grass
			% of mix	% of mix
1	Anatone	Bluebunch wheatgrass	5	10
2	Magnar	Basin wildrye	5	10
3	Sherman	Big bluegrass	15	30
4	Great Northern	Western yarrow	5	2.5
5	Appar	Blue flax	10	7.5
6	Don	Falcate alfalfa	10	5
7	Delar	Small burnet	15	7.5
8	Eski	Sainfoin	20	10
9	Common	Sunflower	10	5
10	Common	Tansyaster	5	2.5

The mixes were separated according to seeding depth, one mix for drilling seed at 1/4 to 1/2 inch and a broadcast mix for shallow (0 to 1/8 inch) seeding. Because the planting was done using a Truax Rough Rider range drill with alternate row seeding capabilities, the standard seeding rates (Ogle and others, 2011b) were also cut in half. By doing an alternate row seeding, the number of rows planted is effectively halved and seeding rates are therefore adjusted. Seeding rates and drill calibrations are shown in the appendix. All seed was mixed with rice hulls as an inert carrier to facilitate flow through seeding equipment using specifications found in St. John and others (2005).

The first evaluation occurred on July 12, 2011 and again on June 15, 2012. A 200 ft transect was laid diagonally in each field beginning 100 ft from the southwest corner. A frequency grid based on that described by Vogel and Masters (2001) was used to evaluate plant density of the planted species and volunteer weeds. The grid measured approximately 40 x 41 inches, having four ten inch columns and five rows, totaling 20 cells. Counts were made of the cells that contained at least one plant. Evaluations were made at 20 foot intervals making a total of 10 counts. The total cells were then added for each species to determine average plants/ft^2. It was difficult to find target species in the masses of weeds at the time of the first season evaluation. The native grasses were particularly difficult to find and were not counted in the evaluation. In 2012 target grass species were more easily identified and were included in the evaluation.

Results

Despite previous farming practices and weed control efforts, there was an abundance of annual weeds present in both fields. The most prevalent weed species in 2011 included witchgrass (*Panicum capilare*), shepherd's purse (*Capsella bursa-pastoris*), field bindweed (*Convolvulus arvensis*), volunteer wheat (*Triticum aestivum*), lamb's quarters (*Chenopodium album*), prickly lettuce (*Lactuca serriola*), red-root pigweed (*Amaranthus retroflexus*), prostrate pigweed (*A. blitoides*), nightshade, (*Solanum* sp.) and tumble mustard (*Sisymbrium altissimum*). Mowing provided fair control of annual broadleaf weeds, but witchgrass continued to dominate the fields throughout the season (Figure 1). In late summer, sunflowers covered the field with a thick understory of witchgrass (Figure 2).

Figure 1. A solid stand of witchgrass. The planting was mowed 3 times to reduce the risk of weeds setting seed. Photo take July 20, 2011.

Figure 2. Despite mowing, sunflowers persisted and produced flowers in the first growing season. Photo taken September 12, 2011.

In 2011, the 25% grass seed mix produced approximately 2 times more total forbs than the 50% grass mixture (Table 3). However, overall weed densities were similar for both planting mixes. These differences are to be expected early in the first growing season as the seeded plants are generally not big enough to cause direct competition for resources. Few target grasses were observed, as young grass leaves are easily missed in the thick weeds.

Densities of all seeded species stayed the same or increased from 2011 to 2012. The plants were likely more numerous from volunteering, and were also larger and easier to find. Overall densities of target species were not different between 25% and 50% grass plots in 2012. In 2012 total target species densities were 4 times greater in the 25% grass mix and 9 times greater in the 50% grass mix compared to 2011, with much of the increase being accounted for by the establishment and observation of grasses in 2012. Grass densities were 2 times higher in the 50% grass mix than the 25% grass mix as expected. There were approximately 2 times more alfalfa and sainfoin plants observed in the 25% grass plots than in the 50% grass plots. Sunflower and blue flax densities were essentially equal between the two treatments in 2012 as volunteers from seed shed the previous year (especially from sunflower) eliminated the original proportions. Yarrow densities were 7 times greater in the 25% grass plots than the 50% grass plots. This may also be due to volunteering. Hoary tansyaster was observed in the planting but not encountered in the evaluated transects.

Total weed density was 40% lower in 2012 than 2011; however weed densities were not significantly different between the 25 and 50% grass treatments. Increased target species densities will likely suppress weed establishment. The most abundant weed species encountered in 2012 was spear saltbush (*Atriplex patula*). This species may have mistaken for lamb's quarters in 2011. Other weed species encountered in 2012 were Canada thistle (*Cirsium arvense*), dandelion (*Taraxacum officinale*), kochia (*Bassia scoparia*), sowthistle (*Sonchus* sp.), cheatgrass (*Bromus tectorum*), yellow salsify (*Tragopogon dubius*), and biennial cinquefoil (*Potentilla biennis*). Other species seen in the planting but not in the evaluated transects included: hound's tongue (*Cynoglossum officinale*), bull thistle (*Cirsium vulgare*), musk thistle (*Carduus nutans*), and an unknown mint (Lamiaceae).

Discussion

Acceptable establishment densities for NRCS plantings range from 1 to 2 plants/ft² (Ogle et al., 2011a). In 2011, the evaluated plant densities fell short of this standard; however the grasses had not been included in the evaluation. In 2012 both treatments averaged over 2 plants/ft².

In the first growing season we saw little pollinator value in the two fields planted. Annual weeds forced multiple mowing treatments which removed the majority of flowers available for foraging insects. Annual sunflower persisted and blossomed despite the mowing; however, and provided food for foraging bumblebees in late summer and early fall. In 2012 there was no mowing and the perennial forbs were allowed to flower, and pollinator activity was witnessed at the time of evaluation. Very little tansyaster was seen at the evaluation time; however more was observed later in the season, but was largely overshadowed by sunflower. Sunflower plants were small in June, with the majority of plants showing 2 to 4 true leaves, approximately 3 inches tall. In September the sunflower had formed a dense stand with plants averaging 3 to 8 feet tall (figure 4).

The planting provides excellent cover and forage for wildlife. Deer were observed in the planting and grazing was observed on sainfoin, small burnet, and prickly lettuce. Birds are also abundant in the planting.

Figure 3. Blue flax, yarrow, small burnet and sainfoin are visible during the second growing season. Photo taken June 2012.

Figure 4. A dense stand of volunteer sunflower dominates the pollinator planting in September, 2012.

Noxious weeds and non-target species present a concern. Idaho state noxious weeds observed within the pollinator planting include musk thistle, Canada thistle, field bindweed, and hound's tongue. Spot treatments of herbicides may be necessary to control and prevent the spread of noxious weeds. Farming practices and field history indicate that bull thistle, musk thistle, hound's tongue, cinquefoil and mint were likely brought in with non-certified seed. Use of certified seed is highly recommended to ensure seed quality.

Future evaluations will take place in 2013, 2014, and 2015 to monitor plant longevities and long term trends in species densities.

Table 3. Plant densities evaluated

Target species		7/12/11 25% Grass Mix	7/12/11 50% Grass Mix	6/15/12 25% Grass Mix	6/15/12 50% Grass Mix
		----------Plants/ft²----------			
	Bluebunch wheatgrass	0	0	0.06	0.11
	Basin wildrye.	0	0	0.06	0.13
	Big bluegrass	0	0	0.03	0.06
	Western yarrow	0.02	0.02	0.07	0.01
	Blue flax	0.07	0.03	0.07	0.15
	Falcate alfalfa	0.07	0.02	0.28	0.20
	Small burnet	0.19	0.07	0.17	0.16
	Sainfoin	0.08	0.09	0.29	0.15
	Sunflower	0.16	0.05	1.61	1.86
	Tansyaster	0	0	0	0
	Total target species	0.59	0.28	2.61	2.83
Weed species					
	Witchgrass	1.86	1.78	0	0
	Shepherd’s purse	0.36	0.23	0.06	0.07
	Field bindweed	0	0.01	0	0
	Wheat	0.04	0.14	0	0
	Lamb’s quarters	0.19	0.07	0	0
	Prickly lettuce	0.04	0.01	0.5	0.45
	Redroot pigweed	0.25	0.16	0	
	Prostrate pigweed	0.02	0	0	
	Nightshade	0.01	0	0	0.01
	Tumble mustard	0	0.01	0	0.01
	Spear saltbush			1.0	0.88
	Canada thistle			0.01	0
	Dandelion			0.04	0.02
	Kochia			0.10	0
	Sow thistle			0.04	0.02
	Cheatgrass			0.01	0
	Salsify			0.01	0.01
	Cinquefoil				0.01
	Total weed species	2.77	2.41	1.76	1.48

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Appendix. Drill Calibrations

Mix 1 drill

Variety	Common Name	% of mix	Pure stand rate* lb PLS/acre	% PLS	lb/bu**	lb PLS/ac PLS*% of mix	bulk seed (lb/ac) PLS/%PLS*100	volume (% of bu) bulk seed/lb/bu*100
Anatone	bluebunch wg	5	4.00	84.60	21.70	0.20	0.24	1.09
Magnar	basin wildrye	5	4.00	92.70	18.50	0.20	0.22	1.17
Delar	small burnet	15	10.00	94.00	23.10	1.50	1.60	6.91
sainfoin	Sainfoin	20	17.00	90.00	28.60	3.40	3.78	13.21
sunflower	sunflower	10	11.50	90.00	23.00	1.15	1.28	5.56

Mix 1 broadcast

Variety	Common Name	% of mix	Pure stand rate* lb PLS/acre	% PLS	lb/bu**	lb PLS/ac PLS*% of mix	bulk seed (lb/ac) PLS/%PLS*100	volume (% of bu) bulk seed/lb/bu*100
						0.00	0.00	0.00
						0.00	0.00	0.00
Sherman	big bluegrass	15	1.00	90.00	17.90	0.15	0.17	0.93
Great Northern	yarrow	5	0.25	90.00	20.60	0.01	0.01	0.07
Appar	blue flax	15	2.00	97.00	46.10	0.30	0.31	0.67
Don	yellow alfalfa	10	2.50	90.00	60.00	0.25	0.28	0.46
tansyaster		5	1.00	35.00	12.00	0.05	0.14	1.19

* 1/2 of rate in Ogle and others, 2011b

** St. John and others, 2005

Mix 2 drill

Variety	Common Name	% of mix	Pure stand rate* lb PLS/acre	% PLS	lb/bu**	lb PLS/ac PLS*% of mix	bulk seed (lb/ac) PLS/%PLS*100	volume (% of bu) bulk seed/lb/bu*100
Anatone	bluebunch wg	10	4.00	84.60	21.70	0.40	0.47	2.18
Magnar	basin wildrye	10	4.00	92.70	18.50	0.40	0.43	2.33
Delar	small burnet	7.5	10.00	94.00	23.10	0.75	0.80	3.45
eski	Sainfoin	10	17.00	90.00	28.60	1.70	1.89	6.60
sunflower	sunflower	5	11.50	90.00	23.00	0.58	0.64	2.78

Mix 2
broadcast

Variety	Common Name	% of mix	Pure stand rate* lb PLS/acre	% PLS	lb/bu**	lb PLS/ac PLS*% of mix	bulk seed (lb/ac) PLS/%PLS*100	volume (% of bu) bulk seed/lb/bu*100
Sherman	big bluegrass	30	1.00	90.00	17.90	0.30	0.33	1.86
great northern	yarrow	2.5	0.25	90.00	37.00	0.01	0.01	0.02
Appar	blue flax	7.5	2.00	97.00	46.10	0.15	0.15	0.34
Don	yellow alfalfa	5	2.50	90.00	60.00	0.13	0.14	0.23
tansyaster	common	2.5	1.00	35.00	12.00	0.03	0.07	0.60

* 1/2 of rate in Ogle and others, 2011b

** St. John and others, 2005

Effects of long-term refrigerated storage on hardwood willow cuttings

Study Number: IDPMC-T-1201-RI
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Planting healthy, vigorous cuttings is essential to successful establishment of riparian willow plantings for streambank erosion practices. Cutting vigor during the initial planting phase is critical to establishment and long-term survival of the cutting. Cuttings are often harvested dormant in late winter prior to the scheduled planting, but schedules frequently become preempted by unforeseen circumstances. Installation is then forced to wait until the completion of groundwork, construction, etc, or until conditions become favorable, or when money for the planting is approved. Willow cuttings are commonly kept in long-term storage for weeks to months after their scheduled installation date, which raises the question, "how long can cuttings be kept in storage and still retain enough vigor to be used in riparian restoration projects?"

Cutting survival under storage conditions is dependent on water loss and the prevention of infection (Behrens, 1988). Unfavorable conditions can 1) kill cuttings, or 2) reduce rooting potential (Behrens, 1988). Best storage conditions for dormant cuttings are those that cause no water stress and prevent the spread of fungal pathogens. The best means to achieve this is to lower the temperature and increase humidity (Behrens, 1988; Davis and Potter, 1985). Relative humidity should be kept near 100% (Behrens, 1988; Scianna et al., 2005). An optimum temperature for cutting storage is approximately -4° C (24° F) (Behrens, 1988; Cram and Lindquist, 1982); however this is more feasible with small nursery cuttings than for larger cuttings intended for riparian bioengineering projects. Many riparian restoration projects are limited in resources. Cutting storage locations may include basements, root cellars, walk-in refrigerators or in plastic bags outside during winter months.

Storage of hardwood cuttings during winter months is not problematic, but problems arise when storage becomes prolonged. Winter storage of completely dormant, leaflesss, cuttings is a well established practice without any major problems (Behrens, 1988). Cuttings should maintain vigor in freezing conditions outside fairly well if protected from disease, wind, or insects. Heeling-in cuttings as well as fall dormant planting have proven successful as means of storage and establishment (Cram and Lindquist, 1982; Tilley and Hoag, 2009).

Long term storage effects on hardwood cuttings for restoration are less understood. The majority of cutting storage research involves small diameter cuttings used for nursery stock production. Cram and Lindquist (1982) obtained best survival of 8 inch nursery willow cuttings after 6

months when stored at -4° C (24° F). They also saw higher survival rates of cuttings stored in polyethylene compared to non-wrapped cuttings. This study conducted by the Aberdeen Plant Materials Center (PMC) addresses long term storage on larger diameter cuttings of three willow species commonly used for riparian restoration projects in the Great Basin Region.

Materials and Methods

Three native willow species representing clonal, small tree and large tree types were harvested on November 29 and 30, 2011. Peachleaf willow (*Salix amygdaloides*) was harvested from the PMC cutting nursery located north of Aberdeen, Idaho at an elevation of 1,310 m (4,300 ft) (42.999814, -112.785988). Yellow willow (*S. lutea*) was collected from a native stand at Quaking Aspen Spring at an elevation of 1,585 m (5200 ft) (42.2309642, -112.7885628). Coyote willow (*S. exigua*) was collected from a native stand on the Curlew National Grassland on Hwy 37, approximately 1 mi south of Twin Springs in Rock Creek at 1,554 m (5100 ft) (42.2423708, -112.7495098). All cuttings were trimmed to a length of 60 cm (24 in) with a basal diameter of 1.9 to 2.5 cm (0.75 to 1.0 in). The cuttings were stored exposed (un-wrapped) in a dark walk-in cooler with temperatures ranging from 1 to 2° C (34 to 36° F) with 82% relative humidity. Treatments were storage durations of 60, 120, 180 and 240 days and a 0 day control treatment.

Four replications of 6 cuttings were placed in 9.5 l (10 qt) galvanized buckets in a growth chamber kept at 22-23° C (71 to 74° F). The design was a randomized complete block with 4 buckets acting as 4 replications. The growth chamber was equipped with 6, 34 watt white fluorescent bulbs, 3 on the door and 3 on the back panel with a 24 hr light period. Photosynthetically active radiation (PAR), measured using a Decagon AccuPAR LP-80 ceptometer®, measured 45 µmols/m²s. Relative humidity in the growth chamber was measured at 58%. The buckets were watered daily to maintain water depth at 23 cm (9 in). No soil medium was used in the experiment to facilitate root measurement.

Cuttings were evaluated after 32 days of growth chamber conditions for 1) percent survival (visible active growth, root initials, or healthy green stem tissues), 2) percentage of cuttings with root initials (ruptured bark exposing inner white tissues), 3) average number of shoots and roots per cutting, 4) average shoot and root mass, and 5) percent bud break (new buds visible on stem). Shoot and root mass was measured after air drying for 14 days at 22° C (72° F).

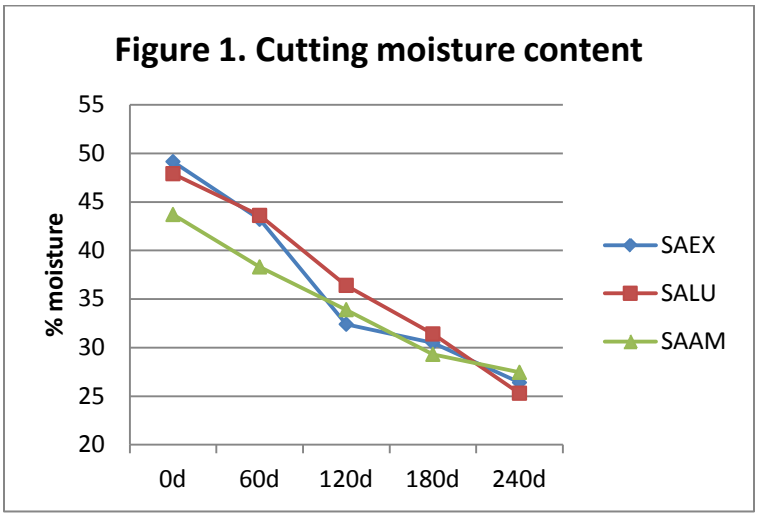
A second set of cuttings was used to measure cutting moisture content. Four replications of one cutting per rep were used for each storage treatment. Fresh weights were measured after storage treatment conclusion, and dry weights were recorded after oven drying at 60° C (140 °F) for 10 days.

Comparisons of cutting survival and growth measurements were made using a one-way ANOVA. Significance was assessed at $\alpha=0.05$. Means were differentiated using a Least Significant Difference (LSD) test.

Results

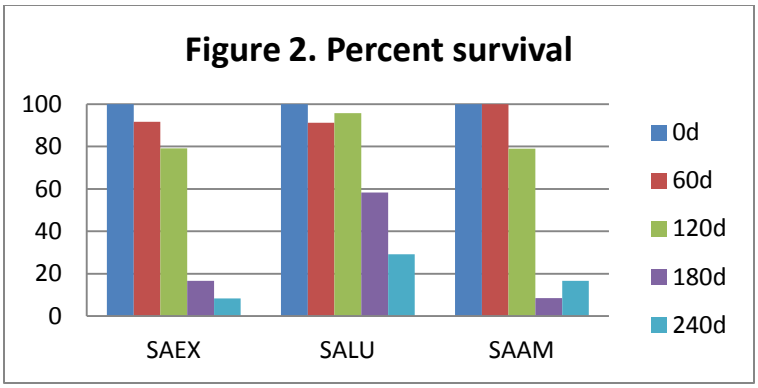
Cutting moisture content

The three willow species began the storage treatment with between 40 and 50% moisture content. Cutting moisture decreased steadily for all three species at a rate of approximately 0.1% per day. After 240 days water content ranged from 25 to 30% (figure 1).



Cutting survival

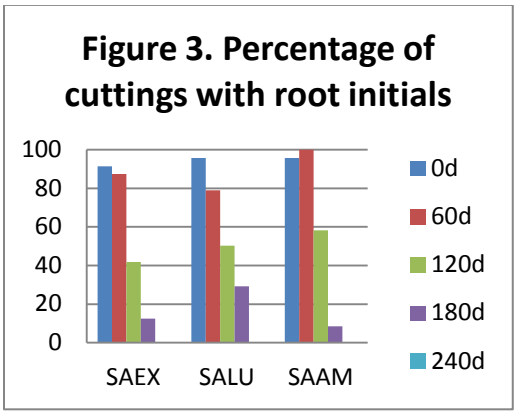
Cutting survival decreased significantly among peachleaf and coyote willow between 60 and 120 days of storage (figure 2). Between 60 and 120 days of storage peachleaf willow cutting survival dropped from 100% to 79%, while coyote willow dropped from 91.7% to 79% survival. Survival of yellow willow did not decrease significantly until between 120 and 180 days of storage. Cutting survival for all species continued to decline with increasing lengths of storage. Survival of peachleaf and coyote willow at 180 days was 8.5 and 16.7% respectively. Very few cuttings of any species were recorded as living at the 240 day evaluation.

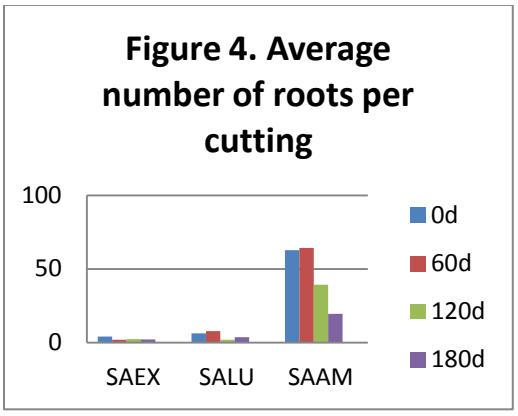


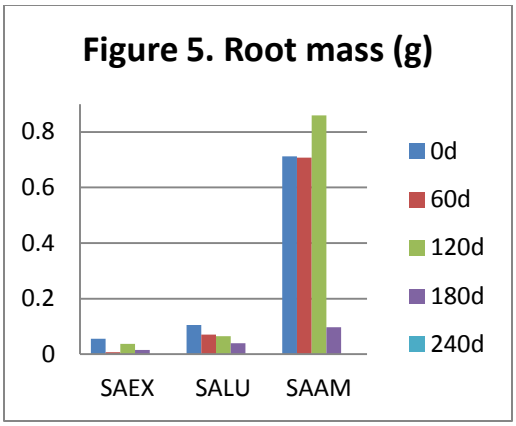
Root development

Root initial development was significantly higher after 0 and 60 days of storage compared to longer storage lengths (figure 3). Between 60 and 120 days of storage the percentage of cuttings bearing root initials decreased from 88 to 42% for coyote willow, 79 to 50% for yellow willow, and 96 to 58% for peachleaf willow. After 120 days of storage coyote and peachleaf willow had essentially zero root initial development. Yellow willow root initial development dropped significantly between 180 and 240 days of storage with no initials forming from the 240 day treatment.

The number of roots per cutting did not differ significantly with storage treatment for coyote willow; however significant differences in roots per cutting were detected after 120 and 180 days for peachleaf and yellow willow respectively (figure 4). With 240 days of storage no root production was recorded for any species. Root biomass differed significantly between 60 and 120 days of storage in peachleaf willow and after 180 days of storage in coyote willow (figure 5). No differences were detected in root biomass among the treatments with yellow willow.

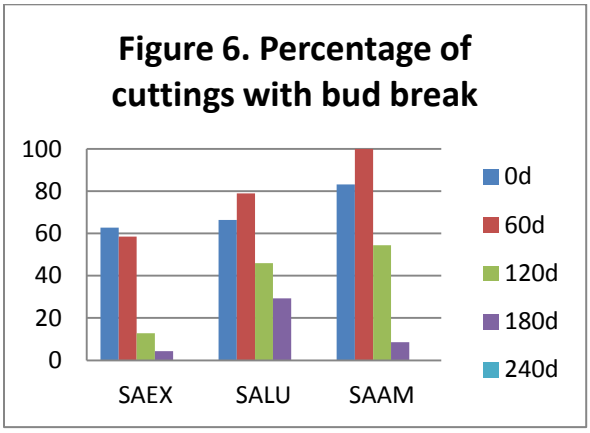


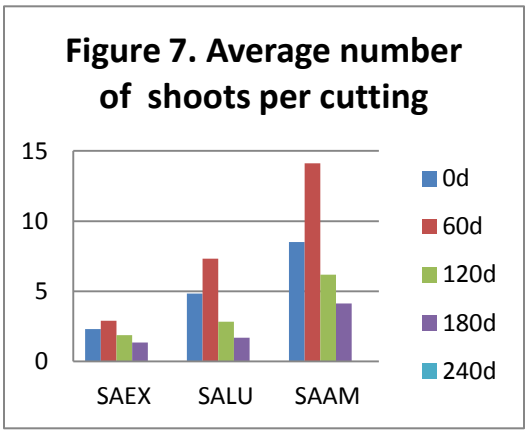


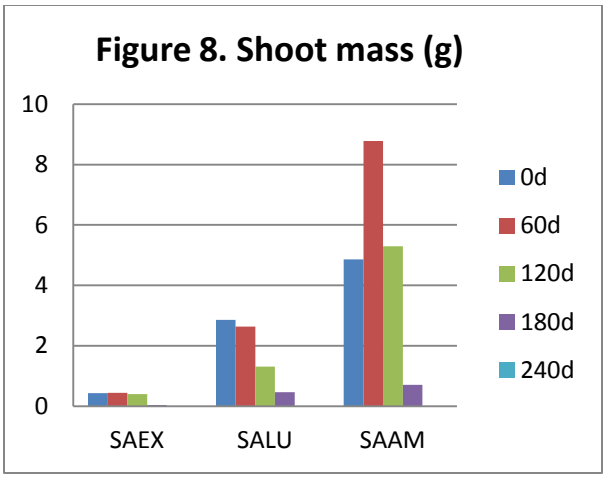


Shoot development

Bud development was significantly lower in coyote willow and peachleaf willow after 60 days of storage (figure 6). Significant differences in bud development were detected in yellow willow after 120 days of storage. At 180 days of storage, coyote and peachleaf willow showed 4 and 9% bud development respectively, while yellow willow had 29% of cuttings with budbreak. No significant differences were seen in number of shoots per cutting for coyote willow (figure 7). Reductions in number of shoots were observed however after 120 days of storage for yellow and peachleaf willow. No significant differences were detected for shoot biomass for coyote or yellow willow (figure 8). Shoot biomass was significantly lower in peachleaf willow after 180 days of storage.







Discussion

Root and shoot biomass would have been easier to separate means with a longer period of growth before evaluation. The miniscule weights obtained from dry root and shoot production for coyote and yellow willow were difficult for the scales used to measure. However the trends in general showed decreasing root and shoot biomass correlating to increasing storage lengths and decreasing survival rates as expected. Peachleaf willow did show anomalously high growth after 60 days of storage, but that did not differ significantly from the 0 day treatment.

Some differences in growth response could be observed between species; however species data were not compared against other statistically. Yellow willow had fair survival after 180 days, while the other species dropped significantly in survival after 120 days. Peachleaf willow was very productive in shoot and root biomass compared to the other two species.

Survival, the most important measurement, decreased significantly after 60 days for coyote and peachleaf willow and after 120 days for yellow willow. Survival was less than 60% for all species after 120 days.

This study shows that restoration sized dormant willow cuttings can be stored in refrigerated conditions for at least 2 months before risking significant decreases in vigor and survival. After 60 to 120 days of storage, survival and growth responses declined steadily, increasing the likelihood of establishment failure in field conditions. Cutting vigor can be sustained for longer periods with colder temperatures (Behrens, 1988) and better moisture retention (Scianna et al., 2005), but if these conditions are unobtainable it is recommended to plant cuttings within 2 to 3 months after harvest.

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Cottonwood Planting Depth

IDPMC-T-1104-RI
July, 2012

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Introduction

Opinions vary as to how deep dormant cottonwood (*Populus* spp.) cuttings should be planted in relation to the water table. Cottonwoods generally grow further from the stream channel and in areas with a deeper water table than willows (*Salix* spp.). Cottonwoods are typically found in the transition zone, an area between the bank zone and upland area where flooding is infrequent (Tilley et al., 2012). Numerous studies and observations have indicated that mature cottonwoods will die under prolonged flooding (Amlin and Rood, 2001; Hosner, 1960). Likewise, nursery stock cottonwood cuttings have shown reduction in shoot and root development under inundated conditions (Amlin and Rood, 2001).

Successful field establishment of cottonwoods has been achieved with cottonwood cuttings and longstem potted materials placed into the capillary fringe zone (Dreesen and Fenchel 2008). Yet others recommend placing cuttings 20 to 30 cm (8 to 12 in) into the lowest water table of the year (Hoag, 2001). It is a common belief that cuttings placed directly into permanent standing water will suffer from lack of oxygen and “drown”. However, it has been suggested that dormant cuttings and longstem materials can be successfully established when planted directly into the permanent water table so long as a significant amount of the cutting remains in the capillary fringe. Practitioners of deep planting indicate that the portion of the cutting in permanent water will rot and die, but the rest of the cutting will survive (Fenchel pers. com.). Being able to plant the cutting deeper into the water table would allow more flexibility in planting depth. The planter can effectively place the cutting as deep as possible ensuring that some of the cutting is in suitable water depth and not worry about placing the cutting too deep.

Materials and Methods

Twenty-four 150 cm (60 in) long dormant black cottonwood (*P. balsamifera* ssp. *trichocarpa*) cuttings were harvested from the Aberdeen PMC cutting nursery on March 21, 2011. Basal diameter of the cuttings ranged from 2.5 to 5.0 cm (1 to 2 in). The cuttings were soaked in 76 cm (30 in) of water from March 28 to April 4 and then randomly planted on April 4 into two 51x51x94 cm (20x20x37 in) plastic containers filled 60 cm (24 in) deep with a 1:1 mixture of vermiculite and perlite. The containers were placed in a metal tank that could be filled with water to a depth of 20 cm (8 in). Holes were drilled into the bottom 20 cm (8 in) of each container to

allow water to freely pass from the tank to the soil in the can creating a permanent water table at 20 cm (8 in) from the bottom. Capillary action pulled water from the permanently wet zone upward into the soil column creating a moisture gradient from permanently saturated to dry on the surface. The soil profile could essentially be divided into three zones: a dry zone from the soil surface to approximately 20 cm (8 in) that was influenced by sunlight and surface air, the capillary fringe zone from 20 cm to 40 cm (8 to 16 in); and the permanently wet zone from 40 to 60 cm (16 to 24 in).

Cuttings in the shallow planted treatment were placed with the bottom of the cuttings approximately 40 cm (16 in) below the soil surface into the capillary zone just above the permanent water zone. Cuttings for the deep planted treatments were placed with the bottom of the cuttings all the way to the bottom of the container at 60 cm (24 in) deep with 20 cm (8 in) of cutting into the permanently wet zone (figure 1). The cuttings were fertilized monthly during the growing season using a liquid application of 15:30:15 nitrogen, phosphorus and potassium.

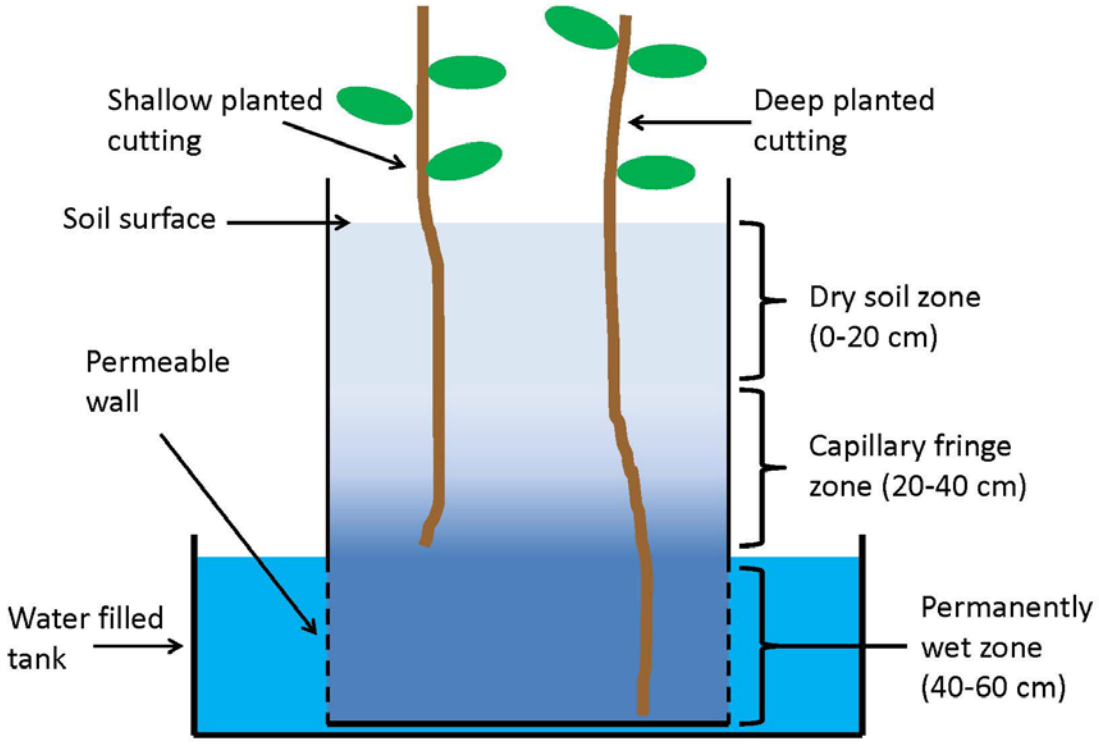

Figure 1. Diagram of cottonwood planting.

On June 21, 2011 (70 days after planting) the cuttings were evaluated for survival. On May 8, 2012 (1 year of growth) the containers were split open and the soil carefully washed from the roots. The cuttings were evaluated for survival and vigor. Vigor was rated on a 1 to 9 scale with

1 being healthy and 9 being dead. The cuttings were also visually examined for areas of root growth, rot, or other evidence of problems.

Results

On June 21, 2011 all cuttings were alive and producing vigorous shoot growth (figure 2). All cuttings had put on several feet (0.6m) of shoot growth and had healthy green leaves. At the time of harvest on May 8, 2012, no significant differences could be detected for survival or vigor between the two planting depths. The deep planted treatment resulted in 91.5% survival compared to 83% survival for the shallow planted cuttings. The shallow planted cuttings had a vigor rating of 4.7 and the deep planted cuttings had a vigor rating of 5.0.

Figure 2. Initial evaluations showed 100% survival and excellent growth from all cuttings on June 21, 2011.

A rooting zone could be easily defined in cuttings of both treatments from approximately 20 cm to 40 cm (8 to 16 in), directly correlating to the capillary fringe zone (figure 3). Little root growth was seen in the dry zone 0-20 cm (0 to 8 in) from the surface for either treatment. Similarly, deep planted cuttings had little root growth in the permanently wet zone between 40

and 60 cm (16 to 24 in). Additionally, the bark around the cuttings that were in permanent water was dead and could easily be rubbed off of the cutting (figure 4).

Figure 3. Shallow planted cutting (left) with vigorous root growth in capillary zone (2-4 dm from bottom), and deep planted cutting (right) showing zone of no root growth and dead bark from 0 to 2 dm from bottom (permanently wet zone) and vigorous root growth in capillary zone (2 to 4 dm from bottom). Soil surface was at 6 dm.

Figure 4. Close-up of deep planted cutting with bark sloughing off the wood in the permanent water zone.

Discussion

Cutting survival was not influenced by planting depth. Planting deeper into permanent water did not have any measurable effect on cutting vigor or survival. The portion of the stem that was in permanent water appeared to die off, but the damage to that section of the cutting did not affect the rest of the cutting.

Cottonwoods grow naturally in areas with a deep water table and a large portion of the root system in the capillary fringe zone. Thus planting cottonwoods in the correct location in relation to the stream channel is vital to establishment and long term survival. Planting deep (into permanent water) could provide some insurance against drought and fluctuating water tables. Deep planting into the permanent water table ensures that some of the cutting will be in the capillary fringe even if the water table drops, but the cutting should not be negatively affected if the lower portion of the cutting remains in permanent water.

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OFF-CENTER STUDIES

Curlew National Grassland Off-Center Evaluation

2012 Progress Report

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INTRODUCTION

In November of 2010, the Aberdeen Plant Materials Center (PMC) installed a multi-species planting at an off-center test site located on the USDA-Forest Service Curlew National Grassland located approximately 30 miles south of American Falls, Idaho in cooperation with the Caribou/Targhee National Forest. The trial includes accessions of primarily native grasses, forbs and shrubs adapted for use in MLRA 13 Eastern Idaho Plateaus (13 to 18 inch plus precipitation areas). The trial contains 63 accessions of 35 species of native and introduced grasses, forbs and shrubs as listed in Table 1. Appendix 1 is a plot map of the planting. The goal of this trial is to evaluate the adaptability of new conservation releases in mid-elevation mountain big sagebrush/grass ecosystems and compare their establishment, production and longevity against traditionally recommended released plant materials. The site will also serve as a display nursery for the Forest Service and other conservation practitioners to view plant species and releases in a natural setting.

The Curlew test site historically supported a Wyoming or mountain big sagebrush/bluebunch wheatgrass plant community. Climatic conditions are semi-arid with mean annual precipitation ranging from 12 to 25 inches, and the frost free period is approximately 90 days or less. The soil at the site is a silty clay loam to silt loam. The elevation is 5,216 ft.

MATERIALS AND METHODS

The study area was burned by wildfire in 2006. In fall 2009 the study site was plowed and packed, followed by applications of 16 oz 2, 4-D and 64 oz glyphosate on June 18, 2010 and July 29, 2010. The trial was planted on November 17, 2010 using a Tye Drill with a drill width of 80 inches (8 rows at 10 inch spacing). Experimental design is a randomized complete block with 3 replications. Each plot is one drill width wide (80 in) and 20 ft long. Seeding depths are dependent on species and were planted according to Ogle et al (2010). Species were seeded at a target rate of 20 to 30 pure live seeds (PLS) per ft^2 for large seeded species (<500,000 seeds per pound) and 40 to 50 PLS/ft^2 for smaller seeded species (>500,000 seeds/lb). Pure live seed values were determined by seed lab results or, best estimates when lab results were not available. All seed was mixed with rice hulls as an inert carrier to improve seed flow according to St. John et al (2005). A cover crop was planted in the unplanted prepared areas surrounding the trial consisting of 40% Anatone bluebunch wheatgrass, 20% Sherman big bluegrass, 15% Bannock thickspike wheatgrass, 10 percent Magnar basin wildrye, 5% Maple Grove Lewis flax, 5% Richfield firecracker penstemon, 5% Great Northern western yarrow, and 0.25 lbs/ac Snake River Plains fourwing saltbush. The plots were mowed to approximately four inch height on September 29, 2011 for weed control.

Seeding with the Tye drill.

Initial plant establishment was measured on July 11, 2011 using a frequency grid based on that described by Vogel and Masters (2001). Data were analyzed using the Statistix 8 Analytical software and subjected to an analysis of variance with a significance level of $p<0.05$. In cases where significance was detected, means were separated using a Least Significant Difference (LSD) all pairwise comparison. Analyses were broken into five groups, 1) all species, 2) native grasses, 3) introduced grasses, 4) forbs, and 5) shrubs. All tables have been arranged with accessions ranked from highest plant density to the lowest at the time of the 2011 evaluation. Plant density data was also collected on June 14, 2012.

Densities of volunteer crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*Thinopyrum intermedium*), and annual bromes (*Bromus* spp.) were evaluated in the test plots with frequency grids on August 13, 2012. One density frame was evaluated for each accession in the center of the plots of replications 1 and 3. These data will be used to track long term persistence and competition of introduced perennial and annual grasses among the seeded species.

Cover crop

Establishment and performance of the cover crop seeding mixture was evaluated on August 14, 2012 by recording 8 density frames (2 on each side of the planting). Cover class frequency data was also recorded on August 14, 2012 using a 60 meter (200 ft) line-intercept transect on each side of the planting.

Weather

There are no weather stations located near the Curlew site or in nearby locations with similar elevation and conditions. The closest weather station is the Bull Canyon weather station located 11 miles north of the Curlew study site at an elevation of 6,418 ft. During water year 2011, Bull Canyon recorded 22.7 inches of precipitation. The Curlew study site, being lower in elevation, probably received less precipitation than Bull Canyon, but the Curlew test site received normal to above normal precipitation for the year (University of Utah, 2012).

Precipitation was very low throughout the Intermountain West in 2012. The Bull Canyon Weather station recorded below average precipitation with a cumulative total of 10.74 inches through July, 2012.

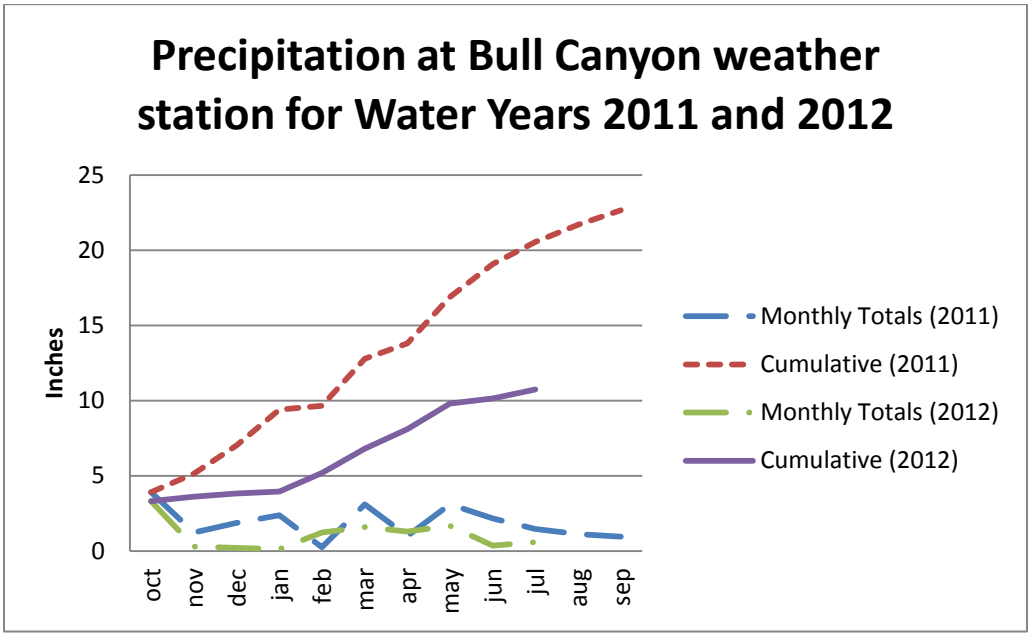

Table 1. Species and accessions

Bluebunch wheatgrass (*Pseudoroegneria spicata*)
- Anatone
- Goldar
- P-7
- P-33

Snake River wheatgrass (*Elymus wawawaiensis*)
- Secar
- Discovery

Western wheatgrass (*Pascopyrum smithii*)
- Recovery
- Rosana
- Arriba

Slender wheatgrass (*Elymus trachycaulus*)
- First Strike
- Pryor

Basin wildrye (*Leymus cinereus*)
- Washoe
- Magnar
- Trailhead
- Continental

Bluegrass (*Poa* spp.)
- Sherman big bluegrass
- Opportunity Nevada bluegrass
- Mt. Home Sandberg bluegrass
- High Plains Sandberg bluegrass
- Reliable Sandberg bluegrass

Green needlegrass (*Nassella viridula*)
- Cucharas

Fescue (*Festuca* spp.)
- 9076469 Idaho fescue
- Covar sheep fescue
- Durar hard fescue

Streambank/Thickspike wheatgrass (*Elymus lanceolatus*)
- Sodar
- Bannock
- Critana

Squirreltail (*Elymus elymoides* and *E. multisetus*)
- Fish Creek bottlebrush squirreltail

- Sand Hollow big squirreltail
- Toe Jam Creek bottlebrush squirreltail
- Wapiti bottlebrush squirreltail
- 9019219 bottlebrush squirreltail
- 9092275 bottlebrush squirreltail

Forbs

- Maple Grove Lewis flax (*Linum lewisii*)
- Appar blue flax (*Linum perenne*)
- Richfield firecracker penstemon (*Penstemon eatonii*)
- Great Northern western yarrow (*Achillea millefolium*)
- Antelope prairie clover (*Dalea candida*)
- Silverleaf phacelia (*Phacelia hastata*)
- 9076577 Douglas' dustymaiden (*Chaenactis douglasii*)
- NBR-1 basalt milkvetch (*Astragalus filipes*)
- Don falcata alfalfa (*Medicago sativa* ssp. *falcata*)
- Timp northern (Utah) sweetvetch (*Hedysarum boreale*)
- Delar small burnet (*Sanguisorba minor*)
- Sainfoin (*Onobrychis viciifolia*)
- Lutana cicer milkvetch (*Astragalus cicer*)
- Stillwater prairie coneflower (*Ratibida columnifera*)

Shrubs

- Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*)
- Snake River Plains fourwing saltbush (*Atriplex canescens*)
- Wytana fourwing saltbush (*A. canescens*)
- Northern Cold Desert winterfat (*Krascheninnikovia lanata*)

Altai wildrye (*Leymus angustus*)

- Mustang

Crested wheatgrass (*Agropyron cristatum*)

- Ephraim
- Hycrest
- Hycrest II
- Nordan

Russian wildrye (*Psathrostachys juncea*)

- Bozoisky Select
- Bozoisky II

Siberian wheatgrass (*Agropyron fragile*)

- Vavilov
- Vavilov II

Meadow brome (*Bromus biebersteinii*)

- Regar
- Cache

RESULTS

2011

Establishment densities ranged from essentially zero plants to 13 plants/m² in 2011 (table 2). Eight out of the top ten species to establish were introduced grasses, four of which were crested wheatgrass accessions. The highest ranking native grasses were Fish Creek bottlebrush squirreltail and Pryor slender wheatgrass, both of which are short-lived perennials commonly used as a nurse crop with longer lived species in a seed mixture. In general, forbs had moderate establishment success, while the shrub accessions with the exception of Wyoming big sagebrush had low establishment numbers the first year evaluation.

Native grasses had a broad range of establishment densities (table 3) ranging from 0.2 plants/m² for Sand Hollow Germplasm big squirreltail (*Elymus multisetus*) to 11.6 plants/m² for Fish Creek Germplasm bottlebrush squirreltail (*E. elymoides*) in 2011. Introduced grasses all had excellent establishment (table 4). The lowest plant density recorded was 6.7 plants/m² from Bozoisky Russian wildrye. Cache meadow brome had the highest density with 13.0 plants/m². Forbs (table 5) generally had lower establishment numbers than the grasses; however good stands were observed in many plots. All shrub species had low initial establishment (table 6). No significant differences were detected between means.

2012

Despite drought conditions in 2012, plant densities of native grasses did not generally show dramatic decreases. Slender wheatgrass and squirreltail accessions, known to be short lived perennials, decreased or maintained 2011 densities. Bluebunch wheatgrass densities stayed essentially the same as 2011 with the exception of Anatone which increased in density from 7.6 to 9.5 plants/m². The rhizomatous grass species western wheatgrass, thickspike wheatgrass, and streambank wheatgrass all increased in density from 2011 to 2012.

Introduced grass species accessions either increased or decreased in densities from 2011 to 2012. The highest densities were obtained by Hycrest II, Ephraim and Hycrest crested wheatgrass with 14.1, 12.5 and 11.7 plants/m² respectively. However these numbers may be inflated due to volunteering from the existing soil seed bank. Cache and Regar meadow brome both decreased under drought stress although Cache maintained a good stand with 10.7 plants/m². Vavilov II Siberian wheatgrass maintained approximately 7 plants/m² while Vavilov decreased from 9.6 plants/m² to 4.2 plants/m².

Forb densities declined significantly from 2011 to 2012 with many accessions being nearly eliminated from the plots. Don falcate alfalfa and Appar blue flax (both introduced species) maintained the best stands with 3.3 and 3.2 plants/m² respectively. Wyoming big sagebrush and Snake River Plains fourwing saltbush had fair stands with 2.0 and 0.7 plants/m² respectively.

Densities of volunteer crested wheatgrass and annual bromes are listed in tables 3-6. These data will be used to track persistence and expansion of introduced species over time. The average density of crested wheatgrass and annuals bromes throughout all of the evaluated plots in 2012 was 7.0 plants/m² and 5.7 plants/m² respectively.

In the cover crop areas surrounding the test plots, seeded perennials made up 11% of the cover (6% bluebunch wheatgrass, 2% big bluegrass, 2% thickspike wheatgrass, and 1% blue flax) during 2012. Other seeded cover crop species were observed but not recorded in the line-intercept transects. Bare ground and litter made up the majority of the cover classes with 28 and 29% respectively. Volunteer crested wheatgrass accounted for 18% of the total cover. Annual grasses, including bulbous bluegrass (*Poa bulbosa*), cheatgrass (*Bromus tectorum*) and an unidentified annual brome comprised 14% of the ground cover. Incidental volunteer native forbs including tapertip hawksbeard (*Crepis acuminata*) and lesser rushy milkvetch (*Astragalus convallarius*) made up less than 1% of the total cover. Plant density measurements for the cover crop are provided in table 7.

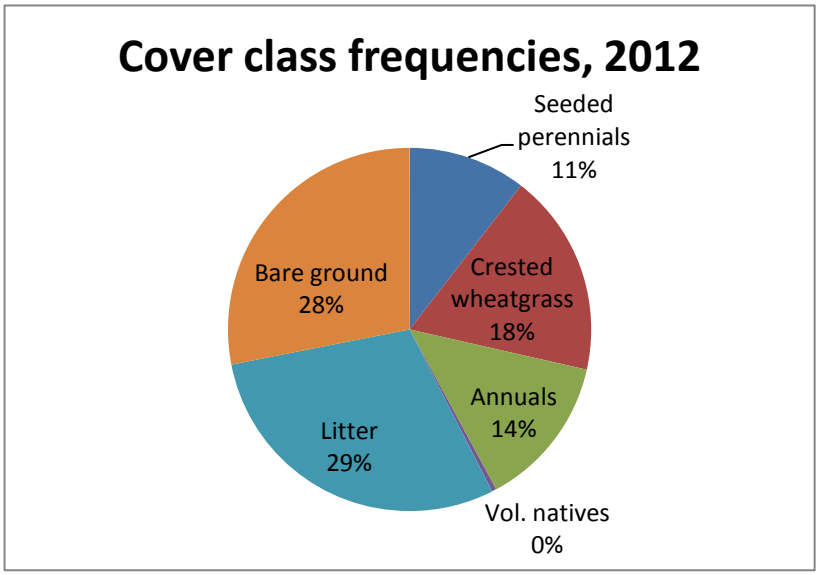

Table 2. All species

Accession	Density[1] July 11, 2011	Density[1] June 14, 2012	Accession (cont.)	Density July 11, 2011	Density June 14, 2012
	-------- (plants/m ²)--------			-------- (plants/m ²)--------	
Cache	13.0 a	10.7 a-d	Recovery	4.3 h-q	5.8 e-n
Hycrest II	12.1 a-b	14.1 a	NBR-1	4.0 i-q	0.0 q
Fish Creek	11.6 a-c	9.1 b-f	Durar	3.9 i-q	5.5 e-o
Nordan	11.6 a-c	8.7 b-g	9076469	3.8 i-q	2.9 i-q
Pryor	11.5 a-d	2.0 k-q	Bannock	3.6 j-q	6.5 d-k
Ephraim	11.1 a-e	12.5 a-b	Opportunity	3.5 j-q	4.4 f-q
Vavilov	9.6 a-f	4.2 g-q	Washoe	3.5 j-q	0.7 p-q
Bozoisky II	9.5 a-g	9.0 b-f	Phacelia	3.3 k-q	0.7 p-q
Hycrest	9.0 a-h	11.7 a-c	Secar	3.3 k-q	4.9 e-p
Covar	8.5 a-i	8.9 b-g	9019219	3.1 k-q	2.6 j-q
Delar	8.1 b-j	1.2 n-q	Sherman	3.1 k-q	4.2 g-q
Maple Grove	8.1 b-j	1.3 n-q	Trailhead	3.1 k-q	2.5 j-q
Anatone	7.6 b-k	9.5 a-e	Continental	2.4 l-q	1.8 l-q
Don	7.6 b-k	3.3 h-q	High Plains	2.4 l-q	2.5 j-q
Timp	7.6 b-k	0.6 p-q	9092275	2.3 l-q	0.9 o-q
Regar	7.5 b-k	4.5 f-q	Magnar	2.3 l-q	0.5 p-q
Vavilov II	7.5 b-k	7.7 c-h	Wyoming big sagebrush	1.5 m-q	2.0 k-q
Appar	7.0 c-l	3.2 h-q	Great Northern	1.5 n-q	0.9 o-q
Mustang	6.8 d-l	2.5 j-q	Richfield	1.5 n-q	0.4 p-q
Bozoisky	6.7 e-l	5.7 e-n	Wapiti	1.3 o-q	0.1 q
Sodar	6.7 e-l	7.4 c-i	Lutana	1.2 o-q	0.1 q
Critana	6.6 e-l	6.4 d-l	Stillwater	1.1 p-q	0.1 q
First Strike	6.3 f-m	2.0 k-q	Cucharas	0.9 q	0.5 p-q
P-7	6.2 f-n	6.7 d-j	Mountain Home	0.9 q	1.0 o-q
Sainfoin	5.9 f-o	0.5 p-q	Reliable	0.7 q	1.3 n-q
P-33	5.8 f-p	4.5 f-q	Snake River Plains	0.5 q	0.5 p-q
Goldar	4.7 g-q	6.1 d-m	Wytana	0.3 q	0.1 q
Rosana	4.5 h-q	8.2 b-g	Sand Hollow	0.2 q	0.0 q
Toe Jam	4.5 h-q	5.7 e-n	Antelope	0.1 q	0.0 q
Douglas' dustymaiden	4.4 h-q	1.7 l-q	Northern Cold Desert	0.1q	0.1 q
Discovery	4.4 h-q	5.5 e-o			
Arriba	4.3 h-q	8.7 b-g			
LSD (0.05)	4.8	4.7			

[1] For plants/ft², divide by 10.76

Table 3. Native grasses

Accession	Target Species Density[1] July 11, 2011	Target Species Density[1] June 14, 2012	Crested Wheatgrass Density[2] August 13, 2012	Annual Brome Density[2] August 13, 2012
	-------- (plants/m ²)--------		-------- (plants/m ²)--------	
Fish Creek	11.6 a	9.1 a	4	5.5
Pryor	11.5 a	2.0 c-h	2.5	3
Anatone	7.6 a-c	9.5 a	6	3.5
Sodar	6.7 a-d	7.4 a-c	7.5	2
Critana	6.6 a-d	6.4 a-e	5.5	9.5
First Strike	6.3 a-e	2.0 c-h	10.5	4.5
P-7	6.2 a-f	6.7 a-d	7	6.5
P-33	5.8 b-f	4.5 a-h	9.5	7.5
Goldar	5.7 b-g	6.1 a-f	11	4
Rosana	4.5 b-g	8.2 a-b	6.5	4
Toe Jam Creek	4.5 b-g	5.7 a-h	5	4.5
Discovery	4.4 b-g	5.5 a-h	7.5	2
Arriba	4.3 b-g	8.7 a	7	1
Recovery	4.3 b-g	5.8 a-g	5	4
9076469	3.8 b-g	2.9 b-h	9	8.5
Bannock	3.6 b-g	6.5 a-e	10	5
Opportunity	3.5 b-g	4.4 a-h	3.5	8.5
Secar	3.3 b-g	4.9 a-h	4.5	11
Sherman	3.1 b-g	4.2 a-h	8.5	2
9019219	3.1 b-g	2.6 b-h	6.5	10.5
High Plains	2.4 c-g	2.5 b-h	11.5	3
9092275	2.3 c-g	0.9 e-h	9	7
Wapiti	1.3 d-g	0.1 g-h	7	7.5
Cucharas	0.9 e-g	0.5 f-h	7.5	3
Mountain Home	0.9 e-g	1.0 d-h	6	11
Reliable	0.7 f-g	1.3 d-h	7	1.5
Sand Hollow	0.2 g	0.0 h	4.5	12.5
LSD (0.05)	5.5	5.7		

[1] For plants/ft², divide by 10.76
[2] Not analyzed for statistical significance

Table 4. Introduced grasses

Accession	Target Species Density[1] July 11, 2011	Target Species Density[1] Aug 13, 2012	Crested Wheatgrass Density[2] August 13, 2012	Annual Brome Density[2] August 13, 2012
	-------- (plants/m ²)--------		-------- (plants/m ²)--------	
Cache	13.0 a	10.7 a-c	2.5	2.5
Hycrest II	12.1 a-b	14.1 a	NA	5.5
Nordan	11.6 a-c	8.7 a-d	NA	2.5
Ephraim	11.1 a-c	12.5 a-b	NA	6.5
Vavilov	9.6 a-c	4.2 d-e	0.5	2.5.
Bozoisky II	9.5 a-c	9.0 a-d	2	3
Hycrest	9.0 a-c	11.7 a-b	NA	14
Covar	8.5 a-c	8.9 a-d	10	3
Regar	7.5 b-c	4.5 d-e	3.5	1.5
Vavilov II	7.5 b-c	7.7 b-e	NA	3
Mustang	6.8 c	2.5 e	8.5	4
Bozoisky	6.7 c	5.7 c-e	6.5	2
Durar	3.9 c	5.5 c-e	7	4
LSD (0.05)	5.0	5.7		

[1] For plants/ft², divide by 10.76
[2] Not analyzed for statistical significance

Table 5. Forbs

Accession	Target Species Density[1] July 11, 2011	Target Species Density[1] June 14, 2012	Crested Wheatgrass Density[22] August 13, 2012	Annual Brome Density[2] August 13, 2012
	-------- (plants/m ²)--------		-------- (plants/m ²)--------	
Delar	8.1 a	1.2	2	10.5
Maple Grove	8.1 a	1.3	5.5	12
Don	7.6 a-b	3.3	7.5	2
Timp	7.6 a-b	0.6	9.5	11
Appar	7.0 a-c	3.2	5	15
Sainfoin	5.9 a-d	0.5	10	12
Douglas' dustymaiden	4.4 b-e	1.7	6	1
NBR-1	4.0 c-e	0.0	10.5	2
Phacelia	3.3 d-f	0.7	10.5	4.5
Great Northern	1.5 e-f	0.9	7	8
Richfield	1.5 e-f	0.4	5	10.5
Lutana	1.2 e-f	0.1	3	14.5
Stillwater	1.1 e-f	0.1	7	3
Antelope	0.1 f	0.0	10	5
LSD (0.05)	3.4	N/A		

[1] For plants/ft², divide by 10.76
[2] Not analyzed for statistical significance

Table 6. Shrubs

Accession	Target Species Density[1] July 11, 2011	Target Species Density[1] June 14, 2012	Crested Wheatgrass Density[22] August 13, 2012	Annual Brome Density[2] August 13, 2012
	-------- (plants/m ²)--------		-------- (plants/m ²)--------	
Wyoming big sagebrush	1.5	2.0	8.5	1.5
Snake River Plains	0.5	0.7	6.5	4.5
Wytana	0.3	0.1	5.5	6.5
Northern Cold Desert	0.1	0.1	10	1.5
LSD (0.05)	N/A	N/A		

[1] For plants/ft², divide by 10.76
[2] Not analyzed for statistical significance

Table 7. Cover Crop

	Density[2] July 11, 2011
	----- (plants/m ²)----
Crested wheatgrass	9.9
Cheatgrass	9.3
Bluebunch wheatgrass	5.3
Bulbous bluegrass	3.4
Big bluegrass	2.5
Thickspike wheatgrass	2.0
Wyoming big sagebrush	0.5
Western yarrow	0.1
Douglas' dustymaiden	0.1

[1] For plants/ft², divide by 10.76
[2] Not analyzed for statistical significance

SUMMARY

High densities of volunteer crested wheatgrass at the Curlew seeding are noteworthy. A second year of chemical fallow prior to planting the test accessions to control crested wheatgrass and annual weeds may have significantly reduced competition and led to a more complete plant community conversion. However, deferring planting until the fall of 2011 would likely have resulted in poor germination rates of seeded species due to inadequate moisture during the establishment period.

This progress report documents data from the first two growing seasons. In future evaluations, the grass plots will be clipped in the third and fourth growing seasons to determine air-dry forage production. Crested wheatgrass densities within the test plots and in the cover crop areas will also be tracked to observe trends in stand composition in the presence of a crested wheatgrass seed bank.

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Fence

Anatone	9076469	Timp	Rosanna	Critana	Secar	Stillwater	Don	Magnar
Goldar	Covar	Delar	Antelope	Cucharas	Wapiti	NBR-1	Maple Grove	Hycrest
P-7	Sodar	Sainfoin	Sand Hollow	Don	Wytana	Sherman	Rosanna	Timp
P-33	Bannock	Lutana	N. C. Desert	Washoe	MACA	Antelope	Great Northern	Bozoisky Sel.
Secar	Critana	MACA	Pryor	Maple Grove	Magnar	High Plains	Secar	Sand Hollow
Discovery	Fish Creek	Stillwater	CHDO	Great Northern	Nordan	9076469	9019219	Wapiti
Recovery	Sand Hollow	WY big sage	Sherman	Anatone	Arriba	Sainfoin 2 bu	Mt. Home	P-7
Rosanna	Toe Jam	S. R. Plains	NBR-1	Trailhead	Durar	First Strike	Critana	S. R. Plains
Arriba	Wapiti	N. C. Desert	Reliable	Timp	Opportunity	Mustang 2 bu	Sodar	Pryor
First Strike	9019219	Wytana	Hycrest	Appar	Sainfoin	Goldar	Phacelia	Cucharas
Pryor	9092275	Mustang	P-33	9019219	P-7	Ephraim	Trailhead	Wytana
Washoe	Maple Grove	Ephraim	Sodar	Recovery	Covar	Bannock	Toe Jam	WY big sage
Magnar	Appar	Hycrest	Mustang	Phacelia	Bozoisky II	Appar	P-33	Discovery
Trailhead	Richfield	Hycrest II	High Plains	Mt. Home	Stillwater	Continental 2 bu	Opportunity	Vavilov
Continental	Great Northern	Nordan	Vavilov	WY big sage	Fish Creek	Hycrest II	Delar 2 bu	Lutana
Sherman	Durar	Bozoisky Sel.	9092275	First Strike	Bozoisky Sel.	Recovery	Anatone	Reliable
Opportunity	Antelope	Bozoisky II	Delar	Ephraim	Cache	Cache	Bozoisky II	Regar
Mt. Home	Phacelia	Vavilov	Discovery	9076469	Goldar	9092275	Richfield	Durar
High Plains	CHDO	Vavilov II	Richfield	Regar	S. R. Plains	N. C. Desert	Covar	CHDO
Reliable	NBR-1	Regar	Lutana	Toe Jam	Vavilov II	Vavilov II	Fish Creek	Arriba
Cucharas	Don	Cache	Bannock	Hycrest II	Continental	Washoe	MACA 2 bu	Nordan

Rep. 1

Rep. 2

Rep. 3

Curlew National Grassland Off-center Evaluation
Planted November 17, 2010

FIELD PLANTING, DEMONSTRATION AND DISTRICT SEED INCREASE EVALUATION SUMMARIES

PLANT MATERIALS

2012

IDAHO EVALUATION SUMMARIES

FIELD, DSI and DEMONSTRATION PLANTINGS

IDAHO DIVISION I
PLANT MATERIALS PLANTINGS

FIELD OFFICE: BONNERS FERRY

ID00016 Boundary Creek WRP. Cropland area planted to permanent perennial species field planting. A mix of Alkar tall wheatgrass, Greenar intermediate wheatgrass, Ranger alfalfa, birdsfoot trefoil, red clover, Sherman big bluegrass, tufted hairgrass, orchardgrass, and timothy at critical area planting rates was dormant planted on 1000 acres in late fall 1999. A 42 feet air-seeder with fertilizer attachment planted mix with 2000 units per acre of nitrogen, phosphorus, potassium, and sulfur applied 1 inch below and to side of seed. FY00 excellent stand establishing with some species as tall as 3-4 feet by early July. In October wild oats were present throughout stand. FY0 permanent wildlife planting mixture established well utilizing the 42-foot air seeder. The drill was calibrated with the producer based upon 14.2 lbs. PLS/acre. A "flush" of wild oats occurred the first year. The stand was seeded the 1st week of November 1999. The "so called dormant planting" resulted in some sprouting of clovers due to a warmer than normal late fall. As a result, some mortality occurred in the clovers. An excellent stand of Alkar tall wheatgrass, Greenar intermediate wheatgrass, birdsfoot trefoil, Ranger alfalfa, Latar orchardgrass, timothy and clover exists. The Sherman big bluegrass is "spotty" due to becoming overpowered by the other species in the mix. There are some ridges in the field with quackgrass, which is good cover. IDF&G is actively spot spraying the Canadian thistle. They plan to obtain a boom sprayer in order to treat the acreage more uniformly. FY02 overall stand is good to excellent with the primary species including Alkar tall wheatgrass, Greenar intermediate wheatgrass, Latar orchardgrass and redtop. Some birdsfoot trefoil, clover, timothy, and alfalfa are present in scattered locations. Tufted hairgrass and Sherman big bluegrass were not found. FY04 prescribed burned fall 2004 (15 acres) to rejuvenate existing stand – resulted in excellent response in plant vigor. Stand is primarily Latar, Alkar, Greenar, and alfalfa – general overall stand is predominately wheatgrasses and orchardgrass. Providing excellent wildlife nesting and escape cover. FY11 in the last few years it appears all legumes were sprayed out due to Canada thistle control. There are extensive areas of solid tall and intermediate wheatgrass providing very good nesting cover. However; these species tend to lay down over winter due to wet snow and rain. This thatch build up does responds to cool moist prescribe burns. The best tall stiff structured grasses are Magnar and Trailhead basin wildrye; Bozoisky Russian wildrye and tall wheatgrasses. Of all basin wildryes, Magnar has best cover structure. Other areas have extensive very competitive dominance by orchardgrass. In future only recommend about 10-20% orchardgrass in seed mixtures. Orchardgrass has a "wimpy" structure but is very palatable for all wildlife. Remarks: to plan again; mixes for extensive areas along levees with well drained soils would include stiff structured grasses such as tall wheatgrass and basin wildrye. On wetter basins or fringe areas mixes would include tufted hairgrass and bluejoint reedgrass. As an understory grass, plant Sherman big bluegrass. FY12 no evaluations.

ID06008 Bernie Heinemann. Riparian Field Planting. Coyote willow (50); 9067541 Peachleaf willow (20); 9067546 Peachleaf willow (20); 9067549 Peachleaf willow (20); 9067375 Peachleaf willow (20); 9067376 Peachleaf willow (20); and 9067560 Peachleaf willow (20) cuttings ordered February 2006. Site characteristics: Porthill silt loam soil, 5 percent slopes, 2000 feet elevation, 24 inch precipitation, non-irrigated, T65N R1W, Section 10. FY06- FY10 no evaluations. FY11 There is good stand of willows along wet fringe areas of the wetland enhancement. There was about 40% mortality due to deer browsing. The remaining willows are about 8 feet tall and are doing well. This is providing good shade and habitat from the Peachleaf willows. Unfortunately I cannot tell which varieties are better. I do know the coyote willow is spreading nicely along the wet fringe area with its creeping root characteristics. I feel it has spread with new shoots about 3 feet beyond what was planted. FY12 no evaluations.

FIELD OFFICE: COUER D'ALENE
ID11006 John Burton. Four pounds of Clearwater Selection Venus penstemon was shipped to field office on March 18, 2011. This seed is being included in a seed mix including 25% Latar orchardgrass, 45% Delar small burnet, 20% hairy vetch and 10% Clearwater Selection Venus penstemon. Seeded May 2011. FY12 grasses have established but no penstemon found.

ID13010 Francis Hughes. Field planting interseeding legumes into existing orchardgrass. Sent 10 lbs Delar small burnet, 10 lbs Shoshone sainfoin, 2 lbs cicer milkvetch and 1.5 lbs alfalfa in December 2012.

FIELD OFFICE: PLUMMER
None

FIELD OFFICE: SANDPOINT
None

IDAHO DIVISION II
PLANT MATERIALS PLANTINGS

FIELD OFFICE: GRANGEVILLE

ID02002 Teresa Seloske Forest Field Planting. Lind Douglas fir (30 plants) and Yakima Douglas fir (13 plants) ordered July 16, 2001. Plants delivered to FO April 3, 2002 by WAPMC. FY02 Planting completed April 6, 2002. Lind Douglas fir 10 percent survival with poor vigor. Yakima Douglas fir 15 percent survival with fair vigor. Survival effected by extremely dry conditions. FY03 very hot dry summer resulted in failure of this planting. File was cancelled at end of 2003. FY06 field determination indicated the Yakima ecotype failed to establish, but the Lind ecotype is still alive. Lind ecotype has not grown much, but there is good survival of this ecotype during field evaluation in July 2006. FY08 this planting initially suffered from very hot dry summers and plant did not appear to be doing well. Following a number of years of root system establishment, this planting is doing somewhat better. The Lind ecotype is doing much better than the Yakima ecotype. The Lind ecotype could probably be recommended on sites where we would normally only recommend ponderosa pine. Next evaluation 2013.

ID04009 Carl Skyrman. Demonstration planting. Anatone bluebunch wheatgrass and Secar Snake River wheatgrass. Seed ordered March 8, 2004. Site characteristics: Chard sandy loam soil, northwest aspect, 1820 feet elevation, 16-22 inch precipitation, non-irrigated, T26N R1E NW1/4 Section 13. FY04 – Secar and Anatone were planted side by side in the spring of 2004. Good stands for each with > 5 plants per square foot establishing and it is hard to differentiate between plantings. Anatone plants were a bit more robust than Secar plants during evaluation 7/22/04. FY05 no evaluation. FY06 (4/25/06) good established stand, Carl will spray with Sencore for cheatgrass and ventenata control. FY08 pictures of planting indicate good establishment of most seeded species. FY09- FY12 no evaluations.

ID05003 Steve Hunter. **Starthistle control project**. Rush intermediate wheatgrass, Tegmar intermediate wheatgrass and Newhy hybrid wheatgrass were ordered February 4, 2005. Site characteristics: 3 acres, MLRA B9, Bluesprin skeletal loam soil, 20 percent slopes, southwest aspect, elevation 2700 feet, 18 inch precipitation zone, non-irrigated, T30, R3, NW ¼ section 36. FY05 not planted. FY06 planted May 22, 2006 into poorly prepared seedbed. Fair stand establishing with about 0.25 plants/ft2 and fair vigor. FY08 Rush poor stand with 15 percent survival and fair vigor; Tegmar fair stand with 40 percent survival and fair vigor; Newhy poor stand with 25 survival and fair vigor. Plants on site are very stunted. Starthistle plants have been significantly reduced on the site. However, there has been an invasion of ventenata, annual fescue, medusahead and cheatgrass on the site and they are stressing the planted perennial grasses. FY09- FY12 no evaluations.

ID05004 Tony Carson (combined with ID04004). Field planting. Anatone bluebunch wheatgrass, Magnar basin wildrye, Nezpar Indian ricegrass, High Plains Sandberg bluegrass, Rosana western wheatgrass, Sherman big bluegrass, Snake River Plains fourwing saltbush and Northern Cold Desert winterfat were ordered February 4, 2005. Site characteristics: 1 acre, Lickskillett – Tannahill silt loam soil complex, 45 percent slopes, south aspect, elevation 1960 feet, 16 inch precipitation, T28N, R1E, NE ¼ section 12. FY05 seeding was completed in early spring 2005. Half of the seeded area was treated with a straw pellet mulch. Above average spring rainfall resulted in very encouraging initial stand establishment with positively identified plants of Northern Cold Desert winterfat, Rosana western wheatgrass, Nezpar Indian ricegrass, Anatone bluebunch wheatgrass and many small seedlings present on July 13, 2005. FY06 April 25, 2006 excellent stand establishing, primarily seedlings, but also includes a few established grasses and fourwing saltbush. Good soil moisture during evaluation and cooperator will irrigate in 2-3 weeks if no additional rains occur. FY07 Snake River Plains fourwing saltbush fair stand with good vigor and about 35 inches tall. Northern Cold Desert winterfat fair stand with good vigor and about 6 inches tall. Nezpar Indian ricegrass, Sherman big bluegrass and Rosana western wheatgrass poor stands with fair vigor and about 3- 4 inches tall. Too soon to conduct a complete evaluation of stand. FY08 Anatone fair stand with fair vigor; Magnar poor stand with very poor vigor; Nezpar poor stand with poor vigor; High Plains very poor stand; Rosana good stand with good vigor; Sherman good stand with good vigor; Snake River Plains good stand with good vigor; Northern Cold Desert good stand with good vigor. Anatone and Rosana are the grasses doing the best on this very difficult eroded low fertility site. Both Snake River Plains fourwing saltbush and Northern Cold Desert winterfat are doing very well. Next evaluation 2013.

ID05006 Gary Crea (combined with ID04008). Feedlot species adaptation trial. (1st planting P27 Siberian wheatgrass, Sodar streambank wheatgrass, Topar pubescent wheatgrass, Vavilov Siberian wheatgrass, Rush intermediate wheatgrass, Rosana western wheatgrass, Durar hard fescue and Alkar tall wheatgrass) (2nd planting Newhy hybrid wheatgrass, Critana thickspike wheatgrass, and Rosana western wheatgrass) Seed was ordered on February 4, 2005. Site characteristics: 0.5 acres, MLRA B9, Ferdinand-Flybow-Riggins soil complex, 2-8 percent slopes, west to southwest aspect, 20-24 inch precipitation, non-irrigated, T31N, R1E, SW of SW ¼ of section 27. FY04 overall the stand establishment is excellent due to good rainfall this year. Stand establishment exceeds 2 plants per square foot for all species except Alkar. The grasses are suppressing weeds in the feedlot. FY05 stand is spotty possibly due to excessive weed competition during establishment. FY06- FY12 no evaluations.

ID07009 Daryl Mullinix Ventenata Study. Demonstration planting. Seed ordered February 14, 2007. Site was prepared for planting in fall of 2006 and spring of 2007. Site was planted on May 8, 2007. Layout-(south end) 1. Delar small burnet; 2. Pryor slender wheatgrass; 3. Secar Snake river wheatgrass; 4. Union Flat blue wildrye; 5. Regar meadow brome; 6. Covar sheep fescue; 7. Latar orchardgrass; 8. Bromar mountain brome; 9. Alkar tall wheatgrass; 10. Durar hard fescue; 11. Sherman big bluegrass; 12. Winchester Idaho fescue; 13. Foothills Canada bluegrass; 14. Bozoisky-Select Russian wildrye; 15. Rush intermediate wheatgrass; 16. Tuscany tall fescue; 17. Rosana western wheatgrass; 18. Sodar streambank wheatgrass; 19. Vavilov Siberian wheatgrass; 20. Lutana cicer milkvetch; 21. Syn-1 alfalfa (north end). FY07 Mark Stannard visited the plots on 7/27/07. The weeds were not bad but he mowed the plots to keep the weeds from going to seed. The grasses were doing fairly well. Vavilov was the best performing grass and alfalfa, cicer milkvetch, and small burnet were also doing very well. The ground was very hard and very dry. A lot of the plants were totally dormant. FY08 Mark spoke with Dr. Prather, Univ. of Idaho, and he indicated that he didn't have funding to do ventenata work. Mark prefers that plots not be sprayed. Sandlund talked with Daryl in early March and asked him not to spray the plots and to give them a 20-30 feet buffer strip around the plots not sprayed. The plots have a heavy infestation of ventenata and meadow foxtail. Rich Gribble and Bob Sandlund mowed the plot in late July. Species doing best include: Delar, Tuscanny II, Vavilov, Alkar, and Syn-1 alfalfa (getting hammered by deer). All other species are struggling. They recommend that plots be wick with Roundup in 2009 to control meadow foxtail. Spraying plots with sencor and diuron should also be considered. FY09 no evaluation.
FY10 evaluations: The meadow foxtail and ventenata competition was very heavy in all plots. In the fall of 2009 the adjacent field was sprayed with Outrider at 2/3 oz per acre. The plots were sprayed in Nov. 2009. The spray application did an excellent job controlling the ventenata and the meadow foxtail. Most of the planted species were having a difficult time prior to the spray application. Unfortunately the spray also had an adverse affect on plants within the plot. 1. Delar small burnet - only a couple of plants remain very poor vigor; 2. Pryor slender wheatgrass - a good population of plants, seeding out, plants are smaller than would be expected; 3. Secar Snake River wheatgrass - poor population and extremely poor vigor; 4. Union Flat blue wildrye - poor stand and poor vigor; 5. Regar meadow brome - none found; 6. Covar sheep fescue - very poor population and vigor; 7. Latar orchardgrass - good population plants are stunted; 8. Bromar mountain brome - none found; 9. Alkar tall wheatgrass - good population and fair vigor; 10. Durar hard fescue - none found; 11. Sherman big bluegrass - none found; 12. Winchester Idaho fescue - none found; 13. Foothills Canada bluegrass - fair population, poor vigor; 14. Bozoisky Russian wildrye - none found; 15 . Rush intermediate wheatgrass - good population fair vigor; 16. Tuscany tall fescue - poor population and poor vigor; 17. Rosana western wheatgrass - good population beginning to spread, fair vigor; 18. Sodar streambank wheatgrass - none found; 19. Vavilov Siberian wheatgrass - good population , fair vigor; 20. Lutana cicer milkvetch - none found.; 21. Syn-1 alfalfa - none found. Plot will be sprayed with a broad leave herbicide. FY12 no evaluations.

ID08008 Sydney Yuncevich Spirit sweetgrass adaptation planting. Sprigs were ordered on March 11, 2008 for shipping sometime in mid April. FY08 excellent stand with good vigor – sprigs were planted in pots, kept outside and watered occasionally. All survived and they will be planted out next spring. FY09- FY12 no evaluations.

ID09008 Daryl Mullinix. Field planting. 9076516 western wheatgrass was ordered February 2009. Purpose: adaptation and competition with the weed Ventenata. Site Characteristics: MLRA 9B, Chard sandy loam soil, 5- 8 percent slope, north aspect, 1800 feet elevation, 14- 16 inch rainfall, non-irrigated, T27N R1E NW1/4 Section 23. FY09- FY12 no evaluations.

ID09010 Jeff Goldman. Field planting. 9076516 western wheatgrass seed ordered February 2009. Purpose: adaptation and competition with the weed Ventenata. Site Characteristics: MLRA 43A, Ferninand silt loam soil, 8- 12 percent slope, east aspect, 3500 feet elevation, 20- 22 inch rainfall, non-irrigated, T30N R3E NW1/4 Section 12. FY09- FY12 no evaluations.

ID10009 Tim Bodine. Field planting. Recovery western wheatgrass, Vavilov II Siberian wheatgrass and Hycrest II crested wheatgrass (2 acres each) seed was ordered March 1, 2010. Purpose: adaptation to control winter annual grass – ventenata. Site characteristics: MLRA 43, silt loam soil, 5- 7 percent slopes, south aspect, 3570 feet elevation, 20- 22 inch precipitation, non-irrigated, T31N R2E SE quarter Section 10. FY10- FY12 no evaluations.

ID11004 Doug Boggin. Field planting. Recovery western wheatgrass seed ordered March 3, 2011. Site 1 erosion control planting. Site 2 hayfield conversion. 50 lbs PLS shipped March 2011.

ID11005 Joseph Peterson field planting. 200 cuttings of coyote willow and 50 cuttings of white willow were shipped in March 2011.

ID11007 Daryl Mullinix. Field planting. Recovery western wheatgrass, Vavilov II Siberian wheatgrass and Rush intermediate wheatgrass seed was ordered March 24, 2011. Purpose adaptation and erosion control. Site characteristics: loamy fine sand soil, 8 percent slopes, NW aspect, 1540 feet elevation, 16 inch rainfall, non-irrigated, T27N R1E SW1/4 Section 23. FY12 no evaluations.

ID13006 Rich Gribble. Warm season grass field planting. 0.5 lbs Grant's cane bluestem and 0.5 lbs Blackwell switchgrass was shipped march 7, 2012. Purpose: find a pasture grass that will produce during summer heat. Site was planted on May 18, 2012. Bluestem never germinated. Switchgrass germinated early June with approximately 80% survival and 10 plants/ft^2.. Failed bluestem plot was reseeded to switchgrass on August 24, 2012. The seed germinated in early September but was killed by frost on September 19.

ID13007 Sue Hagle. Post-ventenata and dogstail grass field planting. Small replicated plots of Cache meadowbrome, Washoe basin wildrye, Bozoisky Russian wildrye, Recovery western wheatgrass, Reliant intermediate wheatgrass, Vavilov Siberian wheatgrass, Nezpar Indian ricegrass, appar blue flax, delar small burnet, manska pubescent wheatgrassand Union blue wildrye were seeded April 10, 2012. The site is a forest with understory of dogtail grass and oneflower sunflower. Plots were hand raked for seedbed prep prior to broadcasting.

FIELD OFFICE: LEWISTON

ID82001 Pat Richardson. Starthistle control field planting. Covar sheep fescue planted in early 1980's. FY01 good to excellent stand with 2 plants per foot squared average, excellent vigor, fair spread for bunch grass. Plants are 10 inches tall with seedheads averaging 14 inches tall and 6-inch diameter plants. Overall Covar is providing good starthistle control. Starthistle is present in plot, but not reproducing seed. Where Covar has 4 plants per foot squared, starthistle is not present. Covar is moving slowly downslope into starthistle dominated area. FY04 excellent stand of Covar with excellent vigor, 7 inch height and light infestation of yellow starthistle. FY06 plots were heavily grazed by horses – some plants appear to be uprooted by hoof action. **FY07** good stand with fair vigor – stand is being very heavily grazed to ½ inch stubble height. Stand continues to exclude yellow starthistle with only 3- 4 plants observed within the plots. The edges of the plot are infested with Japanese brome, cheatgrass and medusahead. Plot was measured with GPS unit to determine actual size (203 ft x 80 ft = 0.37 acres). Next evaluation will be in 2013**.**

FIELD OFFICE: MOSCOW

ID06001A Lee and Roxanne Carrick. Riparian field planting. Cuttings ordered August 9, 2005. Cuttings to be shipped mid-late October 2005. Site characteristics: MLRA B9, Hampson silt loam soil, 0-3% slopes, NW aspect, 2600 feet elevation, 24 inch precipitation, non-irrigated, T41N R3W NW ¼ Section 3. 85 each of Rivar Mackenzie willow, Curlew Drummond willow, and Silvar coyote willow will be dormant fall planted 2005. FY06 planted November 4, 2006. FY08 Curlew Drummond willow 39 percent survival with good vigor and 24 inch height; Rivar Mackenzie willow 68 percent survival with good vigor and 36 inch height; Silvar coyote willow 22 percent survival with good vigor and 60 inch height. FY09- FY12 no evaluations.

ID06001B Lee and Roxanne Carrick. Riparian field planting. Plants to be shipped early-mid April 2006. Site characteristics: MLRA B9, Hampson silt loam soil, 0-3% slopes, NW aspect, 2600 feet elevation, 24 inch precipitation, non-irrigated, T41N R3W NW ¼ Section 3. 60 each of Blanchard blue elderberry, Okanogan snowberry, St Maries mockorange and 125 Cheney redosier dogwood will be spring planted in 2006. FY06 planted May 25, 2006. FY08 Cheney redosier dogwood 1 percent survival with poor vigor; St Maries Lewis Mockorange 2 percent survival with

poor vigor; Okanogan snowberry 68 percent survival with good vigor and 6- 12 inch height; Blanchard blue elderberry 10 percent survival with fair vigor. FY09- FY12 no evaluations.

FIELD OFFICE: NEZPERCE

ID09006 Nezperce Field Office. Hwy 95 (Winchester) windbreak planting. Coyote willow, Laurel willow, golden willow and white willow cuttings were ordered February 2009 from Aberdeen PMC. University of Idaho Nursery provided thinleaf alder, redosier dogwood, Lewis mockorange (syringe), Drummond willow, Mackenzie willow, bittercherry, aspen and black cherry for this project. Plants were stored in a cooler prior to planting. Planting was scheduled for mid April 2009. Weed barrier fabric used on one side of small stream and no fabric on other side. FY09-FY11 no evaluations. FY12 fair to good establishment in weed barrier fabric of all species. Side with no fabric has limited establishment.

FIELD OFFICE: OROFINO

ID13008 Terri Whitefield planting. Large slump/slide on a southeast facing hillside. The terrain is very steep (~55%) and the soil is a silt loam. The precipitation in the area is around 26". This hillside has some areas that are dominated by medusahead and star thistle, however, where this slide occurred there are some ponderosa pine trees and hawthorne close that provide some shading. Purpose: prevent more weed encroachment and stabilize the soil. Divided site into 3 plotsPlot 1 seeded to 80% Recovery western wheatgrass and 20% Union Flat blue wildrye. Plot 2 seeded to 50% Rush intermediate wheatgrass and 50% Bromar mountain brome. Plot 3 seeded to 100% Lincoln smooth brome. Site was seeded April 25 2012 and evaluated August 14, 2012. Plot 1 looking very good, better than plots 2 and 3. Average 4.4 western wheatgrass plants/ft and 5.0 blue wildrye plants/ft. Plot 2 also had good establishment with approximately 8 plants/ft (not separated by species). Plot 3 had fair establishment with an average of 3.4 plants/ft.

ID13005 Field Office. Forb and grass display. Multiple forbs and grasses for display on south side of field office. Request made February 6, 2012. Seed shipped from IDPMC, MTPMC and WAPMC March 2012.

IDAHO DIVISION III
PLANT MATERIALS PLANTINGS

FIELD OFFICE: CALDWELL

ID07001 Wayne Newbill (Ada County) field planting. Regar meadow brome and Cache meadow brome irrigated forages trial. Seed ordered August 10, 2006. Seed will be planted in late summer – early fall and surface irrigated (furrows) for establishment. Seed was delivered on 8/18/06. **FY06** weed control using 2 pints Roundup per acre was applied on 8/30/06 followed by discing, corrugating, pre-irrigation, harrowing, seeding with drill – 7 inch spacing on 9/9/06 and final corrugation. Regar is located in west field and Cache is located in east field. Fields were irrigated following planting. Initial evaluation in later fall 2006 indicated best stand establishment was Regar accession. **FY07** Regar - excellent stand, excellent vigor, 18 inch height and 3 plus plants per foot squared. Cache - excellent stand, excellent vigor, 12 inch height and 3 plus plants per foot squared. Cooperators rates Regar good to excellent and Cache good during establishment year. FY08 Both fields looked very good and had only mild weed issues. There was one cutting of hay and one period of grazing. Yield was reduced due to fact that it took Wayne awhile to find someone to hay the field and it should have been harvested 3 weeks prior to when it was cut and during that time it was not irrigated. Reduced available water did have an effect most notably on the Regar and patches of it did not recover from it as well as hoped. Appears to have gone dormant, I think it will come back in the spring.
FY08 Regar: Excellent stand on South end, as you get further down to the end where Wayne land leveled the quality decreases and there are some patches of weeds and lowered yields. There are also a few areas where the grass has gone prematurely dormant, probably due to lack of water during first cutting of hay. Field was grazed for two weeks continuously with 6 young horses. Grazing was fairly short when finished, but plants have recovered nicely. 6 horses x 1.25 Au x .5 Mth = 3.75 AUM's 3.75/ 1.2 Ac = 3.1 AUM's/ac 1 AUM = 915 lbs 915 x 3.1 = 2,836/2000= 1.4 Tons 1.4 + 4.2 tons of hay = 5.6 Tons/ Ac Yield. **FY08 Cache:** Excellent stand throughout even down to North end where the soil is less than desirable, surprising because the soil in this field is very shallow and of poorer quality than the other field. The field seems to have suffered no ill effects from the lack of moisture that affected the West field. It was grazed for one week continuously with 6 young horses. 6 horses x 1.25 Au x .25 Mth = 1.88 AUM's 1.88 / 1ac = 1.9 AUM's/Ac 915 x 1.9 = .9 Tons .9 + 4.2 = 5.1 tons/ Ac yield. **FY09 Regar:** stand quality has decreased since last year with patches dying off – it is believed the hardpan (salt- calcium deposits) on this property at relatively shallow depths is affecting the stand. **FY09 Cache:** stand quality has decreased since last year with patches dying off – it is believed the hardpan (salt- calcium deposits) on this property at relatively shallow depths is affecting the stand. The

Regar stand is more effected by this die off than the Cache stand. Newhy hybrid wheatgrass (a very salt tolerant species) will be planted into the patches to determine if stand can be salvaged. **FY10 Regar:** Good stand with 3+ plants/ft2, 10 inch height, 3.6 AUMs/ac. **FY10 Cache:** Good stand with 3+ plants/ft2, 8 inch height, 2.75 AUMs/ac. Fields were grazed in late spring, mowed during summer and grazed again in fall thus not all production is accounted for under the AUMs/ac figures. **FY10 Newhy:** The dead areas (high calcium carbonates locations) were over-seeded with Newhy RS wheatgrass and look much better this year. Both fields would benefit from applications of 2,4D for clover, plantain and other herbaceous weed control. In addition, irrigated forage grasses require fairly high levels of fertility and both fields would probably benefit from applications of fertilizer (primarily nitrogen since this is intended to be an irrigated grass pasture). FY11-12 no evaluations.

ID07002 Doug Austin (Ada County). Field planting. Regar meadow brome, orchardgrass and alfalfa field planting. Seed ordered August 28, 2006. Seed was planted in late summer – early fall and irrigated for establishment. Site characteristics: silt loam soil, 0-2 percent slope, 2800 feet elevation and irrigated. Seed was planted in early September 2006 and irrigated for establishment. FY07 stand 75% Potomac orchardgrass, 10% Regar meadow brome and 15% alfalfa – cooperator took 3 cuttings of hay (1st 0.6 ton/ac; 2nd 0.9 ton/ac and 3rd 1.5 ton/ac = 3 ton/ac for first year). FY08 Field had excellent utilization, no species being avoided. Some small 10 feet diameter spots with discolored foliage. Was unclear if this was a excess moisture issue as the soil was slightly muddy and trampled and had more weeds than surrounding areas. However, areas were minimal and overall had excellent weed control. Yielded 47 tons total on 12 acres and then began grazing. Yielded 17 AUM's on 12 acres. May yield some additional AUM"s as weather seems to be holding and grass is still up. FY09 excellent stand of all species with approximately 6 tons of production this year from 4 cuttings. Following haying, fall grazing is planned. Alfalfa has decreased from about 15 percent of stand to 5- 10 percent of stand. No evaluation 2012.

ID08014 Jim Classen. WHIP field planting. Garrison creeping foxtail seed (18 pounds) ordered April 3, 2008.FY08 Garrison good stand with 4 plants per square foot and excellent vigor. Despite difficulties in planting late (see attached assistance notes from 6/6/08 through 9/3/08) and difficulties in watering due to water seeping into neighbors field the stand is emerging with a good density. Majority of plants are very small around 6 inches, but have developed some seed heads. There are some areas where plants achieved full height and are about 2 feet. The stand is somewhat patchy, but that is largely due to water regime. In areas that received too much water at bottom of pond. There is no Garrison Creeping Foxtail, however yellow nut-sedge, barnyard grass and smartweed are growing, which although weeds are excellent duck and wildlife food. Other areas where it was too dry along the berm have a heavy weed infestation problem mainly Kochia. The bulk of the area is intermittent with mustard and cocklebur. However there is enough grass underneath that I believe next year will largely crowd out weeds. Field was flood irrigated several times over the season for several days. More irrigation was not possible due to flooding neighbor's alfalfa field. When last cutting of hay is removed the pond will be flooded for fall months. That will test the Creeping Foxtail and determine its suitability. FY09 this is an excellent stand of Garrison creeping foxtail, plants are robust and healthy. Some weeds are still present in thinner areas of the planting. On berms where Siberian wheatgrass was planting, a thick stand of kochia exists. FY10 this is an excellent stand with 4 plants/ft2, 36-40 inch height and excellent vigor. The inner pond is flooded and the Garrison looks great (100 percent cover); the outer berm built to prevent flooding of adjacent alfalfa field has less water available resulting in a thinner Garrison stand and increased weed pressure. FY11 We are very satisfied with this stand of Garrison creeping foxtail. Plants are healthy and have suppressed weeds to where there is hardly any weed infestation. Recommend status reviews only every couple of years. Next evaluation 2014.

ID09003 Forest Clifton. Erosion control field planting. Vavilov and Vavilov II Siberian wheatgrass seed was ordered October 30, 2008. Site characteristics: 4 acres; purpose - soil erosion, conservation cover, fire reduction, weed control; soil - Lankbush sandy loam; slope- 30%; aspect - south; elevation – 2600 ft; precipitation - 10"; irrigation – no; T5N R2W Qrtr Section NW ¼ of SE Section 32. Seed will be broadcast planted in November and then rolled to press seed into seedbed. FY09 it is too early to determine stand establishment. It appears that more plants are establishing in the Vavilov II side of planting than on the Vavilov side of planting. **FY10** Both the Vavilov and Vavilov II plantings have established nicely except for the lower portion of the accession Vavilov where there are very few seedlings. The seed may have been buried too deep to sprout and a reseeding is recommended in this area. The Vavilov planting on the upper slope is thriving; about 5-7 plants per square feet. On the Vavilov II side, there are more plants overall. The Vavilov II accession took a little longer to establish, but now it is looking better than the accession Vavilov. The Vavilov II side has an average of 3 plants per square feet, with some areas at top of slope with densities of 7 plants per square feet. Weeds are not too tall, but there is still pressure in some areas with mustard. The Landowner mowed the stand/weeds in May. Mustard, Russian thistle and kochia are most common on the Vavilov side. Bulbous bluegrass

died after being mowed. Overall the wheatgrass has filled significantly this year and the stand is expected to look great next year. FY11 this seeding is establishing well and there are new plants from this year. The plants established on the upper slope (of the Vavilov side) are suppressing weeds and yet, have spread out, leaving bare ground in between plants. While some areas like the upper slope are thriving, other areas struggle with weed pressure and difficult soil. The North end of the Vavilov side is under weed pressure from mustards and field penny cress. The south end of the Vavilov side also has more weed pressure. We talked to Mr. Clifton about mowing during the early spring or spraying to control weed pressure. Also, a reseeding of the south end of the Vavilov area this fall could improve current stand. On the south side of the field just behind the house there is an area where very few plants grow in general. We were pleased to see that more grass seedlings than weeds are growing in this area. Although the Vavilov II seeding is under more weed pressure and seems to be having a more difficult time getting strongly established, there are several seedlings that will continue to grow and suppress weeds. Several younger seedlings on the Vavilov II side (particularly on the north end), have great potential. Mr. Clifton did not get a chance to reseed lower portions of the fields this spring due to the strange weather we had, but will try to add seed and reseed the lower portions. No evaluation 2012

ID11009 CB River Ranch field planting. Formerly ID06002 CB River Ranch WRP upland planting. Original stand failed . Site Characteristics: Feltham loamy fine sand soil, 3-12 percent slope, NE aspect, 11 inch precipitation. Field sprayed multiple times in 2010 for site preparation. No tillage was performed. Field dormant planted to Vavilov II Siberian wheatgrass in late fall 2010. Germination and good initial stand establishment during March 2011 field visit. With good rains during spring from March through May stand continues to look very good. July 2011 evaluation: Vavilov II Siberian wheatgrass was seeded November 18, 2010. Due to a wet spring this year, the seeding was very successful. It is very easy to see where the seed was drilled because so many seedlings have surpassed the three-leaf stage. Some seedlings have grown just past the three-leaf stage, but other seedlings from this year are producing a seed head. The smaller seedlings on the East side of the field look damaged perhaps from the herbicide applied in the spring; however, green leaves are showing through the brown. Even in some areas (i.e. entrance to field) where there appeared to be no germination early this spring, there is now a stand of seedlings. Large patches of kochia on the north end of the field and near the entrance continue to grow, but are too mature to be sprayed now, will schedule mowing to keep from going to seed. There is some cheatgrass but pressure is minimal and plants are relatively small and they have already gone to seed so will monitor this fall for further herbicide application. Existing Siberian Wheatgrass from previous seeding is still present and plants have enlarged and are vigorous although spotty across the field. No evaluation 2012

ID12002 Hermis Sparks. Grassed waterway critical area planting demonstration. Seed mixture includes Vavilov II Siberian wheatgrass, Recovery western wheatgrass, Rush intermediate wheatgrass, Regar meadow brome and Garrison creeping foxtail. Site characteristics: 1 acres; purpose - soil erosion and weed control; soil – Elijah silt loam; slope- 2%; aspect – east and west; elevation – 2631 ft; precipitation - 10”; irrigation – yes; T3N R1W Section 34. Planting planned for late March 2012.

ID13009 Alayne Blickle. Pollinator habitat. 1/2 acre site to be irrigated and mowed during establishment year. Appar, Nezpar, Richfield, whorled buckwheat, yarrow and dustymaiden shipped August 27, 2012.

FIELD OFFICE: EMMETT

ID09009 Richard Zamzow. WRP upland field planting. Vavilov II Siberian wheatgrass. Seed ordered February 2009. Site characteristics: fine sandy loam soil, 2100 feet elevation, 10-12 inch precipitation, aspect-flat. Planting planned for spring 2009. FY09 and FY12 no evaluations.

ID10002 Randy Heffner. Field planting. Bozoisky Russian wildrye and Manifest intermediate wheatgrass fall and winter forage trial. Seed ordered September 2, 2009. Site Characteristics: Boise County, MLRA B10, 6 acres, dormant fall planting, Brownlee sandy clay loam, 5-10 percent slope, south aspect, 2800 feet elevation, 14-16 inch rainfall, irrigated, T7N R2E NE1/4 Section 2. FY10- FY12 no evaluations.

ID13013 Randy Heffner. Field planting. Compare Manifest to Rush intermediate wheatgrass. Trial initiated August 31, 2012. Seed requested from NDPMC August 31, 2012.

FIELD OFFICE: MARSING/GRANDVIEW

ID11001 Ron Bitner. Vineyard cover crop/erosion control trial. Vavilov II Siberian wheatgrass, Ephraim crest wheatgrass, Roadcrest crested wheatgrass and Recovery western wheatgrass seed was ordered September 23, 2010.

Tall fescue, white mustard and Birdsfoot trefoil seed will be obtain by landowner for this trial. Planting is planned for November 1, 2010 or later. Site characteristics: Canyon County Idaho, MLRA 11, Jacquith loamy fine sand soil, 1- 3 percent slopes, 2630 feet elevation, 7- 11 inch rainfall zone, site is irrigated, T3N R4W SE Quarter Section 5. FY10 the IDFG 7 ft drill was rented to complete the plantings. The grass planting was completed November 3rd and the Basalt milkvetch was seeded on November 4th. The birdsfoot trefoil, white mustard, and tansy phacelia will be planted in February 2011. FY12 no evaluations.

ID13003 Ron Bitner. Vineyard cover crop. White prairie clover, yarrow, cicer milkvetch prairie coneflower, blanket flower, phacelia ordered from MTPMC on February 29, 2012. Blue flax and small burnet ordered from IDPMC on February 29, 2012.

ID13012 Pioneer Seed. Pollinator field planting. Coordinated through Ron Bitner. Discussed field preparation. Planting scheduled tentatively for 2013.

FIELD OFFICE: MOUNTAIN HOME
None

FIELD OFFICE: PAYETTE
None

FIELD OFFICE: WEISER
ID94025 Eckhardt Ephraim crested wheatgrass, Magnar basin wildrye, Mankota Russian wildrye, Trailhead basin wildrye, P27 Siberian wheatgrass, Manska pubescent wheatgrass, Reliant intermediate wheatgrass, Bannock thickspike wheatgrass, Schwendimar thickspike wheatgrass, Greenar intermediate wheatgrass, Sherman big bluegrass, Secar Snake River wheatgrass, Goldar bluebunch wheatgrass, Bozoisky Russian wildrye, Hycrest crested wheatgrass, Rush intermediate wheatgrass demo plots. Site is clay loam soil, non-irrigated, 10-12 inch ppt, 3000 feet elevation, and 5% slopes on NE exposure. Seed ordered July 1994. FY94 and FY95 due to drought conditions, seeding planned for spring 96. FY96 planted April 9, 1996 by hand planting and raking plots to control bulbous bluegrass competition. June 19, 1996 evaluation for establishment: Mankota poor, Manska good, Sherman very poor, Greenar good, Trailhead fair, Reliant good, Bozoisky good, Bannock good. July 8, 1996 establishment: Mankota fair, Manska good, Sherman poor, Greenar good, Trailhead fair, Reliant good, Bozoisky good, Bannock good, Goldar good, Rush excellent, Secar fair. Rush has the best stand establishment to date with Goldar next. FY97 no evaluation. FY98 first set of plots; Reliant is out producing all other plots, Greenar is second in production, Sherman hand planted plot is third in production, Sherman broadcast plot failed, T6633-P is fourth in production. Second set of plots; Bozoisky performed the best with Mankota second, and trailhead the poorest. The wildryes, thickspike wheatgrasses and intermediate wheatgrasses have shown adaptation to this area and could play a roll in revegetating local rangelands. FY99 plots were grazed this spring and grazing preference was evaluated. Plots: Greenar and Reliant were grazed the heaviest, followed by Mankota and Bozoisky Russian wildrye. This was uniform for all replications. Thickspike wheatgrasses and all other varieties had slight utilization. Basin wildryes were not utilized. Grazing preference for the larger plantings: Bozoisky Russian wildrye was used the heaviest, followed by Goldar bluebunch wheatgrass, and Rush intermediate wheatgrass used the least. Cattle are grazing Fourwing saltbush. The producer is very happy with results from these plots and uses the information to make his planting decisions. Cattle in mid May grazed FY00 the small plot species. Grazing preference was for Goldar, Bozoisky, and the intermediate wheatgrasses. The intermediate wheatgrasses are spreading into adjacent plots. Moderate use was made on Magnar and Trailhead. Sherman was used only slightly. Fourwing saltbush was utilized and continues to get taller (20 inches tall). In the large acre sized plots adjacent to a Hycrest planting, grazing preference (mid May) in order are: 1) Goldar, 2) Bozoisky, 3) Rush, and 4) Secar. Use of Goldar was similar too slightly heavier than the Hycrest. FY01 all plots are grazed this year. Utilization was heaviest on Greenar intermediate wheatgrass and Reliant intermediate wheatgrass plots. The larger plantings showed grazing preference was highest for Bozoisky Russian wildrye, then Goldar bluebunch wheatgrass, followed by Rush intermediate wheatgrass. FY03 plots were grazed this fall at time of evaluation. FY04 – Cattle preference (cows were moved into filed 4 days prior to evaluation on 10/5/04). Most preferred species during this period was Bozoisky-Select Russian wildrye which was grazed very close. Second most preferred species was Goldar bluebunch wheatgrass which was grazed to a uniform 2 inch stubble height. Secar Snake River wheatgrass and Rush intermediate wheatgrass were not utilized. FY05 no evaluation. FY06 – observations in late June, grazing preference was Goldar bluebunch as first choice, Bozoisky-Select Russian wildrye as second choice, Rush intermediate as third and Secar as least desirable. FY10 Bozoisky Russian wildrye appears to be the preferred grazing species and grazing pressure is affecting stand

health and stand is beginning to look very poor. Goldar bluebunch wheatgrass is probably the next preferred grazing species after Russian wildrye. Secar Snake River wheatgrass is the least preferred grazing species in trial. Rush intermediate wheatgrass is the most aggressive species in the trial and stand survival is high. Because of light grazing pressure, Rush is moving into Goldar bluebunch wheatgrass plots. Next evaluation 2013.

ID11008 Dean Dryden. Riparian Planting. Duane Pearson (Emmett), Travis Youngberg (Weiser), Mike Raymond (Weiser), Tom Yankey (Volunteer), Blake Tubbs (Payette), and Dean Dryden (Landowner) participated in a willow planting field day to train and educate staff on planting willow cuttings and poles using the waterjet stinger to stabilize streambank erosion in New Meadows area. 50 poles of Golden Willow (local collection donated by Tom Yankey) and 40 poles of Peachleaf Willow (donated by the PMC) and 5 cottonwood poles (donated by PMC) were planted May 2011. FY12 no evaluations.

ID13001 Soulen Ranch. Field Planting. Soulen Ranch multi-species demonstration planting for jointed goatgrass control. 1 lb PLS of Rush, Vavilov, Hycrest II, Bozoisky, Hycrest, Reliant, Manska and Vavilov II shipped from IDPMC August 30, 2012. Soils are Gem Reywat complex, 3-5% slopes. Precipitation 12-14 inches. Demo plots to be 6x20 ft with 2 replications.

ID13002 Cada Ranch. Field Planting. Cada Ranch multi species demonstration planting for jointed goatgrass control. 1 lb PLS of Ephraim, Sodar, Magnar, Rush, Vavilov, Bannock, Bozoisky, Reliant, manska, Roadcrest, Vavilov II, Recovery, and Trailhead shipped from IDPMC August 31, 2012. Roadsite location with disturbed soils in Cranecreek-Reywat complex with 2-25% slopes. Preipitation 12-14 inches. Demo plots to be 6x20 ft with 2 replications.

IDAHO DIVISION IV
PLANT MATERIALS PLANTINGS

FIELD OFFICE: BURLEY
None

FIELD OFFICE: GOODING/FAIRFIELD
ID01007 Spring Cove Ranch (Butler) Demonstration planting. Magnar basin wildrye, Snake River Plain fourwing saltbush, and Northern Cold Desert winterfat ordered March 16, 2001. Site characteristics: Planting 1. Vertisol soil, 11-inch rainfall, irrigated, 3300 feet elevation, south of Pioneer Reservoir. Planting 2. Sodic soil, 12-inch rainfall, irrigated, 3500 feet elevation, near Clover Creek – Hill City Road – southern base of Bennett Mountain foothills. FY01 - FY04 seed not planted due to extreme drought. Cooperator plans to plant fall 2004. FY05 Planting Site 1: Seed again not planted. Dan said he still wants to drill the Magnar next spring (2006) in the planned site (Planting Site 1). Said site in 2005 was too dry. As of 1/10/06 site is under flood waters. Moisture should be good for spring 2006 planting. He said he will drill seed in spring 2006. FY07 Dan has not planted the Magnar yet on account of other farming activities, but still wants to keep the seed and says he will try to get it planted this fall (2007). FY08 Spring Cove Ranch, called Dan last week, he said he did get the Magnar in the ground (about 3 acres or something, small seeding) last fall (fall 2007). He said he disked the ground twice and broadcast the Magnar and left as is. He felt he had enough seed coverage due to the soil condition after working and did not harrow or follow up for seed coverage. He did not take a close look after this growing season but believed he needed another year before making a judgment as not much apparently came. FY09 and FY12 no evaluations.

FIELD OFFICE: JEROME/ SHOSHONE/HAILEY
None

FIELD OFFICE: RUPERT
None

FIELD OFFICE: TWIN FALLS
ID00007 Twin Falls SWCD/Twin Falls Highway District. Drought tolerant landscape-weed control demonstration plantings. Seed ordered March 1, 2000 for late March delivery. Planting 1: Vavilov Siberian wheatgrass, Bozoisky Russian wildrye, and Ladak alfalfa. Planting 2: Hycrest crested wheatgrass, Bozoisky Russian wildrye, and Ladak alfalfa. Planting 3: Secar Snake River wheatgrass, Critana thickspike wheatgrass, Trailhead basin wildrye, Rimrock Indian ricegrass, and Wytana fourwing saltbush. Planting 4: Secar Snake River wheatgrass, Bannock

thickspike wheatgrass, Magnar basin wildrye, Nezpar Indian ricegrass, and Snake River Plain fourwing saltbush. Site characteristics: MLRA B11A, Portneuf silt loam soil, 0-2 percent slopes, north exposure, 3800 feet elevation, 10-12 inch precipitation, irrigated for establishment only, T11S R18E SW1/4 of SW1/4 of Section 13. FY00 due to very dry spring the planting was delayed until better planting conditions occur. FY01 site was planted in mid to late April and sprinkler irrigated in May to assist with plant establishment. Site was also mowed several times during growing season for weed control. Because of mowing, species identification was not possible – estimated initial stand establishment for all plantings are fair with good plant vigor. FY02 introduced plantings are well established - native plantings failed. Introduced seed of Vavilov Siberian wheatgrass (15 lb) and Bozoisky Russian wildrye (5 lb) was ordered on September 15, 2002 to replant failed portion. Planting completed for October 25, 2002 (dormant planting). FY03 field observation determined that little establishment has occurred this year due to drought conditions. FY04 stands were mowed in June and inadequate moisture was available for regrowth. Wytana fourwing saltbush and Snake River Plains fourwing saltbush are becoming more evident with scattered plants throughout plantings 3 and 4. Mowing is keeping the fourwing saltbush short, but does not appear to be killing the shrubs. FY05 this is the first year of above normal spring moist since plantings were installed. Planting 1: good stand of Vavilov (2-3 plants/ft^2), Bozoisky (2 plants/ft^2) and alfalfa (< 1 plant/ft^2) and good vigor for grasses and poor vigor for alfalfa. Planting 2: good stand of Hycrest (3 plants/ft^2) and thickspike (2 plants/ft^2). Wytana fourwing saltbush and Snake River Plains fourwing saltbush are becoming more evident and plants are larger than last year throughout the older plantings 3 and 4. FY08 Mowing operations have ceased and overall stands are improving. Planting 1: good stand of Vavilov, Bozoisky and alfalfa with good vigor for grasses and poor vigor for alfalfa. Planting 2: good stand of Hycrest and thickspike. Wytana fourwing saltbush and Snake River Plains fourwing saltbush are becoming more evident and plants are larger than earlier years. FY10 the north planting continues to look fairly good with good stand of Vavilov (2-3 plants/ft^2), Bozoisky (2 plants/ft^2) and alfalfa (< 1 plant/ft^2) and good vigor for grasses and poor vigor for alfalfa; the south planting continues to struggle with poor stands and vigor overall. **Evaluations will no longer be collected for this planting.**

ID03001 Walt Coiner Field Planting
Evaluations will longer be collected for this planting.

	Stand					Vigor				
Species	2003	2004	2005	2006	2010	2003	2004	2005	2006	2010
Irrigated Perennial Cover										
Sherman big bluegrass	good	fair	fair	fair	poor	exc.	fair	exc.	exc.	poor
Talon Canada bluegrass	good	exc.	exc.	exc.	good	exc.	exc.	exc.	exc.	good
Foothills C. bluegrass	exc.	exc.	exc.	exc.	good	exc.	exc.	exc.	exc.	good
Durar hard fescue	fair	exc.	fair	good	fair	exc.	exc.	fair	good	fair
Semi-Irrigated Perennial Cover										
Covar sheep fescue	poor	fair	good	good	exc.	fair	good	exc.	exc.	exc.
Quatro sheep fescue	poor	good	exc.	good	exc.	fair	good	exc.	exc.	exc.
Bozoisky R. wildrye	poor	v. poor	good	good	good	fair	poor	good	good	good
Newhy hybrid wheatgrass	poor	failed	fair	fair	failed	fair	v. poor	good	good	failed
Roadcrest c. wheatgrass	good	fair	poor	poor	failed	good	good	good	fair	failed
Vavilov S. wheatgrass	good	exc.	exc.	good	destroyed	good	exc.	exc.	good	destroyed
Ephraim c. wheatgrass	exc.	fair	exc.	exc.	destroyed	good	fair.	exc.	exc.	destroyed
Sodar s. wheatgrass	good	poor	poor	poor	destroyed	fair	poor	poor	poor	destroyed
Paiute orchardgrass	fair	fair	fair	fair	destroyed	fair	fair	fair	fair	destroyed
Dryland Perennial Cover										
Vavilov S. wheatgrass	good	exc.	exc.	good	good	good	exc.	exc.	good	good
Bozoisky R. wildrye	poor	v. poor	good	good	failed	fair	poor	good	good	failed
Sherman big bluegrass	v. poor	v. poor	good	good	failed	poor	v. poor	good	good	failed
Rosana w. wheatgrass	fair	good	exc.	exc.	exc.	good	good	exc.	exc.	good

Recommendations based on evaluation years
Irrigated – Foothills and Talon Canada bluegrass are the best fully irrigated ground cover choices
Semi-irrigated – Vavilov Siberian wheatgrass, Rosana western wheatgrass, Bozoisky Russian wildrye and Ephraim crested wheatgrass provide the best ground cover
Dryland – Vavilov Siberian wheatgrass mixed with Rosana (Recovery) western wheatgrass provides best ground cover

ID04003 Steve Schuyler. Windbreak field planting. Siouxland poplar, Carolina poplar, Golden willow and Laurel willow cuttings. Cuttings ordered January 12, 2004. Site characteristics: 0-1 percent slope, north aspect, 8-10 inch precipitation zone, irrigated-gravity, Portneuf silt loam soil. Planted April 10, 2004 – weed barrier fabric was installed – planting protected with snow fence along west edge. FY04 survival and height - 91 percent – 35 inches Laurel willow, 42 percent – 6 inches Carolina poplar, 82 percent – 42 inches Golden willow, 0 percent Siouxland poplar. FY05 replacements ordered February 22nd 10 golden willow, 25 Carolina poplar, and 5 Laurel willow. Evaluation August 11, 2005- Laurel willow 94% survival with excellent vigor, 8 feet height and 5 feet crown width; Carolina poplar 58% survival with excellent vigor, 9.3 feet height and 7.5 feet crown width; Golden willow 82% survival with excellent vigor, 9.5 feet height and 11 feet crown width.; Siouxland poplar failed. FY08 Laurel willow 89 percent survival with good vigor and 15.5 feet height; golden willow 82 percent survival with excellent vigor and 20 feet height; Carolina poplar 58 percent survival with excellent vigor and 28 feet height. FY09 Laurel willow 89 percent survival with yellowing leaves possibly iron clorosis; Golden willow 82 percent survival; Poplar 58 percent survival. FY11 Laurel willow 89 percent survival, Golden willow 82 percent survival and poplar 58 percent survival. A gall problem is affecting the poplars in this planting – in the spring of 2011 chemicals were injected into the soil to deal with the gall issue. The treatments appear to be clearing up the problem. FY12 no evaluations.

ID04006 Dickenson 319 Riparian woody planting. Laurel willow, golden current, Wood's Rose, redosier dogwood, Siberian peashrub, coyote willow, golden willow, chokecherry, blue spruce, and Austrian pine. Plantings are protected from grazing and grass is mowed around pines, spruce, juniper and sumac.
FY04 planted in May 2004. Plantings are protected from grazing with a fence and arranged in clumps (copses) for natural appearance. Laurel willow 92 percent survival, excellent vigor, 24-36 inch height. Golden current 100 percent survival, excellent vigor, and 18-24 inch height. Wood's rose 100 percent survival, excellent vigor, and 18-24 inch height. Redosier dogwood 60 percent survival, fair vigor, and 18-24 inch height. Siberian peashrub 100 percent survival, excellent vigor, and 18-24 inch height. Coyote willow 80 percent survival, good vigor and 12-48 inch height. Golden willow 100 percent survival, excellent vigor and 72 inch height. Chokecherry 23 percent survival, poor vigor and 36 inch height. Blue spruce 73 percent survival, good vigor and 36 inch height. Austrian pine 100 percent survival, excellent vigor and 36 inch height. FY05 evaluation August 11, 2005- Laurel willow 100% survival, excellent vigor, 4-8 feet height and 2 feet crown width; Golden current 92% survival, excellent vigor, 4 feet height and 2.5 feet crown with; Wood's rose 100% survival, excellent vigor, 2.5 feet height and 3 feet crown width; Redosier dogwood 83% survival, excellent vigor, 4 feet height and 2 feet crown width; Siberian peashrub 12% survival, very poor vigor; Coyote willow 33% survival, good vigor, 5 feet height and 0.5 feet crown width; Golden willow 90% survival, excellent vigor, and 6 feet height; chokecherry 27% survival, fair vigor and 4.4 feet height; blue spruce 73% survival, fair vigor and 4.5 feet height; Austrian pine 100% survival, excellent vigor and 4.6 feet height; Rocky Mountain juniper 100% survival, excellent vigor and 14 inch height; Skunkbush sumac 80% survival, good vigor and 2 feet height. FY08 Laurel willow 100 percent survival with excellent vigor and 15 feet height; coyote willow failed; Peachleaf willow 80 percent survival with fair vigor and 15 feet height; Simom poplar failed; Carolina poplar failed; Firecracker penstemon failed. FY11 evaluations were conducted too late this year. FY12 no evaluations.

ID05002 Perinne Coulee 319 Riparian planting. Redosier dogwood (accessions 9023733, 9023739 and 9023740), Laurel willow and Peachleaf willow (accessions (9067375, 9067376, 9067541, 9067546, 9067549 and 9067560) cuttings were ordered February 4, 2005. Planted spring 2005. Survival and identification difficult in 2005. FY07 Peachleaf willow 50 percent survival with good vigor and 10 feet height; Laurel willow and red-osier dogwood failed. FY08 58 percent survival with good vigor and 11 feet height; Laurel 14 percent survival with poor vigor and 2.5 feet height (affected by saline soil conditions. FY09 Peachleaf 25 surviving with 12 feet height and 12 feet crown width; Laurel 11 surviving with feet height. FY11 evaluations were conducted too late this year. FY12 no evaluations.

ID08007 Twin Falls Canal Company. Riparian project. Laurel willow, peachleaf willow accessions 9067546 and 9067376 and black cottonwood accession 9067538 were ordered March 10, 2008 for delivery in late March. FY08 Peachleaf willow 55 percent survival with fair vigor and 2 feet height; Black cottonwood failed; Laurel willow 37 percent survival with fair vigor and 15 inch height. FY09 Peachleaf 7 surviving with 6 feet height; black cottonwood 1 surviving with 1 foot height; Laurel 7 surviving with 5 feet height. FY11 evaluations were conducted too late this year. FY12 no evaluations.

ID09007 Twin Falls Britt Pond. Riparian Planting. 9076375 peachleaf willow (10 cuttings) and 9076376 peachleaf willow (50 cuttings) cuttings ordered February 2009. Planted on May 8, 2009. FY09 Peachleaf 23 surviving; Laurel 7 surviving. FY11 evaluations were conducted too late this year. FY12 no evaluations.

ID09012 Twin Falls East Perrine. Riparian Planting. 9076375 peachleaf willow (40 cuttings) ordered February 2009. Planted on May 8, 2009. FY11 evaluations were conducted too late this year. FY12 no evaluations.

ID12007 Twin Falls Canal Company. Riparian planting. 200 peachleaf willow and 10 laurel willow shipped from PMC May 2012. Planting installed May 21, 2012

IDAHO DIVISION V
PLANT MATERIALS PLANTINGS

FIELD OFFICE: AMERICAN FALLS/ABERDEEN
None

FIELD OFFICE: BLACKFOOT
None

FIELD OFFICE: FORT HALL
ID03002 Shoshone-Bannock Tribe. Demonstration Planting. Nezpar Indian ricegrass, Goldar bluebunch wheatgrass, Magnar basin wildrye, Sodar streambank wheatgrass, High Plains Sandberg bluegrass, and Sherman big bluegrass seed was ordered September 30, 2002. Planting completed early November 2002. FY03 no evaluation. FY04 Nezpar Indian ricegrass excellent stand and vigor with 24 inch height. Goldar bluebunch wheatgrass excellent stand and vigor with 24 inch height. Magnar basin wildrye excellent stand with good vigor and 36 inch height. Sodar streambank wheatgrass excellent stand and vigor with 30 inch height. Sherman big bluegrass good stand with good vigor and 30 inch height. Very poor stand and vigor with 8 inch height (only 3 plants came up – seed may have been buried too deep). FY05 evaluation June 15, 2005. Magnar excellent stand, 98% survival, excellent vigor and 48 inch height; Nezpar good stand, 90% survival, good vigor and 36 inch height; Goldar good stand, 95% survival, good vigor and 42 inch height; Sodar excellent stand, 98% survival, excellent vigor and 42 inch height; Sherman excellent stand, 98% survival, excellent vigor and 38 inch height; High Plains failed and will be replanted next year and irrigated for establishment. FY06 excellent stands of Goldar bluebunch wheatgrass and Magnar basin wildrye, good stands of Sodar streambank wheatgrass, and Sherman big bluegrass, fair stand of Nezpar Indian ricegrass and High Plains Sandberg bluegrass failed. FY07 no evaluation. FY08 common camas excellent stand with 90 percent survival and excellent vigor. Demo plots – Magnar basin wildrye 98 percent survival with excellent vigor and 48 to 60 inch height; Nezpar Indian ricegrass very poor stand with 10 percent survival and poor vigor; Goldar bluebunch wheatgrass fair stand with 70 percent survival and good vigor; Sodar streambank wheatgrass excellent stand with 80 percent stand and good vigor; Sherman big bluegrass good stand with 60 percent stand and good vigor; High Plains Sandberg bluegrass failed. FY10 Clearwater Venus penstemon, Snake River Plains fourwing saltbush and Opportunity Nevada bluegrass seed ordered to add to demonstration plots. FY12 no evaluations.

FIELD OFFICE: MALAD
None

FIELD OFFICE: MONTPELIER
None

FIELD OFFICE: POCATELLO
None

FIELD OFFICE: PRESTON
None

FIELD OFFICE: SODA SPRINGS
ID05012 Don Ayers. **Herbaceous windbreak field planting**. Magnar basin wildrye seed ordered March 15, 2005. Site Characteristics: Lantonia-Chinahat silt loam soil, 1-4 percent slopes, 5983 feet elevation, 14-16 inch precipitation,

non-irrigated, T8S R41E NW ¼ Section 24. FY05 Two of the four rows had good emergence and two rows had very poor emergence. Ground preparation was much better in rows that the best emergence. Plants that emerged have grown well and look very healthy - fair stand with 4 plants/ft^2, good vigor and 4 inch height. Several more plants emerged in the fall. FY06 planting was accidentally tilled and destroyed – cooperator plans to replant. **Cancelled 2012**

ID09002 _____ - Recovery western wheatgrass field planting. Seed shipped September 29, 2008. FY09 – FY12 no evaluations.

ID09005 Alan Rasmussen. Riparian field planting. Laurel willow, white willow, coyote willow, golden willow, 9076375 peachleaf willow, 9067538 peachleaf willow cuttings ordered February 2009. Site characteristics: MRLA 13, 4 acres, Iphil silt loam soil, 0- 2 percent slopes, northwest aspect, 5230 feet elevation, 14-16 inch rainfall, irrigated, T11S R40E NW¼ Section 11. FY10 1- 2 percent survival with fair vigor. FY12 2% survival of peachleaf willow, 8' tall, and 1% survival of golden willow 6.5' tall; 0% survival of other species.

ID10001 Curtis Reed. Field planting. Magnar basin wildrye seed ordered August 30, 2009. Seeding planned for late October 2009. Purpose: vegetative filter strip (dust control). Site characteristics: MLRA 13; silt loam soil; 0-1 percent slope; east aspect; elevation 6240; 18- 20 inch precipitation; non-irrigated; T8S R41E sections 5 and 6. FY10 no evidence of establishment or survival – evaluate next year for final establishment determination.FY11 no evaluation. **Cancelled 2012**.

ID13004 Wayne Bingham. Field planting. Existing CRP to native grasses. Secar, Magnar, Nezpar and Anatone shipped on August 31, 2012.

IDAHO DIVISION VI
PLANT MATERIALS PLANTINGS

FIELD OFFICE: ARCO

ID03003 Hill-Freeman Snake River Plains fourwing saltbush field planting. Seed ordered October 18, 2002. FY03 one half pound of Snake River Plains fourwing saltbush was included in a five acre marginal pastureland seeding adjacent to Warm Springs Creek on Barton Flat (South Custer County). The entire seeding area of 13.3 acres included a three and a half acre stand of decadent crested wheatgrass. A seed mix of Vavilov Siberian wheatgrass (1.2 lbs/ac), Bannock thickspike wheatgrass (2.0 lbs/ac), Bozoisky Russian wildrye (1.2 lbs/ac), Rincon fourwing saltbush (0.25 lbs/ac), and Bighorn skunkbush sumac (0.25 lbs/ac) was broadcast over the seeding area. The area was then rolled to obtain seed to soil contact on a firm weed free seedbed. FY04- FY06 no evaluations. FY07 Vavilov Siberian wheatgrass good stand with good vigor - 2 plants per feet squared; Bannock thickspike wheatgrass good stand with good vigor - 2 plants per feet squared; Bozoisky Russian wildrye poor stand with fair vigor - trace plants per feet squared; Snake River Plains fourwing saltbush failed; Bighorn skunkbush sumac – failed. FY08 – FY12 no evaluations.

FIELD OFFICE: DRIGGS

None

FIELD OFFICE: IDAHO FALLS

ID13011 Jesse Fullmer Idaho Falls Field Office. Pollinator planting. Seed requested and shipped August 2012. Planting delayed until spring 2013.

FIELD OFFICE: REXBURG

ID13014 Raybould. Field Planting. Testing Siberian wheatgrass in sandy low-precip pivot corners in St. Anthony. 30 lbs PLS Vavilov II shipped on October 23, 2012.

ID13015 **Raybould. Field Planting.** Testing Siberian wheatgrass in sandy low-precip pivot corners in St. Anthony. 30 lbs PLS Vavilov shipped on October 31, 2012.

FIELD OFFICE: RIGBY/TERRETON

ID09011 Carl Ball – Hamer Farms. Field Planting. Vegetative cross wind strips demo plantings. Rush intermediate wheatgrass, Manifest 9092056 int. wheatgrass, Bozoisky Russian wildrye, Mankota Russian wildrye, Luna pubescent wheatgrass, Largo tall wheatgrass and Alkar tall wheatgrass seed ordered April 15, 2009. Site

Characteristics: MLRA 11; Corassy Butte loamy sand soil; 2- 4 percent slopes; SW aspect; 4800- 4900 feet elevation; full irrigation; T7N R36E Sections 13 and 14. FY09 strips were planted on June 8, 2009. FY10 Rush intermediate wheatgrass excellent stand, 68 inch height, very good density, outstanding performance, rates very high for use in cross wind strips; Bozoisky Russian wildrye excellent stand, 20 inch height, not enough height for cross wind strips, irrigation may be too much water for this species; Mankota Russian wildrye excellent stand, 20 inch height, not enough height for cross wind strips, irrigation may be too much water for this species; Alkar tall wheatgrass good stand, 68 inch height, not as dense as Rush, outstanding performance, rates very high for use in cross wind strips; Largo tall wheatgrass good stand, 72 inch height, not as dense as Rush, outstanding performance, rates very high for use in cross wind strips; Manifest intermediate wheatgrass fair stand, 50 inch height, drifting sand appears to be affecting stand quality, ergot present in seedheads, not a good choice for cross wind strips; Luna pubescent wheatgrass excellent stand, 53 inch height, drifting sand appears to be affecting stand quality, ergot present in seedheads, not a good choice for cross wind strips. FY12 no evaluations.

FIELD OFFICE: RIGBY/DUBOIS

ID89015 Wagoner. Field planting. Luna pubescent wheatgrass, P-27 Siberian wheatgrass, Sodar streambank wheatgrass, Greenar intermediate wheatgrass, Delar small burnet, Trevois alfalfa field planting on rangeland. Site is gravelly loam soil with a pan at 5-6 inches, non-irrigated, 12-inch rainfall, 6300 feet elevation, and 3% slopes on NE exposure. FY89 ripped rangeland in spring and seeded mix in fall of 1990. FY91 excellent stand establishing with production about 1400 lbs/ac. FY92 clipping data: No Treatment - 318 lbs/ac., chisel only treatment (native species) - 495 lbs/ac., chisel/disc/seed treatment - 1110 lbs/ac. Clipped 7/9/92. FY93 Clipped plots resulted in production of 1200-2000 lbs/ac. FY94 production of about 800 lbs/ac in extremely droughty year. Non treated rangeland producing about 100 lbs/ac this year. FY95 excellent stand Luna and Greenar, Good stand P-27, Sodar and Travois and Poor stand of Delar. Stand produced 1400+ lbs/acre this year. High antelope use of stand was noted. Stand was grazed 3 weeks in spring and 4 weeks in fall with good management. FY96 excellent stand of Trevois and good stands of Luna, P27, Sodar, and Greenar. Very poor stand of Delar. Considered 90% stand overall. Produced 1000 lbs/ac in very poor moisture year. Stand is doing great under good management. FY03 Disc-Seed treatment – near fence good stand of natives – primarily crested wheatgrass in seeding with 5-6 percent sagebrush and 600 pounds per acre production in very dry year. Ripped-Disc-No Seed treatment – sagebrush very heavy with forage producing about 200 pounds per acre and brush producing about 200 pounds per acre in very dry year. Ripped-Disc-Seed treatment – excellent stand of primarily Bozoisky wildrye, Nordan crested wheatgrass, P27 Siberian wheatgrass and some Trevois alfalfa. Very little intermediate wheatgrass left in stand. Production is about 1000 pounds per acre in very dry year. FY05 There is a good stand of native bluebunch wheatgrass, Sandberg bluegrass and Indian ricegrass near west fence-line producing about 750 pounds per acre. The disced and seeded stand near west fence has a good stand of crested wheatgrass with about 5 percent sagebrush invasion and producing about 1000 pounds per acre. The ripped, disced and seeded area has an excellent stand of primarily Nordan crested wheatgrass and Bozoisky Russian wildrye with 3-4 plants per square foot, excellent vigor and producing about 1300 pounds per acre this year. P27 Siberian wheatgrass, Greenar intermediate wheatgrass and Trevois alfalfa are present, but in much lower amounts. Planting will no longer be evaluated, but will be maintained for training purposes.

ID90025 Wagoner. Rush intermediate wheatgrass field planting on rangeland. Site is gravelly loam soil with a pan at 5-6 inches, non-irrigated, 12-inch rainfall, 6300 feet elevation, and 3% slopes on NE exposure. FY89 ripped rangeland. FY90 planted April 1990. FY91 excellent stand establishing with no weeds. Production is 1400 lbs/ac. FY92 stand excellent with 1200 lbs/ac production. FY93 excellent stand producing 2000+ lbs/ac. Grazing value - appears to be a highly preferred/selected species according to cooperator. FY94 excellent stand producing 800 lbs/ac in very droughty year. FY95 excellent stand producing 1800+ lbs/acre. Rush is the most productive species in all range trials. FY96 excellent stand with 5-10 plants/ft2 producing 1000-lbs/ac and good vigor in very low rainfall year. FY03 good to excellent stand with 3 plants per square foot and good to excellent vigor. Producing 700 pounds per acre in very dry year – produces about 1400 pounds per acre in average to favorable years. Sagebrush invasion is about 1-5 percent of plant community. No weeds in stand. Planting will no longer be evaluated, but will be maintained for training purposes.

ID90035 Wagoner. Bozoisky Russian wildrye field planting on rangeland. Site is gravelly loam soil, non-irrigated, 12-inch ppt, 6200 feet elevation, and 2% slopes on NE exposure. FY90 planted April. FY91 good stand establishing. FY92 excellent stand producing 1100 lbs/ac. FY93 90% + stand and up to 4' tall, estimated production 1200-1400 lbs/ac. FY94 good stand producing about 600 lbs/ac in very droughty year and only 50% of plants produced seedheads this year. FY95 good stand producing 1200+ lbs/acre. This species is doing very well and is well adapted to site. FY96

good stand with 4-5 plants/ft2 and 1200-lbs/ac production in very low summer rainfall year. FY03 good stand of P27 Siberian wheatgrass and Bozoisky Russian wildrye with 3 plants per square foot and good to excellent vigor. Stand is producing about 800 pounds per acre in a very dry year. Estimate 1400-1600 pounds per acre in an average to favorable moisture year. FY05 the Bozoisky Russian wildrye stand is maintaining very well with approximately 3 plants per square foot, excellent vigor and production about 1200 pounds per acre. Cattle seek out this species year around according to cooperator. **Planting will no longer be evaluated, but will be maintained for training purposes.**

ID92013 Webster. Field planting. Regar meadow brome, Bozoisky Russian wildrye, Luna pubescent wheatgrass, Critana thickspike wheatgrass field planting on rangeland. Site is gravelly silt loam soil, non-irrigated, 14-inch rainfall, 6000 feet elevation, and 4% slopes on SE exposure. FY92 site sprayed for weed control, but too dry to seed. FY93 seeding not completed. FY94 very poor moisture conditions, planting not installed. FY95 good stand of all species establishing with good spring moisture. FY96 good stand of all species with 2-4 plants/ft2 and good vigor on all except Regar has fair vigor. Stand had low production and is still establishing. FY97 good stands for all species with 60% stands and good vigor - they have been slow to establish on this tough site. FY99 Bozoisky and Luna good stands, Regar and Critana fair stands. FY03 good to excellent stand of Bozoisky Russian wildrye and Regar meadow brome with 3 plants per square foot (70% Bozoisky – 30% Regar), good vigor and about 1500 pounds per acre production in a very dry year. Good to excellent stand of Bozoisky Russian wildrye and Trevois alfalfa with 3 plants per square foot (70% Bozoisky – 30% Trevois), good vigor and about 1500 pounds per acre production in a very dry year. Fair to good stand of Critana thickspike wheatgrass with 9 plants per square foot, poor vigor and about 400 pounds per acre production in a very dry year. Good to excellent stand of Luna pubescent wheatgrass with 5 plants per square foot, good vigor and about 1500 pounds per acre production in a very dry year. Bozoisky is heavily grazed (80-90 percent utilization) by cattle and elk and stands are maintaining very well. FY05 Plot 1: good stand with 2 plants per square foot - Bozoisky Russian wildrye 100% survival, Regar meadow brome failed, Trevois alfalfa 50% survival; stand producing about 1300 pounds per acre. Cattle and elk are utilizing the stand at about 60 percent utilization on Bozoisky and 30 percent utilization on alfalfa. Plot 2: excellent stand with 3 plants per square foot – Bozoisky 100 percent survival and Trevois 50 percent survival; stand is producing about 1700 pounds per acre; Cattle and elk are utilizing stand with about 85 percent utilization on Bozoisky and 30 percent utilization on alfalfa. Plot 3; fair stand of Critana thickspike wheatgrass with 9 plants per square foot and fair vigor; stand is producing about 700 pounds per acre. Cattle and elk are not utilizing this plot. Plot 4: good stand of Luna pubescent wheatgrass with good vigor and 5 plant per square foot; stand is producing about 1700 pounds per acre; Cattle and elk are not utilizing this stand. **Planting will no longer be evaluated, but will be maintained for training purposes.**

FIELD OFFICE: SALMON/CHALLIS

ID80100 IDL Bradbury Flat. Multiple Adaptation Evaluation. Planted March 25, 1980. Evaluations 8/7/84, 8/6/86, 7/12/89, 7/7/92, 11/14/95, 9/99, 5/21/03 and 7/25/07. FY07 evaluation by Dan Ogle, Mark Olson and Nate Matlack - Next evaluation FY13.

Accession	Stand	Plants/ft2	Vigor	Comments
B1574 crested wheatgrass	70%	1.0	good-exc.	
P27 Siberian wheatgrass	65%	0.5	good	
Sodar streambank wheatgrass	65%	1.5	good	
AB447 crested wheatgrass	60%	0.5	good	
Secar Snake River wheatgrass	60%	0.25	fair-good	high residue problems
Hatch winterfat	50%	0.5	good-exc.	
AB764 winterfat	50%	0.5	good-exc.	
AB922 fourwing saltbush	1%	< 0.1	fair-good	
AB942 fourwing saltbush	1%	< 0.1	fair-good	

Nezpar Indian ricegrass, Luna pubescent wheatgrass, Goldar bluebunch wheatgrass, Magnar basin wildrye, Topar pubescent wheatgrass, Appar blue flax, NM1143 Firecracker penstemon, Bandera R.M. penstemon, Cedar Palmer penstemon, NM1123 Venus penstemon, AB555 aster, R885a black-eyed susan, Delar small burnet, Immigrant forage kochia, Ladac alfalfa, buckwheat species, and arrowleaf balsamroot failed.

ID80101 IDL Bradbury Flat. Multiple Adaptation Evaluation. Planted November 7, 1981. Evaluations 8/7/84, 8/6/86, 7/12/89, 7/7/92, 11/14/95, 9/99, 5/21/03 and 7/25/07. FY07 evaluation by Dan Ogle, Mark Olson and Nate Matlack - Next evaluation FY13.

Accession	Stand	Plants/ft2	Vigor	Comments
B1574 crested wheatgrass	50%	0.5	good	
P27 Siberian wheatgrass	60%	0.75	excellent	
Sodar streambank wheatgrass	80%	1.25	excellent	
AB447 crested wheatgrass	65%	0.5	good-exc.	
Secar Snake River wheatgrass	50%	0.25	good-exc.	High residue problems
AB764 winterfat	20%	0.15	poor	
AB585 winterfat	1%	<0.1	very poor	
AB922 fourwing saltbush	3%	0.1	very poor	
AB942 fourwing saltbush	2%	<0.1	very poor	
Immigrant forage kochia	3%	0.1	fair-good	
Bozoisky Russian wildrye	70%	0.5	excellent	
Vinall Russian wildrye	70%	0.7	excellent	

Nezpar Indian ricegrass, Luna pubescent wheatgrass, Goldar bluebunch wheatgrass, Magnar basin wildrye, Topar pubescent wheatgrass, Appar blue flax, NM1143 firecracker penstemon, Bandera R.M. penstemon, Cedar Palmer penstemon, NM1123 Venus penstemon, Delar small burnet, Lodorm green needlegrass, Blair smooth brome, and Paiute orchardgrass failed

ID82102 BLM Centennial. Multiple Adaptation Evaluation. Planted late October 1982. Evaluations 8/7/84, 7/28/86, 7/13/89, 6/26/92, 6/20/95. FY99 not evaluated. Evaluated 5/21/03. Evaluated 7/24/07 by Dan Ogle, Mark Olson and Nate Matlack - Next evaluation FY13.

Accession	Stand	Plants/ft2	Vigor	Comments
GP52 alfalfa	10%	0.1	fair-good	
BC79 alfalfa	3%	0.05	fair	
RS1 wheatgrass cross	25%	0.5	good	
RS2 wheatgrass cross	15%	0.25	fair	
Newhy hybrid wheatgrass	75%	1.0	good	
Scarlet globemallow	1%	<0.1	fair-good	
Ephraim crested wheatgrass	85%	1.25	fair-good	
Barton western wheatgrass	5%	0.25	poor-fair	
Topar pubescent wheatgrass	1%	<0.1	very poor	
Whitmar beardless wheatgrass	25%	0.25	fair-good	
Goldar bluebunch wheatgrass	25%	0.5	fair-good	
Secar Snake River wheatgrass	50%	0.75	fair-good	
Vinall Russian wildrye	60%	0.75	good-exc.	
Bozoisky Russian wildrye	45%	0.25	excellent	
U7881 alfalfa	1%	<0.1	very poor	
Nordan crested wheatgrass	70%	0.75	good	

Lutana cicer milkvetch, Canbar Canby bluegrass, Immigrant forage kochia, Bandera R.M. penstemon, Cedar Palmer penstemon, Appar blue flax, Paiute orchardgrass, P27 Siberian wheatgrass, Nezpar Indian ricegrass, Magnar basin wildrye, and yellow sweetclover failed

ID82103 BLM Spud Alluvial. Multiple Adaptation Evaluation. Planted late October 1982. Evaluations 8/7/84, 7/28/86, 7/13/89, 6/25/92, 11/14/95, 9/99, 5/20/03 and 7/25/07. FY07 evaluation by Dan Ogle, Mark Olson and Nate Matlack - Next evaluation FY13.

Accession	Stand	Plants/ft2	Vigor	Comments
RS1 wheatgrass cross	85%	1.5	fair	
RS2 wheatgrass cross	85%	1.5	fair	
Fairway crested wheatgrass	85%	1.5	fair	
Immigrant forage kochia	50%	2.0	excellent	many young plants
Ephraim crested wheatgrass	75%	1.0	good	
Barton western wheatgrass	<5%	0.1	poor	
Whitmar beardless wheatgrass	70%	1.0	fair	
P27 Siberian wheatgrass	90%	1.5	good	
Goldar bluebunch wheatgrass	30%	0.3	poor	
Secar Snake River wheatgrass	80%	0.75	fair-good	

Vinall Russian wildrye	70%	1.0	good-exc.
Bozoisky Russian wildrye	85%	0.75	excellent

BC79 Synthetic alfalfa, GP52 Synthetic alfalfa, scarlet globemallow, Cedar Palmer penstemon, Appar blue flax, Paiute orchardgrass, Topar pubescent wheatgrass, Nezpar Indian ricegrass, Magnar basin wildrye, and yellow sweetclover failed.

ID82104 BLM Jeff's Flat. Multiple Adaptation Evaluation. Planted late October 1982. Evaluations 8/7/84, 7/28/86, 7/13/89, 6/26/92, 9/99 5/19/03 and 7/24/07. FY07 evaluated by Dan Ogle, Mark Olson and Nate Matlack - Next evaluation FY13.

Accession	Stand	Plants/ft2	Vigor	Comments
GP52 Synthetic alfalfa	1-5%	<0.25	fair	
BC79 Synthetic alfalfa	1-5%	<0.25	fair	
Manchar smooth brome	50%	4	good	
Baylor smooth brome	50%	4	good	
Durar hard fescue	75%	3	good-exc.	
Covar sheep fescue	45%	2	good	
Nordan crested wheatgrass	25%	0.5	fair-good	
P27 Siberian wheatgrass	40%	0.75	good	
Greenar intermediate wheatgrass	65%	4	excellent	
Magnar basin wildrye	5%	0.1	fair	
Vinall Russian wildrye	3%	0.1	poor	
Bozoisky Russian wildrye	5%	0.1	fair	

RS1 wheatgrass cross, RS2 wheatgrass cross, Hycrest crested wheatgrass, Delar small burnet, Lutana cicer milkvetch, Cedar Palmer penstemon, Appar blue flax, Paiute orchardgrass, Sherman big bluegrass, yellow sweetclover failed.

ID82105 BLM Round Valley. Multiple Adaptation Evaluation. Planted late October 1982. Evaluations 8/7/84, 8/6/86, 7/12/89, 6/25/92, 11/13/95, 9/99, 5/19/03 and 7/23/07. FY07 evaluated by Dan Ogle, Mark Olson and Nate Matlack - Next evaluation FY13.

Accession	Stand	Plants/ft2	Vigor	Comments
RS1 wheatgrass cross	1%	<0.1	fair	
RS2 wheatgrass cross	1%	<0.1	fair	
Immigrant forage kochia	2%	<0.1	fair-good	
Scarlet globemallow	1%	<0.1	fair	
Nordan crested wheatgrass	70%	1.0	good	
P27 Siberian wheatgrass	70%	1.0	good-exc.	
Vinall Russian wildrye	30%	0.5	good	
Bozoisky Russian wildrye	75%	1.5	excellent	
Nordan crested wheatgrass	60%	1.0	fair-good	

GP52 synthetic alfalfa, BC79 synthetic alfalfa, Critana thickspike wheatgrass, Bandera R.M. penstemon, Cedar Palmer penstemon, Appar blue flax, Paiute orchardgrass, Goldar bluebunch wheatgrass, Secar Snake River wheatgrass, Barton western wheatgrass, Topar pubescent wheatgrass, Whitmar beardless wildrye, Nezpar Indian ricegrass, Magnar basin wildrye, yellow sweetclover failed.

ID82106 BLM Gooseberry/Sheep Creek. Multiple Adaptation Evaluation. Evaluated 7/7/92, 5/19/03 and 7/23/07. FY07 evaluation by Dan Ogle, Mark Olson and Nate Matlack - Next evaluation FY13.

Accession	Stand	Plants/ft2	Vigor	Comments
Nordan crested wheatgrass	5%	0.1	fair-good	
Bozoisky Russian wildrye	10%	0.2	poor-fair	
Vinall Russian wildrye	10%	0.3	fair	
Sherman big bluegrass	95%	1.5	fair-good	
Greenar intermediate wheatgrass	2%	<0.1	very poor	
P27 Siberian wheatgrass	1%	<0.1	very poor	
Ephraim crested wheatgrass	3%	<0.1	poor	
Durar hard fescue	85%	2	good	
Covar sheep fescue	80%	2	fair-good	
Manchar smooth brome	50%	0.5	fair	

Baylor smooth brome	20%	0.25	fair
Fairway crested wheatgrass	5%	0.1	fair

Magnar basin wildrye, Appar blue flax, Paiute orchardgrass, Cedar Palmer penstemon, Bandera R.M. penstemon, Lutana cicer milkvetch, Delar small burnet, RS2 wheatgrass cross, RS1 wheatgrass cross, BC79 synthetic alfalfa, and GP52 synthetic alfalfa failed.

ID08001 Shiner Ranch. Field Planting. Vavilov II Siberian wheatgrass seed ordered 9/27/07 and shipped 10/4/07 for November dormant planting.
Seed mixture 1 (5 ac): Vavilov II Siberian wheatgrass, Bozoisky Russian wildrye, falcata alfalfa;
Seed mixture 2 (75 ac): Vavilov Siberian wheatgrass, Bozoisky Russian wildrye, falcata alfalfa
Site Characteristics: Leadore gravelly loam soil, 2-6 % slope. South aspect, 5,600 feet elevation, 8-12 inch rainfall, non-irrigated, T17N R24E NE1/4 Section 2. FY07 - a four acre field planting that contained Vavilov II Siberian wheatgrass, Bozoisky Russian wildrye and falcata (yellow blossom) alfalfa was planted in November 2007. The rest of the planting area was planted to Vavilov Siberian wheatgrass, Bozoisky Russian wildrye and falcata (yellow blossom) alfalfa in November 2007. The Vavilov II and Bozoisky Russian wildrye seed was furnished by the PMC and the falcata alfalfa was purchased by the cooperator. We wanted to evaluate the Vavilov II release with Vavilov, the standard currently available on the market and also evaluate the falcata alfalfa as a potential dryland forage type alfalfa that may do well in this area. A ½ pound of alfalfa was planted per acre. There is some information available on the internet describing this alfalfa. FY11 all three grasses with 90% survival. Bozoisky has fair vigor and plants approximately 26 inches tall. Vavilov and Vavilov II with poor vigor, plants approximately 7 inches tall. Falcate alfalfa with 5% survival. Site is overgrazed. FY12 no evaluations.

FIELD OFFICE: ST. ANTHONY
ID06009 John Taft. Henrys Lake WRP. Field planting of 100 Engelmann spruce and 100 quaking aspen. Planting completed June 20 and 21, 2006 at 7 separate locations. One gallon potted plants; Engelmann spruce - 3 feet tall and quaking aspen 4- 5 feet tall; were planted using a skid steer with mounted 10 inch auger to dig holes. Each tree was planted by hand, pressed in by foot pressure and watered with bucket following planting. Hydrology – soil moisture varied from saturated locations near ponds at south end of project to field capacity at ponds at north end of project. FY08 – FY12 no evaluations.
FY07 Spruce – survival is poor with approximately 20% survival overall. Top growth die back is common with approximately half of the surviving plants green near base, but dead above. These are expected to die. Approximately 15 plants throughout entire WRP site show fair to good bud growth. Winter was open and plants were exposed most of winter – this may have resulted in top growth injury. Spring moisture since March has been very poor resulting in drought injury. Spruce is doing best in sites with saturated conditions. On sites that are drier and better drained, spruce is struggling.
FY07 Aspen – survival is good with approximately 50% survival overall. Top growth die back is common with approximately half of the surviving plants leafing along stem and about half sprouting from the base. Winter was open and plants were exposed most of winter – this may have resulted in top growth injury. Spring moisture since March has been very poor resulting in drought injury. Aspen is doing best in sites with very good soil moisture to saturated conditions. On site that are drier and better drained, aspen is struggling.
Site 1 berm near pond - was the only location where wildlife use was evident – probably moose.
Site 2 berm near pond
Site 3 wetland near road junction – aspen are in nearly standing water (water table within 6 inches of surface)
Site 4 upland just across bridge on right side of road
Site 5 upland to east of ponds on south end of property
Site 6 wetlands near ponds on south end of property

PLANT MATERIALS

2012

UTAH EVALUATION SUMMARIES

FIELD AND DEMONSTRATION PLANTINGS

UTAH AREA 1
PLANT MATERIALS PLANTINGS

UT05003 Swaner Nature Preserve. Riparian planting. Peachleaf willow (accessions 9067375, 9067376, 9067541, 9067546, 9067549 and 9067560), Redosier dogwood (accessions 9023733, 9023739 and 9023740) and Blanchard blue elderberry cuttings were ordered February 4, 2005. Site characteristics: East Canyon Creek, Summit County, MLRA E47, Echocreek-Kovich loam soil, 1-2 percent slope, NW aspect, 6350 feet elevation, 16 inch precipitation, non-irrigated, T1S R4E SE ¼ Section 18. FY05 peachleaf willow 9067375 85% survival, fair vigor, 12-24" height; peachleaf willow 9067376 100% survival, good vigor, 24-36" height; peachleaf willow 9067541 73% survival, fair vigor, 12-18" height; peachleaf willow 9067546 100% survival, good vigor, 24" height; peachleaf willow 9067549 88% survival, fair vigor, 24" height; peachleaf willow 9067560 85% survival, good vigor, 24-36" height. All peachleaf willows are performing well under severe reed canarygrass competition. Redosier dogwood 9023733 10% survival, very poor vigor, 3" of new growth; redosier dogwood 9023739 failed; redosier dogwood 9023740 100% survival, poor vigor, 6" of new growth; Blanchard blue elderberry failed. Elderberry stock was not in containers and plants were very difficult to handle. Recommend not sending elderberry plants without containers in the future.FY06 peachleaf willow 9067375 50% survival, fair vigor, 18-24" height; peachleaf willow 9067376 77% survival, fair vigor, 24-36" height; peachleaf willow 9067541 57% survival, fair vigor, 18-24" height; peachleaf willow 9067546 67% survival, fair vigor, 18-24" height; peachleaf willow 9067549 67% survival, fair vigor, 24-36" height; peachleaf willow 9067560 78% survival, fair vigor, 36-48" height. All peachleaf willows are performing well under severe reed canarygrass competition and high water this spring. Redosier dogwood 9023733 failed; redosier dogwood 9023739 failed; redosier dogwood 9023740 failed; Blanchard blue elderberry failed. FY08 all dogwood accessions and the elderberry failed. All Peachleaf willow accessions had some survival with accession 9067375 36% survival, 9067376 28% survival, 90673741 4% survival, 9067346 72% survival, 9067349 60% survival and 9067560 24% survival. Accessions range from 24 to 36 inches in height. Quackgrass and Reed canarygrass competition is severe so any Peachleaf survival is impressive. FY10 Peachleaf willow survival: 9067375 – 8 percent, 9067376 – 8 percent, 9067541 – 4 percent, 9067546 – 4 percent, 9067549 – 36 percent and 9067560 – 36 percent; dogwood and elderberry failed. Weed competition from quackgrass and Reed canarygrass is very severe. FY11 no evaluation. FY12 no evaluation.

UT07004C Zan Harris Logan Field Office. 9067549 and 9067560 Peachleaf willow accessions and coyote willow cuttings were shipped April 4, 2007. FY08 30 percent survival of 9067549 and 9067560 and 20% survival of coyote willow. Site is heavily infested with Reed canarygrass. FY10 Peachleaf willow survival: 9067549 - 28 percent and 9067560 - 32 percent; Coyote willow survival - 66 percent. This planting is performing very well. FY11 no evaluation. FY12 no evaluation.

UT09003 Lyle Holmgram Tremonton Field Office adaptation trial. 10 plants of 9008027 silver buffaloberry were ordered February 2009 for delivery in late March. FY10 Silver buffaloberry – 30 percent survival and about 8 inches tall. Site characteristics: MLRA 28A, riparian planting, silt loam soil, 3- 35 percent slopes, south aspect, 4312 feet elevation, 14 inch rainfall zone, non-irrigated, T11N R3W NW Qtr Section 2. FY11 no evaluation. FY12 no evaluation.

UT10001 Basque Cross Ranch Tremonton Field Office field planting. Vavilov II Siberian wheatgrass seed was ordered September 3, 2009 for shipment on October 13, 2009. Site Characteristics: MLRA 28A; 5 acres; gravelly loam soil; 6- 10 percent slope; south aspect; 5600 feet elevation; 10- 12 inch precipitation; non-irrigated; T13N R12W SE1/4 Section 30. FY10 initial establishment – Vavilov II Siberian wheatgrass good stand with 4 plants per foot squared and excellent vigor; Bozoisky II Russian wildrye plants not apparent; Oahe intermediate wheatgrass good stand with 4 plants per foot squared and excellent vigor; Ranger alfalfa fair stand with 0.2 plants per foot squared and excellent vigor. Overall planting is establishing very well. FY11 no evaluation. FY12 no evaluation.

UT11004 Lyle Holmgren Tremonton Field Office field planting. Washoe basin wildrye, Trailhead basin wildrye, Magnar basin wildrye, Newhy RS wheatgrass, Recovery western wheatgrass and Silver buffaloberry seed was ordered January 14, 2011 for delivery in early February. Silver buffaloberry plants (20) were ordered for delivery in late February. Site characteristics: MLRA 28A, riparian planting, silt loam soil, 3- 35 percent slopes, south aspect, 4312 feet elevation, 14 inch rainfall zone, non-irrigated, T11N R3W NW Qtr Section 2. FY12 no evaluation.

UT12001 Val Simmons Provo Field Office saline demonstration plots. Recovery western wheatgrass, Bozoisky Russian wildrye, Newhy hybrid wheatgrass, Mankota Russian wildrye, Rosana western wheatgrass, Shoshone

manystem wildrye, Garrison creeping foxtail seed was ordered June 2, 2011. Site characteristics: MLRA D28, strongly alkali silty clay soil, 1-2 percent slopes, south aspect, 4540 feet elevation, 14-16 inch rainfall, non-irrigated.

UT12002 Earl Christiansen Provo Field Office demonstration planting. Nezpar Indian ricegrass, Bannock thickspike wheatgrass, First Strike slender wheatgrass and Snake River Plain fourwing saltbush seed was ordered June 2, 2011. Site characteristics: MLRA D28, fine sandy loam soil, 2- 4 percent slopes, north aspect, 4550 feet elevation, 12- 14 inch rainfall, non-irrigated. FY12 no evaluation.

UT12003 Earl Christensen Provo Field Office demonstration Planting. Vavilov II Siberian wheatgrass, Bozoisky-Select Russian wildrye and First Strike slender wheatgrass seed ordered June 2, 2011. Site characteristics: MLRA D28, fine sandy loam soil, 2- 4 percent slopes, north aspect, 4550 feet elevation, 12- 14 inch rainfall, non-irrigated. FY12 no evaluation.

UT12013 Les Adams Field Planting. Pasture mix trial. Rush, Recovery, Regar, Delar, and Appar requested and shipped October 2012.

UTAH AREA 2
PLANT MATERIALS PLANTINGS

UT99001 Graymont Western (Lime plant) – Fillmore FO. Vavilov Siberian wheatgrass critical area planting. 20 pounds of Vavilov seed was ordered November 19, 1998. The Vavilov will be planted in a mix, which will include Nordan crested wheatgrass, Sodar streambank wheatgrass, Critana thickspike wheatgrass, Nezpar Indian ricegrass, and forbs and shrubs. Site characteristics are a crushed gravelly – silty material lain over rock – cobble material; this material hardens to a near cemented pavement when packed and as moisture occurs; rainfall is about 8-10 inches; site is very windy. Site modifications recommended included 10 ton per acre composted straw, fertilizer based on soil tests, ripping prior to seeding resulting in a rough - rocky soil surface with about 50% of surface being exposed rock to provide micro-sites where seedlings would be protected from constant winds were recommended. FY99 no evaluation. FY00 Three site preparation treatments were installed in the fall/spring of 1998/1999 including 1. Planting directly into shallowly scarified site where soil surface was shattered and smooth; 2. Planting into moderately ripped site where soil surface was rough with approximately 25 percent of surface exposed angular rock; and 3. Planting into severely ripped site where soil surface was very rough with approximately 50 percent of surface exposed large angular rock. Company Manager indicated the past two years were dry winters with below normal rainfall season long. The mid growing season evaluation, on June 6, 2000, indicated Sodar streambank wheatgrass, Bannock or Critana thickspike wheatgrass, Vavilov Siberian wheatgrass, Nezpar Indian ricegrass, penstemon species, scarlet globemallow, winterfat, fourwing saltbush, and Wyoming big sagebrush were all planted and present to some degree on each treatment. Treatment 1 had a 5-10 percent stand present, plants were very small (stunted), and not reproducing (no seedheads present). Treatment 2 had a 30-40 percent stand present, plants were average sized, and a few were reproducing. Treatment 3 had a 70-90 percent stand, plants were tall for site (high vigor), and a high percentage of plants were reproducing. FY01 Graymont has produced a publication "Assessment of Revegetated Test Benches and Reference Transects at Cricket Mountain Plant" that describes the success of this trial. **FY06** May 16th – planting is excellent with approximately 75% Vavilov Siberian wheatgrass, 20% Nordan crested wheatgrass-Sodar streambank wheatgrass-Critana thickspike wheatgrass, 1% Nezpar Indian ricegrass, and 4% Richfield firecracker penstemon-Immigrant forage kochia-sweetclover-fourwing saltbush. The most severely disturbed site has an excellent stand and the moderately disturbed site has a good to excellent stand. The control with no ripping has a poor to failed stand. There are also plantings completed in years following the test plantings. The sites are typically moderately disturbed with good to excellent stands and species mixtures include additional species including Bozoisky Russian wildrye, rabbitbrush, Immigrant forage kochia and penstemon. On one west slope the seeding mixture included fourwing saltbush, shadscale in mixture with grasses and forbs. Due to droughty conditions, this planting only established shadscale approximately 60% of community and fourwing saltbush 10% of community. From these observations, the strongest species appear to be Vavilov Siberian wheatgrass, Bozoisky Russian wildrye, Richfield firecracker penstemon, Immigrant forage kochia, shadscale and fourwing saltbush. FY12 no evaluation..

UT03001 Merlin Webb – Cedar City FO. Seed shipped February 2003. Rimrock Indian ricegrass, Critana thickspike wheatgrass, Trailhead basin wildrye, Volga mammoth wildrye , Nezpar Indian ricegrass, Bannock thickspike wheatgrass, Magnar basin wildrye, Vavilov Siberian wheatgrass, P-27 Siberian wheatgrass, Snake River Plains fourwing saltbush broadcast seeded into good seedbed on February 22, 2003 - rained soon after planting.

FY03 no evaluation. FY04 stand/survival – Planting # 1 P27 fair/100%, Bannock fair/100%, Nezpar fair/100%, Mesa alfalfa fair/100% and Volga failed. Planting # 2 Vavilov fair/100%, Nezpar fair/100%, Bannock fair/100%, Magnar poor/25%, Volga failed, and Snake River Plains failed. FY05 Planting # 1 P27 fair stand with ½ plant/ft2 – Bannock fair stand with ¼ plant/ft2 – Nezpar poor stand with 1/10 plant/ft2 – alfalfa poor stand with 1/10 plant/ft2 – Volga failed. Mix has about 1 plant/ft2. Planting # 2 Vavilov good stand with 4 plants/ft2 - Nezpar poor stand with 1/10 plant/ft2 – Bannock fair stand with ½ plant/ft2 – Magnar and Volga failed – Snake River Plains fourwing saltbush fair stand with ¼ plant/ft2. Mix has 4.9 plants/ft2. Vavilov had the best survival of all plants in this trial and thus was able to respond to better moisture conditions that occurred this year. FY08 Plot 1 - Volga fair stand, Nezpar poor stand, P27, Bannock and alfalfa failed. Plot2 - SRP fourwing saltbush good stand, Magnar and Volga fair stand, Bannock and Vavilov poor stand and Nezpar very poor stand. FY10 Planting # 1 P27 failed – Bannock failed – Nezpar poor stand – alfalfa failed – Volga poor stand. Sand dropseed dominates the site with globemallow very common. Planting # 2 Vavilov good stand with 0.5 plants/ft2 - Nezpar very poor stand – Bannock very poor stand – Magnar fair stand - Volga fair stand – Snake River Plains fourwing saltbush fair stand. Vavilov dominates the site following excellent spring and summer rain in 2010. **Next evaluation planned for 2013.**

UT07002 Niels Hansen seed increase planting. Northern Cold Desert winterfat seed shipped February 8, 2007. Seed will be planted the spring of 2007. FY07 In the spring of 2007 6.5 acres of Northern Cold Desert Germplasm Winterfat was planted. The seeding rate was approximately 2 lbs per acre in rows five feet apart using a ten foot double disk grain drill with all but three of the drops taped shut. Row spacing was 5 feet. Soil had been prepared in the fall of 2006 with no tillage in the spring and soils were firm. On 3/20/07 seed was placed in a groove 1/4 to1/2 inch deep, but there was no packing wheel. The actual seeding rate was less due to adding too many rice hulls with the seed and occasional plugging. There were very harsh spring conditions for germination because there was no rain. It rained the second week in June and some winterfat germinated, but there was no rain again for four weeks. About 30 plants survived. They grew a foot tall by fall of 2007 and had heavy seed production. FY08 in fall of 2007 part of the winterfat field was replanted using left-over seed. The DWR cone seeder with 1/4 inch depth bands was used for this planting. In spring of 2008 the field was tilled for several reasons: no new seedlings were observed; the stand was too thin for production; and a significant encroachment of squarrose knapweed was observed. Landowner is holding back a half acre of this land where there were about 30 winterfat plants that grew where he spilled some seed cleaning the drill. These plants were hand-transplanted to a five foot spacing and will be sprinkle irrigated because he believes winterfat responds well to midsummer moisture. In fall of 2008 or spring of 2009 additional winterfat seed will be planted into weed barrier material. The other 6 acres have been spot sprayed with Milestone, sprayed with glyphosate first week of June, tilled twice in June, and sprayed with glyphosate and 2,4-D July 12. Some weed seed will persist next year, but weeds that have sprouted are gone. FY09 - FY12 no evaluations.

UT07005 Niels Hansen seed increase planting Bozoisky II Russian wildrye. In the spring of 2007 cooperator planted 6 acres of Bozoisky II Russian wildrye after fall tillage and spring application of glyphosate. A ten foot grain drill with all but four drops taped closed was used for planting. There were no packer wheels and site was sprinkled. Row spacing was 35 inches. This was sprinkle irrigated every two weeks, with some being irrigated every four weeks. This was not adequate irrigation scheduling for sprouting seed, but was mandated by the irrigation company since it was a short water year. Weeds (prostrate knotweed) were sprayed once with 2,4-D in June and again with Weedmaster in July. The spring planted Russian wildrye established well, though with the cool soil temperatures at 6000 feet it didn't sprout significantly until the last of May. It was planted in March. Four ton/acre of turkey manure was applied to field in August 2007 and then 67 lbs/acre Urea was applied in May of 2008 after a soil test showed low N levels. Site was irrigated with subsurface drip on four of the 6 acres. FY09 - FY12 no evaluations.

UT07006 Niels Hansen seed increase planting Gooseberry Leaf Globemallow. In April 2007 1/2 acre of Gooseberry Leaf Globemallow was planted in 30 rows using the DWR cone seeder at 1/4 inch depth. It was planted after 1 quart per acre application of glyphosate. No emergence occurred until late May. Due to early planting, weed pressure was too high; kochia and Russian thistle dominated the stand. A weed wick was used for weed control in June, mowed between rows and cooperator also did a lot of hand weeding. A significant number of plants survived. In the spring of 2008 landscape fabric was laid and plants were pulled through to control weeds and facilitate seed collection. FY09 - FY12 no evaluations.

UT08009 Stuart Johnson – Richfield FO field planting. Rush intermediate wheatgrass and Regar meadow brome seed ordered May 27, 2008. Planting scheduled for July- August. Location is a mountain sage site, loamy soil, 2-3

percent slopes, north aspect, 7000+ feet elevation, 16 inch rainfall, T22S R3W NE ¼ Section 33. FY08 The seed was delivered to Stuart on June 30th. He plans to planted the seed by the end of July. 2009 will be the first growing season for evaluations. FY09 no evaluation. FY10 two sites were seeded; Site 1: embankment around an irrigation pond; Rush intermediate wheatgrass has a fair stand; Regar meadow brome failed; site is heavily grazed to a 2 inch stubble height. Site2: stream diversion area; evidence of Rush intermediate wheatgrass establishment; Regar meadow brome failed; due to equipment traffic to repair stream down cuttings only remnant stand still exists. FY11 no evaluation. FY12 no evaluation.

UT09001 Niels Hansen seed increase planting Vavilov II Siberian wheatgrass. Cooperator intends to plant Vavilov II Siberian wheatgrass in a dormant fall planting in 2008 or spring of 2009 after treatment of glyphosate for weed control of knapweed. FY09 - FY12 no evaluations.

UT10002 Niels Hansen seed increase planting Vavilov II Siberian wheatgrass. 50 PLS of Foundation seed shipped 11/12/09. FY10 - FY12 no evaluations.

UTAH AREA 3
PLANT MATERIALS PLANTINGS

UT86018 Smith – Roosevelt FO Hycrest crested wheatgrass, Ephraim crested wheatgrass, Appar blue flax, Arriba western wheatgrass, T28606 needle and thread, Magnar basin wildrye, and Nordan crested wheatgrass field planting. FY90 Hycrest, Ephraim, Appar, Magnar, Nordan all 80-100 % survival. Arriba and T28606 are less than 40% survival. FY91 and FY92 no evaluations. FY93 Hycrest, Ephraim, Appar, Nordan, and T28606 doing best. Magnar and Arriba poor stands. Sagebrush invading site, heavy use by elk, and Appar has many new seedlings. FY94 Hycrest, Appar, Arriba, and Nordan all have good stands. Ephraim, T28606 and Magnar have fair stands. All species are adapted to site and wildlife use is heavy. FY95 no change except vigor has improved due to excellent moisture year. FY96 Hycrest, Ephraim, Appar, T28606 and Nordan have good vigor. Fair vigor for Arriba and Magnar. FY97 Hycrest, Ephraim, Appar, Arriba and Nordan good stands. T28606 and Magnar fair stands. Many sagebrush seedlings within plots, particularly heavy in Arriba western wheatgrass and T28606 needle and thread. FY98 Hycrest, Ephraim, Appar, Arriba, Magnar, and Nordan all have excellent vigor. T28606 has good vigor. FY99 very heavy wildlife use in winter and spring. Poor regrowth due to dry spring/ summer and fair regrowth following late summer rains. Planting is being invaded by sagebrush. FY00 Heavy spring use by wildlife and a very dry spring and summer. Rains began in early September and plants began to green-up. Evaluation indicated good vigor for Ephraim, Appar, Arriba, T28606, Nordan and fair vigor for Hycrest and Magnar. FY01 fair to poor vigor for all species following two years of drought and heavy wildlife use. Sagebrush invasion is effective plant growth and vigor. FY03 good stands of Hycrest, Ephraim, Arriba and Nordan. Fair stands of T28606 needle and thread and Magnar. Appar failed. Area is experiencing heavy wildlife use. FY04 Stands are experiencing heavy wildlife use – no livestock use for the last two years. Good vigor and stands of Hycrest, Ephraim and Nordan. Fair vigor and stands of Arriba, T28606 and Magnar. Poor stand and vigor of Appar – most plants are along the edge of planting. FY05 Stands are experiencing heavy wildlife use – no livestock use for the last three years. Good to excellent vigor and stands of Hycrest, Ephraim, Nordan, Arriba and T28606. Fair vigor and stand of Magnar. Appar failed. FY10 Hycrest, Ephraim, Arriba and Nordan continue to have good stands. T28606 and Magnar have fair stands. **Next evaluation 2013**

UT93005 Smith – Roosevelt FO Trailhead basin wildrye, Magnar basin wildrye field planting for erosion control. FY94 planted October 1993 and initial evaluation indicated Magnar with best seedling establishment and Trailhead doing best in run in areas. FY95 both Trailhead and Magnar rated good stands. Magnar is best adapted. FY96 good stands for both, good vigor for both, good drought tolerance for both, all seedheads of both species eaten by wildlife. FY97 excellent stands and plant vigor for both cultivars. Plant height about 50 inches for Magnar and 38 inches for Trailhead. Magnar has excellent seed production and Trailhead has fair seed production. FY98 excellent vigor and long seedheads for both cultivars. Magnar is a more robust and taller plant than Trailhead. FY99 no evaluation. Excellent stands of each with good vigor and approximately 50 inch height. Basal areas are getting larger, but no seed production this year due to spring/summer drought. FY00 due to very dry spring and summer with rains coming in early September resulting in green-up, both Trailhead and Magnar had fair vigor and only 36-40 inches of growth. FY01 both Magnar and Trailhead have poor vigor after very dry spring and summer (7.7 inches of precipitation this year). Each plant only has 2-3 reproductive stems, which probably did not produce seed this year. FY03 – Fair vigor for both Magnar (45 inch height – 0.5 AUM/ac) and Trailhead (38 inch height – 0.3 AUM/ac). Elk are using the fall green-up. FY04 due to lack of summer thunder storms there is only a fair stand with fair vigor for both Magnar and Trailhead.

FY05 Magnar fair stand with good vigor, 50 inch height, 0.6 AUMs/ac – Trailhead fair stand with good vigor, 40 inch height and 0.4 AUMs/ac. FY10 fair stand with good vigor for both Magnar (42 inch height) and Trailhead (38 inch height). FY12 evaluated November 21, 2012 good stands of Magnar and Trailhead with 3 plants/ft producing approximately 500 and 450 lb/ac respectively. Plants are small ranging 10-12 inches from drought and moderate grazing. **Next evaluation 2013**

UT98005 Prevedel – Roosevelt FO Rush intermediate wheatgrass sprinkler irrigated field planting. Materials ordered 3/30/98. FY98 planted August 16, 1998 into excellent seedbed. FY99 excellent stand with excellent vigor and 20 plants per square foot. In early August plants went from very palatable to coarse. Fall rains softened it up making it more palatable to elk now utilizing field. FY00 stand produced approximately 3000 pound/acre under sprinkler irrigation. Elk graze stand until it gets rank, but will graze regrowth. Cooperator states Rush is an excellent grass for intensive grazing systems. FY01 excellent stand and vigor with 7 AUMs per acre. Cooperator is very satisfied with Rush intermediate wheatgrass performance. FY03 Rush is doing very well in the excessive heat of this summer and is becoming more dominant in the pasture mix of Rush, Regar meadow brome and Paiute orchardgrass. Still producing about 7 AUM/ac. FY04 good stand and vigor – Rush is out performing Regar meadow brome pastures. Both Rush and Regar stands are being invaded by quackgrass. FY05 good to excellent stand with excellent vigor and producing 13 AUMs/ac irrigated. FY06 good to excellent stand with excellent vigor and producing 13 AUMs/ac irrigated. Early warm up and severe summer heat limited production. FY07 Prevedel trial looked good. Brett tried to plant alfalfa with the Rush but it has not done well. Furthermore with the alfalfa in it does not allow him to spray out weeds (knapweed) in the spring without affecting the alfalfa. He has decided he will end up spraying out the weeds and alfalfa and going back to a grass only pasture. He indicated that to increase the vigor of the pastures he needs/plans to fertilize. FY10 good stand with 4 plants per foot square, excellent vigor and approximately 4.5 AUMs/ac. Stand might benefit from fertilization. FY12 Evaluated November 27, 2012 good stand with 3 plants/ft producing approximately 3,000 lbs/ac. **Next evaluation 2013**

UT05004 Mike Wilcox – Monticello FO field planting. This is a dormant spring or fall planting of Topar pubescent wheatgrass and Rush intermediate wheatgrass. Barnam loam soil, 3 percent slopes, south aspect, 6000 feet elevation, 14 inch precipitation, non-irrigated, T31N R26E Section 8. Seed ordered March 3, 2005. FY06 not planted – cooperator plans to plant in spring of 2007. FY07 planting was drill seeded in late September 2007. FY09 - FY11 no evaluations. FY12 seeding judged as failure. Cancel.

UT07001 James Wheeler – Monticello FO field planting. Seed of P-7 bluebunch wheatgrass, Anatone bluebunch wheatgrass, Regar meadow brome, Cache meadow brome, Rush intermediate wheatgrass, Topar pubescent wheatgrass, Paiute orchardgrass, Bozoisky Russian wildrye, Vavilov Siberian wheatgrass and Sherman big bluegrass were ordered on August 28, 2006. A dormant fall planting is scheduled for late October to early November. Site characteristics include MLRA 36, silty clay loam soil, 0-2 percent slopes, NE aspect, 14-16 inch precipitation, T32S R26E NE ¼ Section 31. FY06 seed was drill planted into prepared seedbed on November 17, 2006. Soil moisture and fall rain was good prior to and after planting. It turned cold and snowy soon after planting. FY07 this area is suffering from the current drought conditions. Kyle explained that they did have some grass coming up from the planting in the spring but not much since. We walked around and looked and in fact did find some dormant grass plants that had become established. Dan indicated that it looks as if they got established enough for them to come up this next spring. We did see quite a few weeds in the planting but that is to be expected in the early stages of a new planting. Kyle and his Dad are optimistic and look forward to this coming spring to see how the grasses come back. FY10 Rush intermediate wheatgrass excellent stand with excellent vigor; Vavilov Siberian wheatgrass good stand with excellent vigor; P27 Siberian wheatgrass fair stand with excellent vigor. Anatone bluebunch wheatgrass, Regar meadow brome, Cache meadow brome, Topar intermediate wheatgrass, Paiute orchardgrass poor to very poor stands. FY11 no evaluations. FY12 seeding was viewed to be well established but was visited too late for evaluation.

UT08002 Sam E. Jones (Reservation) Monticello FO Demonstration Plots. Nezpar Indian ricegrass, Vavilov Siberian wheatgrass, Vavilov II Siberian wheatgrass, 9076517 western wheatgrass, Rimrock Indian ricegrass, Rosana western wheatgrass, Paloma Indian ricegrass, Alma blue grama, Hachita blue grama, Grants cane bluestem and Westwater alkali muhly seed was ordered Jan. 14, 2008. Site Characteristics: sandy clay loam soil, 0-3% slope, 5000 feet elevation, 8-10" rainfall zone. FY10 planting has not been completed. FY11 planted???; no evaluation. FY12 "this seeding originally established but over the years due to drought has failed." Cancel.

UT08004 Kyle Wheeler Monticello FO irrigated forages field planting. Rush intermediate wheatgrass, Tegmar intermediate wheatgrass, Regar meadow brome, Cache meadow brome and Paiute orchardgrass seed ordered Jan. 14, 2008. Site Characteristics: silty clay loam soil, 0-3% slope, 7000 feet elevation, 10-12" rainfall zone and irrigated. FY10 good to excellent stand of all species planted. FY11 no evaluation. FY12 seeding was viewed to be well established but was visited too late for evaluation.

UT11001 Monument Valley High School (Monticello) demonstration planting. Nezpar Indian ricegrass, Paloma Indian ricegrass, Rimrock Indian ricegrass, Cochise spike dropseed, Vavilov II Siberian wheatgrass, P27 Siberian wheatgrass and Volga mammoth wildrye seed ordered March 30, 2010. Planting planned for fall 2010. Purpose – field/demonstration planting – FFA project. Site characteristics – MLRA 35, 5 acres, Monue-Sheppard complex fine sandy loam, 1-3 percent slope, 5180 feet elevation, 7- 8 inch rainfall, T43S R16E SW1/4 Section 32. FY10 planted fall 2010. FY11 no evaluation. FY12 no seed established; site had 15 days of 40-60 mph winds which completely rearranged dunes.

UT11002 Grand County demonstration plantings. Paloma Indian ricegrass, Nezpar Indian ricegrass, Viva galleta, Arriba western wheatgrass, Recovery western wheatgrass, Secar Snake River wheatgrass, Discovery Snake River wheatgrass and Jemez NM olive seed plants ordered July 12, 2010. Seed for 6 demonstration plot locations in Grand County. Plantings intended to determine replacement species for tamarisk removal projects. FY12, 2 small grass plants (3 leaf stage) believed to be Arriba found in the plots. All other species had 0% establishment.

UT11003 Chris Carter Castle Dale FO field planting. P27 Siberian wheatgrass, Vavilov II Siberian wheatgrass, Nezpar Indian ricegrass, Northern Cold Desert winterfat and Immigrant forage kochia seed was ordered September 22, 2010. Seeding is planned for late fall (dormant) 2010. Site characteristics – MLRA 34, Killpack/Sagar loam soil, 0-3 percent slopes, 5700 feet elevation, 7- 9 inch precipitation zone, non-irrigated, T17S R9E SE ¼ Section 24. FY12, nothing germinated, will reevaluate summer 2013.

UT11005 Lee Thayne Price FO demonstration plantings. Toe Jam Creek squirreltail, Discovery Snake River wheatgrass, Secar Snake River wheatgrass, Arriba western wheatgrass, Recovery western wheatgrass, Nezpar Indian ricegrass, Rimrock Indian ricegrass, Viva galleta, Vavilov II Siberian wheatgrass, Bannock thickspike wheatgrass, Sodar streambank wheatgrass and Northern Cold Desert winterfat seed was ordered March 24, 2011. Plots will be established at two locations (upland and bottomland -with expected additional moisture with early spring runoff). FY12, nothing germinated, will reevaluate 2013.

UT12008 Price City River Walk. Seed of multiple species was ordered June 7, 2011. Plants will be greenhouse propagated fall- winter 2011- 2012 and planted in spring 2012. FY12, All the species were germinated and grown in conetainers in a greenhouse. Very high success with germination except for the Bridger Select Rocky Mountain Juniper. They had to be taken to a nursery in Salem where they were put in an incubator. Some success was seen after that. After the plants had grown sufficiently, they were transplanted into larger pots to continue growing and getting root ball mass high before transplanting outside. Many, but not all of the plants were planted outside next to the Price River Walkway. In order to help the plants survive, they were given supplemental water. We intend on doing this for the first couple of years then seeing if they will remain established on their own. All plants were doing well throughout the year. To date there have probably been around 300 containerized plants planted along the walkway. In all, we had approximately 1,600 containerized plants in the greenhouse.