

BENTON COUNTY



ROSE ANNA PARK AND ST. REGIS PARK

SHORELINE RESTORATION PLAN

MARCH 2007

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Native Habitat Development for Pollinators – NRCS Jobsheet #16

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PROJECT INFORMATION

St. Regis Beach Park

Site Location:

Located on West Lake Road,
Approximately 1 1/4 miles
south of County Road 2, on
the southwesterly side of
Little Rock Lake

Site Address:

11409 West Lake Road,
Rice MN 56367

Rose Anna Park

Site Location:

Located on West Lake Court
on the southerly side of Little
Rock Lake, near U.S.
Highway 10

Site Address:

9876 West Lake Court, Rice
MN 56367

**Project Coordinator:**

William Mayland, AICP Assistant Director, Department of Development Benton County

Project Timeline:

Site preparation	April – May 2007
Installation	May - June 2007
Maintenance	2007- ongoing

Funding sources:

This project was funded in part by the Initiative Foundation, a regional foundation. Additional funding for the project received from park dedication fees collected within Watab township.

GENERAL SITE DESCRIPTIONS

St. Regis Beach Park:

St. Regis Beach Park is located on the west side of Little Rock Lake. The park is approximately 0.6 acres. A site visit was conducted on September 5, 2006 by Annie Felix. The shoreline on park property currently consists of an established shoreline buffer created by Lake Restorations Inc. It is unknown when the restored buffer was installed. The buffer is approximately 180 feet long and 5 feet wide. There is a path down to the water.

Native plants found within the established buffer include: aster, jewelweed, blue vervain, swamp milkweed, culvers root, wool grass, fern, anemone, rue, sedges, goldenrod, and bush clover. Invasive/exotic species found include: stinging nettle, reed canary, willow, and smartweed. Poplars, maples, ivy were found, but we recommend removing them to maintain park view and allow full sun to reach the native plants so they can germinate and establish. See Section 6. for more management recommendations.

Rose Anna Park:

Rose Anna Park is located on the west side of Little Rock Lake. The park is approximately 0.6 acres. A site visit was conducted on September 5, 2006 by Annie Felix. The shoreline on park property currently consists of an established shoreline buffer created by Lake Restorations Inc. It is unknown when the restored buffer was installed. The buffer is approximately 67 feet long and 3 feet wide. There is a path down to the water used as a boat launch.

Native plants found within the established buffer include: aster, jewelweed, swamp milkweed, fern, anemone, sedges, meadow rue, milkweed, and anemone. Invasive/exotic species found include: stinging nettle, reed canary, and catnip. See Section 6. for more management recommendations.

PROJECT GOALS

The Master Plan for Parks, Trails, and Open Space identified the installation of low maintenance plants and the restoration of the shoreland as high priorities. The parks would continue to be used as winter access to the lake and a summer picnic area.

The 2001 Benton County Comprehensive Local Water Management Plan – Plan of Action – devotes one section to Little Rock Lake. The objective is to take actions to protect and enhance water quality in the Little Rock Lake Watershed. Action D. states: Continue to implement recommendations found in the Lake Assessment Report (1991) to improve the quality of Little Rock Lake. 1991 LAP Report, Recommendation Number 2. states: The 1990 water quality of Little Rock Lake was poor relative to other lakes in the eco-region. A reduction of the amount of nutrients that enter the lake may result in improved transparency and a reduction in algal concentration. One means of reducing input is by implementing best management practices (BMPs) in the watershed (land management activities used to control non-point source pollution). Technical assistance

in BMP implementation may be available through local resources management agencies. (<http://www.pca.state.mn.us/publications/reports/lar-05-0013.pdf>).

Benton County requested Benton Soil and Water Conservation District to design a shoreline restoration plans for St Regis Beach Park and Rose Anna Park, including a detailed description of the methods for restorations, guidance for installation of the material and a ten year maintenance plan.

PLAN OVERVIEW

Enhance the already established buffers by adding on an additional twenty feet of buffer area. We recommend that the existing buffer be maintained and managed to control exotic and invasive species (see Section 6. Established Buffer Areas).

The following are the recommended restoration steps:

1. Site Preparation
2. Seed installation
3. Plug installation
4. Watering
5. Labeling
6. Maintenance

Each step is described in detail in the following sections.

RESTORATION PLAN

Step 1. Site Preparation

Eliminate turf by using one of the following methods:

A.) Herbicide

Use Roundup, only spray turf grass, and spray only on calm day. Allow 10-21 days for the herbicide to take effect. The remaining dead material can be burned off or it can be mowed and then mulched or raked away. To create a seed bed of freshly worked soil, roto-till the area to a depth of 1 to 4 inches. NOTE: Herbicide application should be performed by a certified herbicide applicator. Always follow label recommendations.

B.) Sod cutter to remove sod

Sod-cutters avoid the use of chemicals but are labor intensive. Blade depth should be set at least 4 inches deep to cut all grass roots. Be especially careful around tree roots. This usually creates a nearly weed-free surface. Keep in mind, though, that this area will be lower than the surrounding lawn and you may want to bring in extra topsoil to level. Clean, sandy loam topsoil is best; avoid peat, clay or heavy loam-based soil. If topsoil is brought in from an off-site source, make sure

the source was not contaminated with weed seeds. Till area by loosening topsoil to a depth of 3 inches using roto-tiller.

Date: March-May

Step 2. Seed Installation

Hand broadcasting is the simplest and most reliable method of seeding. Adjustable hand-held spreaders may work with the grass seed although they tend to get plugged. Wildflower seed should always be hand broadcast.

The key to a successful seeding is seed to soil contact. Soil contact helps the seeds retain moisture, which is necessary for germination, and provides a substrate for seedling growth. Spread grass seed first. Mixing seeds with a slightly dampened filler (sawdust, peat moss, or vermiculite) will result in a more even distribution on the ground. To ensure even coverage, divide the seed in half and broadcast the first half over the entire area. Work slowly. Broadcast the second half at a perpendicular angle to the first seeding. Lightly rake the grass seed into the soil.

Wildflower seed should be broadcast last and can be spread evenly or concentrated in bands or swaths across your prairie area. Again, mix the flower seed with a filler to help distribute the seed more evenly. Much of this seed is quite small. Spreading it thinly will produce the best results. Do not rake in the flower seeds.

Date: May 15 - June 30

Step 3. Plug Installation

Seedlings can be planted every 3 feet. When planting large areas, a cordless drill equipped with a bulb auger can make the job easier and quicker. Keep plants watered and in the shade until planted. After planting, dry roots tend to reject water. Tap container upside down to remove plant, and then gently pry the roots apart.

For each plant, simply drill a hole into the soil similar in depth to the plant plug. Place plants at the correct depth in the soil so that the top of the root ball is level with the soil surface. It works well to have one person do the drilling and others follow along and plant the plugs. Bulb augers can be purchased at your local nursery supply or home supply store. The cordless drill must be at least 12 volts. For those less inclined to go the power tool route, a hand trowel works well too.

Date: Plant after seed installation, May 15 - June 30

Step 4. Watering

Keep newly seeded areas moist by watering regularly until seeds have germinated (about 3-4 weeks). Give special care to seeds that have been "moist stratified" or they may go

into dormancy or die in the dry soil. Deep soaking is necessary to reach the root system. During the first year, water plants once a week (unless there is rain). A good soaking (sprinkler for an hour) is better than frequent watering for briefer times. During the second season, water only during droughts. Early morning watering is best and most efficient approach.

Date: First year- once a week (unless rain); Second year- only if drought

Step 5. Labeling

Label a few plants of each species to avoid mistaking them later for weeds. Labeling allows you to track the success of your planting program and also allows park visitors to learn about the restoration.

Date: During planting plugs is best, because plugs are labeled in the packs

Step 6. Maintenance

NEW BUFFER AREAS

Year One

Most prairie plants are perennials. Although perennial seeds will germinate the first year, the young seedlings' root growth will be two to three times their above-ground growth, and they may not flower until the second or third year. While this lack of visual growth can be frustrating, keep in mind that it is the strong root system of prairie perennials which enables them to be nearly maintenance-free at maturity.

During this early stage of growth, weeds will take advantage of the lack of above-ground vegetation and appear on your site. To minimize the effects of tall weeds shading prairie seedlings and to prevent these weeds from setting seed, cut the planting one, two, or even three times during its first growing season. This is generally done on 30-day intervals using a scythe, mower or line trimmer. Weed whips work the best, as the cutting height can easily be controlled between eight to ten inches. Be sure to mulch up the cut material so that it does not smother the newly germinating native plants. Mowing is also effective, but it is important to keep the blade set as high as possible, at least eight inches or above the basal leaves of the plants. Hand weeding is also useful during the first growing season, especially to remove individual noxious weeds. These and invading woody plants may have to be treated with spot spraying. At no time should fertilizers be used. Prairie plants are well-adapted to their environment and do not need fertilization. This expensive, time-consuming and often environmentally unfriendly procedure is not only unnecessary on a natural landscape but is detrimental because it can encourage weeds and other undesirable vegetation.

Year two

During the second season, residual seeds from the first season will germinate and some of the faster-growing native plants will flower and produce seed. There might still,

however, be a need for weed control and one mowing might be necessary sometime between mid-June and mid-August. The height and density of the weed cover should help determine if and when to mow. In areas where weeds are especially dominant, the advantages of cutting the weeds and preventing them from setting seed offset any disadvantages of cutting prairie plants. Spot spraying might still be necessary this year.

Year three

By the third year, both grasses and flowers will be mature, providing beautiful, low-maintenance returns. One cutting per year can be used as a clean-up procedure. The best time to cut off old prairie vegetation is in early May or late November (after you've enjoyed the gold, lavender, russets, and maroons of an autumn prairie). In areas where prairie plants were especially tall and dense, mulch or rake away the dead plant material. Fire is another method of removing old prairie thatch. In natural prairie ecosystems, fire not only gets rid of accumulated thatch, it also helps reduce woody plant invasion and stimulates the growth of many native grasses and wildflowers. Rotation between prescribed burns and cutting is ideal for prairies and savannas. Keep in mind that a prescribed burn is a useful maintenance tool, but requires some expertise. Be certain to check local regulations and permit procedures and, when burning, always use caution.

Year four - beyond

Continue spot mowing, herbicide applications, and/or hand weeding as necessary during the growing season. Prescribed burns are recommended every 3-5 years to rejuvenate the planting.

ESTABLISHED BUFFER AREAS

Each site location has an established buffer installed by Lake Restorations, Inc. The buffer areas do require management in order to control exotic and invasive weeds that have established inside the buffer. If budget allows, in most cases, hiring a licensed prairie management contractor to perform the weed management work would provide the best results.

Begin weed management in spring 2007 using one of the following management options:

1) Conduct early spring prescribed burn within the buffer area (April/May) to remove all vegetative material. After burn, allow plants to germinate and grow 12 inches of foliage.

a) Choose 1 of the following control techniques:

1. Chemical control method: After plants have grown 12 inches, spray weeds using the recommended herbicide. NOTE: Herbicide application should be performed by a certified professional. Always follow label recommendations. Continue herbicide applications throughout growing season as needed (whenever weed growth exceeds 8 inches).

2. Mechanical control method: Follow directions under "NEW BUFFER AREAS Year One" on page 7.

2) Perform early spring site mow as soon as spring melt occurs and dead vegetation is dry using any type of cutting machine, e.g. lawn mower, weed whips, etc. Remove all mowed clippings from site using rake to remove from buffer area.

Again choose one of the above control techniques.

Year 2008-ongoing Management Recommendations:

Follow recommendations listed under NEW BUFFER AREAS – Years Two, Three, Four and beyond.

FENCING

Fencing around the restoration area is highly recommended to protect the newly established site from foot traffic and mowing activities. Split-rail fencing is attractive, long-lived, and easy to work around when conducting prescribed burns.

REPLACEMENT

Replacement – Reseed or install new plugs as soon as possible when large gaps appear in planting areas.

GEESE

Discourage geese from feeding off the young plant shoots. Use bird scare tape or fencing to keep the geese away. Goose tape made from a shimmering reflective material and hung vertically in regular spacings is an effective countermeasure.

NATIVE POLLINATORS

Pollinators play a key role in terrestrial ecosystems because they enhance the reproduction of native plants that provide food and cover for numerous wildlife species, help stabilize the soil, and have the potential to improve water quality. As a group, native pollinators are threatened worldwide by habitat loss, pesticides, disease, parasites, and the effects of invasive species both as direct competitors and as negative influences upon pollinator habitat. These threats to the sustainability of native pollinators and their habitat have serious economic implications for humans and for native ecosystem diversity and stability.

The native plants for this project were selected according to the Minnesota NRCS Job Sheet #16 – Native Habitat Development for Pollinators – Minnesota (see NRCS Job Sheet #16 attachment). Also see Plant List for a list of plants selected for these restoration sites.



Native Habitat Development for Pollinators (645)

Biology Jobsheet #16

Natural Resources Conservation Service (NRCS) - Minnesota

Landowner _____

Definition

Restoring and conserving native plant communities to benefit pollinators and associated wildlife species.



Where used

On landscapes which once supported the habitat to be restored and managed, including land retired from agricultural production entered in retirement programs.

Specifications

Follow NRCS practice standard 645 – Upland Wildlife Habitat Management for design recommendations. To attract native pollinators, an area must have adequate sources of food, shelter, water, and nesting sites. A variety of wildflowers and grasses will provide native pollinators with food (nectar, pollen, and /or larval host plants). Optional shrubs can provide important shelter, nesting, and over wintering areas for pollinators. Establish and/or manage sites >1/2 ac. in size that contain a diversity of native grasses, wildflowers, and shrubs.

Plantings shall contain species from each flowering group – early, mid and late flowering season. Plant must remain undisturbed, and be available throughout the growing season.

Seed mixes will consist of at least 15 native species. The mixture will be comprised of a minimum 5 grasses, and a minimum 5 forbs. At least one forb shall be a legume.

Minimum grass seeding rate will be 8.0 PLS lb/ac. Minimum forb seeding rate will be 1.0 PLS lb/ac. The mixture will result in a minimum 20 PLS seeds per square foot total.

Grass/Forb Establishment

Prepare a firm seedbed for all planting methods.

Conventional Tillage - Prepare a fine firm seedbed to a minimum of 3 inches. The seedbed should contain enough fine soil particles for uniform shallow coverage of the seed as well as contact with moisture and nutrients. If possible, use specialized native grass drills with depth bands designed to handle a wide variety of seed. For conventional drills, as a minimum cultipack before seeding. Cultipack after seeding if possible.

Do not use heavy drills on conventionally prepared seedbeds as heavy drills tend to sink in the soil and depth control is difficult.

Plant seed between one-quarter and one-half inch deep. Some seed may be seen on the surface of the ground after seeding. Tillage should only be used on flatter slopes or in conjunction with erosion control measures.

No-Till - No-till drilling reduces the exposure of the newly seeded site to erosion. A no-till drill must be used to seed these sites. A drill should be selected that can handle a wide variety of seed (fluffy, smooth, large, and small) and low seeding rates. Plant seed to a depth of one-quarter to one-half inch deep.

Use of a herbicide is essential in order to kill existing vegetation. Land that has been in grass for many years usually has a thick residue layer on the soil surface. To allow for the best no-till

seedbed, this residue must be removed. Three options are (1) grazing, (2) mowing with residue removed, and (3) prescribed burn. In the fall a burndown herbicide can be applied to prepare for a spring no-till seeding. An additional spring herbicide application may be required, depending on plant growth.

Broadcast - Prepare a fine firm seedbed to a minimum of 3 inches. Use a roller, cultipacker or similar implement prior to seeding. The seedbed should contain enough fine soil particles for uniform shallow coverage of the seed as well as contact with moisture and nutrients. Broadcast seed at a rate of 1.5 times the normal seeding rate and roll or cultipack again after seeding. Do not harrow in the seed.

During the establishment year, mow weeds after they have reached 12" in height. Mow 2 to 3 times, generally on 30 day intervals from the date of seeding. Mow to a 6-8 inch height. Use a rotary mower or remove the clippings so as not to smother the seedlings. This will slow the weeds but won't harm the prairie plants.

The second year, evaluate the stand to determine if weed control is necessary. If it is, spot mow weeds at a height of six inches. If there is enough material for a prescribed burn, this may be an effective method to control weeds.

Nutrients

Lime and fertilizer are usually not required for establishment of native grasses and forbs.

Use of Pesticides

Only those pesticides which are labeled for the specific use will be recommended. University and Extension publications and specific label instructions will be used for guidance on herbicide selection and use.

Operation and Maintenance

Operation and maintenance will include but not be limited to the following:

1. Control annual weeds and other competition the year of establishment, with early and timely clipping before seed heads appear, or timely application of herbicides.

2. Prevent unmanaged disturbance of the planting.
3. After the seeding is established control all noxious weeds as identified by state and local laws, by: (a) treating with chemicals per label directions, or (b) spot mow before seed heads form. When possible delay use of control measures until after August 1st to protect nesting wildlife.
4. Re-seed any areas that do not have adequate permanent cover.
5. Do not use the area for field borders, roads or other uses that will damage or destroy the cover.
6. Manage grasses and forbs periodically to rejuvenate grass quality and vigor. Management should occur within 4-5 years of adequate vegetative establishment. Refer to practice 647 - Early Successional Habitat Management for recommendations. Management activities must take place prior to May 15 or between August 1 and September 1. No more than 50% of the field may be manipulated in a given year.
7. Prevent animal damage and browse by rodents, mice, rabbits, deer, gophers and other wildlife which adversely affect woody vegetative cover.
8. Replace dead trees and shrubs as necessary, and control undesirable vegetative competition to promote a fully functional tree planting. Control weed and grass competition around trees and shrubs for a minimum of 2 to 4 feet using cultivation, mulch, or chemical control measures. Mechanical cultivation needs to be kept shallow to avoid damaging tree and shrub root systems.
9. Under dry conditions consider supplemental watering. Young shrub seedlings require extra water until roots fully develop. When you water give each tree 5-15 gallons of water.

RECOMMENDED FORB SPECIES		Value to Pollinators	Flowering Season Early = April – June Mid = June – August Late = August - October
DRY			
Bush Clover	(Lespedeza capitata)	G	July - August
Dotted Blazingstar	(Liatris punctata)	EX	July - September
Purple Coneflower	(Echinacea angustifolia)	EX	June - July
Showy Penstemon	(Penstemon grandifloris)	G	May - June
Silky Aster	(Aster sericeus)	EX	August - October
DRY to MESIC			
Butterfly Weed	(Asclepias tuberosa)	EX	June - August
Hoary Vervain	(Verbena stricta)	G	July - September
Leadplant	(Amorpha canescens)	EX	July - September
Prairie Smoke	(Geum triflorum)	G	May - June
Rough Blazingstar	(Liatris aspera)	EX	July - September
Showy Goldenrod	(Solidago speciosa)	G	August - September
Smooth Aster	(Aster laevis)	EX	August - October
Stiff Tickseed	(Coreopsis palmata)	EX	July - August
MESIC to WET			
Canada Tick Trefoil	(Desmodium canadense)	G	July - August
Common Ox-eye	(Heliopsis helianthoides)	EX	June - August
Giant Sunflower	(Helianthus giganteus)	EX	July - October
Partridge Pea	(Chamaecrista fasticulata)	EX	July - September
Tall Blazingstar	(Liatris pycnostachya)	EX	July - September
Wild Bergamot	(Monarda fistulosa)	EX	July - August
Yellow Coneflower	(Ratibida pinnata)	EX	July - September
WET			
Blue Vervain	(Verbena hastata)	G	July - September
Boneset	(Eupatorium perfoliatum)	EX	August - September
Joe-pye Weed	(Eupatorium maculatum)	G	July - September
New England Aster	(Aster novae-angliae)	G	September - October
Panicled Aster	(Aster lanceolatus)	EX	August - October
Swamp Milkweed	(Asclepias incarnata)	EX	June - July
DRY to WET			
Black-eyed Susan	(Rudbeckia hirta)	EX	July - October
Illinois Bundleflower	(Desmanthus illinoensis)	G	June - August
Purple Prairie Clover	(Dalea purpurea)	EX	July - August
Maximillian Sunflower	(Helianthus maximiliani)	EX	July - October
Stiff Goldenrod	(Solidago rigida)	EX	August - September
Yarrow	(Achillea millefolium)	EX	June - September
RECOMMENDED WOODY SPECIES		Value to Pollinators	Flowering Season
American Plum	(Prunus americana)	EX	April - May
Chokecherry	(Prunus virginiana)	EX	April - May
Dogwoods	(Cornus spp)	EX	May - July
High-bush Cranberry	(Viburnum trilobum)	EX	May - June
Nannyberry	(Viburnum lentago)	EX	May - June
Serviceberry	(Amelanchier alnifolia)	EX	May - June
Wild Rose	(Rosa spp)	EX	June - July

PLANT LIST

DESIGN AREA: ROSE ANNA PARK		PLANTING AREA (SQ. FT.): 1,500		
Plant Source	Common Name	Scientific Name	Plant Type	# of Packs
	Slender wheatgrass	Agropyron trachycaulum	6- pack	3
	Big bluestem	Andropogon gerardii	6- pack	3
	New England aster*	Aster novae-angliae	6- pack	2
	Fringed brome	Bromus ciliatus	6- pack	3
	Canada tick trefoil*	Desmodium canadense	6- pack	3
	Bottlebrush grass	Elymus hystrix	6- pack	2
	Joe-Pye weed*	Eupatorium maculatum	6- pack	2
	Boneset*	Eupatorium perfoliatum	6- pack	2
	Giant sunflower*	Helianthus giganteus	6- pack	2
	Ox-eye sunflower*	Heliopsis helianthoides	6- pack	2
	Maximillian sunflower*	Helianthus maximiliani	6- pack	2
	Tall blazing star*	Liatris pycnostachya	6- pack	2
	Wild bergamot*	Monarda fistulosa	6- pack	3
	Yellow coneflower*	Ratibida pinnata	6- pack	2
	Black-eyed susan*	Rudbeckia hirta	6- pack	3
	Stiff goldenrod*	Solidago rigida	6- pack	3
TOTALS				33

* USDA Recommended pollinator plant

DESIGN AREA: ST REGIS PARK		PLANTING AREA (SQ. FT.): 3,330		
Plant Source	Common Name	Scientific Name	Plant Type	# of Packs
	Swamp milkweed*	Asclepias incarnata	6-pack	4
	New England aster*	Aster novae-angiae	6-pack	4
	Panicled aster*	Aster lanceolatus	6-pack	4
	Purple prairie clover*	Dalea purpurea	6-pack	4
	Canada tick trefoil*	Desmodium canadense	6-pack	4
	Ox-eye sunflower*	Heliopsis helianthoides	6-pack	4
	Giant sunflower*	Helianthus gigantus	6-pack	4
	Maximilian sunflower*	Helianthus maximilian	6-pack	4
	Tall blazing star*	Liatris pycnostachya	6-pack	4
	Wild bergamot*	Monarda fistulosa	6-pack	4
	Switchgrass	Panicum virgatum	6-pack	4
	Yellow coneflower*	Ratibida pinnata	6-pack	4
	Black-eyed susan*	Rudbeckia hirta	6-pack	4
	Little bluestem	Schizachyrium scoparium	6-pack	4
	Woolgrass	Scripus cyperinus	6-pack	4
	Stiff goldenrod*	Solidago rigida	6-pack	4
	Indian grass	Sorghastrum nutans	6-pack	4
	Prairie dropseed	Sporobolus heterolepis	6-pack	4
TOTALS				72

* USDA Recommended pollinator plant

Task	No. hrs.	No. person(s)	Coordinator	Supervisor	Timeline																											
					2007										2008										2009							
					F	M	A	M	J	J	A	S	O	F	M	A	M	J	J	A	S	O	F	M	A	M	J	J	A	S	O	
Order seed, plugs	1	1	William Mayland	NA	▶																											
Organize & contact installation team	2	1	William Mayland	NA	▶	▶																										
Site preparation	variable	2	William Mayland				▶	▶																								
Seed grass and wildflower mix	1	2	NA	Annie Felix				▶	▶																							
Install plugs	4	2	NA	Annie Felix				▶	▶																							
Watering	1	1	William Mayland	Annie Felix				▶	▶	▶	▶	▶	▶			▶	▶	▶	▶	▶	▶											
Labeling	1	2	Annie Felix	Annie Felix				▶																								
Maintenance	variable	2	William Mayland	Annie Felix				▶	▶	▶	▶	▶	▶			▶	▶	▶	▶	▶	▶				▶	▶	▶	▶	▶			

Materials Cost Estimate

Project Name:	St. Regis Park	TOTAL	\$626.00
		6.5% TAX	\$40.69
		15% Contingency	\$100.00
PROJECT TOTAL			\$766.69

NATIVE SEED

TYPE	SQ FT	Total Cost
Shoreline grass seed mix	3,300	\$72.50
Shoreline wildflower seed mix	3,300	\$13.50

NATIVE PLUGS

Spacing Factors						
Spacing	6"	12"	18"	24"	30"	36"
Factors	4.5	1.1	0.5	0.29	0.18	0.13

Sq Ft	Spacing factor	No. plants needed	Pack Type	# of Packs	Cost/Pack	Total Cost
3,300	0.13	430	6-pack	72	\$7.50	\$540.00
TOTAL						\$626.00

OTHER MATERIALS

Item	Qty	Unit	Unit Cost	Total Cost
Split rail fencing				To be determined
Signage				To be determined

Materials Cost Estimate

Project Name:	Rose Anna Park	TOTAL	\$285.50
		6.5% TAX	\$18.56
		15% Contingency	\$45.61
PROJECT TOTAL			\$349.67

NATIVE SEED

TYPE	SQ FT	Total Cost
Shoreline grass seed mix	1,500	\$34.00
Shoreline wildflower seed mix	1,500	\$4.00

NATIVE PLUGS

Spacing Factors						
Spacing	6"	12"	18"	24"	30"	36"
Factors	4.5	1.1	0.5	0.29	0.18	0.13

Sq Ft	Spacing factor	No. plants needed	Pack Type	# of Packs	Cost/Pack	Total Cost
1,500	0.13	195	6-pack	33	\$7.50	\$247.50
TOTAL						\$285.50

OTHER MATERIALS

Item	Qty	Unit	Unit Cost	Total Cost
Split rail fencing				To be determined
Signage				To be determined