

Port of Portland
Government Island Grassland Mitigation
2013 Annual Report

Revised April 2014

TABLE OF CONTENTS

Introduction	1
Mitigation Project Summary	2
Site Preparation	2
Summary of Activities	2
Deviation from Mitigation Plan.....	2
Targets	3
Monitoring Methodologies.....	3
Vegetation Monitoring Methods	3
Transect Survey.....	3
Plot Survey	4
Visual Vegetation Structure Survey	4
Wildlife Monitoring Methods	5
Bird Monitoring Methods	5
Monitoring Results:.....	6
Vegetation Monitoring.....	6
Point Intercept Results.....	7
Robel Pole Results.....	7
Bird Monitoring	8
Photo Points.....	10
Anticipated Activities for 2014/2015	10
Anticipated Monitoring for 2014	10
Outreach/Stakeholder Involvement	11
Summary of Outreach/Stakeholder Involvement in 2013.....	11
References	12
Appendices.....	13

Figure 1: Mitigation Site Location and Boundary

Figure 2: Treatment Areas and Locations of Photo Points, Vegetation Surveys and Soil Pits

Figure 3: Wildlife Point Count and Area Search Plot Locations

INTRODUCTION

This annual report summarizes the activities that occurred on the Port of Portland's (Port) Government Island Grassland Mitigation Site and related outreach activities in 2013. This mitigation project was initiated to offset future impacts to four properties at the Portland International Airport (PDX) and is a mitigation obligation that resulted from an Intergovernmental Agreement (IGA) between the City of Portland (City) and the Port as part of the Airport Futures planning process. As required by the IGA between the City and the Port, this annual report documents Port site activities and monitoring related to the grassland mitigation on Government Island during the 2013 field season.

The purpose of this mitigation project is to replace the upland grassland resource values that may be lost or degraded when four PDX properties are developed. These PDX properties are ecologically degraded by a dominance of non-native vegetation but provide acceptable habitat for a number of grassland associated wildlife species. Once completed, the mitigation site should provide the grassland habitat features suitable for these wildlife species and other grassland associates not currently documented at the PDX properties. Specifically, the mitigation site will address grassland resource loss by focusing on creation of habitat structure and function utilized by grassland associated species, particularly those found on the four PDX properties. The habitat structure targets for this project were developed considering the needs of the Western meadowlark. The habitat needs of the Western meadowlark are similar to other desirable grassland avian associates and are therefore considered an "umbrella" species for designing coarse-level habitat conditions for conservation (Altman, 2000).

The success of the project will not be based on the utilization of the site by these species. However, it is reasonable to assume that if the habitat conditions are suitable, the target grassland species will be attracted to the site. Since the mitigation project will occur on an island, the use by some of the species we are hoping to attract may be precluded. Some of the target wildlife species include: grey-tailed vole, western meadowlark, Savannah sparrow, northern harrier, and American kestrel. These species are found on the PDX properties and are included in the City's Special Habitat Areas criteria for grasslands. Although grassland birds were the main focus of the City's designation of PDX properties as Special Habitat, this mitigation plan is not limited to improving habitat for grassland birds. Instead, the idea is to create a site of diverse micro-habitats that will be beneficial for a variety of grassland species. To increase the ecological value of this mitigation project, elements have been designed to improve pollinator habitat within the project area. Many native pollinators that are in decline regionally rely on native flowering forbs that are found in grasslands. This mitigation plan is designed to include a variety of native forbs that will provide nectar source for pollinators throughout the growing season. In effect, the Port is trying to take a holistic approach to this enhancement in an effort to create a site that is not focused on a single species.

The first 50 acres of grassland mitigation will be conducted as a field trial to determine the most practical and effective methods for enhancing grasslands on Government Island. The field trial is intended to determine achievable and sustainable measures of success for grassland enhancement on an island in the Columbia River which will inform the management strategies for subsequent phases of mitigation. General targets based on other prairie enhancement projects are described below and will guide our efforts. However, until the field trial is completed, it is unknown whether these targets are achievable with available resources, therefore specific measures of success have not been pre-determined for this project.

The field trial will incorporate principles of adaptive management to determine the best methods for successfully enhancing grasslands on the island. However, we do not wish to repeat methodologies that have been unsuccessful in other prairie restoration projects. Selected methods are based on experience with our existing mitigation sites, literature review, and discussions with researchers and other groups conducting prairie restoration projects in Oregon such as the Institute for Applied Ecology (IAE), Xerces Society for Invertebrate Conservation (Xerces), The Nature Conservancy and the City of Portland.

MITIGATION PROJECT SUMMARY

Up to 300 acres of grassland mitigation will occur on Government Island in 50 acre increments (see Figure 1). The first 50 acres of mitigation will occur in advance of any impact on the four PDX properties, future phases of mitigation will be triggered when development on the four properties is proposed to exceed 25 acres (reference the Draft Planning Document and Intergovernmental Agreement for Natural Resources to the Airport Futures Project, May 2011). The Port began working on the first 50 acres of mitigation in 2010 and no development has yet occurred on the four PDX properties. The final draft of the proposed mitigation plan for the first 50 acres was submitted to the City in June 2012. The plan includes conducting two years of site preparation before seeding the site. Limited site preparation occurred on the site prior to City approval of the mitigation plan; intensive site preparation work began in 2012. Likewise, some monitoring of the site had been occurring since 2010 but intensive monitoring did not begin until 2012. Site preparation and monitoring continued in 2013 and will be described in detail in this annual report.

The 2012 Annual Report prepared by the Port was submitted to the City of Portland in January of 2013 and went through a number of revisions before it was finalized in July 2013. The Port and City worked together to resolve a number of issues related to the mitigation project which will be described in this annual report.

SITE PREPARATION

SUMMARY OF ACTIVITIES

The Port began limited site preparation in fall 2010 which continued into 2011. More intensive site preparation was initiated in 2012 as described in the 2012 Annual Report. In April of 2013, the mitigation site buffer (30 feet around the perimeter of the 50 acre mitigation site) was sprayed and the 50 acre mitigation site was spot sprayed using glyphosate. The entire 50 acre site was treated with glyphosate in July 2013 then mowed in September. When it was mowed in September particular attention was paid to the buffer ensuring that it was mowed as close to ground surface as possible with minimum soil disturbance in preparation for the seeding. The buffer area was broadcast seeded in mid-October with a native grass seed mix containing *Deschampsia cespitosa*, *Deschampsia elongata*, and *Elymus glaucus*.

DEVIATION FROM MITIGATION PLAN

The Port recognizes the importance of vegetation height and density especially as it relates to grassland wildlife species use. To address the question of vegetation cover and height, we have modified our methodologies for collecting vegetation data. Starting with the June 2013 monitoring, transect surveys incorporated line-point intercept data collection and the direct measurement method for recording vegetation height. The line-point intercept method is based on the methodology outlined in the

Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems (USDA, 2009) used by the Bureau of Land Management. The methodology is discussed in detail under Monitoring Methodologies.

The buffer was not seeded in fall 2012 as proposed in the plan because there was still too much blackberry within the buffer. In 2013, the buffer was sprayed for blackberry in April and July, then mowed in September to prepare the area for seeding which occurred in October.

TARGETS

As stated in the approved mitigation plan, specific measures of success have not been predetermined for this project. Instead, we are targeting certain habitat conditions that will provide the habitat needed for grassland species. In recognition of the importance of vegetation height to grassland birds a new vegetation height target was added in 2013 that was not included in the mitigation plan. Target metrics for mean vegetation height were derived by Bob Altman and Matt Blakeley-Smith based on their research on grassland restoration in the Willamette Valley (pers. com., 2013). In addition, the non-native plant target was modified in 2013 to be no more than 25% cover overall for invasive non-native species. The targets for this project are listed below and that will be used from this point forward:

- Relative cover of native plant species 50% or more
- Little to no woody vegetation (less than 15%)
- Approximately 10-30% cover by forbs
- Greater than 5% bare ground, but no more than 20%
- No single non-native plant species will have more than 50% cover on site
 - Invasive non-native species (as identified in table D-2 of the Recovery Plan) will be managed aggressively to maintain less than 25% cover overall.
- Plant species richness greater than 10 native species
 - Preferably 3 species of native grasses and 10 species of native forbs but at a minimum 1 species of native bunch grass and no less than 7 species of native forbs.
- Mean vegetation height of 12 to 24 inches (measured in mid to late May) including:
 - Less than 25% of the vegetation will be between 6 and 12 inches
 - Greater than 50% of the vegetation will be between 12 and 24 inches
 - Less than 25% of the vegetation will be greater than 24 inches

MONITORING METHODOLOGIES

VEGETATION MONITORING METHODS

Vegetation monitoring was conducted twice in 2013; once in the late spring and again in the late summer. The survey dates were selected based on field conditions. In addition to line-point intercept, plot, vegetation height and visual structure surveys, the Port employed Intuitive Controlled Surveys on all site visits in order to track invasive and undesirable species requiring treatment as well as microsites not captured through transect monitoring. To facilitate monitoring and ensure that it will consistently occur in the same location, metal posts were placed on the site marking the starting and ending points of the vegetation transects.

TRANSECT SURVEY

For the 2013 monitoring year the Port used a line-point intercept method, a variation of the Transect Survey method included in the original mitigation plan (reference Government Island Grassland Mitigation Project, Phase I Grassland Mitigation Plan, Port of Portland, 2012). This deviation in

methodology was intended to more accurately and efficiently sample variation within the transects and quantify changes in plant species cover and/or ground cover over time. This method was chosen to monitor the long term changes in plant species cover for this project and has been shown to be best suited for sampling ground cover and grasses, forbs, and shrubs less than 3 feet (1 m) in height (BLM). This data collection technique, in combination with monitoring vegetation height, should quantify habitat suitability for certain grassland species.

Within each of the five treatment areas, two 200 foot long transects were established in 2010 to ensure that baseline data was collected consistently for all future field trial areas. The start and end point of each transect is marked in the field with a post. During each vegetation survey a 200 foot tape was laid out from the starting point to the end point. Line-point intercept data was collected along each 200-foot (approximately 61-meter) transect. A pin flag is dropped from 1-meter on the same side of the measure tape every five feet, beginning with the north end of each transect line (except in area 5 where the survey was started from the east). Each plant species or ground cover class intercepted by the pin was recorded. During the transect surveys the vegetation height was also measured using the direct measurement method every ten feet along the 200-foot transect. The direct measurement method for plant height estimation involves placing a hand lightly on the vegetation at the level below which about 80% of the vegetation is estimated by eye to be growing (ignoring the occasional tall stalk), then reading this height on a ruler (Stewart, 2001). Plant nomenclature reflected plant names listed by the United States Department of Agriculture Natural Resource Conservation Service on their Plants Database (USDA, NRCS, 2011) available online.

PLOT SURVEY

For each transect, two 1-meter square plots were established, for a total of 20 plots throughout the mitigation site. There is one plot 50 feet from the starting point of each transect and another plot 50 feet from the end point of each transect. The plots are placed from the west side of the transect line. Within the plots all plant species were recorded and a relative percent cover was provided for each species; percent area of bare ground was also recorded.

VISUAL VEGETATION STRUCTURE SURVEY

Within each 1-meter square plot the structure of vegetation was measured using the Robel method where visual obstruction is used to determine height and density of vegetation (Robel et. al., 1970). The Robel Pole is placed vertically at the survey point. The observer stands 4-meters away from the pole, and with eyes 1-meter above the level of the ground the observer notes the highest interval on the pole that is not completely obscured by vegetation.

- The Robel Pole is 150cm tall and 3cm in diameter.
- The pole is marked with alternating colors every 10cm (using tape).
- The pole is secured or held at the survey point. The observer stands 4m from the pole. This distance is usually determined with a 4m string or cord that is attached to the Robel Pole and a second pole (1m tall). The 1m pole is used a sighting tool to ensure that each visual obstruction measurement is taken from the same height of 1m.
- The observer lowers their eye to the sighting pole and records the highest band on the Robel Pole that is completely obscured by vegetation.
- Measurements are taken from the 4 cardinal directions at each point and then averaged.

WILDLIFE MONITORING METHODS

Incidental wildlife observations were recorded during all site visits. In addition, consistent with the methodology used in 2012, specific bird monitoring surveys were conducted; the methodology is described below. The purpose of this monitoring effort is to determine presence and absence of wildlife species on the site before, during, and after site treatment.

BIRD MONITORING METHODS

The Port used two different methods for bird monitoring. For spring breeding bird surveys, a modified point count/transect method was used. An area search method was used to survey for fall and wintering birds. These methods will continue to be used to monitor the 50 acre project site and the adjacent field (Phase 2) to the east of the project site in the upcoming years. All monitoring sessions were conducted as close to sunrise as possible and were completed by 10:30 am, if possible. These monitoring events did not occur on days that were unusually windy, during heavy rain events, or in any conditions that would severely limit the ability of the observer to detect birds. For both monitoring methods, time was paused during any aircraft passes that were loud enough to make auditory detections impossible. All monitoring events were completed by a team of at least 2 observers. The exact dates for field visits were determined by staff/consultant availability and field conditions.

Two spring modified point count/transect surveys were conducted in 2013. The first survey took place on April 24th and the second occurred on June 22nd. The modified point count/transect survey method was used to monitor the 50 acre project site and the adjacent field. All point count stations were previously marked on select vegetation transect stakes by the Port in 2012 and will be used throughout the study. A total of 5 point count stations are located within the mitigation area and two stations are located in the adjacent field. All points were more than 150 meters apart. Point count stations located in the Phase 2 site were over 150 meters away from the boundary of the Phase 1 mitigation site and from any other point count station. Data collection methods and data sheets used for the point count monitoring were adopted from the US Forest Service's technical report entitled, A Habitat-Based Point-Count Protocol for Terrestrial Birds, Emphasis Oregon and Washington (Huff et al. 2000). At each point count station, the observers began by remaining still and quiet for a 2 minute period to allow time for wildlife activity to return to pre-disturbance levels. At this point, species seen and heard over a five minute period and within a 50 meter radius were recorded. After the five minute observation period, transect data was collected while traveling to the next point count station. Recounting of birds tallied during the point counts was avoided by making an effort to carefully track birds heard or seen behind the surveyors. This process was repeated for all 7 points, effectively covering the entire 50-acre site and part of the adjacent pasture. All survey methodologies were conducted in accordance with monitoring protocols identified in the Port's Government Island Grassland Mitigation Project Phase I Grassland Mitigation Plan (Port of Portland, 2012). Point count station locations are shown in Figure 3.

The area search method used to survey for fall migratory bird is based on the Point Reyes Bird Observatory (PRBO) Area Search Census Instructions (PRBO, 1999). Surveys were conducted on February 13, September 11, October 9, and December 16, 2013 in accordance with monitoring protocols identified by the Port's Government Island Grassland Mitigation Project Phase I Grassland Mitigation Plan (2012). For all but one of the area search bird surveys the field team consisted of two consultant biologists, Taya K. MacLean and James DeStaebler from SWCA Environmental Consultants. Port staff, Carrie Butler and Noel Jinings, conducted the February area search bird survey. Two plots were surveyed during each area search, including Plot 1 in a portion of the 50 acre project site and Plot 2 in the pasture area adjacent and to the east (Figure 3). During each survey, both plots were surveyed for 40 minutes. Time started at the beginning of each area search and only paused in cases where

investigation of specific calls or songs was necessary or when over flights of aircraft made audio detection impossible. Only birds within the boundary of the plots were recorded. Data was recorded on the City of Portland BES data forms and entered into the Port of Portland tracking spreadsheet for the project (Appendix A).

MONITORING RESULTS:

VEGETATION MONITORING

Specific measures of success have not been predetermined for this project. Instead, we are targeting certain habitat conditions that will provide the habitat needed for grassland species. Because the 50-acre grassland site is currently in the pre-seeding, site preparation phase of the project, we did not expect to meet habitat condition targets in 2013. Vegetation recorded during monitoring was mostly dead (thatch) with only 1.7% relative native vegetation cover in June and 0% in August (target set at 50% or more). Relative percent invasive non-native vegetation cover was also low at 1.1% in June and 0.6% in August (Target was set at no more than 25% cover). Other targets including relative percent cover by forbs (target set at 10-30%) and species richness (set at >10 native species) were also not achieved in 2013. However, the relative percent cover by woody vegetation target (set at less than 15%) and relative percent bare ground cover target (set at >5% and <20%) were both met. Vegetation height is an especially important value to quantify because of its importance to grassland birds. Again, because the site was mowed in conjunction with site preparation activities, the target for mean vegetative height (set between 12 – 24 inches) was not met in 2013.

Table 1: Pre-treatment Success Measure Status based on 2013 Monitoring Data

Success Measure	Target	11-Jun-13		28-Aug-13	
		Overall	Native Species	Overall	Native Species
*Relative % cover of native species	50% or more	NA	1.7%	NA	0%
*Relative % cover of woody vegetation	Less than 15%	2%	0%	0.8%	0%
*Relative % cover by forbs	Approximately 10-30%	1.4%	0.60%	1.2%	0%
*Relative % cover of bare ground	Greater than 5%, but no more than 20%	5.2%	NA	7.4%	NA
†Number of single non-native plants with more than 50% cover	No single non-native plant will have more than 50% cover on site	0	NA	0	NA
*Relative % cover of invasive non-native species	Less than 25% overall cover	1.1%	NA	0.6%	NA
†Plant species richness	At least 10 native species	18	3	9 ¹	0
†Number of grass species	3 species of native grasses	6	0	4 ¹	0
†Number of bunch-type grass species	At least 1 native species of bunch grass	2	0	1	0

		11-Jun-13		28-Aug-13	
Success Measure	Target	Overall	Native Species	Overall	Native Species
†Number of forb species	Preferably 10 native species of forbs but no less than 7 native forb species	9	1	3	0
◇Mean height (inches) of vegetation	12 – 24 inches	2.9"	NA	1.8"	NA
◇Vegetation between 6-12"	Less than 25%	16%	NA	14.5%	NA
◇Vegetation between 12-24"	Greater than 50%	4%	NA	0%	NA
◇Vegetation greater than 24"	Less than 25%	0%	NA	0%	NA

*Calculation based on m² plot data only

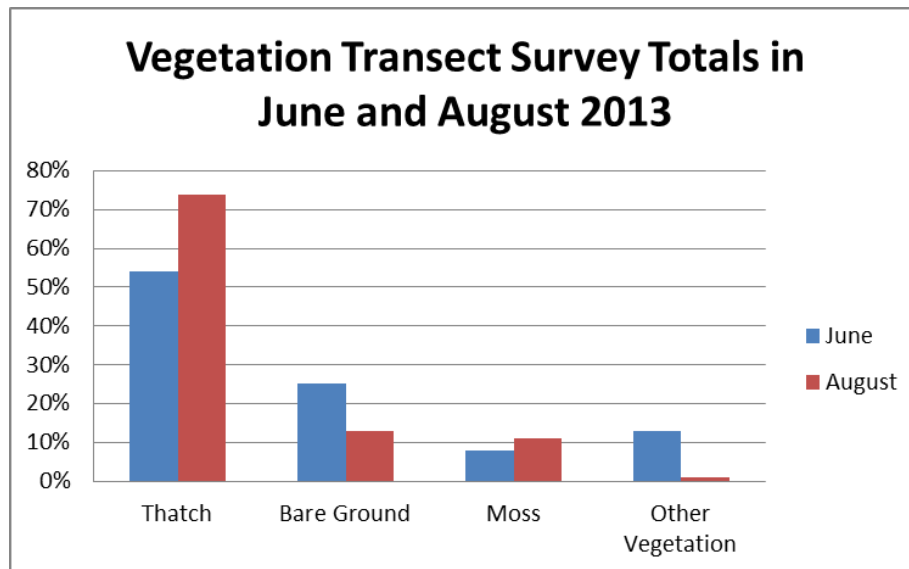
†Calculation based on overall data (both plot and point-intercept transect data)

◇Calculation based on the Direct Measure data collected along each transect

¹One unidentified forb was recorded and assumed to be non-native

POINT INTERCEPT RESULTS

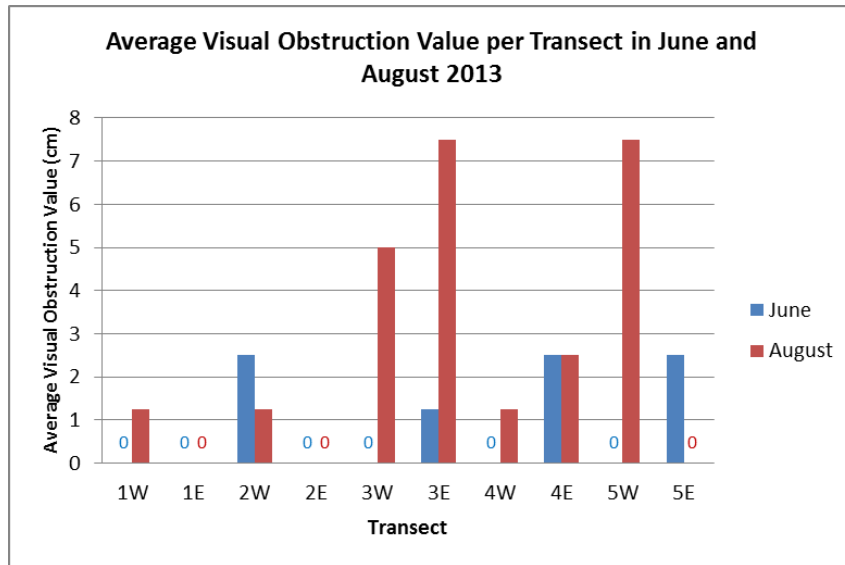
As illustrated in the graph below, the majority of the vegetation encountered along the transects was dead thatch due to site preparation activities including mowing and herbicide application. Once the site is seeded with native species, we expect the point-intercept method to provide more demonstrative data.



ROBEL POLE RESULTS

Vegetative structure (height and density) was quantified using the Robel method (Robel et. al., 1970). Because visual obstruction measurements using the Robel method provide a measure of both the height

and density of vegetation we will refer to the “Average visual obstruction value (cm)” as a surrogate for the “vegetative structure” (height and density) of that transect. As expected in the pre-seeding, site preparation phase of the grassland project, vegetative structure values were low (if non-existent) in most transects with the highest average values in transects 3E and 5W from the August monitoring (see table below). As with the point-intercept method, we would expect the Robel Pole method to provide more demonstrative data once the site is seeded with native species.



BIRD MONITORING

Avian surveys were conducted during the months of February, April, June, September, October and December to capture wintering, breeding and migrating species. The following summaries focus on avian species observed that are highly associated with grassland habitats as identified in the City of Portland (COP) Natural Resources Inventory, Grassland Associated Wildlife Species List for Special Habitat Area Criteria, 2009 (see Table 2 below). Relative Abundance Index values were derived for the COP grassland associated species observed during the breeding season (see Table 3) and Average Count values were derived for the grassland associated species observed during fall and winter surveys (see Table 4). For a complete list of species observed please refer to Appendix A of this report. It is important to keep in mind that while Plot 1 (mitigation site) received site preparation treatments over the course of the year including mowing and herbicide spray, Plot 2 (adjacent field to the east) did not receive treatments and therefore was well-vegetated with tall pasture grasses and weedy forbs.

Table 2: COP Grassland Associated Wildlife Species List

	<u>Common Name</u>	<u>Genus / Species</u>
Mammals	Camas Pocket Gopher	<i>Thomomys bulbivorus</i>
	Deer Mouse	<i>Peromyscus maniculatus</i>
	Gray-tailed Vole	<i>Microtus canicaudus</i>
	Red Fox	<i>Vulpes vulpes</i>
Birds	American Kestrel	<i>Falco sparverius</i>
	Chipping Sparrow	<i>Spizella passerina</i>
	Common Nighthawk	<i>Chordeiles minor</i>
	Northern Harrier	<i>Circus cyaneus</i>
	Oregon Vesper Sparrow	<i>Pooecetes gramineus affinis</i>
	Savannah Sparrow	<i>Passerculus</i>
	Short-eared Owl	<i>Asio flammeus</i>
	Streaked Horned Lark	<i>Eremophila alpestris striaata</i>
	Western Meadowlark	<i>Sturnella neglecta</i>
	White-tailed Kite	<i>Elanus leucurus</i>

During winter surveys no COP grassland associated species were observed in Plot 1. Species observed in Plot 2 included Short-eared Owl, Northern Harrier and Savannah Sparrow (see Table 4).

During the breeding season surveys in Plots 1 and 2 the Savannah Sparrow and Western Meadowlark were the only COP grassland associated species observed (see Table 3). Also of note, Lazuli Bunting was observed in Plot 2.

During fall surveys only Savannah Sparrow was observed in Plots 1 and 2 (see Table 4). Also of note were large numbers of Lincoln’s Sparrows that were observed in October.

Table 3: Relative Abundance Index for COP Grassland Associated Species (Point Count)

Species	Phase 1 Project Treatment Area - 5 Points				Phase 2 adjacent pasture - 2 Points				All Transects Combined	All Transects Combined
	24-Apr	24-Apr	22-Jun	22-Jun	24-Apr	24-Apr	22-Jun	22-Jun	24-Apr	22-Jun
	Total Count	Relative Abundance Index	Total Count	Relative Abundance Index	Total Count	Relative Abundance Index	Total Count	Relative Abundance Index	Total Individuals Observed Between Points	Total Individuals Observed Between Points
Savannah sparrow	4	0.8	5	1	4	2	9	4.5	12	22
Western meadowlark	0	0	0	0	0	0	0	0	1	0

Table 4: Average Count for COP Grassland Associated Species (Area Count)

Species	Area Search Plot 1 (treatment area)						Area Search Plot 2 (pasture)					
	Fall			Winter			Fall			Winter		
	11-Sep Total Count	9-Oct Total Count	Fall Average Count	13-Feb Total Count	16-Dec Total Count	Winter Average Count	11-Sep Total Count	9-Oct Total Count	Fall Average Count	13-Feb Total Count	16-Dec Total Count	Winter Average Count
Northern Harrier	0	0	0	0	0	0	0	0	0	0	1	0.5
Savannah sparrow	6	0	3	0	0	0	16	2	9	1	2	1.5
Short-eared owl	0	0	0	0	0	0	0	0	0	2	0	1

PHOTO POINTS

Photos were taken at the defined photo points in 2013 during the vegetation monitoring. The photo points include one of each of the 10 transects and three additional photo points at the northwest, northeast and southwest corners of the mitigation site. The photos from 2013 are included in Appendix C.

ANTICIPATED ACTIVITIES FOR 2014/2015

Site preparation will continue in 2014 with seeding scheduled to occur in the fall of 2014 that will include a re-seeding of the buffer. The goals of 2014 site preparation are to continue to eliminate the existing undesirable vegetation onsite and try to expose as much bare ground as possible. Increasing the exposed soil and reducing the undesirable plants present onsite when the site is seeded is expected to increase the success of the seeding. To accomplish this, we intend to spray the entire site in the spring, mow the site in the summer and spray the site again in the fall prior to seeding. We will be monitoring the site regularly to determine if more treatments are needed. For example we may need to spray the site more than 2 times to ensure that the site is ready for seed in the fall. We may also conduct spot treatments to address weed populations observed during Intuitive Controlled surveys.

ANTICIPATED MONITORING FOR 2014

In 2014, the Port will continue monitoring vegetation and birds using the same methodology used in 2013. We intend to conduct two vegetation surveys in 2014, one in the late spring and another in the late summer. We plan to conduct avian surveys six times in 2014; two wintering bird surveys, two breeding bird surveys and two migrating bird surveys. We also plan to visit the site at least monthly during the growing season to assess the conditions on the ground to help inform the management decisions.

OUTREACH/STAKEHOLDER INVOLVEMENT

SUMMARY OF OUTREACH/STAKEHOLDER INVOLVEMENT IN 2013

- 2012 Annual Report Meeting – April 5, 2013: City staff provided input after reviewing the first draft of the Port's mitigation annual report for the Government Island grassland mitigation site. Port staff agreed to revise the report expanding the methodologies and results sections and including figures showing transect and quadrat locations. The Port also agreed at this meeting to add point-intercept monitoring to the vegetation data collection beginning in 2013.
- 2012 Annual Report Meeting – May 30, 2013: City staff provided input after reviewing the revised draft of the Port's mitigation annual report for the Government Island grassland mitigation site. Port staff agreed to revise Table 1 to include the results of the vegetation height and density monitoring and add a column to the table that includes the target for each success measure. The Port also agreed to add grass height monitoring to the vegetation data collection beginning in 2013.
- CAC Meeting – September 18, 2013: Port Staff provided an update on the status of the Government Island Grassland mitigation project.

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- Personal Communication. 2013. Bob Altman (American Bird Conservancy) and Matt Blakeley-Smith (Greenbelt Land Trust) provided the set of vegetation structure metrics to the City of Portland. The metrics are based on their research on grassland restoration projects in the Willamette Valley and represent the best available science on optimal western meadowlark habitat structure in the region.
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APPENDICES

Appendix A – 2013 Wildlife Monitoring Data

Appendix B – 2013 Vegetation Monitoring Data

Appendix C – 2013 Photo Documentation



0 3,500 7,000 Feet


-  Phase 1 Mitigation Site
-  300 Acre Mitigation Site
-  Runways and Taxiways

Figure 1
Mitigation Site
Location and Boundary





0 350 700 Feet

- Treatment Areas
- Photo Points
- Soil Plots Location
- Vegetation Transects
- Transects Start Points
- Transect End Points
- Center Point of Vegetation Plots

Figure 2
Treatment Areas and
Locations of Photo Points,
Vegetation Surveys and Soil Pits



0 350 700 Feet

-  Mitigation Site Boundary
-  Treatment Areas


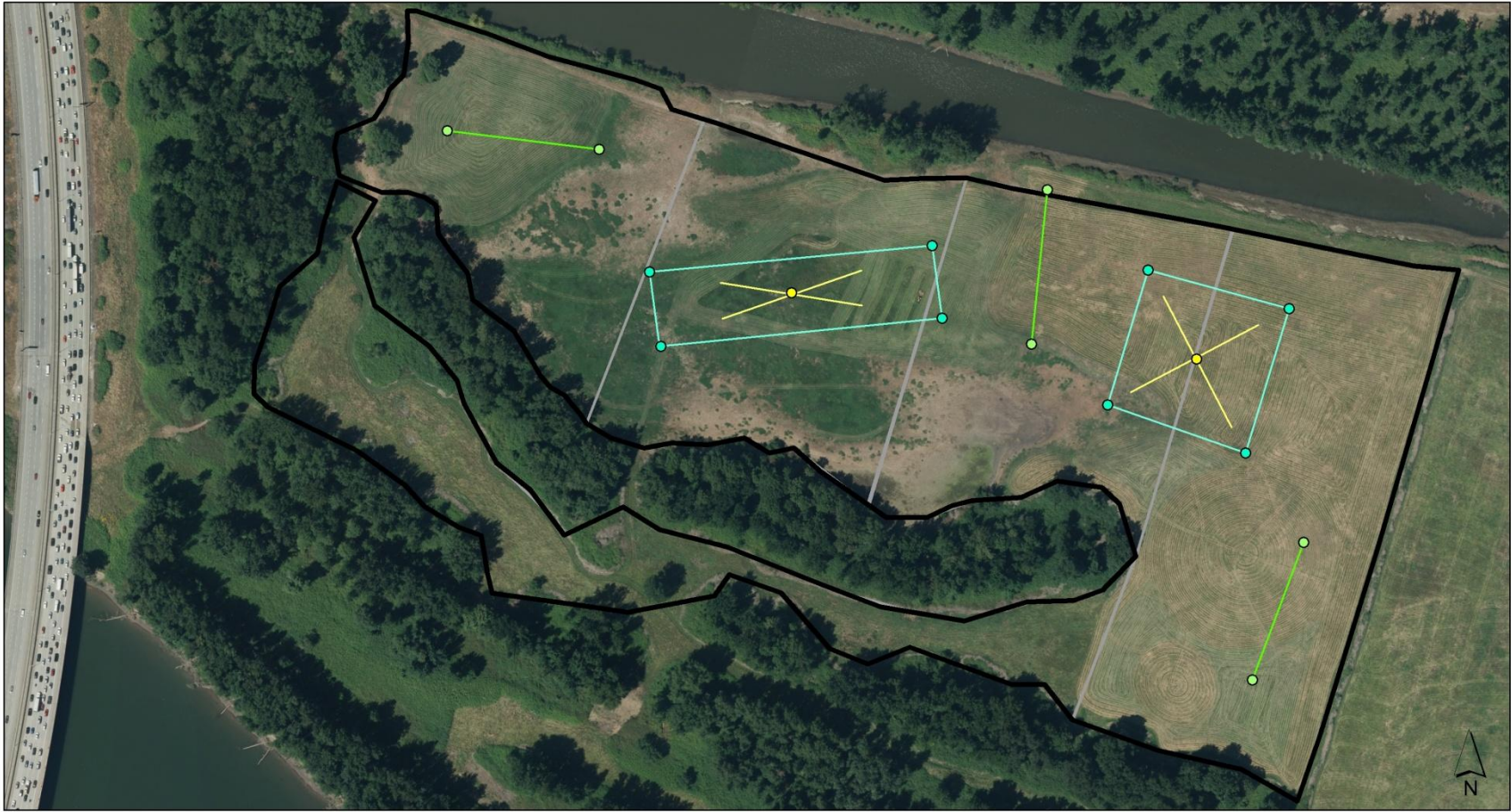


-  Wildlife Point Count Locations
-  Wildlife Area Search Plot 1
-  Wildlife Area Search Plot 2




Figure 3
Wildlife Point Count and
Area Search Plot
Locations



Port of Portland

0 350 700 Feet

-  Mitigation Site Boundary
-  Treatment Areas

-  Pan Trap Transects
-  Butterfly Transects
-  Bee Plot Boundaries




-  Bee Plot Center Stakes
-  Butterfly Transect End Points
-  Bee Plot Corner Points

Figure 4
Pollinator Survey Locations

Appendix A:

2013 Avian Survey Data

Government Island Grassland Mitigation Site

Government Island Grassland Area Search Observations

Investigators: Port Staff JD, TKM (SWCA) JD, TKM (SWCA) JD, (SWCA)
 Date: 13-Feb-13 11-Sep-13 9-Oct-13 16-Dec-13

Common Name	Species	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2
American goldfinch	<i>Carduelis tristis</i>			X				X	
American pipit	<i>Anthus rubescens</i>					X			
American robin	<i>Turdus migratorius</i>					X		X	
Bewick's wren	<i>Thryomanes bewickii</i>		X						X
Canada goose	<i>Branta canadensis</i>							X	
common yellowthroat	<i>Geothlypis trichas</i>				X		X		
Fox sparrow	<i>Passerella iliaca</i>								X
golden-crowned sparrow	<i>Zonotrichia atricapilla</i>		X				X		X
Lincoln's sparrow	<i>Melospiza lincolnii</i>			X	X		X		X
northern harrier	<i>Circus cyaneus</i>								X
Oregon junco	<i>Junco h. oregonus</i>							X	
Savannah sparrow	<i>Passerculus sandwichensis</i>		X	X	X		X		X
short-eared owl	<i>Asio flammeus</i>		X						
song sparrow	<i>Melospiza melodia</i>		X		X		X		X
spotted towhee	<i>Pipilo maculatus</i>		X						X

Government Island Grassland Point Count Observations

Investigators: JD, TKM (SWCA)

Date: 24-Apr-13

22-Jun-13

Common Name	Species	Point ID	Transect ID	Point ID	Transect ID
American goldfinch	<i>Carduelis tristis</i>	1,3,4	2-A	5,B	4-5,B-5
American robin	<i>Turdus migratorius</i>	4	1-5, 5-4	2	4-5
Bewick's wren **	<i>Thryomanes bewickii</i>	5	1-5		
black-capped chickadee **	<i>Poecile atricapillus</i>		1-5		
Brewer's blackbird	<i>Euphagus cyanocephalus</i>		B-1		
brown-headed cowbird	<i>Molothrus ater</i>			4	B-5
Canada goose	<i>Branta canadensis</i>	1,2	1-5		
cliff swallow	<i>Petrochelidon pyrrhonota</i>			B	B-5
common yellowthroat	<i>Geothlypis trichas</i>	A	2-A	1,A,B	A-B,B-5
downy woodpecker **	<i>Picoides pubescens</i>	5	1-5		
European starling	<i>Sturnus vulgaris</i>	1,2,3,4,B	4-3, 2-A, 1-5	1,2	1-2,A-1
great blue heron	<i>Ardea herodias</i>	1,4	B-1, 1-5		
house finch **	<i>Carpodacus mexicanus</i>	5	1-5, 5-4	4,5	B-5
killdeer	<i>Charadrius vociferus</i>			2	3-4
lazuli bunting	<i>Passerina amoena</i>			B	A-B,B-5
northern flicker	<i>Colaptes auratus</i>		1-5	3	
Pacific-slope flycatcher	<i>Empidonax difficilis</i>				4-5
pileated woodpecker **	<i>Dryocopus pileatus</i>		5-4		
purple martin	<i>Progne subis</i>			A,B	A-B
red-tailed hawk	<i>Buteo jamaicensis</i>		1-5		B-5
rufous hummingbird	<i>Selasphorus rufus</i>				B-5
savannah sparrow	<i>Passerculus sandwichensis</i>	1,2,3,A,B	3-2, 2-A, A-B, B-1	1,2,3,5,A,B	3-4,2-3,1-2,A-1, A-B,B-5
song sparrow	<i>Melospiza melodia</i>	A	B-1, 1-5	5	
spotted towhee **	<i>Pipilo maculatus</i>	5	1-5		
Swainson's thrush	<i>Catharus ustulatus</i>			5	
tree swallow	<i>Tachycineta bicolor</i>	2,3,4,5,A,B	3-2, 1-5, 5-4	1,2,4,5,A,B	2-3,1-2,A-1,B-5
unknown duck sp.	<i>unknown</i>		A-B		
western meadowlark	<i>Sturnella neglecta</i>		3-2		
willow flycatcher (western Oregon race)	<i>Empidonax traillii brewsteri</i>			5	A-B

** Associated with cottonwood stand within site

Appendix B:

2013 Vegetation Monitoring Data

Government Island Grassland Mitigation Site

11-Jun-13

GOVERNMENT ISLAND SPRING VEGETATION SURVEY

Surveyors: Noel Jinings, Taya MacLean, Dominic Maze, Maureen Minister

Transects 200' long; 2, m² plots evaluated at 50' and 150' along the transect

Botanical Name	Common Name	Survey Area 1 East Line			Survey Area 1 West Line			Survey Area 2 East Line			Survey Area 2 West Line			Survey Area 3 East Line		
		Plot 1EN	Plot 1ES	Transect 1E	Plot 1WN	Plot 1WS	Transect 1W	Plot 2EN	Plot 2ES	Transect 2E	Plot 2WN	Plot 2WS	Transect 2W	Plot 3EN	Plot 3ES	Transect 3E
	Thatch	75%	60%	95%	50%	85%	95%	90%	60%	90%	98%	60%	82.5%	70%	65%	95%
	Moss	15%	25%	35%	40%	3%	45%	TRACE	15%	17.5%		25%	57.5%	15%	15%	50%
	Bare ground	8%	5%	12.5%	10%	10%	17.5%	8%	25%	35%		5%		5%	2%	2.5%
	Leaf litter															
	Scat															
<i>Agropyron repens</i>	Quackgrass			12.5%					2%	2.5%			17.5%	5%	15%	5%
<i>Alopecurus pratensis</i>	Meadow foxtail		40%	12.5%		7%										
<i>Cardamine hirsuta</i>	Hairy bittercress															
<i>Chamaesyce maculata</i>	Spotted sandmat											TRACE	1%			
<i>Cirsium arvense</i>	Canada thistle					1%		1%		2.5%						
<i>Cirsium vulgare</i>	Bull thistle															
<i>Convolvulus arvensis</i>	Field bindweed			7.5%						2.5%		1%		TRACE		
<i>Echinochloa crus-galli</i>	Barnyard Grass											3%	1.5%			
<i>Festuca arundinacea</i>	Tall fescue	5%		12.5%			12.5%	2%		10%					1%	
<i>Fraxinus latifolia</i>	Oregon Ash															
<i>Geranium dissectum</i>	Long-stalked geranium						2.5%									
<i>Geranium molle</i>	Dovefoot geranium							1%	TRACE			TRACE		TRACE		
<i>Holcus lanatus</i>	Velvetgrass											1%			5%	
<i>Phalaris arundinacea</i>	Reed canarygrass										2%					
<i>Populus balsalmifera</i>	Black cottonwood											1%				
<i>Prunella vulgaris</i>	Self-heal															
<i>Ranunculus repens</i>	Creeping buttercup															
<i>Rubus armeniacus</i>	Himalayan blackberry													3%		
	Overall Cover:	103%	130%		100%	106%		102%	102%		100%	96%		98%	103%	

Botanical Name	Common Name	Survey Area 3 West Line			Survey Area 4 East Line			Survey Area 4 West Line			Survey Area 5 East Line			Survey Area 5 West Line		
		Plot 3WN	Plot 3WS	Transect 3W	Plot 4ES	Plot 4EN	Transect 4E	Plot 4WS	Plot 4WN	Transect 4W	Plot 5EW	Plot 5EE	Transect 5E	Plot 5WW	Plot 5WE	Transect 5W
	Thatch	74%	60%	85%	89%	98%	95%	68%	65%	92.5%	50%	80%	92.5%	80%	60%	100%
	Moss	10%	25%	50%	10%		57.5%	5%	15%	40%	3%	10%	42.5%	8%	15%	32.5%
	Bare ground	5%	5%	15%			5%			17.5%	15%		12.5%	10%		12.5%
	Leaf litter										8%	4%	5%		3%	
	Scat											1%				
<i>Agropyron repens</i>	Quackgrass	3%	5%	13%	1%		2.5%	5%	10%	2.5%			12.5%	8%	15%	
<i>Alopecurus pratensis</i>	Meadow foxtail										20%					5%
<i>Cardamine hirsuta</i>	Hairy bittercress										1%					
<i>Chamaesyce maculata</i>	Spotted sandmat															
<i>Cirsium arvense</i>	Canada thistle													4%		
<i>Cirsium vulgare</i>	Bull thistle								2%		1%			TRACE		
<i>Convolvulus arvensis</i>	Field bindweed			1%				2%	2%	15%					7%	
<i>Echinochloa crus-galli</i>	Barnyard Grass															
<i>Festuca arundinacea</i>	Tall fescue			5%			5%	20%	8%	15%		4%				2.5%
<i>Fraxinus latifolia</i>	Oregon Ash										1%					
<i>Geranium dissectum</i>	Long-stalked geranium															
<i>Geranium molle</i>	Dovefoot geranium															
<i>Holcus lanatus</i>	Velvetgrass			3%										4%		
<i>Phalaris arundinacea</i>	Reed canarygrass					2%										
<i>Populus balsalmifera</i>	Black cottonwood												2.5%			
<i>Prunella vulgaris</i>	Self-heal										TRACE			1%		
<i>Ranunculus repens</i>	Creeping buttercup										2%			1%		
<i>Rubus armeniacus</i>	Himalayan blackberry	8%	5%											2%		
	Overall Cover:	100%	100%		100%	100%		100%	100%		101%	99%		100%	103%	

28-Aug-13

GOVERNMENT ISLAND SPRING VEGETATION SURVEY

Surveyors: Carrie Butler, Taya MacLean, Maureen Minister, Sarah Wilson

Transects 200' long; 2, m² plots evaluated at 50' and 150' along the transect

Botanical Name	Common Name	Survey Area 1 East Line			Survey Area 1 West Line			Survey Area 2 East Line			Survey Area 2 West Line			Survey Area 3 East Line		
		Plot 1EN	Plot 1ES	Transect 1E	Plot 1WN	Plot 1WS	Transect 1W	Plot 2EN	Plot 2ES	Transect 2E	Plot 2WN	Plot 2WS	Transect 2W	Plot 3EN	Plot 3ES	Transect 3E
	Thatch	87%	90%	100%	47%	78%	87.5%	50%	100%	92.5%	100%	78%	97.5%	98%	97%	100%
	Moss	8%	5%	10%	10%	5%	22.5%			2.5%		20%	12.5%	2%	3%	12.5%
	Bare ground	5%	5%	15%	40%	15%	45%	48%		47.5%			2.5%			10%
	Leaf litter															
	Scat						2.5%									
<i>Agropyron repens</i>	Quackgrass															
<i>Alopecurus pratensis</i>	Meadow foxtail															
<i>Cardamine hirsuta</i>	Hairy bittercress															
<i>Chamaesyce maculata</i>	Spotted sandmat															
<i>Cirsium arvense</i>	Canada thistle				2%											
<i>Cirsium vulgare</i>	Bull thistle															
<i>Convolvulus arvensis</i>	Field bindweed															
<i>Corylus avellana</i>	Common Filbert															
<i>Echinochloa crus-galli</i>	Barnyard Grass															
<i>Festuca arundinacea</i>	Tall fescue				2%			2%	trace							
<i>Fraxinus latifolia</i>	Oregon Ash															
<i>Geranium dissectum</i>	Long-stalked geranium															
<i>Geranium molle</i>	Dovefoot geranium				1%											
<i>Holcus lanatus</i>	Velvetgrass															
<i>Phalaris arundinacea</i>	Reed Canary Grass											2%				
<i>Populus balsamifera</i>	Black cottonwood															
<i>Prunella vulgaris</i>	Self-heal															
<i>Ranunculus repens</i>	Creeping buttercup															
<i>Rubus armeniacus</i>	Himalayan blackberry															
Grass Spp	Unidentified grass species						0.5%			5%						
	Overall Cover:	100%	100%		102%	98%		100%	100%	5%	100%	100%		100%	100%	

Botanical Name	Common Name	Survey Area 3 West Line			Survey Area 4 East Line			Survey Area 4 West Line			Survey Area 5 East Line			Survey Area 5 West Line		
		Plot 3WN	Plot 3WS	Transect 3W	Plot 4EN	Plot 4ES	Transect 4E	Plot 4WN	Plot 4WS	Transect 4W	Plot 1EW	Plot 1EE	Transect 5W	Plot 1WW	Plot 1WE	Transect 5E
	Thatch	70%	85%	98%	91%	74%	97.5%	97%	93%	100%	100%	10%	100%	95%	95%	95%
	Moss	10%	10%	2%	5%	20%	12.5%		5%	15%		75%	15%	5%	5%	15%
	Bare ground	10%	5%			5%						15%	10%			30%
	Leaf litter															
	Scat															
<i>Agropyron repens</i>	Quackgrass				4%	1%										
<i>Alopecurus pratensis</i>	Meadow foxtail															
<i>Cardamine hirsuta</i>	Hairy bittercress															
<i>Chamaesyce maculata</i>	Spotted sandmat															
<i>Cirsium arvense</i>	Canada thistle															
<i>Cirsium vulgare</i>	Bull thistle															
<i>Convolvulus arvensis</i>	Field bindweed													2%		
<i>Corylus avellana</i>	Common Filbert							3%	2%	2.5%						
<i>Echinochloa crus-galli</i>	Barnyard Grass															
<i>Festuca arundinacea</i>	Tall fescue							1%								
<i>Fraxinus latifolia</i>	Oregon Ash															
<i>Geranium dissectum</i>	Long-stalked geranium															
<i>Geranium molle</i>	Dovefoot geranium															
<i>Holcus lanatus</i>	Velvetgrass															
<i>Phalaris arundinacea</i>	Reed Canary Grass			2.5%			2.5%									
<i>Populus balsamifera</i>	Black cottonwood															
<i>Prunella vulgaris</i>	Self-heal															
<i>Ranunculus repens</i>	Creeping buttercup															
<i>Rubus armeniacus</i>	Himalayan blackberry	10%														
Grass Spp	Unidentified grass species															
	Overall Cover:	100%	100%		100%	100%		101%	100%		100%	100%		100%	102%	

June Survey - Vegetation Height (inches)

Transect 1 East	
Minimum	0
Maximum	15.5
Median	4.5
Mean	5.3
<6"	60%
6-12"	30%
12-24"	10%
>24"	0%

Transect 1 West	
Minimum	0.0
Maximum	9.4
Median	1.3
Mean	2.2
<6"	90%
6-12"	10%
12-24"	0%
>24"	0%

Transect 2 East	
Minimum	0.0
Maximum	11.5
Median	0.5
Mean	1.7
<6"	95%
6-12"	5%
12-24"	0%
>24"	0%

Transect 2 West	
Minimum	0.1
Maximum	7.8
Median	1.6
Mean	2.9
<6"	80%
6-12"	20%
12-24"	0%
>24"	0%

Transect 3 East	
Minimum	0.3
Maximum	7.0
Median	4.1
Mean	3.8
<6"	85%
6-12"	15%
12-24"	0%
>24"	0%

Transect 3 West	
Minimum	0.1
Maximum	8.5
Median	3.9
Mean	4.1
<6"	70%
6-12"	30%
12-24"	0%
>24"	0%

Transect 4 East	
Minimum	0.3
Maximum	6.0
Median	3.4
Mean	3.1
<6"	95%
6-12"	5%
12-24"	0%
>24"	0%

Transect 4 West	
Minimum	0.3
Maximum	7.0
Median	3.3
Mean	2.9
<6"	90%
6-12"	10%
12-24"	0%
>24"	0%

Transect 5 East	
Minimum	0.0
Maximum	18.0
Median	0.5
Mean	4.2
<6"	70%
6-12"	10%
12-24"	20%
>24"	0%

Transect 5 West	
Minimum	0.1
Maximum	14.3
Median	3.8
Mean	3.9
<6"	75%
6-12"	20%
12-24"	5%
>24"	0%

All Transects	
Minimum	0.0
Maximum	18.0
Median	2.9
Mean	3.4
<6"	81%
6-12"	16%
12-24"	4%
>24"	0%

August Survey - Vegetation Height (inches)

Transect 1 East	
Minimum	0.0
Maximum	7.5
Mean	1.0
Average	2.0
<6"	90%
6-12"	10%
12-24"	0%
>24"	0%

Transect 1 West	
Minimum	0.0
Maximum	3.0
Mean	1.0
Average	1.1
<6"	100%
6-12"	0%
12-24"	0%
>24"	0%

Transect 2 East	
Minimum	0.0
Maximum	10.0
Mean	1.5
Average	2.8
<6"	80%
6-12"	20%
12-24"	0%
>24"	0%

Transect 2 West	
Minimum	0.0
Maximum	7.0
Mean	2.5
Average	2.7
<6"	85%
6-12"	15%
12-24"	0%
>24"	0%

Transect 3 East	
Minimum	0.0
Maximum	10.0
Mean	1.5
Average	3.3
<6"	75%
6-12"	25%
12-24"	0%
>24"	0%

Transect 3 West	
Minimum	0.0
Maximum	7.0
Mean	3.0
Average	3.2
<6"	80%
6-12"	20%
12-24"	0%
>24"	0%

Transect 4 East	
Minimum	0.0
Maximum	8.5
Mean	2.8
Average	3.1
<6"	85%
6-12"	15%
12-24"	0%
>24"	0%

Transect 4 West	
Minimum	0.1
Maximum	7.5
Mean	3.9
Average	3.3
<6"	90%
6-12"	10%
12-24"	0%
>24"	0%

Transect 5 East	
Minimum	0.0
Maximum	2.0
Mean	0.5
Average	0.6
<6"	100%
6-12"	0%
12-24"	0%
>24"	0%

Transect 5 West	
Minimum	0.3
Maximum	9.5
Mean	5.0
Average	4.5
<6"	70%
6-12"	30%
12-24"	0%
>24"	0%

All Transects	
Minimum	0.0
Maximum	10.0
Mean	1.8
Average	2.6
<6"	85.5%
6-12"	14.5%
12-24"	0%
>24"	0%

Robel Pole Measurements

All measurements are in cm and represent the height of complete visual obstruction

JUNE

Transect	1 W				1 E			
VO Direction	N	S	E	W	N	S	E	W
North Plot	0	0	0	0	0	0	0	0
South Plot	0	0	0	0	0	0	0	0
Total	0				0			
Average	0				0			

Transect	2 W				2 E			
VO Direction	N	S	E	W	N	S	E	W
North Plot	10	0	0	0	0	0	0	0
South Plot	0	10	0	0	0	0	0	0
Total	20				0			
Average	2.5				0			

Transect	5 W				5 E			
VO Direction	N	S	E	W	N	S	E	W
West Plot	0	0	0	0	0	10	10	0
East Plot	0	0	0	0	0	0	0	0
Total	0				20			
Average	0				2.5			

Transect	3 W				3 E			
VO Direction	N	S	E	W	N	S	E	W
North Plot	0	0	0	0	0	0	0	0
South Plot	0	0	0	0	0	0	0	10
Total	0				10			
Average	0				1.25			

Transect	4 W				4 E			
VO Direction	N	S	E	W	N	S	E	W
North Plot	0	0	0	0	0	10	0	10
South Plot	0	0	0	0	0	0	0	0
Total	0				20			
Average	0				2.5			

AUGUST

Transect	1 W				1 E			
VO Direction	N	S	E	W	N	S	E	W
North Plot	0	0	0	0	0	0	0	0
South Plot	10	0	0	0	0	0	0	0
Total	10				0			
Average	1.25				0			

Transect	2 W				2 E			
VO Direction	N	S	E	W	N	S	E	W
North Plot	0	0	0	0	0	0	0	0
South Plot	0	0	10	0	0	0	0	0
Total	10				0			
Average	1.25				0			

Transect	5 W				5 E			
VO Direction	N	S	E	W	N	S	E	W
West Plot	0	10	10	10	0	0	0	0
East Plot	10	10	0	10	0	0	0	0
Total	60				0			
Average	7.5				0			

Transect	3 W				3 E			
VO Direction	N	S	E	W	N	S	E	W
North Plot	0	0	0	10	0	10	0	0
South Plot	10	10	10	0	10	20	10	10
Total	40				60			
Average	5				7.5			

Transect	4 W				4 E			
VO Direction	N	S	E	W	N	S	E	W
North Plot	0	0	0	0	0	0	0	0
South Plot	0	0	10	0	0	10	10	0
Total	10				20			
Average	1.25				2.5			

Appendix C:

2013 Photo Documentation

Government Island Grassland Mitigation Site

Transect 1 East 2013



June



August

Transect 1 West 2013



June



August

Transect 2 East 2013



June



August

Transect 2 West 2013



June



August

Transect 3 East 2013



June



August

Transect 3 West 2013



June



August

Transect 4 East 2013



June



August

Transect 4 West 2013



June

Missing August photo

Transect 5 East 2013



June



August

Transect 5 West 2013



June



August



NW Photo Point - June



SW Photo Point - June