



Sod Mats as an Alternative to Plugs in Wetland Revegetation Gadwall Pond, Fort Collins, CO



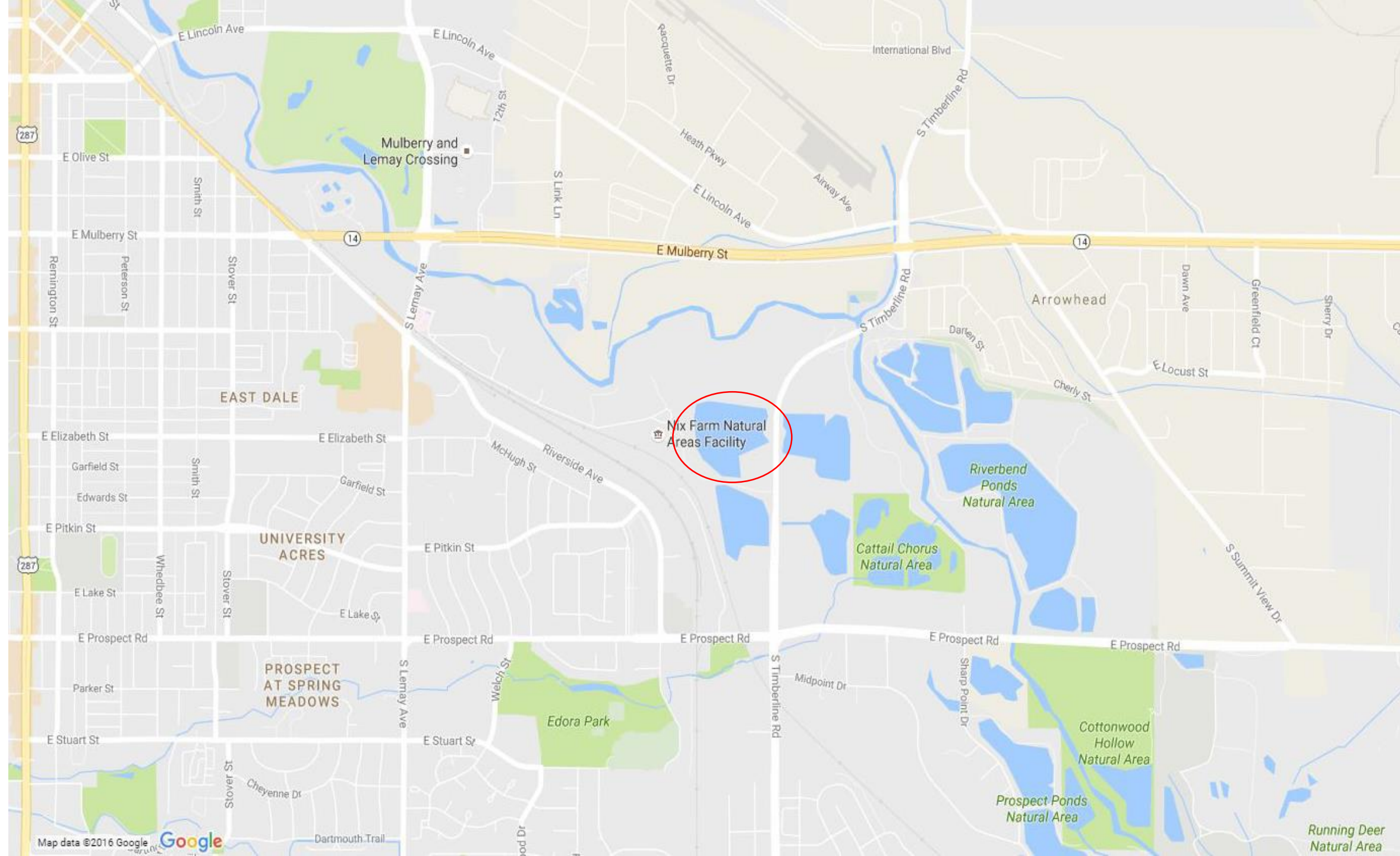
RiversEdge West[®]
RESTORE + CONNECT + INNOVATE



Susan Sherrod | Biohabitats, Inc.



LOCATION: KINGFISHER POINT NATURAL AREA





Kingfisher Point Natural Area

Oct 2017

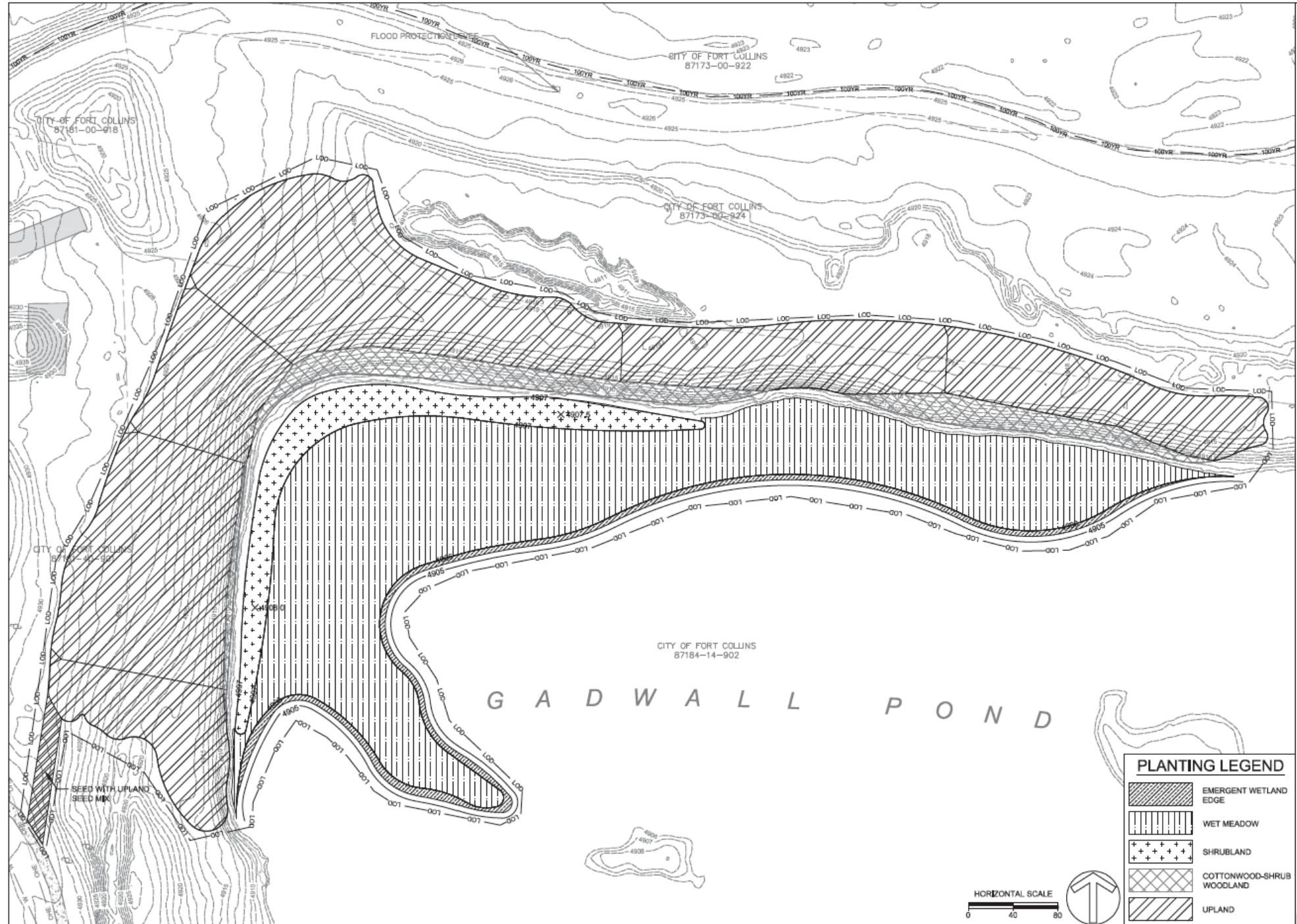


S I T E C O N D I T I O N S



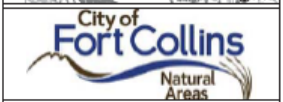
S I T E C O N D I T I O N S





CLIENT
 CITY OF FORT COLLINS
 NATURAL AREAS DEPARTMENT
 1745 HOFFMAN MILL ROAD
 FORT COLLINS, CO 80524

DATE: ISSUES / REVISIONS
 07/14/2018 GADWALL POND ONLY, FOR CONSTRUCTION



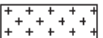




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Restore the Earth & Inspire Ecological Stewardship

**KINGFISHER POINT
 NATURAL AREA
 ECOLOGICAL
 RESTORATION
 DESIGN/BUILD PLANS**

PLANTING PLANS

PLANTING LEGEND

-  EMERGENT WETLAND EDGE
-  WET MEADOW
-  SHRUBLAND
-  COTTONWOOD-SHRUB WOODLAND
-  UPLAND



DESIGN

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Rationale for Wetland Sod Mats

Substantial belowground biomass from well-developed roots complexed with coconut fiber supports...

- Greater resistance to herbivory (geese will pull entire plug out from the crown)
- Faster establishment
- Higher rates of survivorship than individual plugs



Roots Coir Mat Shoots

Rationale for Wetland Sod Mats (ctd.)

Mat **installation more time-efficient** than plugs

City Natural Areas

Department had **prior success** with wetland mats

Desire to **scale up** mat design and analyze cost/benefit



Wetland Sod Mats

Coordinated closely w/ North Fork Native Plants



Natural Areas provided seed from local ecotypes

Cleaning, viability testing, stratification, germination, overseeding yielded enough material for 600 mats (5 × 1 m)

- Hardstem bulrush monoculture mats for outside edge
- Forb mats experimental
- Graminoid blends based on hydrologic needs and NFNP expertise



CONSTRUCTION





CONSTRUCTION





CONSTRUCTION



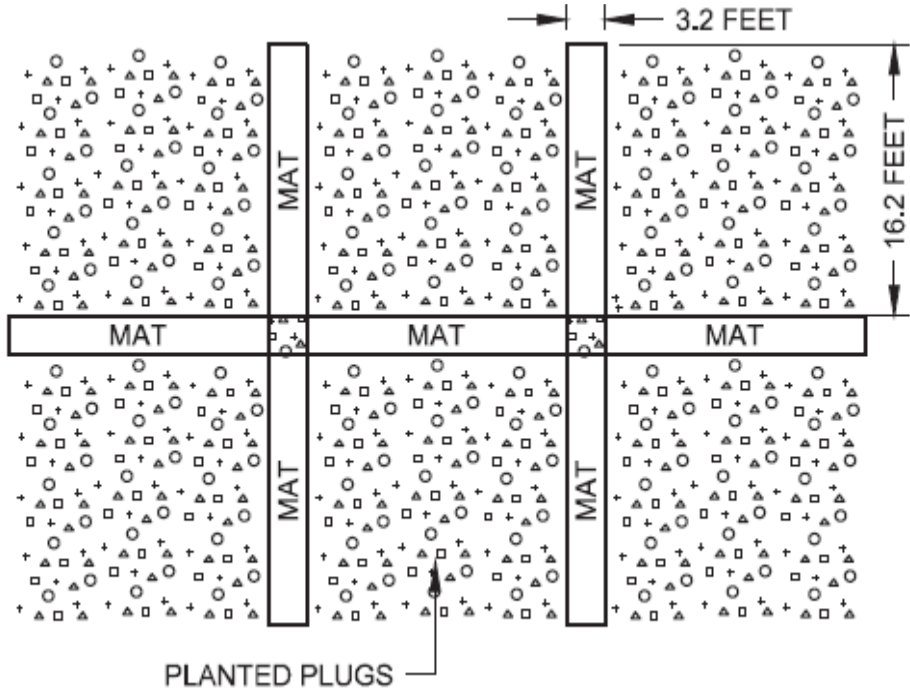




INSTALLATION



NOTE: INSTALL MATS
IN CHECKERBOARD
PATTERN ACROSS
PLANTING ZONE PER
THIS DETAIL.





INSTALLATION





INSTALLATION





INSTALLATION





So...

- Are mats more resistant to herbivory?
- Do mats have higher rates of survivorship than individual plugs?



Is mat **installation** more **efficient** than **plugs**?



Gadwall Cost Assessment

53 ft² wetland sod mat = \$272 (materials, delivery, install)

53 ft² wetland plugs at 12" spacing = \$165

Apples and Oranges:

Sod mats 100% density

Gadwall was custom grow

Biomass gains are unaccounted for







THANK YOU!!!

For questions & additional information:
ssherrod@biohabitats.com



KFP - Fort Collins Wetland Sod Production Estimates

		Un-cleaned Seed Qty (oz)	Assumed reduction once processed	Assumed Tz%	Average Cleaned Seeds per oz	Estimated Clean Seed Quantity	Seed Rate	Wetland Sod Mats at 125 plugs Per Mat
<i>Carex atherodes</i>	Wheat sedge	0.545	0.218	0.5	29,000	3,161	10	2.53
<i>Carex emoryi</i>	Emory's sedge	6.17	3.085	0.5	90,000	138,825	10	111.06
<i>Carex nebrascensis</i>	Nebraska sedge	1.865	0.9325	0.5	40,000	18,650	10	14.92
<i>Carex pellita</i>	Woolly sedge	0.35	0.21	0.5	28,500	2,993	10	2.39
<i>Juncus (balticu) arcticus</i>	Arctic (Baltic) rush	1.395	0.1395	0.5	452,636	31,571	10	25.26
<i>Juncus torreyi</i>	Torrey's rush	18.42	1.842	0.5	768,750	708,019	20	283.21
<i>Eleocharis palustris</i>	Common spikerush	0.315	0.23625	0.5	45,500	5,375	10	4.30
<i>Schoenoplectus acutus</i>	Hardstem bulrush	48.39	24.195	0.5	28,000	338,730	10	270.98
<i>Schoenoplectus pungens</i>	Common threesquare	0.415	0.166	0.5	13,500	1,121	10	0.90
<i>Asclepias incarnata</i>	Swamp milkweed	3.4	2.55	0.5	6,500	8,288	10	6.63
<i>Helianthus nuttalli</i>	Nuttall's sunflower	1.87	0.6545	0.5	11,000	3,600	10	2.88
<i>Iris missouriensis</i>	Rocky Mountain iris	1.61	0.4025	0.5	1,250	252	10	0.20
<i>Liatris ligulistylis</i>	Rocky Mountain blazing star	4.58	1.145	0.5	10,000	5,725	10	4.58
<i>Rudbeckia hirta</i>	Blackeyed Susan	2.48	0.62	0.5	92,000	28,520	10	22.82
<i>Sisyrinchium montanum</i>	Strict blue-eyed grass	4.27	1.0675	0.5	45,000	24,019	10	19.22
<i>Solidago gigantea</i>	Giant Goldenrod	3.93	0.9825	0.5	250,000	122,813	10	98.25
<i>Stachys palustris</i>	Marsh hedgenettle	0.06	0.015	0.5	16,000	120	10	0.10
<i>Triglochin maritima</i>	Seaside arrowgrass	0.415	0.10375	0.5	83,000	4,306	10	3.44
<i>Verbena hastata</i>	Swamp verbena	7.57	1.8925	0.5	77,000	72,861	10	58.29





INSTALLATION

