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Skeetkill Creek Marsh Wetlands Mitigation Site
Second Annual Monitoring Report
2000

Prepared for

The Hackensack Meadowlands Development Commission
Division of Planning and Management, Wetlands and Water Quality

In Partial Fulfillment of Requirements for

New Jersey Department of Environmental Protection
Waterfront Development Permit and Water Quality Certificate

on the behalf of
Russo Development Corporation

Prepared by

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September 2000

Newark Bay Study Area
NBSA-00110

Skeetkill Creek Marsh Wetlands Mitigation Site
Second Annual Monitoring Report 2000

Executive Summary

The Skeetkill Creek Marsh Wetland Mitigation Site supported a dense monoculture of common reed (*Phragmites australis*), with very little open water and reduced tidal flow, prior to mitigation. In its pre-restoration condition, the site supported limited habitat diversity and few opportunities for passive recreation. On March 10, 1998, the New Jersey Department of Environmental Protection (NJDEP) Land Use Regulation Program (LURP) granted a Waterfront Development Permit and a Water Quality Certificate to the HMDC to perform wetland mitigation activities at the site. The mitigation plan included the creation of 3 acres of open water, enhancement of 5.12 acres of wetlands via excavation, and the creation of 1.2 acres of upland islands.

This is the second annual report that summarizes the status of the mitigation of the Skeetkill Creek Marsh Wetland Mitigation Site. The mitigation construction was completed in December 1998. Therefore, the data in this report was collected during the second post-mitigation growing season. Four habitats have become apparent: open water, low marsh, high marsh, and upland transition. The open water habitats include mudflats during low tides. No macrophytic vegetation grows in this zone. Both the low and high marsh habitats are dominated by obligate and facultative wetland species including: *Pluchea purpurascens*, *Eleocharis parvula*, *Phragmites australis* and *Atriplex patula*. The upland transition zone included faculatative wetland species such as *Phragmites australis* and Atriplex patula as well as numerous upland species.

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TABLE OF CONTENTS

Description		Page No.
1.	Introduction	4
1.1.	Background	4
1.2.	Mitigation Goals and Requirements	4
1.3.	Overview of Wetland Mitigation at Skeetkill Creek WMS	4
1.4.	Monitoring	5
2.	Materials and Methods	5
2.1.	General	6
2.2.	Plot Layout	6
2.3.	Sampling and Cover Determination	8
2.4.	Vegetation Cover Map	8
3.	Results	9
4.	Discussion	9
5.	Conclusions	10
6.	Recommendations	12
7.	References	

LIST OF TABLES

TABLE 1	Vascular Plant Species List for Skeetkill Creek Marsh	14
TABLE 2	Vascular Plant Species Collected In Monitoring Plots, Spring 2000	16
TABLE 3	Plot Tidal Zones and Plant Species Characteristics, Spring 2000	18
TABLE 4	Summary of Vegetation Data for Low Marsh Zone, Spring 2000	19
TABLE 5	Summary of Vegetation Data for High Marsh Zone, Spring 2000	20
TABLE 6	Summary of Vegetation Data for Upland Transition Zone, Spring 2000	21
TABLE 7	Vascular Plant Species Collected In Monitoring Plots, Summer 2000	23
TABLE 8	Plot Tidal Zones and Plant Species Characteristics, Summer 2000	24
TABLE 9	Summary of Vegetation Data for Low Marsh Zone, Summer 2000	25
TABLE 10	Summary of Vegetation Data for High Marsh Zone, Summer 2000	26
TABLE 11	Summary of Vegetation Data for Upland Transition Zone, Summer 2000	27
TABLE 12	Comparison of Vegetation Data for 1999 and 2000 Growing Seasons	28

LIST OF FIGURES

FIGURE 1	Site Location Map	30
FIGURE 2	Photograph of Pleasantview Terrace Park	31
FIGURE 2	Site map With Permanent Plots	32
FIGURE 3	Plot and Quadrat Layout	34
FIGURE 4	Data Sheet Example	36
FIGURE 6	Vegetation Cover Map	38

LIST OF APPENDICES

Appendix A:	Photographs of Permanent Plots (June and August 2000)	A: 1-24
Appendix B:	Plot frequency data, Spring 2000.	
Appendix C:	Plot cover ranks, Spring 2000.	
Appendix D:	Quadrat occurrence data, Spring 2000.	
Appendix E:	Plot frequency data, Summer 2000.	
Appendix F:	Plot cover ranks, Summer 2000.	
Appendix G:	Quadrat occurrence data, Summer 2000.	

1.0 Introduction

1.1 Background

On March 18, 1996 the Department of the Army authorized permit number 85-690, which authorized the discharge of clean fill associated with the construction of office/warehouse buildings into 57.5 acres of wetlands and waters of the United States in the Moonachie Creek watershed in the Borough of Carlstadt. As part of the Special Conditions associated with this permit, the applicant, Russo Development Corporation, was required to convey a 16.3 acre site, located at Block 4014, Lots 16, 17 and 23 in the Borough of Ridgefield, Bergen County to the Hackensack Meadowlands Development Commission (HMDC) and provide a total of $700,000.00 to the HMDC for development and implementation of a mitigation plan for the site.

The 16.3 acre site, now known as the Skeetkill Creek Marsh Wetland Mitigation Site (hereafter referred to as "the Site") was undeveloped and had not been directly used for any industrial activities; however, it exists on the fringe of an industrial area (Figure 1). Prior to mitigation, the site supported a dense monoculture of common reed (*Phragmites australis*), with very little open water and reduced tidal flow. In its pre-restoration condition, the site supported limited habitat diversity and limited opportunities for passive recreation. The Site was conveyed from Russo to the HMDC on March 16, 1998.

1.2 Mitigation Goals and Requirements

On March 10, 1998, the New Jersey Department of Environmental Protection (NJDEP) Land Use Regulation Program (LURP) granted a Waterfront Development Permit and a Water Quality Certificate to the HMDC to perform wetland mitigation activities at the Site. The mitigation plan included the creation of 3 acres of open water, enhancement of 5.12 acres of wetlands via excavation, and the creation of 1.2 acres of upland islands.

There are no Army Corps of Engineers mitigation requirements associated with this project. The NJDEP-LURP requires the HMDC to monitor the wetland mitigation project for three years after construction. The third and final monitoring report will include the following information: 1) documentation that the goals of the mitigation project have been satisfied, and 2) evidence to document 85% survival and 85% areal coverage of the mitigation plantings.

1.3 Overview of Wetland Mitigation at Skeetkill Creek Marsh Mitigation Site

The wetland mitigation design included control of *Phragmites australis*, which dominated the site prior to mitigation, grading of the marsh surface to create low and high marsh habitat, creating additional meanders in existing tidal channels, and the excavation of shallow pools to provide open water habitat. Upland waterfowl habitat nesting islands with access to open water were created. A secondary component of the design includes a passive park along Pleasantview Terrace, which runs along the northern Site boundary (Figure 2). The goal of this mitigation project was to establish habitat for waterfowl, including black ducks and other wading birds

through the use of water control structures, creating a channel/island complex and replacing a monotypic stand of *Phragmites australis* with a diversity of wetland plants.

Construction activities to implement the mitigation plan were initiated on March 30, 1998, and were concluded during December 1998. Wetland enhancements completed at the Site include: the limitation of common reed, the re-establishment of tidal flow, and the creation of open water areas and nesting islands. Planting of native vegetation within the upland portions of the Site was completed during the spring of 2000. This mitigation project should result in lowland scrub-shrub passerine habitats along the marsh/upland edge; creation of dabbling duck, shorebird, and wading bird breeding, wintering and migratory habitats; greater fishery access; and natural mosquito control.

1.4 Monitoring

A Memorandum of Understanding was executed between the HMDC and Rutgers University in December 1998 to perform monitoring activities associated with documenting the results of the mitigation efforts at the Site. The following discussions present observations recorded by Rutgers staff during the second growing season after completion of construction activities.

2.0 Materials and Methods

2.1 General

Twenty-four permanent 10' by 10' plots were established at the Site in June 1999 (Figure 3). Four permanent plots were destroyed by landscaping and were reestablished in June 2000. Vegetation monitoring was conducted during June 2000 (Spring) and again in August 2000 (Summer); photographs of each plot were taken at the time of each sampling (Appendix A). A digital camera was held at eye level (5'10") at the northeast corner of each plot, and the focus and meter settings were selected to maximize the field of view. Various markers were placed within the plot or at the edge of the plot to help clarify the plot boundaries.

Site elevations (feet NAVD88) are depicted on Figure 3. Four elevation zones were identified to define habitats based on inundation characteristics seen during the field work. The zone names indicate the category of salt marsh vegetation that is expected to become established (Day et al. 1989, Mitsch and Gosselink 1993). The elevation ranges reflect site specific flood patterns that were observed by the monitoring staff during 2000 and marked on the "as built" survey:

Elevation (NAVD88)	Vegetation Zone
<1'	submerged or mudflat
1'-2.5'	low marsh
2.5'-5.0'	high marsh
>5.0'	upland transition

2.2 Plot Layout

Plot corners were marked with metal fence posts or rebar with a PVC shaft. Each plot was subdivided into four 5'x5' subplots using 5' long wooden stakes and tent stakes as markers for the 5' interval (Figure 4). Each subplot was further subdivided into twenty-five 1'x1' squares which are referred to as **quadrats**.

The first subplot was located in the northwestern corner of the main 10'x10' plot. Quadrat 1 was located in the northwestern corner of the 5'x5' plot with subsequent quadrats designated consecutively in intervals of 5 (e.g., 1-5, 6-10, 11-15, etc.), going south from quadrat 1. Quadrat 25 was located in the southeast corner of the subplot. Upon reaching the 25th quadrat the next subplot was sampled starting with quadrat 26. This next 5'x5' subplot was situated just south of the first subplot. Again, quadrats were designated in intervals of 5 (e.g., 26-30, 31-35, 36-40, etc.) until quadrat 50 was reached. The third 5'x5' subplot was located in the northeast corner of the main 10'x10' plot starting with quadrat 51 and proceeding to quadrat 75. The final subplot was located in the southeastern corner of the main plot and sampled similarly to the others starting with quadrat 76 and ending with quadrat 100.

2.3 Sampling and Cover Determination

Each 1' by 1' quadrat was visually sampled and all vascular plant species present were listed on a data sheet (Figure 5). When species identification was not possible, an "unknown" category was created and specimens were collected from adjacent areas for identification in the lab. After all 100 quadrats within a plot had been sampled, total percent cover was estimated for each vascular plant species found within the 10' by 10' plot.

For each elevation zone, the relative percent dominance was calculated by averaging the estimated cover for each species (within each 10' by 10' plot), and dividing by the sum of the estimated cover for all plant species within all 10' by 10' plots within each elevation zone. Relative percent frequency was calculated as the number of occurrences of each species within an elevation zone divided by the total number of occurrences of all species of that elevation zone. Relative percent density was calculated as the sum of the quadrat counts for each species divided by the total quadrat count for all plant species within a particular elevation zone.

Quantitative ecology uses many methods to summarize community composition (Krebs 1989, Mueller-Dombois and Ellenberg 1974). The number of species per area can be used to estimate species richness. In this study, the number of species per 10' by 10' permanent plot is averaged for each habitat type to indicate species richness within the habitats (Appendices B and E). **Frequency** refers to the likelihood of finding a species in a given area. In this study, frequency is the number of times a species occurs in a 10' by 10 permanent plot (Appendices B and E). **Dominance** refers to spatial commonness or "cover". In this study, a visual estimate of cover rank for each plot was recorded after the quadrats had been sampled (Appendices C and F). **Density** refers to number of units per area. In this study, the number of occurrences per 100 quadrats in each 10' by 10' permanent plot is used to estimate density (Appendices D and G).

Importance value (IV) is a common, synthetic value used in describing community composition (Mueller-Dombois and Ellenberg 1974). The IV for each vascular plant species is an average of three calculations: relative dominance, relative frequency, and relative density. These are calculated, from the data described above, as follows:

$$\text{relative dominance of species A} = \frac{\text{total cover of species A}}{\text{total cover of all species}} \times 100$$

$$\text{relative frequency of species A} = \frac{\text{number of plots where species A was found}}{\text{sum of number of plots where each species was found}} \times 100$$

$$\text{relative density of species A} = \frac{\text{number of quadrats where species A was found}}{\text{sum of number of quadrats where each species was found}} \times 100$$

Calculation of IV was performed on the summarized data for each of the habitats (Smith 1974).

$$\text{Importance Value of species A} = (\text{relative dominance of species A} + \text{relative frequency of species A} + \text{relative density of species A})/3$$

It provides a synthetic estimate that is based on the cover, dispersion, and commonness of each of the species making up a plant association (Bray and Curtis 1957). Eventually, it will allow trend analysis for community succession patterns in the permanent plots (Morin 1999, Pielou 1984).

2.4 Vegetation Cover Map

A vegetation cover map was prepared for the 2000 growing season (Figure 6). The Skeetkill Creek Vegetation map was drawn using positions recorded in August 2000 using a Trimble GeoExplorer II GPS receiver. The positions were exported from Trimble internal format to a GIS layer in ArcView format. The positions were superimposed on a two-layer GIS view including 1998 air photo and the contours from the as built survey. The data from the GPS receiver is accurate within +/- 3 meters on the ground. Visual verification was used to rectify vegetation boundaries to the landmarks and survey data on the GIS layers.

The boundaries between plant communities were determined visually and recorded via GPS as the boundaries were walked; positions were recorded at two-second intervals. The perimeters of impoundments were mapped first. Next, the boundaries of *Phragmites australis* dominated areas were recorded. Then, the areas dominated by salt marsh species and upland communities were recorded.

Additional classification was conducted through onsite plant identification efforts and marked on an air photo. These data were transferred to a GIS layer, rectified with the pre-construction air photo. Finally, the map was field checked to confirm distributions and landmarks.

3.0 Results

3.1 Spring Sampling

Fifty vascular plant species occurred in the 24 monitoring plots during Spring 2000 (Table 2). Thirty-seven species are identified to genus and species; their common names and "Region 1 Wetland Indicator Status" are listed in Table 2. Herbivory and seasonal patterns of growth made identification difficult for the remaining thirteen. Seven specimens are identified to genus only; six specimens are listed as "Unknowns."

Taxonomic identification is based on the key and nomenclature of Gray's Manual of Botany Eighth (Centennial) Edition (Fernald 1991). Whenever plants could be found with flowers or fruits, identifications were confirmed using Gray's. Field workers searched areas that are adjacent to the permanent plots for plants with identical characteristics when collection was necessary. Reference specimens were collected, dried and will be added to a reference collection held in the Hartman Lab after identification is completed.

Table 3 lists the plots in each of the habitat zones and the dominant plant species present. Photos of each plot were taken at the time of Spring sampling in June (Appendix A).

The low marsh zone included five permanent plots (Table 3). Seven species were found in these plots (Table 4). Facultative wetland species (FACW) such as *Phragmites australis* and *Atriplex patula* dominated these plots (Rel. Dom. = 75 %, I.V. = 54%). Two obligate wetland species (*Pluchea purpurascens* and *Eleocharis parvula*) rank next in dominance (Rel. Dom. = 17%, I.V. = 26%).

The high marsh zone included seven permanent plots (Table 3). Nine species were found in these plots (Table 5). Facultative wetland species (FACW, *Phragmites australis* and *Atriplex patula*) dominated these plots (Rel. Dom. = 67% I.V. = 55%). *Pluchea purpurascens* is the only obligate wetland species and it ranks next in dominance (Rel. Dom. = 26%, I.V. = 24%).

The upland transition zone included ten permanent plots (Table 3). Forty-five species were found in these plots (Table 6). *Phragmites australis* had both the highest importance value (IV=14%) and the highest relative dominance (23%), followed by Atriplex patula (Rel. Dom. = 17.4%, I.V. = 12.2%)

Six plots out of 24 (25%) were dominated by *Phragmites australis* (Table 3); these included plots from low marsh (plot 6), high marsh (plots 9, 18) and upland transition zones (plots 1, 7, 10). The level of *Phragmites australis* dominance varied among plots and zones and ranged from abscence in several plots to complete dominance in plots 10 and 18 (Rel. Dom. of 100%). Thirteen plots (51.2%) had no *Phragmites australis;* however, two of the thirteen were from the submerged/mudflat habitat zone.

3.2 Summer Sampling

Thirty-six vascular plant species occurred in the 24 monitoring plots during Summer 2000 sampling (Table 7). Thirty species are identified to genus and species; their common names and "Region 1 Wetland Indicator Status" are listed in Table 7. Herbivory and seasonal patterns of growth made identification difficult for the remaining six. Four specimens are identified to genus only; two specimens are listed as "Unknowns."

Table 8 identifies the plots in each of the habitat zones and the dominant plant species present. Photos of each plot were taken at the time of sampling in August. Appendix A shows the Summer (and Spring) photos for each plot.

The low marsh zone included five permanent plots (Table 8). Six species were found in these plots (Table 9). *Pluchea purpurascens* and *Eleocharis parvula* dominated these plots and are the only obligate wetland species (Rel. Dom. = 60%, I.V. = 63%). Facultative wetland species rank next in dominance (Rel. Dom. = 38%, I.V. = 34%), and include *Atriplex patula*, *Cyperus strigosus*, and *Phragmites australis*.

The high marsh zone included seven permanent plots (Table 8). Fifteen species were found in these plots (Table 10). Facultative wetland species (FACW, *Phragmites australis*, *Polygonum* spp and *Atriplex patula*) dominated these plots (Rel. Dom. = 44%, I.V. = 44%). *Pluchea purpurascens* and *Eleocharis parvula* are the only obligate wetland species and they rank next in dominance (Rel. Dom. = 39%, I.V. = 33%).

The upland transition zone included ten permanent plots (Table 8). Thirty-one species were found in these plots (Table 11). Facultative wetland species (FACW, *Atriplex patula, Chenopodium album, Cyperus strigosa, Phragmites australis, Polygonum* spp, *Rumex pallidus* and *Solidago sempervirens*) dominated these plots (Rel. Dom. = 36%, I.V. = 36%). *Pluchea purpurascens* was the only obligate wetland species (Rel. Dom. = 11%, I.V. = 9%) found during Summer 2000 in the upland transition zone.

Seven plots out of 24 (29%) were dominated by *Phragmites australis* (Table 8); these included plots from low marsh (plots 6, 8), high marsh (plots 9, 18) and upland transition zones (plots 1, 7, 10). The level of *Phragmites australis* dominance varied among plots and zones and ranged from abscence in several plots to complete dominance in plots 7, 9, 10 and 18 (Rel. Dom. of 100%). Twelve plots (50%) had no *Phragmites australis;* however, two of the twelve were from the submerged/mudflat habitat zone.

3.3 Vegetation Map

Three general categories are included on the vegetation map: Open Water, Tidal Wetlands, and Upland Transition. Each includes two or more distinct associations.

Areas mapped as **"Open Water"** are flooded during every high tide and include no macrophytes. At low tide, small areas of mud flats are exposed, both in impoundments and along banks of Skeetkill Creek.

The tidal wetlands include two distinct vegetation types: the ***Pluchea purpurascens* dominated tidal community** and the ***Phragmites australis* dominated tidal community**. The tidal wetlands include areas regularly flooded during high tides and dominated by macrophytes. Originally, this area was dominated by *Phragmites australis*. Now there are extensive areas dominated by *Pluchea purpurascens* (salt-marsh fleabane), an obligate wetland species. Other species in this association include: *Atripexs patula* (orach), *Hibiscus moscheutos* (swamp rose mallow), *Baccharis halimifolia* (groundsel tree), and *Lythrum salicaria* (purple loosestrife). Both *Phragmites australis* and *Lythrum salicaria* have the ability to increase in these patches. In the remaining interdidal marsh, *Phragmites australis* continues to dominate. Usually, no other vascular plant species are apparent.

The upland transition zone includes patches dominated by one of three plant species: ***Polygonum lapathifolium, Phytolacca americana*** or ***Phragmites australis***. Areas of the original upland transition zone continue to be dominated by *Phragmites australis*. In areas where *Phragmites* dominance has been reduced, we note that the original upland is now dominated by *Polygonum lapathifolium* (nodding smartweed), along with *Phytolacca americana* (pokeweed) and *Melilotus alba* (white sweet clover). Other species common in this association are: *Apocynum cannabinum* (indian hemp), *Solanum dulcamara* (bittersweet nightshade), *Solanum nigrum* (black nightshade), *Oenothera biennis* (common evening primrose), *Polygonum persicaria* (lady's thumb), *Polygonum pensylvanicum* (pinkweed), *Asclepias syriaca* (common milkweed), *Lythrum salicaria* (purple loosestrife), and *Setaria spp.* (foxtail grass).

Areas of constructed uplands were made with materials resulting from the grading activities that created open water areas. Constructed raised areas that are not dominated by *Phragmites australis* (common reed) are dominated by *Phytolacca americana* (pokeweed). Other species include *Solanum dulcamara* (bittersweet nightshade), *Solanum nigrum* (black nightshade), *Atriplex patula* (orach), *Pluchea purpurascens* (saltmarsh fleabane), *Polygonum lapathifolium* (nodding smartweed), *Hibiscus moscheutos* (swamp rose mallow), *Parthenocissus quinquefolia* (Virginia creeper), and *Ailanthus altissima* (tree-of-heaven). At this time, constructed raised areas are at least 50% bare ground on top. Plant growth occurs around edges and on slopes, not on central level parts.

4.0 Discussion

This report documents site condition during the second post-construction growing season. The disturbances associated with the mitigation construction are still visible. The number of annual and short-lived perennial species is high. Vegetation types are not yet clearly associated with habitat zones.

The monitoring plots were visited frequently during the entire growing season (March-September). There were at least twelve site visits during June and August to collect the monitoring data and plant material for identifying unknowns and to take photographs.

The number of species found in all of the permanent plots has decreased from the previous year; in fact, 17 species that were seen last year were not observed in either the spring or summer sampling (Table 12). Most species that are no longer found in the plots either do not normally

occur in wetlands or rarely occur (these species either have no wetland indicator status or are FACU, indicating a 1-33% probability of occurring in wetlands). Similarly, 6 species that were not observed last year were observed this year, including 3 facultative upland species, 1 facultative wetland species, and 2 upland species (<1% occur in wetlands); these were found in the upland transition plots and may be the result of the park plantings in the upland.

Fewer species were found in the summer sampling (36 observed species) than in the spring sampling (50 observed species). Of the 50 species observed in the spring, 20 were not observed in the summer; of the 36 species found in the summer sampling, 10 were not found in the spring sampling. High marsh plots had more species present in the summer than in the spring, but more plots were dominated by *Phragmites australis*. *Phragmites australis* was more prevalent in the entire marsh during the summer sampling. These differences may reflect the changes in vegetation over a growing season. Certain species may be more prevalent early in the season, while others are not noticeable until later. Some individuals may complete their life cycle early in the season, and would not be present in a late summer sampling.

5.0 Conclusions

The low marsh plots (n=5) and the high marsh plots (n=7) were dominated by obligate and facultative wetland species during both spring and summer samplings. These areas account for approximately 60% percent of the enhanced wetland areas. Spring sampling shows a 44% relative dominance for desirable species in the low marsh and 58% relative dominance in the high marsh. The upland plots (n=10) represented approximately 10% of the Site and had a percent relative dominance of 27% for desirable wetland species. Summer sampling shows over 60% relative dominance for desirable species in both the low and high marsh. The upland plots (n=10) represented approximately 10% of the Site and had a percent relative dominance of 26% for desirable wetland species. The remaining two plots were within the impoundment areas and no vascular plant species were present in either the spring or summer samplings. Impoundments cover approximately 30% of the enhanced wetlands.

6.0 Recommendations

The monitoring team has been provided with two air photos of the site by HMDC. The first was taken during construction, at low tide. The second was taken after construction was completed (December 1998), during a high tide. We recommend that an additional photo be taken during the peak growing season (August 2001). It is essential that the schedule for this photo be set for low tide. It may not be possible to get the photo processed and rectified for the final report on September 15, 2001. An October 15 deadline is recommended.

Discussion between agencies should address the successful regrowth of *Phragmites australis* in some areas of the enhanced wetland A reduction in the area that this species can dominate in this marsh due to changes in hydrology assures a net reduction in its ultimate coverage within the enhanced wetland area. Furthermore, additional spraying or removal is **not** recommended by the monitoring team. The monitoring team does recommend discussion as soon as possible because,

if additional spraying is deemed necessary by either agency, it should be conducted within the next month.

7.0 References

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Table 1
Vascular Plant Species found at
Skeetkill Creek Marsh Wetlands Mitigations Site
Ridgefield Creek, Bergen County, New Jersey
2000

Species	Common Name	Indicator Status	Seasons found	
			Spring	Summer
Acer rubrum	Red Maple		X	X
Ailanthus altissima	Tree-of-Heaven	NI		
Ambrosia artemisiifolia	Common Ragweed	FACU	X	X
Apocynum cannabinum	Indian Hemp	FACU	X	
Artemisia vulgaris	Common Mugwort	--	X	X
Asclepias syriaca	Common Milkweed	--		X
Atriplex patula	Orach	FACW	X	X
Baccharis halimifolia	Groundsel Tree	FACW		
Cardamine oligosperma	Few-Seed Bitter Cress	NI	X	
Chenopodium album	Pigweed	FACU+	X	X
Chenopodium ambrosioides	Mexican Tea	FACU	X	X
Cirsium arvense	Creeping Thistle	--	X	X
Conyza canadensis	Canada Horseweed	UPL	X	
Cyperus strigosus	Straw-Color Flat Sedge	FACW		X
Daucus carota	Wild Carrot	--	X	X
Eleocharis parvula	Small Spikerush	OBL	X	X
Galium aparine	Catchweed Bedstraw	FACU	X	X
Hibiscus moscheutos	Swamp Rose-Mallow	--		
Juncus gerardii	Saltmeadow Rush	FACW+	X	
Lythrum salicaria	Purple Loosestrife	FACW+		X
Melilotus alba	White Sweetclover	FACU-	X	X
Melilotus officianalis	Yellow Sweetclover	FACU-	X	X
Oenothera biennis	Common Evening Primrose	FACU-		X
Oenothera laciniata	Cut-Leaf Evening Primrose	FACU-	X	
Parthenocissus quinquefolia	Virginia Creeper	FACU		X
Phragmites australis	Common Reed	FACW	X	X
Phytolacca americana	Common Pokeweed	FACU+	X	X
Plantago lanceolata	English Plantain	UPL	X	
Plantago major	Common Plantain	FACU		X
Pluchea purpurascens	Saltmarsh Fleabane	OBL	X	X
Polygonum aviculare	Doorweed	FACU	X	
Polygonum lapathifolium	Nodding Smartweed	FACW+	X	X
Polygonum persicaria	Lady's Thumb	FACW	X	X
Populus deltoides	Common Cottonwood	FAC		
Potentilla simplex	Common Cinquefoil	FACU-	X	
Robinia pseudoacacia	Black Locust	FACU-		
Rudbeckia serotina	Black-Eyed Susan	FACU-		X
Rumex obtusifolius	Bitter Dock	FACU-	X	X
Rumex pallidus	Seabeach Dock	FACW	X	X
Senecio vulgaris	Common Groundsel	FACU	X	
Solanum dulcamara	Bittersweet Nightshade	FAC-	X	X
Solanum nigrum	Black Nightshade	FACU-	X	X
Solidago sempervirens	Seaside Goldenrod	FACW	X	X
Spartina patens	Salt Hay	FACW+	X	
Stellaria media	Common Chickweed	UPL*	X	
Trifolium pratense	Red Clover	FACU-	X	
Trifolium repens	White Colver	FACU-	X	X
Triticum aestivum	Wheat	--	X	X
Vicia cracca	Cow Vetch	--	X	

Table 1
Vascular Plant Species found at
Skeetkill Creek Marsh Wetlands Mitigations Site
Ridgefield Creek, Bergen County, New Jersey
2000

UNKNOWNS				
Amaranthus sp.	--	--	X	
Oxalis sp	--	--	X	
Picea sp.	--	--	X	X
Poa sp.	--	--	X	X
Polygonum sp	--	--		X
Rhus sp.	--	--		X
Rubus sp.	--	--	X	X
Setaria sp.	--	--		
Triticum sp	--	--	X	
Small grass	--	--	X	
Unknown #1	--	--	X	X
Unknown #2	--	--	X	
Unknown broad leaf #5	--	--		
Unknown clover #1	--	--	X	
Unknown clover #2	--	--	X	
Unknown monocot	--	--		X
Unknown sedge	--	--		

Notes:

"Indicator Status" refers to wetland indicator status for Region 1 wetlands.

"Indicator Status" Key:

OBL = Obligate Wetland

FACW = Facultative Wetland

FAC = Facultative

FACU = Facultative Upland

UPL = Obligate Upland

NI = No Indicator Status

+ or -sign indicate a frequency toward higher or lower frequency of occurrence within a category

Table 2
Vascular Plant Species Collected in Monitoring Plots
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Spring 2000

Species	Common Name	Indicator Status
Acer rubrum	Red Maple	---
Amaranthus sp	---	---
Ambrosia artemisiifolia	Common Ragweed	FACU
Apocynum cannabinum	Indian Hemp	FACU
Artemisia vulgaris	Common Mugwort	---
Atriplex patula	Orach	FACW
Cardamine oligosperma	Few-Seed Bitter Cress	NI
Chenopodium album	Pigweed	FACU+
Chenopodium ambrosioides	Mexican Tea	FACU
Cirsium arvense	Creeping Thistle	---
Conyza canadensis	Canada Horseweed	UPL
Daucus carota	Wild Carrot	---
Eleocharis parvula	Small Spikerush	OBL
Galium aparine	Catchweed Bedstraw	FACU
Juncus gerardii	Saltmeadow Rush	FACW+
Melilotus alba	White Sweetclover	FACU-
Melilotus officianalis	Yellow Sweetclover	FACU-
Oenothera laciniata	Cut-Leaf Evening Primrose	FACU-
Oxalis sp.	---	---
Phragmites australis	Common Reed	FACW
Phytolacca americana	Common Pokeweed	FACU+
Picea sp.	---	---
Plantago lanceolata	English Plantain	UPL
Pluchea purpurascens	Saltmarsh Fleabane	OBL
Poa sp.	---	---
Polygonum aviculare	Doorweed	FACU
Polygonum lapathifolium	Nodding Smartweed	FACW+
Polygonum persicaria	Lady's Thumb	FACW
Potentilla simplex	Common Cinquefoil	---
Rhus sp.	---	---
Rubus sp.	---	---
Rumex obtusifolius	Bitter Dock	FACU-
Rumex pallidus	Seabeach Dock	FACW
Senecio vulgaris	Common Groundsel	FACU
Solanum dulcamara	Bittersweet Nightshade	FAC-
Solanum nigrum	Black Nightshade	FACU-
Solidago sempervirens	Seaside Goldenrod	FACW
Spartina patens	Salt Hay	FACW+
Stellaria media	Common Chickweed	UPL*
Trifolium pratense	Red Clover	FACU-
Trifolium repens	White Clover	FACU-
Triticum aestivum	Wheat	---
Triticum sp	---	---
Vicia cracca	Cow Vetch	---

Table 2
Vascular Plant Species Collected in Monitoring Plots
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Spring 2000

UNKNOWNS		
Small grass	---	---
Unknown #1	---	---
Unknown #2	---	---
Unknown broad leaf #5	---	---
Unknown clover #1	---	---
Unknown clover #2	---	---

Notes:

"Indicator Status" refers to wetland indicator status for Region 1 wetlands.

"Indicator Status" Key:

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UPL = Obligate Upland

NI = No Indicator Status

+ or -sign indicate a frequency toward higher or lower frequency of occurrence within a category

Table 3
Plot Tidal Zones and Plant Species Characteristics
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Spring 2000

TIDAL ZONE	PLOT NUMBER	DOMINANT PLANT SPECIES
Submerged	23	no vascular vegetation present
	24	no vascular vegetation present
Low Marsh	4	*Atriplex patula*
	6	*Phragmites australis*
	8	*Atriplex patula* and *Pluchea purpurascens*
	14	*Pluchea purpurascens* and *Eleocharis parvula*
	15	*Pluchea purpurascens* and unknown grass
High Marsh	2	*Atriplex patula*
	5	*Atriplex patula* and *Pluchea purpurascens*
	9	*Phragmites australis* and *Pluchea purpurascens*
	12	*Pluchea purpurascens*
	17	*Atriplex patula*
	18	*Phragmites australis*
	19	*Atriplex patula*
Upland Transition	1	*Phragmites australis*
	3	*Polygonum lapathifolium*
	7	*Phragmites australis*
	10	*Phragmites australis*
	11	*Atriplex patula*
	13	*Pluchea purpurascens*
	16	*Phytolacca americana* and *Rumex obtusifolius*
	20	*Poa* sp.
	21	*Polygonum lapathifolium* and unknown grass
	22	*Cirsium arvense*

Table 4
Summary of Vegetation Data for Low Marsh Zone
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Spring 2000

Species	Indicator Status	Relative Dominance (%)	Relative Frequency (%)	Relative Density (%)	Importance Value (%)
Artemisia vulgaris		1.72	5 88	0.66	2 76
Atriplex patula	FACW	25 86	29.41	30.08	28.45
Eleocharis parvula	OBL	1.72	5 88	0.40	2 67
Juncus gerardii	FACW+	1.72	5.88	0.13	2.58
Phragmites australis	FACW	48.28	11.76	9.10	23.05
Pluchea purpurascens	OBL	15.52	23.53	32.06	23 70
Small grass		5.17	17.65	27.57	16.80

Notes:

[1]Calculations are based on vegetation in five 10' by 10' permanent plots in the low marsh zone

[2]"Indicator Status" refers to wetland indicator status for Region 1 wetlands.

"Indicator Status" Key:

OBL = Obligate Wetland
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FACU = Facultative Upland
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+ or - sign indicate a frequency toward higher or lower frequency of occurrence within a category

Table 5
Summary of Vegetation Data for High Marsh Zone
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Spring 2000

Species	Indicator Status	Relative Dominance (%)	Relative Frequency (%)	Relative Density (%)	Importance Value (%)
Atriplex patula	FACW	30.68	25.00	33.49	29.73
Chenopodium album	FACU+	0 50	4.17	0.09	1.59
Phragmites australis	FACW	35.71	12.50	18.22	22.14
Pluchea purpurascens	OBL	26.66	20.83	25 90	24.46
Rumex pallidus	FACW	0.50	4 17	0.09	1 59
Solanum nigrum	FACU-	0.50	4.17	0 09	1 59
Solidago sempervirens	FACW	0.50	4 17	2 56	2.41
Small grass		4.02	12.50	19.17	11 90
Unknown #1		1.01	8.33	0.38	3.24

Notes:

[1]Calculations are based on vegetation in seven 10' by 10' permanent plots in the high marsh zone

[2]"Indicator Status" refers to wetland indicator status for Region 1 wetlands

"Indicator Status" Key:

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Table 6
Summary of Vegetation Data for Upland Transition Zone
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Spring 2000

Species	Indicator Status	Relative Dominance (%)	Relative Frequency (%)	Relative Density (%)	Importance Value (%)
Acer rubrum		0.63	1.89	0.16	0.89
Amaranthus sp.		0.32	0.94	0.53	0 60
Ambrosia artemisiifolia	FACU	0.32	0 94	0.05	0.44
Apocynum cannabinum	FACU	0.32	0 94	0.42	0.56
Artemisia vulgaris		3.47	5.66	7.70	5 61
Atriplex patula	FACW	17.35	6.60	12.76	12 24
Cardamine oligosperma	NI	0.32	0.94	0.16	0 47
Chenopodium ambrosioides	FACU	0.32	0.94	0 05	0.44
Cirsium arvense		8.83	1.89	4.54	5 09
Conyza canadensis	UPL	0.32	0.94	0 05	0 44
Daucus carota		0.63	1.89	0.53	1.02
Galium aparine	FACU	0 32	0 94	0.05	0 44
Melilotus alba	FACU-	0.32	0.94	0 11	0 45
Melilotus officianalis	FACU-	0.63	1.89	0 37	0 96
Oenothera laciniata	FACU-	0 63	1.89	1 90	1.47
Oxalis sp.		0.32	0.94	0 26	0.51
Phragmites australis	FACW	23.34	5.66	14 50	14 50
Phytolacca americana	FACU+	2.52	2.83	2 43	2.59
Picea sp		0.32	0.94	0 05	0 44
Plantago lanceolata	UPL	0 63	1.89	0 47	1 00
Pluchea purpurascens	OBL	2.21	1 89	4.75	2.95
Poa sp.		7.57	4.72	12 29	8 19
Polygonum aviculare	FACU	2.52	2.83	3.74	3 03
Polygonum lapathifolium	FACW+	6.62	5.66	10.18	7.49
Polygonum persicaria	FACW	0.63	1.89	0 26	0.93
Potentilla simplex		0.32	0.94	0.21	0 49
Rhus sp.		0.32	0.94	0.26	0 51
Rubus sp.		0.32	0.94	0.05	0 44
Rumex obtusifolius	FACU-	4.73	4.72	5 80	5 08
Senecio vulgaris	FACU	0.32	0 94	0.05	0 44
Small grass		1.58	4 72	5.06	3 79
Solanum dulcamara	FAC-	1.26	3.77	1 16	2 07
Solanum nigrum	FACU-	0.32	0.94	0 11	0.45
Spartina patens	FACW+	0.63	1.89	0.58	1 03
Stellaria media	UPL*	0.32	0.94	0.11	0.45
Trifolium pratense	FACU-	0.63	1.89	1.00	1 17
Trifolium repens	FACU-	1.26	3.77	0 79	1.94
Triticum aestivum		0 32	0.94	0.16	0 47
Triticum sp.		0.32	0 94	0.37	0.54

Table 6
Summary of Vegetation Data for Upland Transition Zone
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Spring 2000

Vicia cracca		0.32	0.94	0.05	0.44
Unknown #2		0.95	2.83	1.00	1 59
Unknown broad leaf #5		0.95	2.83	0.16	1.31
Unknown clover #1		0.63	1.89	0.37	0.96
Unknown clover #2		0.32	0.94	0.11	0 45
Unknown #1		2.84	3.77	4.27	3.63

Notes:

[1]Calculations are based on vegetation in ten 10' by 10' permanent plots in the upland transition zone.

[2]"Indicator Status" refers to wetland indicator status for Region 1 wetlands

"Indicator Status" Key:

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Table 7
Vascular Plant Species Collected in Monitoring Plots
Skeetkill Creek Marsh Wetlands Mitigations Site
Ridgefield Creek, Bergen County, New Jersey
Summer 2000

Species	Common Name	Indicator Status
Acer rubrum	Red Maple	FAC
Ambrosia artemisiifolia	Common Ragweed	FACU
Artemisia vulgaris	Common Mugwort	---
Asclepias syriaca	Common Milkweed	---
Atriplex patula	Orach	FACW
Chenopodium album	Pigweed	FACU+
Chenopodium ambrosioides	Mexican Tea	FACU
Cirsium arvense	Creeping Thistle	FACU
Cyperus strigosus	Straw-color Flat Sedge	FACW
Daucus carota	Wild Carrot	---
Eleocharis parvula	Small Spikerush	OBL
Lythrum salicana	Purple Loosestrife	FACW+
Melilotus alba	White Sweetclover	FACU-
Melilotus officianalis	Yellow Sweetclover	FACU-
Oenothera biennis	Common Evening Primrose	FACU-
Parthenocissus quinquefolia	Virginia Creeper	FACU
Phragmites australis	Common Reed	FACW
Phytolacca americana	Common Pokeweed	FACU+
Picea sp.	---	---
Plantago major	Common Plantain	FACU
Pluchea purpurascens	Saltmarsh Fleabane	OBL
Poa sp.	---	---
Polygonom lapathifolium	Nodding Smartweed	FACW+
Polygonum persicaria	Lady's Thumb	FACW
Polygonum sp.	---	---
Rhus sp.	---	---
Rudbeckia serotina	Black-eyed Susan	FACU-
Rumex obtusifolius	Bitter Dock	FACU-
Rumex pallidus	Seabeach Dock	FACW
Solanum dulcamara	Bittersweet Nightshade	FAC-
Solanum nigrum	Black Nightshade	FACU-
Solidago sempervirens	Seaside Goldenrod	FACW
Trifolium repens	White Clover	FACU-
Triticum aestivum	Wheat	---
UNKNOWNS		
Unknown monocot	---	---
Unknown #1	---	---

Notes:

"Indicator Status" refers to wetland indicator status for Region 1 wetlands.

"Indicator Status" Key:

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Table 8
Plot Tidal Zones and Plant Species Characteristics
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Summer 2000

TIDAL ZONE	PLOT NUMBER	DOMINANT PLANT SPECIES
Submerged	23	no vascular vegetation present
	24	no vascular vegetation present
Low Marsh	4	*Atriplex patula* and *Pluchea purpurascens*
	6	*Phragmites australis*
	8	*Phragmites australis and Pluchea purpurascens*
	14	*Pluchea purpurascens* and *Eleocharis parvula*
	15	*Atriplex patila* and *Pluchea purpurascens*
High Marsh	2	*Polygonum lapathifolium* and *Polygonum* sp.
	5	*Pluchea purpurascens*
	9	*Phragmites australis*
	12	*Pluchea purpurascens*
	17	*Atriplex patula* and *Pluchea purpurascens*
	18	*Phragmites australis*
	19	*Pluchea purpurascens*
Upland Transition	1	*Phragmites australis*
	3	*Polygonum lapathifolium* and *Polygonum* sp.
	7	*Phragmites australis*
	10	*Phragmites australis*
	11	*Atriplex patula* and *Pluchea purpurascens*
	13	*Pluchea purpurascens*
	16	*Phytolacca americana*
	20	*Poa* sp.
	21	*Polygonum lapathifolium*
	22	*Chenopodium album*

Table 9
Summary of Vegetation Data for Low Marsh Zone
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Summer 2000

Species	Indicator Status	Relative Dominance (%)	Relative Frequency (%)	Relative Density (%)	Importance Value (%)
Atriplex patula	FACW	15.84	22.22	10.86	16 31
Cyperus strigosus	FACW	0.45	5 56	0.60	2 20
Eleocharis parvula	OBL	20.36	27 78	33.41	27 18
Phragmites australis	FACW	22.62	11.11	13.39	15.71
Pluchea purpurascens	OBL	40.27	27.78	41 62	36.56
Rhus sp		0.45	5.56	0.12	2 04

Notes:

[1]Calculations are based on vegetation in five 10' by 10' permanent plots in the low marsh zone

[2]"Indicator Status" refers to wetland indicator status for Region 1 wetlands.

"Indicator Status" Key:

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+ or - sign indicate a frequency toward higher or lower frequency of occurrence within a category

Table 10
Summary of Vegetation Data for High Marsh Zone
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Summer 2000

Species	Indicator Status	Relative Dominance (%)	Relative Frequency (%)	Relative Density (%)	Importance Value (%)
Atriplex patula	FACW	8.98	6.06	11.43	8.82
Cyperus strigosus	FACW	0.90	9.09	2.16	4 05
Eleocharis parvula	OBL	4.49	3 03	8 66	5 39
Lythrum salicaria	FACW+	0.60	6.06	1.04	2.57
Oenothera biennis	FACU-	0.30	3.03	0.43	1.25
Phragmites australis	FACW	23.05	12.12	20.87	18.68
Phytolacca americana	FACU+	0.60	6.06	0.35	2.34
Pluchea purpurascens	OBL	35.33	15.15	32.64	27 71
Poa sp.		1.80	3.03	2.94	2.59
Polygonum lapathifolium	FACW+	11.38	12.12	6.75	10.08
Polygonum sp.		10.78	6.06	8.05	8.30
Rumex obtusifolius	FACU-	0.60	6.06	1.65	2.77
Trifolium repens	FACU-	0.30	3 03	1 47	1.60
Triticum aestivum		0.30	3.03	0.09	1.14
Unknown monocot		0.60	6.06	1.47	2.71

Notes:

[1]Calculations are based on vegetation in seven 10' by 10' permanent plots in the high marsh zone

[2]"Indicator Status" refers to wetland indicator status for Region 1 wetlands.

"Indicator Status" Key.

OBL = Obligate Wetland
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FAC = Facultative
FACU = Facultative Upland
UPL = Obligate Upland
NI = No Indicator Status
+ or - sign indicate a frequency toward higher or lower frequency of occurrence within a category

Table 11
Summary of Vegetation Data for Upland Transition Zone
Skeetkill Creek Marsh Wetlands Mitigation Site
Ridgefield, Bergen County, New Jersey
Summer 2000

Species	Indicator Status	Relative Dominance (%)	Relative Frequency (%)	Relative Density (%)	Importance Value (%)
Acer rubrum	FAC	0.43	3.13	0 14	1 23
Ambrosia artemisiifolia	FACU	0.22	1.56	0 07	0 62
Artemisia vulgaris		0.43	3.13	0 35	1 30
Asclepias syriaca		0.22	1.56	0 35	0 71
Atriplex patula	FACW	3.91	6.25	7.68	5 95
Chenopodium album	FACU+	7 61	1.56	7 04	5 40
Cirsium arvense	FACU	3 26	1 56	3 94	2 92
Cyperus strigosus	FACW	0.22	1 56	0.92	0 90
Daucus carota		0 22	1.56	0 14	0 64
Melilotus alba	FACU-	0.22	1.56	0.14	0 64
Melilotus officianalis	FACU-	0.43	3 13	0.56	1.37
Oenothera biennis	FACU-	0.43	3.13	1.76	1.77
Parthenocissus quinquefolia	FACU	0.22	1.56	0.07	0 62
Phragmites australis	FACW	21.74	9.38	20.42	17 18
Phytolacca americana	FACU+	13.70	9.38	7 61	10 23
Picea sp.		0 22	1 56	0.07	0.62
Plantago major	FACU	0.43	3.13	0 70	1.42
Pluchea purpurascens	OBL	11.09	4.69	12 18	9 32
Poa sp.		11.30	6.25	10.99	9.51
Polygonum lapathifolium	FACW+	9.57	7.81	9.79	9 06
Polygonum persicaria	FACW	0.22	1 56	0 14	0 64
Polygonum sp.		11.09	4.69	11 83	9.20
Rudbeckia serotina		0.22	1.56	0.35	0 71
Rumex obtusifolius	FACU-	0.22	1 56	0 07	0 62
Rumex pallidus	FACW	0.22	1.56	0.28	0 69
Solanum dulcamara	FAC-	0.65	4.69	1.41	2.25
Solanum nigrum	FACU-	0.22	1 56	0 07	0.62
Solidago sempervirens	FACW	0 65	4.69	0 21	1.85
Trifolium repens	FACU-	0.22	1.56	0.49	0.76
Unknown #1		0.22	1.56	0.07	0.62
Unknown monocot		0.22	1.56	0.14	0.64

Notes:

[1]Calculations are based on vegetation in ten 10' by 10' permanent plots in the upland transition zone

[2]"Indicator Status" refers to wetland indicator status for Region 1 wetlands.

"Indicator Status" Key:

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Table 12

A Comparison of Vascular Plant Species Collected in Monitoring Plots in 1999 and 2000

Skeetkill Creek Marsh Wetlands Mitigation Site

Ridgefield Creek, Bergen County, New Jersey

1999	2000
Acalypha rhomboidea	
	Acer rubrum
Acnida cannabina	
Ailanthus altissima	*Ailanthus altissima*
Ambrosia artemisiifolia	*Ambrosia artemisiifolia*
Apocynum cannabinum	*Apocynum cannabinum*
Artemisia vulgaris	*Artemisia vulgaris*
	Asclepias syriaca
Aster divaricatus	
Aster tenuifolius	
Atriplex patula	*Atriplex patula*
Baccharis halimifolia	
Barbarea vulgaris	
	Cardamine oligosperma
Celastrus scandens	
Chenopodium album	*Chenopodium album*
Chenopodium ambrosioides	*Chenopodium ambrosioides*
Chenopodium cf polyspermum	
Chenopodium rubrum	
	Cirsium arvense
Cirsium discolor	
Cirsium horridulum	
Commelina communis	
	Conyza canadensis
	Cyperus strigosus
Daucus carota	*Daucus carota*
Digitaria sanguinalis	
	Eleocharis parvula
Erechtites hieracifolia	
Eupatorium serotinum	
Euphorbia supina	
Fragaria vesca	
	Galium aparine
Hairy aster	
	Juncus gerardii
Lythrum salicaria	
Melilotus alba	*Melilotus alba*
	Melilotus officianalis
Oenothera biennis	*Oenothera biennis*
	Oenothera laciniata
Panicum clandestinum	
Parthenocissus quinquefolia	*Parthenocissus quinquefolia*
Phragmites australis	*Phragmites australis*
Phytolacca americana	*Phytolacca americana*
Plantago lanceolata	*Plantago lanceolata*
Plantago major	*Plantago major*
Pluchea purpurescens	*Pluchea purpurascens*
Polygonum aviculare	*Polygonum aviculare*
Polygonum careyi	
Polygonum lapathifolium	*Polygonum lapathifolium*
Polygonum pensylvanicum	

Table 12

A Comparison of Vascular Plant Species Collected in Monitoring Plots in 1999 and 2000

Skeetkill Creek Marsh Wetlands Mitigation Site

Ridgefield Creek, Bergen County, New Jersey

Polygonum persicaria	*Polygonum persicaria*
Portulaca oleraceae	
	Potentilla simplex
Prunus serotina	
Rubus allegheniensis	
Rumex crispus	
Rumex obtusifolius	*Rumex obtusifolius*
	Rumex pallidus
	Senecio vulgaris
Setaria faberi	
Setaria viridis	
Solanum dulcamara	*Solanum dulcamara*
Solanum nigrum	*Solanum nigrum*
Solanum sarachoides	
Solidago canadensis	
Solidago rugosa	
Solidago sempervirens	*Solidago sempervirens*
Spartina patens	*Spartina patens*
	Stellaria media
Taraxacum officianale	
Toxicodendron radicans	
Trifolium pratense	*Trifolium pratense*
Trifolium repens	*Trifolium repens*
	Triticum aestivum
Verbena urticifolia	
UNKNOWN	**UNKNOWN**
*Aster sp/spp.**	*Amaranthus* sp.
Hibiscus sp	*Oxalis* sp.
Morus sp.	*Picea* sp
Oxalis sp.	*Poa* sp
Phleum sp.	*Polygonum* sp.
Rubus sp.	*Rhus* sp
Solidago sp.	*Rubus* sp.
Vitis sp.	*Setaria* sp
Sedge (sm)	*Triticum* sp
Unknown alternate yellow flower	Small grass
Unknown grass (flat)	Unknown #1
Unknown grass (highly branched)	Unknown #2
unknown grass (lg)	Unknown broad leaf #5
unknown grass (sm)	Unknown clover #1
*Unknown grass 9**	Unknown clover #2
Unknown large sedge	Unknown monocot
Unknown leaves in whorls of 3	Unknown sedge
Unknown opposite entire	
Unknown panicum	
Unknown sedge	
Unknown sedge (lg)	
Unknown sedge (sm)	
Unknown short leaf grass	