

SPECIES	Year	1 METER SEGMENTS																									# intern
		upland end	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Agrostis <i>Agrostis australis</i>	1999		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13
	S 2000		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12
	F 2000		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12
	2001		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
	2002																										0
	2003																										0
	2004																										14
	2005																										0
	2006																										17
Ischaemum <i>Ischaemum</i>	2007		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17	
	2008		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	2009																										0
	2001																										10
	2002																										0
	2003																										6
	2004																										8
	2005																										6
	2006																										9
Spartina <i>Spartina sempervirens</i>	2007																										0
	2008																										11
	2009																										0
	2001																										0
	2002																										0
	2003																										11
	2004																										0
	2005																										0
	2006																										12
Spartina <i>Spartina</i>	2007																										11
	2008																										10
	2009																										0
	2001																										0
	2002																										0
	2003																										0
	2004																										14
	2005																										0
	2006																										14
Spartina <i>Spartina</i>	2007																										0
	2008																										14
	2009																										0
	2001																										0
	2002																										0
	2003																										0
	2004																										11
	2005																										0
	2006																										14
Spartina <i>Spartina</i>	2007																										0
	2008																										14
	2009																										0
	2001																										0
	2002																										0
	2003																										0
	2004																										0
	2005																										0
	2006																										0
Spartina <i>Spartina</i>	2007																										0
	2008																										0
	2009																										0
	2001																										0
	2002																										0
	2003																										0
	2004																										0
	2005																										0
	2006																										0
Spartina <i>Spartina</i>	2007																										0
	2008																										0
	2009																										0
	2001																										0
	2002																										0
	2003																										0
	2004																										0
	2005																										0
	2006																										0
Spartina <i>Spartina</i>	2007																										0
	2008																										0
	2009																										0
	2001																										0
	2002																										0
	2003																										0
	2004																										0
	2005																										0
	2006																										0
Spartina <i>Spartina</i>	2007																										0
	2008																										0
	2009																										0
	2001																										0
	2002																										0
	2003																										0
	2004																										0
	2005																										0
	2006																										0
Spartina <i>Spartina</i>	2007																										0
	2008																										

**Transect 0 downstream REFERENCE**

Observers and dates

2001 S 5/10/01, Liz Duff  
 2001 F 8/25/01, LD, ADR  
 2003 Data Collected 4/22/2004 for Fall 2003, Duff & Magnuson  
 2004 Duff & Yao 10/19/04 11/19/07 Duff and Densmore 11/3/08 Duff Phippen, Inglesinger  
 2005 Duff 10/05/05  
 2006 Duff and Sandler 10/23/06

SPECIES	upland end	1 METER SEGMENTS																									marsh end	# intervals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		
Phragmites <i>Phragmites australis</i>	S 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	
	F 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	
	2002	Data Not Collected																									0	
	2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17	
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18	
	2005	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18	
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19	
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	
	2009	Data Not Collected																									0	
Goldenrod <i>Solidago sempervirens</i>	S 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2		
	F 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8		
	2002	Data Not Collected																									0	
	2003	Data Not Collected																									0	
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4		
	2005	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
	2009	Data Not Collected																									0	
Saltmeadow cordgrass <i>Spartina patens</i>	S 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17		
	F 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13		
	2002	Data Not Collected																									0	
	2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12		
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19		
	2005	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12		
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17		
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23		
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22		
	2009	Data Not Collected																									0	
Baltic Rush <i>Juncus balticus</i>	S 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	25		
	F 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12		
	2002	Data Not Collected																									0	
	2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19		
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20		
	2005	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20		
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14		
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20		
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18		
	2009	Data Not Collected																									0	
Switch Grass <i>Panicum virgatum</i>	S 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23		
	F 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15		
	2002	Data Not Collected																									0	
	2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18		
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17		
	2005	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13		
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15		
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16		
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17		
	2009	Data Not Collected																									0	
Spike Grass <i>Distichlis spicata</i>	S 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11		
	F 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2		
	2002	Data Not Collected																									0	
	2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5		
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14		
	2005	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7		
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11		
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8		
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3		
	2009	Data Not Collected																									0	
Creeping Bent Grass <i>Agrostis stolonifera</i>	S 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0		
	F 2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6		
	2002	Data Not Collected																									0	
	2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2		
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3		
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0		
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10		
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9		
	2009	Data Not Collected																									0	

is immature



Massachusetts Audubon Society, Endicott Center  
 Long Range Phragmites Study  
 Location: Cedar Point Ipswich

**Restoration Occured Spring 2000**  
 Transect 1 Upstream

Observers and dates  
 2000 11/8/00 Duff, ?  
 2001 10/25/01, Duff, ADR  
 2002 Duff/Kagle  
 2003 Data Collected 4/22/2004  
 2004 Duff & Arl 11/19/07 D  
 10/20/2004 11/3/08 Du  
 2005 Duff and Rose 10/5/05  
 for Fall 2003, Duff & Magnu.  
 2006 Duff and Sandler 10/23/06

SPECIES

upland end **1 METER SEGMENTS** marsh end

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Phragmites <i>Phragmites australis</i>	2000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
	2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2002	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2005	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2009																									
Goldenrod <i>Solidago sempervirens</i>	2000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	2002	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	2005	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	2009																									
Black Grass <i>Juncus gerardii</i>	2000																									
	2001																									
	2002																									
	2003																									
	2004																									
	2005																									
	2006																									
	2007																									
	2008																									
	2009																									
Baltic Rush <i>Juncus balticus</i>	2000																									
	2001																									
	2002																									
	2003																									
	2004																									
	2005																									
	2006																									
	2007																									
	2008																									
	2009																									
Switch Grass <i>Panicum virgatum</i>	2000																									
	2001																									
	2002																									
	2003																									
	2004																									
	2005																									
	2006																									
	2007																									
	2008																									
	2009																									
Marsh Elder <i>Iva frutescens</i>	2000																									
	2001																									
	2002																									
	2003																									
	2004																									
	2005																									
	2006																									
	2007																									
	2008																									
	2009																									
Orach <i>Atriplex patula</i>	2000																									
	2001																									
	2002																									
	2003																									
	2004																									
	2005																									
	2006																									
	2007																									
	2008																									
	2009																									

**# of intervals present in**  
 15  
 17  
 16  
 18  
 17  
 18  
 18  
 19  
 18  
 0  
 24  
 17  
 14  
 13  
 13  
 12  
 12  
 12  
 10  
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 5  
 11  
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 0  
 2  
 2  
 2  
 0  
 0  
 9  
 21  
 18  
 17  
 20  
 14  
 18  
 10  
 19  
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 15  
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 16  
 14  
 17  
 13  
 20  
 21  
 22  
 0  
 4  
 7  
 6  
 2  
 6  
 4  
 3  
 6  
 3  
 0  
 11  
 15  
 2  
 0  
 0  
 1  
 3  
 0  
 0  
 0



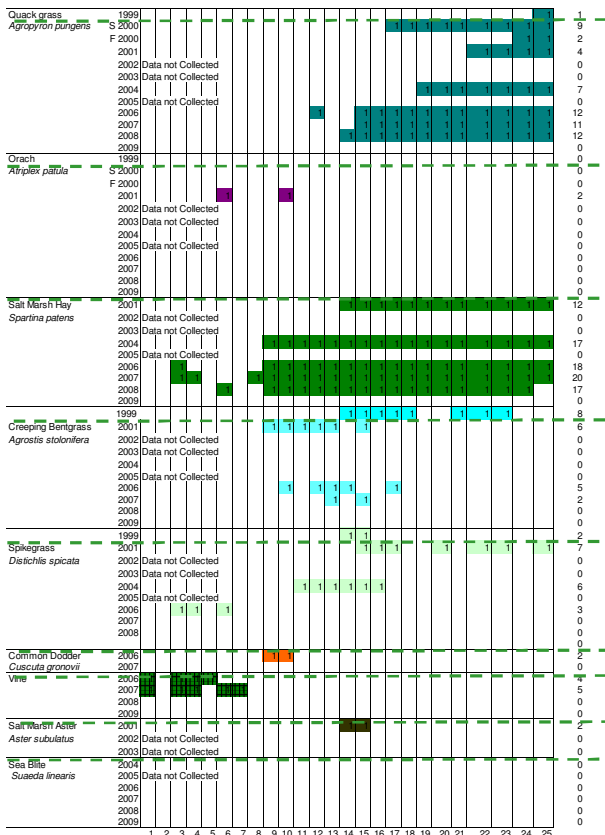




Massachusetts Audubon Society, Endicott Center  
 Long Range Phragmites Study Restoration Occurred Spring 2000  
 Location: Cedar Point Ipswich  
 Salinity range in Phrag: 9-15  
 Wet 5 salinity: 10-20

Observers and dates  
 1999 2004 Duff and Yao 10/19/04  
 2000 2006 Duff and Sandler  
 2001 10/25/01, LD, ADR 11/19/07 Duff and Densmore  
 2002 Duff/Kagle 1/13 Duff, Phippen  
 2003 Data collected #22, 2004 Fall 03, Duff & Mag.

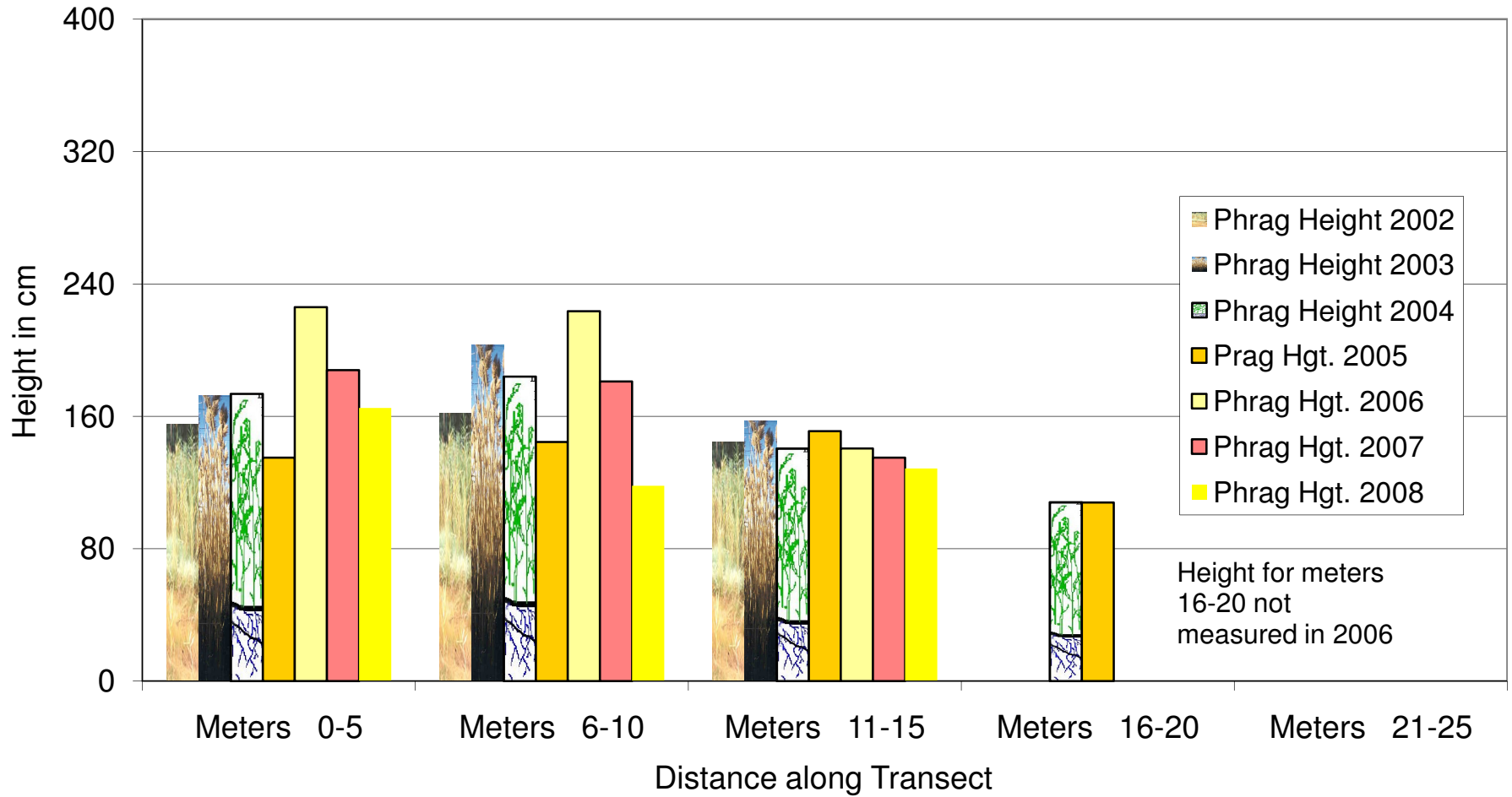
SPECIES	1 METER SEGMENTS																										# Intervals
	upland end	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	marsh end	
Phragmites	1999	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13
<i>S 2000</i>	2000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12
<i>F 2000</i>	2000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12
Phragmites australis	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
	2002	Data not Collected																									0 Restored
	2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14 Fall 2000
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
is immature	2005	Data not Collected																									0
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	2009	Data not Collected																									0
Goldenrod	1999																										6
<i>S 2000</i>	2000																										6
<i>F 2000</i>	2000																										6
	2007																										9
	2002	Data not Collected																									0
	2003	Data not Collected																									0
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11
	2005	Data not Collected																									0
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10
	2009	Data not Collected																									0
Black grass "tick grass"	1999																										1
<i>S 2000</i>	2000																										1
<i>F 2000</i>	2000																										17
<i>?? mis (Det Baltic rush)</i>	2000																										17
Baltic Rush	2001																										17
<i>S 2000</i>	2000																										17
<i>F 2000</i>	2000																										17
<i>?? mis (Det Baltic rush)</i>	2000																										17
Baltic Rush	2002	Data not Collected																									0
<i>S 2000</i>	2002	Data not Collected																									0
<i>F 2000</i>	2002	Data not Collected																									0
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11
	2005	Data not Collected																									0
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	2009	Data not Collected																									0
Switch Grass	1999																										18
<i>S 2000</i>	2000																										18
<i>F 2000</i>	2000																										18
	2001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19
	2002	Data not Collected																									0
	2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
	2005	Data not Collected																									0
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19
	2009	Data not Collected																									0
Marsh Elder	1999																										2
<i>S 2000</i>	2000																										1
<i>F 2000</i>	2000																										2
	2001																										3
	2002	Data not Collected																									0
	2003	Data not Collected																									0
	2004	Data not Collected																									0
	2005	Data not Collected																									0
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2009	Data not Collected																									0
Purple Loosestrife	1999																										8
<i>S 2000</i>	2000																										15
<i>F 2000</i>	2000																										15
<i>?? Mis Ided Wood Sage</i>	2001																										1
	2002	Data not Collected																									0
	2003	Data not Collected																									0
	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2005	Data not Collected																									0
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
	2009	Data not Collected																									0
American Germander ( <i>Teucrium canadense</i> )	2004	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2005	Data not Collected																									0
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
	2007	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
	2009	Data not Collected																									0



Location: Cedar Point Ipswich

Transect 2 Upstream

Average *Phragmites* Heights, Transect # 1.5, Cedar Point, Ipswich, MA  
2002-2008





Average *Phragmites* Heights, Transect # 2, Cedar Point Ipswich, MA  
1999-2008

1999 is pre-restoration. All the rest is  
post restoration.  
Transect was not monitored in 2002.

