

Monitoring Plan Project Performance Criteria and Related Monitoring Methods

Introduction

This Monitoring Plan for the East Timbalier Island Planting Project was developed to allow an objective assessment of project progress towards pre-determined performance standards. Monitoring is an important part of the restoration process, and is required to document restoration effectiveness pursuant to NOAA's Final Rule (15 CFR Part 990). The remaining sections of this monitoring plan describe performance criteria and monitoring methods.

The performance criteria are specified as (1) percent survival of each of the two species, *Spartina alterniflora* (smooth cordgrass) and *Spartina patens* (marshhay cordgrass) in the planted strips after 60 days, and (2) percent cover achieved at the end of year three of the project (interim monitoring will be conducted at years 1 and 2, but is not subject to performance criteria). Cover requirements are specified for each of two species, *S. alterniflora* and *S. patens*, and two areas, planted strips and gap areas where vegetative spread is expected. The gap area is a five-foot area on the landward side of the *S. alterniflora* planted strip and a three-foot area on each side of the *S. patens* planted strips (see Figure 1 and Figure 2, provided for illustrative purposes.)

Monitoring activities that will be undertaken are presented in Table 1.

Table 1: Project Monitoring

Monitoring Event	Activity		Performance	
	Aerial* Photographs	Ground Photographs	Percent Survival Estimate	Percent Cover Estimate
60 day		✓	✓	
1 and 2 years		✓		✓
3 years	✓	✓		✓

*Aerial photographs will only be required if air photo interpretation is used to estimate percent cover.

The performance criteria by species and area are summarized in Table 2.

Table 2: Performance Criteria

Time Period	Performance Criteria	
60 day		
<i>S. alterniflora</i>	50% survival	
<i>S. patens</i>	50% survival	
3 years	Strip	Gap
<i>S. alterniflora</i>	Minimum of 50% cover; 80% average cover**	Minimum of 25% cover; 45% average cover**
<i>S. patens</i>	Minimum of 30% cover; 50% average cover**	Minimum of 15% cover; 25% average cover**

** Average cover is calculated as the number of equivalent acres tallied divided by the acres required for each category. Calculations are shown below.

60-Day Monitoring Event: Measurement of Percent Survival

The first project monitoring will occur approximately 60 days following the completion of planting. During the preparation of an as-planted survey to document the location of all plantings, the planted strips will be divided into multiple parcels approximately one acre in size. There will be two types of parcels: *S. alterniflora* in planted strips and *S. patens* in planted strips. Percent survival will be visually estimated for each parcel by a team composed of Trustee and Equilon representatives. If the team cannot agree on a visual percent survival estimate, one randomly selected location in the parcel will be sampled. At that location, the number of live and dead (or missing) plants will be counted within a 40-foot length of strip. If any member of the team is still not satisfied with the percent survival estimate, two more randomly selected locations will be sampled and all three estimates will be averaged to obtain the percent survival estimate for that parcel. The three randomly selected locations will be shown on the as-planted survey.

A minimum of ten fixed photo-monitoring stations will be established in areas of interest across the platform as approved by the Project Manager. Ground level photographs will be taken from each of the fixed photo-monitoring stations during the interim and final monitoring events to document general site conditions over time at the same location and vantagepoint. Additional monitoring stations may be established during subsequent monitoring efforts, if warranted. Ground level photographs will also be taken as needed in other locations to document specific site conditions such as erosion, breaching, and plant mortality. The fixed photo-monitoring stations will be marked using PVC pipe driven at least 3 feet below the surface. Differential GPS coordinates will be recorded for each station.

Interim Monitoring

Interim monitoring will be done in years one and two. The purpose of interim monitoring is to assess project performance and to identify areas on the platform that may require corrective actions to ensure project success by the end of year three. A site visit to examine the planted parcels will be arranged for each interim-monitoring event at year one and year two. Planted areas where vegetative survival and spread do not appear sufficient for the area to meet performance standards in year three will be recorded. Photographs will be taken of key areas approved by the Project Manager within the project area. Transects and/or photographs (land based or aerial) or visual estimates will be used to estimate percent cover in the parcels. A summary of findings and recommendations associated with the interim observations will be provided to the Trustees. Based on interim monitoring results and discussions with the Project Manager, monitoring methods associated with the three-year assessment may be adjusted to take advantage of the best approaches developed during the interim monitoring efforts.

Third Year Monitoring Event: Measurement of Percent Cover

The purpose of monitoring after three years is to determine if the project has reached the three-year criteria stated in Table 2 above. Percent cover is used as the criteria for success. In addition to the strip *S. alterniflora* and *S. patens* parcels, two additional parcel types (approximately one acre in size) will be defined: *S. alterniflora* in gaps and *S. patens* in gaps. Each of the four different types of parcels will have its own performance criteria (Table 2). The number of parcels of each type and the location of each parcel will be included on the as-planted survey.

Either of two different methods for determining percent cover in the individual parcels will be used. The traditional ground-based point-line intercept method could be cumbersome to apply and provides lower resolution for determining where plant performance problems exist. Air photo interpretation with ground truthing provides more precise data about the location of performance problems, but the Trustees feel that the method needs to be demonstrated as adequate for this specific application. Either method may prove acceptable after reviewing the year 1 and year 2 performance information. Equilon shall recommend either the air photo interpretation or the ground based point-line intercept method to determine percent cover in the parcels.

After reviewing the year one and year two performance information, the Project Manager with concurrence of Trustees, will notify Equilon of the acceptable method. A general description of the two methods is presented below.

Air photo interpretation

Computer photo interpretation of aerial photographs may be used to determine percent cover in each parcel on the platform. A general description of the method can be found in Lilles and Kiefer (1994). The computer analysis will be calibrated by taking ground measurements of percent cover either immediately before or immediately after the aerial photographs are made. Overflights will not occur more than ten days prior to ground truthing. In the event that the overflight is not done at the same time or prior to ground truthing, it should be done as soon as possible afterwards, as allowed by the weather conditions.

Color infrared photographs will be digitized such that each pixel on the image will represent a small area of the platform. The specifications of the aerial photography must be approved by the Project Manager to assure an appropriate scale and coverage. The photographs will be imported into an image processing software program that can analyze the number of pixels by color.

Estimates of percent cover using ground transect measurements (as described below) will be made at approximately 15 selected locations (transects) to calibrate the computer analysis. Areas selected for calibration will represent the range of percent cover in the planted areas and the gap areas for both species. Areas on the ground will be located using a differential GPS receiver capable of one meter accuracy and the percent cover determined at these locations as described below. Percent cover will be computed in areas where the cover is fairly uniform so that minor differences between the area sampled on the ground and the area sampled from the photos will be inconsequential. The measurement of percent cover on the 15 ground transects will be compared to the calculation of percent cover from the geo-referenced aerial photographs and a

correction factor applied to the computer determined values. These corrected values from the aerial photographs will be used to assign percent cover classes to all parcels of the platform.

Ground-Based Point-line Intercept Method

On the ground, percent cover will be estimated using the point-line intercept method (Bonham 1989). Each transect will be defined by a tape measure drawn taut between two stakes at the endpoints of the transect. At six-inch intervals along the tape measure, a wire pin or wooden dowel will be lowered perpendicular to the ground through a wooden frame. If the pin intercepts plant material (leaves or stems), a "hit" will be recorded along with the plant species. If no plants are intercepted, a "miss" will be recorded. Percent cover will then be estimated by the following formula:

$$\text{Percent cover} = (\text{sum of hits}/\text{total number of possible hits}) * 100$$

The percent cover in each parcel will be obtained by averaging the percent cover estimate for all the transects in each parcel.

Initially percent cover will be estimated for a maximum of 6 randomly located transects per acre. This level of effort will provide a 95% confidence interval of +/- 8% cover if the sample variance is equal to the variance in data contained in Hester and Mendelsohn (1992). After each day of sampling, cover estimates for all transects sampled will be used to calculate a new level of sampling effort so that a 95% confidence interval of +/- 8% is maintained. In order to maintain a reasonable sampling effort a maximum of 8 transects per acre will be sampled.

Percent Cover Computation

In order to standardize the units for each separate type of parcel, the percent cover computation will take place on an equivalent-acres basis. That is, the number of acres at 100% cover that would be equivalent to the required number of acres at the required percent cover will be calculated. For example, a hypothetical performance criteria for *S. alterniflora* of 6 acres at 80% cover would be equivalent to 4.8 acres at 100% cover (6 acres X 0.8 = 4.8). The equivalent acre requirements for each category of parcel will be calculated separately.

The number of acres of each parcel type that would be required if the preliminary planting plan (see the Assessment and Restoration Plan) were implemented is presented in Table 3. The performance criteria and the calculated equivalent acres are also shown. Table 4 shows the same information but shows the division of the total acreage into separate parcels and an alternative way to calculate the total equivalent acres required. The actual number of acres in each category is likely to change in accordance with the as-planted survey. These calculations are shown for illustration purposes only.

Table 3: Example Planting Project with Calculation of Equivalent Acres

Parcel Category	Required Acres	Performance Criteria	Equivalent Acres (acres x criteria)
<i>S. alterniflora</i> strips	11.7	80%	9.36
<i>S. alterniflora</i> gaps	1.7	45%	0.77
<i>S. patens</i> strips	6.9	50%	3.45
<i>S. patens</i> gaps	2.3	25%	0.58

In order to meet the performance criteria, Equilon must show that:

1. Sufficient acres above the minimum percent cover are credited to each parcel category so that the total equals or exceeds the required number of acres within a category (e.g., 11.7 acres for *Spartina alterniflora* strips in Table 3); and
2. The total equivalent acres (based on the performance criteria) required for each parcel category (e.g., 9.36 acres for *Spartina alterniflora* strips in Table 3) have been generated by the project.

Any parcel with a percent cover less than the minimum level will not count towards fulfilling the total number of required acres for that category. In addition, in the calculation of equivalent acres, parcels with a percent cover less than the minimum level will contribute zero equivalent acres for that category. The minimum percent cover requirements which differ for each parcel category are:

- *S. alterniflora* in strips = 50%
- *S. alterniflora* in gaps = 25%
- *S. patens* in strips = 30%
- *S. patens* in gaps = 15%

The equivalent acres can be accumulated in three areas: (1) the planted strip; (2) the associated acres of gap area; or (3) any additional contingency acres planted beyond those required for the restoration project. To calculate the number of equivalent acres generated by the project, each separate one acre parcel is assigned a percent cover rating during the three year monitoring event. The number of equivalent acres contributed by each parcel is then calculated. For example, a one acre parcel at 60% cover generates 0.6 equivalent acres. The equivalent acres for all the separate parcels within a parcel category are then summed to calculate the total number of equivalent acres generated within each parcel category.

For assessment of project performance, substitution between strip and gap parcels and between species is permitted. Parcels that do not meet the minimum requirements for a category can be used to meet the requirements in a category where minimum cover requirements are met. For example, a *S. alterniflora* strip parcel with a measured percent cover of 30% would not meet the minimum cover requirement for a *S. alterniflora* strip but could be counted as a *S. alterniflora* gap parcel. Contingency acres can be used to satisfy any parcel category provided that the contingency parcel meets the minimum cover for its own parcel category. In other words, the

only parcels that can be used to meet the requirements for a parcel category are those that meet the minimum percent cover for that parcel category or contingency parcels that meet the minimum percent cover for their own parcel category. Any parcel used to calculate the number of equivalent acres in each parcel category would also be used to calculate the number of acceptable acres generated. The minimum number of acceptable acres for each parcel category is determined from the as-planted plan and is equal to the number of required acres planted plus the gap areas generated.

An example is provided to clarify the process. Table 5 shows the hypothetical results of monitoring the project outlined in Table 3. Notice that additional contingency acres of *Spartina patens* were planted and the resulting gap areas were also monitored. Table 6 shows how the performance of each separate parcel category would be accounted for and how successful performance would be established.

Excused Performance

The assessment of project performance will be conducted separately for excused performance planted acres (EPPAs) that are planted as a result of an excused performance, if these acres are required to meet the overall goals of the project. The EPPAs will be subject to the following pro-rated performance criteria at the time of the assessment of the project performance:

- *Spartina patens* EPPAs that have been growing for one-year will be required to have a percent cover of 10%;
- *Spartina alterniflora* EPPAs growing for one-year will be required to have a percent cover of 17%;
- *Spartina patens* EPPAs that have been growing for two-years will be required to have a percent cover of 20%;
- *Spartina alterniflora* EPPAs growing for two-years will be required to have a percent cover of 34%;
- Gap EPPAs for *S. alterniflora* and *S. patens* plantings will be required to meet the same minimum % cover requirements as the gap areas associated with the initial plantings (25% for *S. alterniflora* and 15% for *S. patens*).

If the above performance criteria are met for any EPPAs, then these acres will be considered as satisfying the requirements for inclusion as acceptable acres towards meeting the overall acreage and cover requirements of the project.

Table 7 is a hypothetical example of the monitoring results at year 3 when performance has been excused as a result of a named storm in year 1. Approximately 34% of the plantings were lost. The Trustees agreed to replanting rather than stabilizing the platform. In this example, when replanting was done it was not possible to replant all of the *S. alterniflora* that was lost. Under the replanting plan approved by the Project Manager, some of the lost acres were replanted as *S. patens*. Table 7 reflects the project performance for this example. Table 8 gives the accounting matrix for calculating project performance when replanting has been done.

If an excused performance plan does not require replanting or includes platform stabilization in lieu of replanting lost acres, the minimum number of equivalent acres and the minimum number of successful acres required to meet performance objectives will be reduced. The new criteria will be based on the percent cover and successful acre objectives on the unaffected portion of the platform. See Table 9 for an example of calculations used when platform stabilization is used to satisfy excused performance requirements.

Erosion

Erosion could result in part of a parcel being completely washed away while the remainder of the parcel, if considered separately, would meet the minimum performance requirements. Any parcel exhibiting erosion could be counted in either of two ways. The entire parcel can be counted at a lower density or only the portion of the parcel remaining can be counted at the higher density. For example, consider the situation where half of a one acre parcel is eroded away and the remaining half is at 100% cover. The parcel could be counted as 1 acre at 50% cover or 0.5 acres at 100% cover. The number of equivalent acres is the same but the total number of acceptable acres achieved differs.

Literature Cited

Bonham, C.D. 1989. *Measurements for Terrestrial Vegetation*. John Wiley & Sons, Publ. 338 pp.

Hester, M.W. and I.A. Mendelssohn. 1992. *Barrier Island Vegetation Dynamics: Stabilization and Maintenance Projects on Timbalier Island*. Prepared for Texaco, USA, New Orleans Operations Division. 61 pp.

Lillesand, T.M. And Kiefer, R.W. 1994. *Remote Sensing and Image Interpretation*. John Wiley and Sons, Inc, Publ. 750 pp.

Figure 1: East Timbalier Island Planting Project

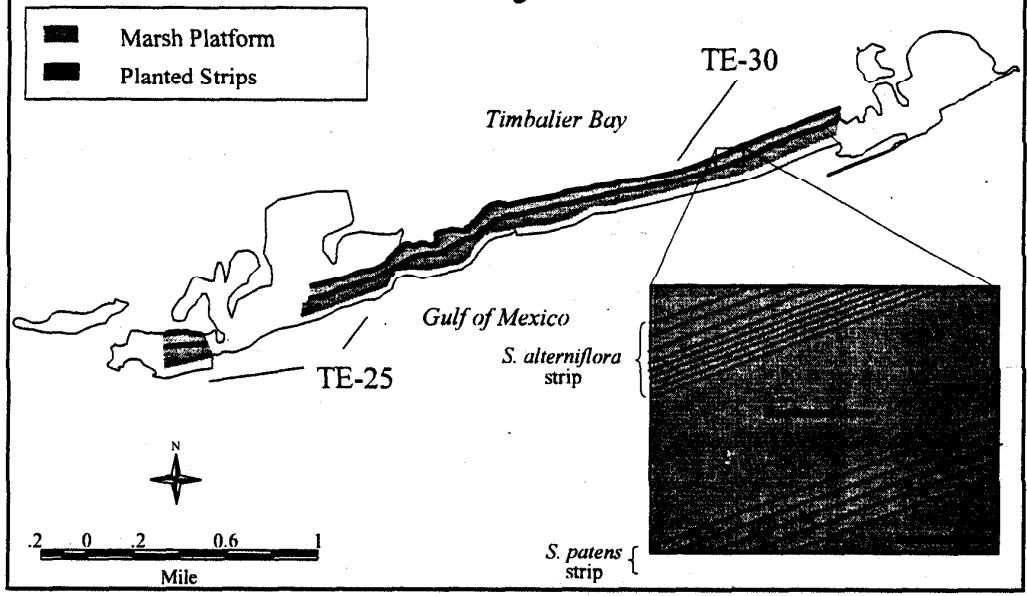


Figure 2: Example of the Sampling Design For the Third Year Monitoring Event

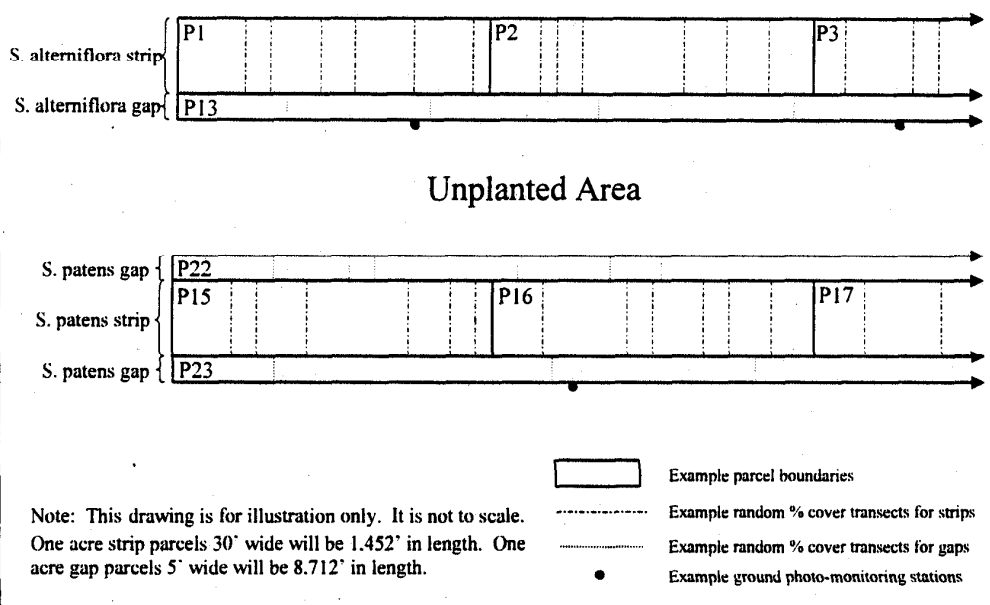


Table 4
Example Initial Planting Design: Year Three Performance Objectives

4a. <i>S. alterniflora</i> strip				
Parcel Number	Parcel Category	Original Parcel Size	Percent Cover Objective	Equivalent Acres
1	<i>S. alterniflora strip</i>	1acre	80	0.8
2	<i>S. alterniflora strip</i>	1acre	80	0.8
3	<i>S. alterniflora strip</i>	1acre	80	0.8
4	<i>S. alterniflora strip</i>	1acre	80	0.8
5	<i>S. alterniflora strip</i>	1acre	80	0.8
6	<i>S. alterniflora strip</i>	1acre	80	0.8
7	<i>S. alterniflora strip</i>	1acre	80	0.8
8	<i>S. alterniflora strip</i>	1acre	80	0.8
9	<i>S. alterniflora strip</i>	1acre	80	0.8
10	<i>S. alterniflora strip</i>	1acre	80	0.8
11	<i>S. alterniflora strip</i>	1acre	80	0.8
12	<i>S. alterniflora strip</i>	0.7 acre	80	0.56
TOTAL		11.7		9.36

4b. <i>S. alterniflora</i> gap				
Parcel Number	Parcel Category	Original Parcel Size	Percent Cover Objective	Equivalent Acres
13	<i>S. alterniflora gap</i>	1acre	45	0.45
14	<i>S. alterniflora gap</i>	0.7 acre	45	0.32
TOTAL		1.7		0.77

4c. <i>S. patens</i> strip				
Parcel Number	Parcel Category	Original Parcel Size	Percent Cover Objective	Equivalent Acres
15	<i>S. patens strip</i>	1acre	50	0.5
16	<i>S. patens strip</i>	1acre	50	0.5
17	<i>S. patens strip</i>	1acre	50	0.5
18	<i>S. patens strip</i>	1acre	50	0.5
19	<i>S. patens strip</i>	1acre	50	0.5
20	<i>S. patens strip</i>	1acre	50	0.5
21	<i>S. patens strip</i>	0.9 acre	50	0.45
TOTAL		6.9		3.45

4d. <i>S. patens</i> gap				
Parcel Number	Parcel Category	Original Parcel Size	Percent Cover Objective	Equivalent Acres
22	<i>S. patens gap</i>	1acre	25	0.25
23	<i>S. patens gap</i>	1acre	25	0.25
24	<i>S. patens gap</i>	0.3 acres	25	0.075
TOTAL		2.3		0.575

Table 5

Example Initial Planting Design: Year Three Results Summary Sheet - No Excused Performance

5a. <i>S. alterniflora</i> strip					
Parcel Number	Parcel Category	Original Parcel Size, acres	Remaining Parcel Size, acres	Percent Cover Over Remaining Area	Equivalent Acres
1	<i>S. alterniflora</i> strip	1	1	70	0.70
2	<i>S. alterniflora</i> strip	1	1	80	0.80
3	<i>S. alterniflora</i> strip	1	0.5	80	0.40
4	<i>S. alterniflora</i> strip	1	0.9	65	0.59
5	<i>S. alterniflora</i> strip	1	1	45	0.00
6	<i>S. alterniflora</i> strip	1	0	0	0.00
7	<i>S. alterniflora</i> strip	1	1	90	0.90
8	<i>S. alterniflora</i> strip	1	0.8	85	0.68
9	<i>S. alterniflora</i> strip	1	1	75	0.75
10	<i>S. alterniflora</i> strip	1	1	80	0.80
11	<i>S. alterniflora</i> strip	1	0.75	95	0.71
12	<i>S. alterniflora</i> strip	0.7	0.5	80	0.40
totals		11.7	9.45		6.73

Eq acres deficit= 2.63

5b. <i>S. alterniflora</i> gap					
Parcel Number	Parcel Category	Original Parcel Size	Remaining Parcel Size	Percent Cover Over Remaining Area	Equivalent Acres
13	<i>S. alterniflora</i> gap	1	0.8	60	0.48
14	<i>S. alterniflora</i> gap	0.7	0.65	50	0.33
totals		1.7	1.45		0.81

5c. <i>S. patens</i> strip					
Parcel Number	Parcel Category	Original Parcel Size, acres	Remaining Parcel Size, acres	Percent Cover Over Remaining Area	Equivalent Acres
15	<i>S. patens</i> strip	1	1	60	0.60
16	<i>S. patens</i> strip	1	1	30	0.30
17	<i>S. patens</i> strip	1	1	25	0.00
18	<i>S. patens</i> strip	1	0.9	65	0.59
19	<i>S. patens</i> strip	1	1	50	0.50
20	<i>S. patens</i> strip	1	1	45	0.45
21	<i>S. patens</i> strip	0.9	0.9	60	0.54
totals		6.9	6.8		2.98

Eq acres deficit= 0.47

5d. <i>S. patens</i> gap					
Parcel Number	Parcel Category	Original Parcel Size	Remaining Parcel Size	Percent Cover Over Remaining Area	Equivalent Acres
22	<i>S. patens</i> gap	1	1	35	0.35
23	<i>S. patens</i> gap	1	0.9	45	0.41
24	<i>S. patens</i> gap	0.3	0.3	20	0.06
totals		2.3	2.2		0.82

5e. Contingency Planting					
Parcel Number	Parcel Category	Original Parcel Size, acres	Remaining Parcel Size	Percent Cover	Equivalent Acres
25	<i>S. patens</i> strip	1	1	35	0.35
26	<i>S. patens</i> strip	1	1	40	0.40
27	<i>S. patens</i> gap	1	1	30	0.30
28	<i>S. patens</i> strip	1	0.9	60	0.54
29	<i>S. patens</i> strip	1	1	50	0.50
30	<i>S. patens</i> gap	1	1	20	0.20
31	<i>S. patens</i> strip	1	1	40	0.40
totals		7	6.9		2.69

Table 6
Accounting Matrix - No Excused Performance - Year 3 Monitoring

6a. <i>S. alterniflora</i> strip								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres Achieved	Counted acres	Equivalent Acres Required	Comments
<i>S. alterniflora strip</i>	1	1acre	1	70	0.70	1		
<i>S. alterniflora strip</i>	2	1acre	1	80	0.80	1		
<i>S. alterniflora strip</i>	3	1acre	0.5	80	0.40	0.5*		adjusted for erosion
<i>S. alterniflora strip</i>	4	1acre	0.9	65	0.59	1		
<i>S. alterniflora gap</i>	13	1acre	0.8	60	0.48	0.8		Replaces parcel 5
<i>S. patens strip (contingency)</i>	25	1 acre	1	35	0.35	1		Replaces parcel 6
<i>S. alterniflora strip</i>	7	1acre	1	90	0.90	1		
<i>S. patens strip</i>	15	1acre	1	60	0.60	1		Replaces parcel 8
<i>S. alterniflora strip</i>	9	1acre	1	75	0.75	1		
<i>S. alterniflora strip</i>	10	1acre	1	80	0.80	1		
<i>S. alterniflora strip</i>	11	1acre	0.75	95	0.71	1		
<i>S. alterniflora strip</i>	12	0.7 acre	0.5	80	0.40	0.7		
<i>S. patens strip (contingency)</i>	28	1 acre	1	60	0.60	1		add on for perf.crit.
<i>S. patens strip (contingency)</i>	26	1 acre	1	40	0.40	1		add on for perf.crit.
<i>S. patens strip (contingency)</i>	29	1 acre	1	50	0.50	1		add on for perf.crit.
<i>S. patens strip (contingency)</i>	31	1 acre	1	40	0.40	1		add on for perf.crit.
Totals					9.38	14.5	9.36	

6b. <i>S. alterniflora</i> gap								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres	Counted acres	Equivalent Acres Required	Comments
<i>S. alterniflora strip</i>	5	1acre	1	45	0.45	1		Replaces parcel 13
<i>S. alterniflora gap</i>	14	0.7 acre	0.65	50	0.33	0.7		
Totals					0.78	1.7	0.77	

6c. <i>S. patens</i> strip								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres	Counted acres	Equivalent Acres Required	Comments
<i>S. alterniflora strip</i>	8	1acre	0.8	85	0.68	1		Replaces parcel 15
<i>S. patens strip</i>	16	1acre	1	30	0.30	1		
<i>S. patens gap</i>	23	1acre	0.9	45	0.41	1		Replaces parcel 17
<i>S. patens strip</i>	18	1acre	0.9	65	0.59	1		
<i>S. patens strip</i>	19	1acre	1	50	0.50	1		
<i>S. patens strip</i>	20	1acre	1	45	0.45	1		
<i>S. patens strip</i>	21	0.9 acre	0.9	60	0.54	0.9		
Totals					3.46	6.9	3.45	

6d. <i>S. patens</i> gap								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres	Counted acres	Equivalent Acres Required	Comments
<i>S. patens gap</i>	22	1acre	1	35	0.35	1		
<i>S. patens strip</i>	17	1acre	1	25	0.25	1		Replaces parcel 23
<i>S. patens gap</i>	24	0.3 acres	0.3	20	0.06	0.3		
					0.66	2.3	0.58	

6e. Unused Parcels					
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres
<i>S. patens gap</i>	27	1 acre	1	30	0.30
<i>S. patens gap</i>	30	1 acre	1	20	0.20
<i>S. alterniflora strip</i>	6	1 acre	0	0	0.00

* Note: This parcel would have been considered unsuccessful if erosion were not considered because the percent cover calculated over the entire one acre parcel (original size) would have been 37.5 %.

Table 7
Example Performance: Year Three Results Summary Sheet - Excused Performance

7a. <i>S. alterniflora</i> strip						
Parcel Number	Parcel Category	Original Parcel Size, acres	Remaining Parcel Size, acres	Percent Cover Over Remaining Area	Equivalent Acres	Excused Acres
1*	<i>S. alterniflora</i> strip	1	0	0	0.00	1
2*	<i>S. alterniflora</i> strip	1	0	0	0.00	1
3*	<i>S. alterniflora</i> strip	1	0.5	80	0.40	0.5
4	<i>S. alterniflora</i> strip	1	0.9	65	0.59	0
5*	<i>S. alterniflora</i> strip	1	0	0	0.00	1
6*	<i>S. alterniflora</i> strip	1	0	0	0.00	1
7*	<i>S. alterniflora</i> strip	1	0	0	0.00	1
8	<i>S. alterniflora</i> strip	1	0.8	85	0.68	0
9*	<i>S. alterniflora</i> strip	1	0	0	0.00	1
10	<i>S. alterniflora</i> strip	1	1	80	0.80	0
11	<i>S. alterniflora</i> strip	1	0.75	95	0.71	0
12*	<i>S. alterniflora</i> strip	0.7	0.5	80	0.40	0.2
	totals	11.7	4.45		3.58	6.70
				Eq acres deficit=	5.78	

7b. <i>S. alterniflora</i> gap						
Parcel Number	Parcel Category	Original Parcel Size	Remaining Parcel Size	Percent Cover Over Remaining Area	Equivalent Acres	Excused Acres
13	<i>S. alterniflora</i> gap	1	0	0	0.00	1
14	<i>S. alterniflora</i> gap	0.7	0.65	50	0.33	
	totals	1.7	0.65		0.33	1.00

7c. <i>S. patens</i> strip					
Parcel Number	Parcel Category	Original Parcel Size, acres	Remaining Parcel Size, acres	Percent Cover Over Remaining Area	Equivalent Acres
15	<i>S. patens</i> strip	1	1	60	0.60
16	<i>S. patens</i> strip	1	1	30	0.30
17	<i>S. patens</i> strip	1	1	25	0.00
18	<i>S. patens</i> strip	1	0.9	65	0.59
19	<i>S. patens</i> strip	1	1	50	0.50
20	<i>S. patens</i> strip	1	1	45	0.45
21	<i>S. patens</i> strip	0.9	0.9	60	0.54
	totals	6.9	6.8		2.98
				Eq acres deficit=	0.47

7d. <i>S. patens</i> gap					
Parcel Number	Parcel Category	Original Parcel Size	Remaining Parcel Size	Percent Cover Over Remaining Area	Equivalent Acres
22	<i>S. patens</i> gap	1	1	35	0.35
23	<i>S. patens</i> gap	1	0.9	45	0.41
24	<i>S. patens</i> gap	0.3	0.3	20	0.06
	totals	2.3	2.2		0.82

7e. Contingency Planting					
Parcel Number	Parcel Category	Original Parcel Size, acres	Remaining Parcel Size	Percent Cover	Equivalent Acres
25	<i>S. patens</i> strip	1	1	35	0.35
26	<i>S. patens</i> strip	1	1	40	0.40
27	<i>S. patens</i> gap	1	1	30	0.30
28	<i>S. patens</i> strip	1	0.9	60	0.54
29	<i>S. patens</i> strip	1	1	50	0.50
30	<i>S. patens</i> gap	1	1	20	0.20
31	<i>S. patens</i> strip	1	1	40	0.40
	totals	7	6.9		2.89

7f. Excused Performance Replanting					
Parcel Number	Replant Category	Replanted Acres	Replanted Percent Cover	Equivalent Acres	Year excused
32	<i>S. alterniflora</i> strip	1	0.45	0.45	1
33	<i>S. alterniflora</i> strip	1	0.35	0.35	1
34	<i>S. alterniflora</i> strip	0.5	0.4	0.20	1
35	<i>S. patens</i> strip	1	0.6	0.60	1
36	<i>S. patens</i> strip	1	0.4	0.40	1
37	<i>S. patens</i> strip	1	0.3	0.30	1
38	<i>S. patens</i> strip	1	0.5	0.50	1
39a	<i>S. patens</i> strip	0.2	0.6	0.12	1
39b	<i>S. patens</i> strip	0.2	0.6	0.12	1
40	<i>S. alterniflora</i> gap	0.3	0.15	0	1
41	<i>S. patens</i> gap	0.5	0.15	0.08	1
	totals	7.7		3.115	

* denotes parcels with at least some excused performance.

**Note: Parcels 39a and 39b were planted and monitored as one area but broken out into separate parcels for accounting purposes.

Table 8
Accounting Matrix - Excused Performance With Replanting - Year 3 Monitoring

8a. S. alterniflora strip								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres Achieved	Counted acres	Equivalent Acres Required	Comments
S. alterniflora strip (EPPA)	32	1acre	1	0.45	0.45	1		Replaces parcel 1
S. alterniflora strip (EPPA)	33	1acre	1	0.35	0.35	1		Replaces parcel 2
S. alterniflora strip*	3*	1acre	0.5	80	0.40	0.5*		adjusted for erosion
S. alterniflora strip (EPPA)	34	0.5	0.5	0.4	0.20	0.5*		supplements parcel 3
S. alterniflora strip	4	1acre	0.0	65	0.60	1		
S. patens strip (EPPA)	35	1acre	1	0.6	0.60	1		Replaces parcel 5
S. patens strip (EPPA)	36	1acre	1	0.4	0.40	1		Replaces parcel 6
S. patens strip (EPPA)	37	1acre	1	0.3	0.30	1		Replaces parcel 7
S. patens strip	15	1acre	1	60	0.60	1		Replaces parcel 8
S. patens strip (EPPA)	30	1acre	1	0.5	0.50	1		Replaces parcel 9
S. alterniflora strip	10	1acre	1	80	0.80	1		
S. alterniflora strip	11	1acre	0.75	95	0.71	1		
S. alterniflora strip*	12	0.7 acre	0.5	80	0.40	0.5		
S. patens strip (EPPA)	39a	.2 acre	0.2	0.6	0.12	0.2		supplements parcel 12
S. patens strip (contingency)	25	1 acre	1	35	0.35	1		add on for perf.crit.
S. patens strip (contingency)	26	1 acre	1	40	0.40	1		add on for perf.crit.
S. patens strip (contingency)	28	1 acre	1	60	0.60	1		add on for perf.crit.
S. patens strip (contingency)	29	1 acre	1	50	0.50	1		add on for perf.crit.
S. patens gap (contingency)	30	1 acre	1	20	0.20	1		add on for perf.crit.
S. patens strip (contingency)	31	1 acre	1	40	0.40	1		add on for perf.crit.
Totals					8.87	16.7	9.36	

8b. S. alterniflora gap								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres	Counted acres	Equivalent Acres Required	Comments
S. patens strip (EPPA)	39b	0.2	0.2	0.6	0.12	0.2		Replaces parcel 13
S. patens gap*	41	.5 acre	0.5	0.15	0.08	0.5		Replaces parcel 13
S. alterniflora gap	14	0.7 acre	0.65	50	0.33	0.7		
S. patens gap (contingency)	27	1 acre	1	30	0.30	1		add on for perf.crit.
Totals					0.82	2.4	0.77	

8c. S. patens strip								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres	Counted acres	Equivalent Acres Required	Comments
S. alterniflora strip	8	1acre	0.8	65	0.68	1		Replaces parcel 15
S. patens strip	16	1acre	1	30	0.30	1		
S. patens gap	23	1acre	0.9	45	0.41	1		Replaces parcel 17
S. patens strip	18	1acre	0.9	65	0.59	1		
S. patens strip	19	1acre	1	50	0.50	1		
S. patens strip	20	1acre	1	45	0.45	1		
S. patens strip	21	0.9 acre	0.9	60	0.54	0.9		
Totals					3.46	6.9	3.45	

8d. S. patens gap								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres	Counted acres	Equivalent Acres Required	Comments
S. patens gap	22	1acre	1	35	0.35	1		
S. patens strip	17	1acre	1	25	0.25	1		Replaces parcel 23
S. patens gap	24	0.3 acres	0.3	20	0.06	0.3		
Totals					0.66	2.3	0.58	

8e. Unused Parcels					
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres
S. alterniflora gap*	40	0.3 acre	0.3	0.15	0.00
Totals					0.00

8f. Excused Performance					
Replant Category	Parcel Number	Replanted Acres	Replanted Percent Cover	Equivalent Acres	Year excused
S. alterniflora strip	32	1	0.45	0.45	1
S. alterniflora strip	33	1	0.35	0.35	1
S. alterniflora strip	34	0.5	0.4	0.20	1
S. patens strip	35	1	0.6	0.60	1
S. patens strip	36	1	0.4	0.40	1
S. patens strip	37	1	0.3	0.30	1
S. patens strip	38	1	0.5	0.50	1
S. patens strip	39a	0.2	0.6	0.12	1
S. patens strip	39b	0.2	0.6	0.12	1
S. alterniflora gap	40	0.3	0.15	0	1
S. patens gap	41	0.5	0.15	0.08	1
totals		7.7		3.115	

*denotes parcels with at least some excused performance.

Table 9
Accounting Matrix - Excused Performance With Substrate Stabilization - Year 3 Monitoring

9a. <i>S. alterniflora</i> strip								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres Achieved	Counted acres	Equivalent Acres Required	Comments
<i>S. alterniflora</i> strip*	1*	1 acre	0	0	0.00	0	0	excused
<i>S. alterniflora</i> strip*	2*	1 acre	0	0	0.00	0	0	excused
<i>S. alterniflora</i> strip*	3	1 acre	0.5	80	0.40	0.5*	0.4	partly excused
<i>S. alterniflora</i> strip	4	1 acre	0.9	65	0.59	1	0.8	
<i>S. alterniflora</i> strip*	5*	1 acre	0	0	0.00	0	0	excused
<i>S. alterniflora</i> strip*	6*	1 acre	0	0	0.00	0	0	excused
<i>S. alterniflora</i> strip*	7*	1 acre	0	0	0.00	0	0	excused
<i>S. alterniflora</i> strip	8	1 acre	0.8	85	0.68	1	0.8	
<i>S. alterniflora</i> strip*	9*	1 acre	0	0	0.00	0	0	excused
<i>S. alterniflora</i> strip	10	1 acre	1	80	0.80	1	0.8	
<i>S. alterniflora</i> strip	11	1 acre	0.75	95	0.71	1	0.8	
<i>S. alterniflora</i> strip*	12	0.7 acre	0.5	80	0.40	0.5	0.4	partly excused
<i>S. patens</i> strip (contingency)	25	1 acre	1	35	0.35	1		add on for perf.crit.
<i>S. patens</i> strip (contingency)	26	1 acre	1	40	0.40	1		add on for perf.crit.
Totals					4.33	6.50	4.00	

9b. <i>S. alterniflora</i> gap								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres	Counted acres	Equivalent Acres Required	Comments
<i>S. alterniflora</i> gap	13*	1 acre	0	0	0.00	0	0	excused
<i>S. alterniflora</i> gap	14	0.7 acre	0.65	50	0.33	0.7	0.32	
Totals					0.33	0.70	0.32	

9c. <i>S. patens</i> strip								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres	Counted acres	Equivalent Acres Required	Comments
<i>S. patens</i> strip	15	1 acre	1	60	0.60	1	0.5	
<i>S. patens</i> strip	16	1 acre	1	30	0.30	1	0.5	
<i>S. patens</i> gap	23	1 acre	0.9	45	0.41	1	0.5	Replaces parcel 17
<i>S. patens</i> strip	18	1 acre	0.9	65	0.59	1	0.5	
<i>S. patens</i> strip	19	1 acre	1	50	0.50	1	0.5	
<i>S. patens</i> strip	20	1 acre	1	45	0.45	1	0.5	
<i>S. patens</i> strip	21	0.9 acre	0.9	60	0.54	0.9	0.45	
Totals					3.38	6.9	3.45	

9d. <i>S. patens</i> gap								
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres	Counted acres	Equivalent Acres Required	Comments
<i>S. patens</i> gap	22	1 acre	1	35	0.35	1	0.25	
<i>S. patens</i> strip	17	1 acre	1	25	0.25	1	0.25	Replaces parcel 23
<i>S. patens</i> gap	24	0.3 acres	0.3	20	0.06	0.3	0.075	
					0.66	2.3	0.58	

9e. Unused Parcels					
Parcel Category	Parcel Number	Original Parcel Size	Remaining Parcel Size (After Erosion)	Percent Cover Over Remaining Area	Equivalent Acres
<i>S. patens</i> gap (contingency)	27	1 acre	1	30	0.30
<i>S. patens</i> strip (contingency)	28	1 acre	1	60	0.60
<i>S. patens</i> strip (contingency)	29	1 acre	1	50	0.50
<i>S. patens</i> gap (contingency)	30	1 acre	1	20	0.20
<i>S. patens</i> strip (contingency)	31	1 acre	1	40	0.40

*denotes parcels with at least some excused performance.

Note: Parcel 3 and Parcel 12 were partly eroded by a named storm. Only a portion of these parcels were excused from meeting performance objectives.