

**National Wetland Condition
Assessment
Great Meadow
Mount Desert Island, Maine
2023 Progress Report**

National Wetland Condition Assessment Great Meadow, Mount Desert Island, Maine 2023 Progress Report

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Table of Contents

Introduction	4
Methods	4
Results and discussion	5
Water level monitoring	5
Vegetation monitoring	5
Literature Cited	20
Appendix 1 Water and well depth measurements	27
Appendix 2 Photopoints	30
Appendix 3 Vegetation survey data	70

INTRODUCTION

Maine has over five million acres of freshwater wetlands. These wetlands are valuable not only for their beauty, but also for their capacity for regulating stream flow and for water retention during extreme weather events. Without wetlands as a natural flood control mechanism, flooding can become more severe.

In Acadia National Park, wetlands make up roughly 20% of the total area of the Park. Great Meadow, in the valley between Dorr and Kebo Mountains on Mount Desert Island, is one of the largest palustrine wetlands (47 hectares) in the Park. It is a mixed wetland complex that includes emergent shrub/fen communities and adjacent forested wetlands (Calhoun et al. 1994). Portions of the wetland had substantial evidence of alteration in the past including roads, berms, ditching, and beaver activity (Manville 1942, Calhoun et al. 1994), which overall has restricted water flow in this wetland and altered the vegetative community (Vaux et al. 2008). Acadia National Park is planning some culvert work in the Great Meadow watershed over the next few years that may further alter water flow dynamics in the wetland, although the intent of the work is to make appropriate modifications to the culvert without altering the hydrology of the wetland. The goal of this project is to document water levels and assess vegetation in the wetland using dataloggers in wells following protocols developed by the U.S. Environmental Protection Agency (2016).

Great Meadow and the surrounding forested wetlands have extensive populations of invasive plants, more than any other location in Acadia National Park (Vaux et al. 2008). Invasive plants (purple loosestrife, *Lythrum salicaria*; glossy false buckthorn, *Frangula alnus*; shrubby St. Johnswort, *Hypericum prolificum*; and amur maple, *Acer ginnala*) in the vicinity of Great Meadow have been treated annually with herbicides since 1993.

Greene et al. (1999) conducted surveys of aquatic plants in Great Meadow and documented 11 aquatic species in the deeper portions of the wetland. The rare plant, Wiegand's sedge (*Carex niegandii*), has been reported in Great Meadow. Wiegand's sedge, previously listed as a globally vulnerable species and a rare species in Maine, was documented in the wet birch woods west of Great Meadow in 1987 (Greene 1990, Greene et al. 2002, Nichols 2002). The conservation plan for this species in New England (Nichols 2002) recommended habitat protection, monitoring, and relocating historical occurrences. In addition, this conservation plan noted factors that may contribute to the loss of this species included the loss and degradation of habitats by wetland filling, nutrient runoff, and alteration to hydrological and disturbance regimes (Nichols 2002). Our knowledge of this species in the northeast, however, has increased since 2002 and this species is no longer considered globally rare and is now considered an uncommon but not rare species in Maine (D. Cameron, Maine Natural Areas Program, pers. comm.).

Reptiles and amphibians have also been documented from Great Meadow area. Brotherton et al. (2004) reported common garter snakes (*Thamnophis sirtalis*), eastern milk snakes (*Lampropeltis triangulum*), spotted salamanders (*Ambystoma maculatum*), four-toed salamanders (*Hemidactylium scutatum*), spring peepers (*Pseudacris crucifer*), American bullfrogs (*Rana catesbeiana*), northern green frogs (*Rana clamitans*), wood frogs (*Rana sylvatica*), and pickerel frogs (*Rana palustris*) in Great Meadow. The four-toed salamander was listed as a species of Special Concern by the Maine Department of Inland Fisheries and Wildlife (Hunter et al. 1999), but recent surveys suggest the species is more common and is not now considered a species of concern in Maine (<http://www.maine.gov/ifw/wildlife/endangered/specialconcern.htm>).

In Great Meadow, the emergent wetland with its bordering forested wetlands is known for very high diversity of birds (Witt 1994, Vaux et al. 2008). Two birds of conservation concern in Acadia National Park, American Bittern (*Botaurus lentiginosus*) and Virginia Rail (*Rallus limicola*), have been documented breeding in the Great Meadow area (Witt 1997, Vaux et al. 2008).

METHODS

All vegetation and water level plot setup and monitoring techniques followed Miller and Mitchell (2013) and US Environmental Protection Agency (2011). Ten permanent vegetation plots were established and monitored in Great Meadow on Mount Desert Island between mid-July and mid-August, 2015 (Mittelhauser 2016).

We installed permanent PVC wells for monitoring water levels with HOBO data loggers in 6 of these plots and have monitored water levels hourly since deployment during 2015. Water level and water temperature was monitored in plots 1–6 in the wetland (Table 1, Figure 1) using HOBO U20L dataloggers set in slotted PVC wells. Annually in the spring and the fall since 2015, we downloaded water level data from the data loggers and corrected

the data using local atmospheric pressure data.

During the summer of 2023, we conducted rapid field assessment (US Environmental Protection Agency 2011) of all 10 plots in Great Meadow. For all plots, species of plants were documented and photopoints were taken during July of 2023.

RESULTS AND DISCUSSION

We set up 10 permanent monitoring plots in Great Meadow during 2015 (Table 1, Figure 1). All plot centers used the randomly selected coordinates, with the exception of plot 4 that we moved slightly following standard protocols (US Environmental Protection Agency 2016) so that the plot and the associated well was not as visible from the adjacent trail.

Water level monitoring. We set up and maintained 6 PVC wells, in plots 1-6 (Figures 1), to monitor water level in relation to the wetland surface (Figure 2). Dataloggers were deployed from mid-July to mid-August, 2015 and hourly water levels reported in this progress report were documented from deployment until 19 Oct 2023. All dataloggers were replaced in the wells on 15 October 2019 since battery were beginning to be at risk of failing - these new loggers should last through until the spring or fall of 2024 before needing replacement again. Graphs of water level in each well from 2015 to 2023, relative to the surface of the wetland, by month are given in Figures 3-8. Graphs of water level in each well for 2022-23, relative to the surface of the wetland, by month along with daily precipitation totals are given in Figures 9-14. Details on the standard measurements taken at each well during downloads are given in Appendix 1.

Plot 5 (Figure 1) is the wettest plot studied, with water levels typically above the wetland surface. Plot 2 is also a fairly wet plot, although water levels vary both above and below the wetland surface depending on precipitation levels. Plot 4 is a vernal pool, so water levels vary seasonally at this site. The remaining plots 1, 3, and 6 typically have water levels below the wetland surface, with plots 3 and 6 drying out the most during dry periods and plot 1 drying out the least during dry periods.

Vegetation monitoring. We documented 117 plant species in the plots during our sampling efforts in 2015, 2020, and 2023 (table 2). Ninety-seven percent of the species documented in the plots were native. Glossy false buckthorn (*Frangula alnus*), Toringo crab apple (*Malus sieboldii*), and creeping bentgrass (*Agrostis stolonifera*) were the only 3 non-native species documented in the plots in the wetland. The Toringo crab apple plants documented were extremely small seedlings, often with only 1 emerging leaf, and were difficult to positively identify from other spe-

Table 1. UTM coordinates of the center of permanent plots established in Great Meadow, Mount Desert Island, 2015 and the sampling conducted at each plot during 2020.

Plot #	UTM_Northing	UTM_Easting	RAM assessment	Water level monitoring
1	563119	4912595	Yes	Yes
2	563070	4913161	Yes	Yes
3	562813	4912849	Yes	Yes
4	562907	4912908	Yes	Yes
5	563200	4912819	Yes	Yes
6	563006	4912922	Yes	Yes
7	563061	4912553	Yes	No
8	563371	4912986	Yes	No
9	562973	4912763	Yes	No
10	563256	4912949	Yes	No

Figure 1. Locations of the 10 permanent plots established in Great Meadow, Mount Desert Island, during 2015.

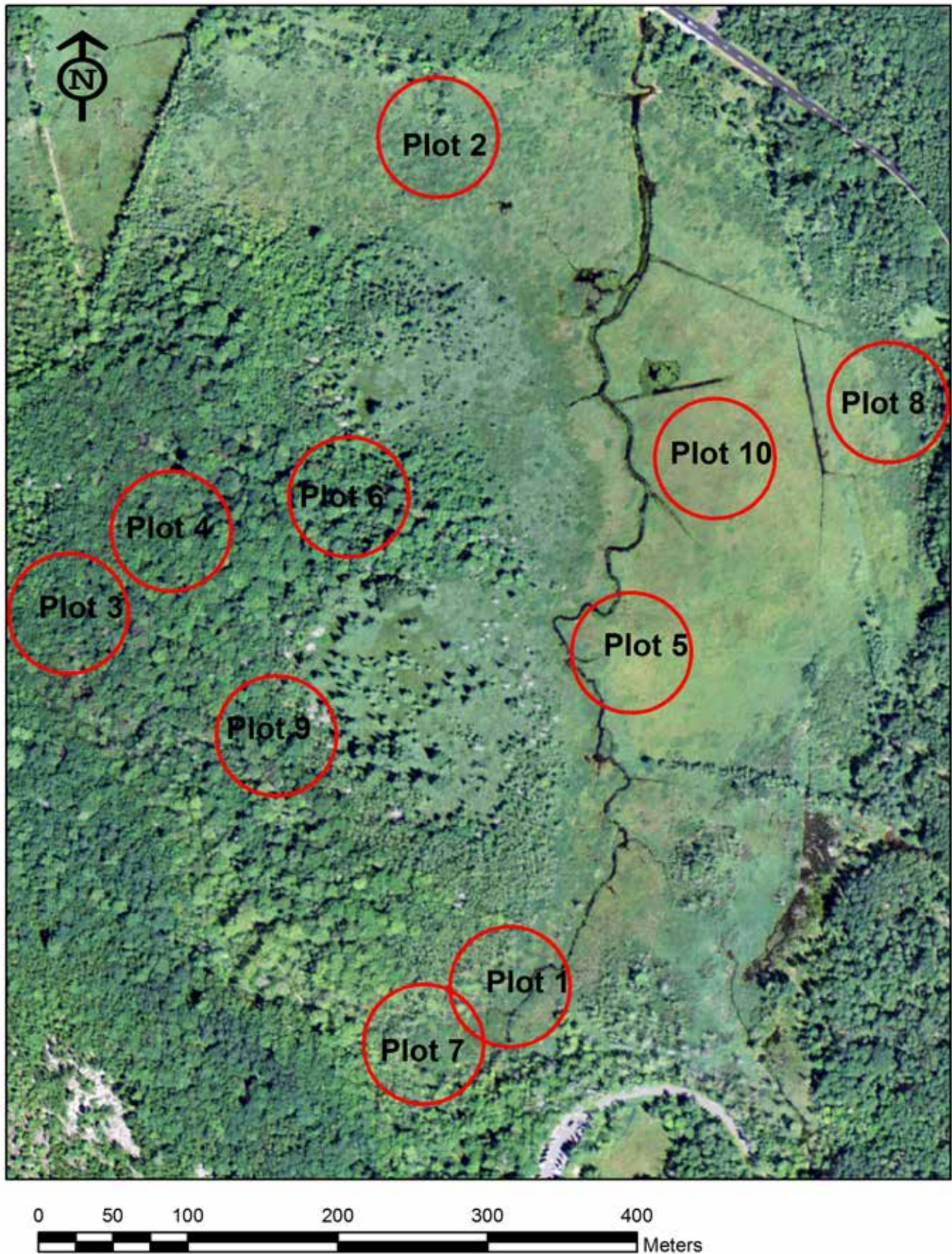


Figure 2. Water levels in relation to wetland surface, all plots, Great Meadow, Mount Desert Island 2023.

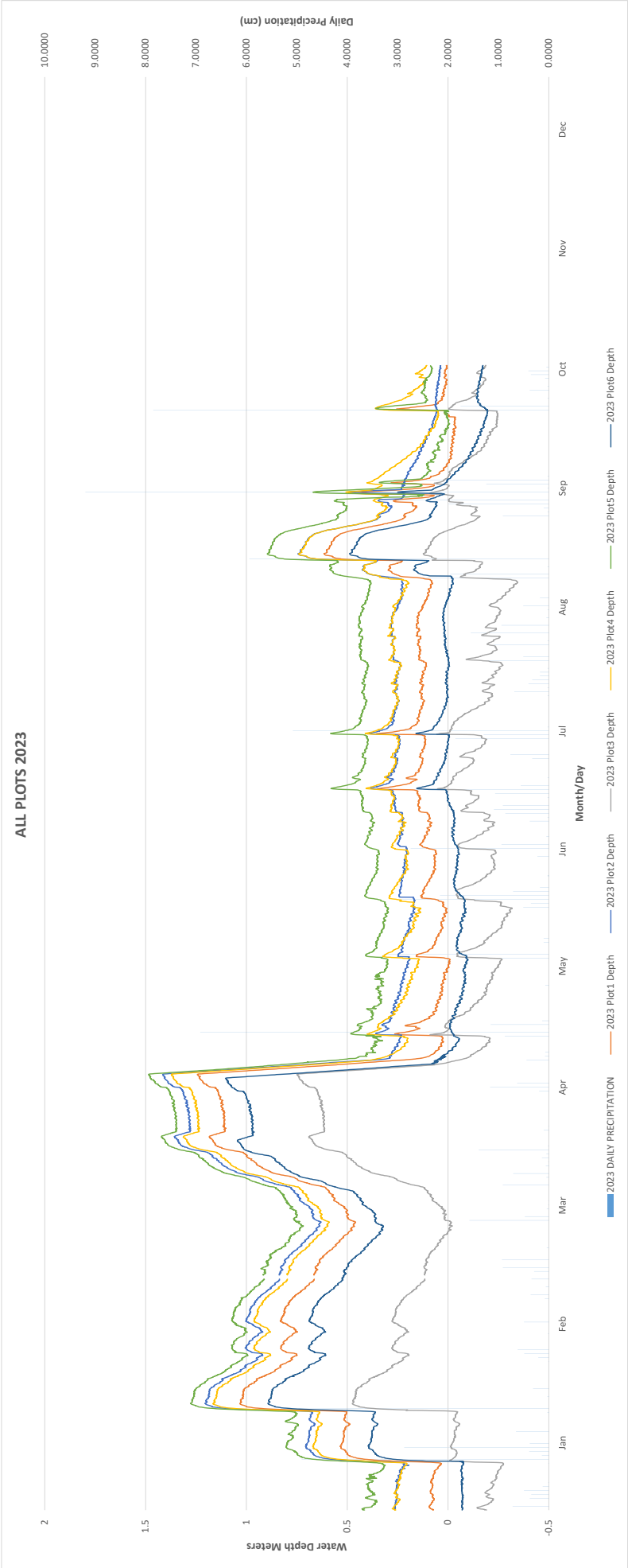


Figure 3. Water levels in relation to wetland surface, Plot 1, Great Meadow, Mount Desert Island 2015-2023.

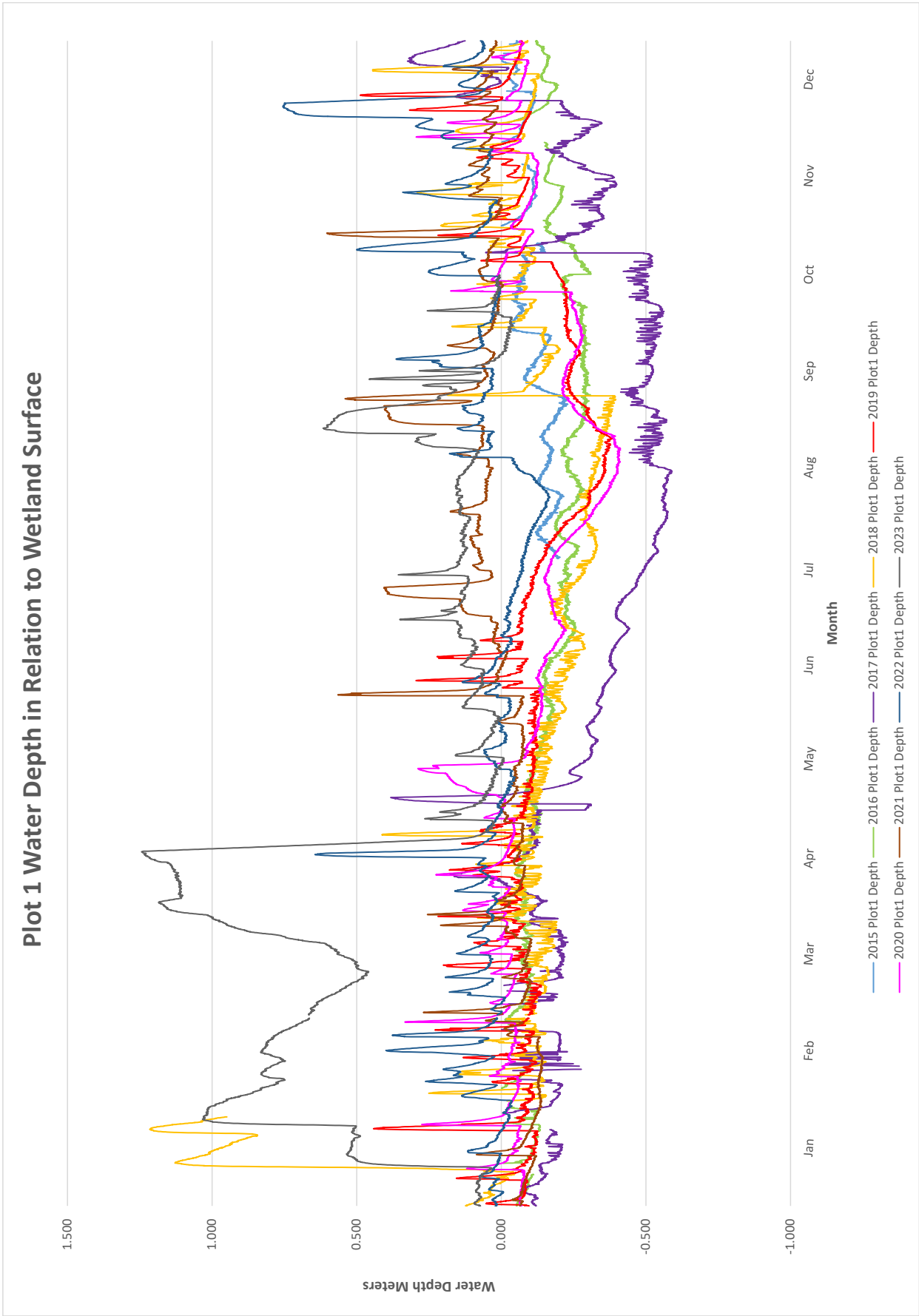


Figure 4. Water levels in relation to wetland surface, Plot 2, Great Meadow, Mount Desert Island 2015-2023.

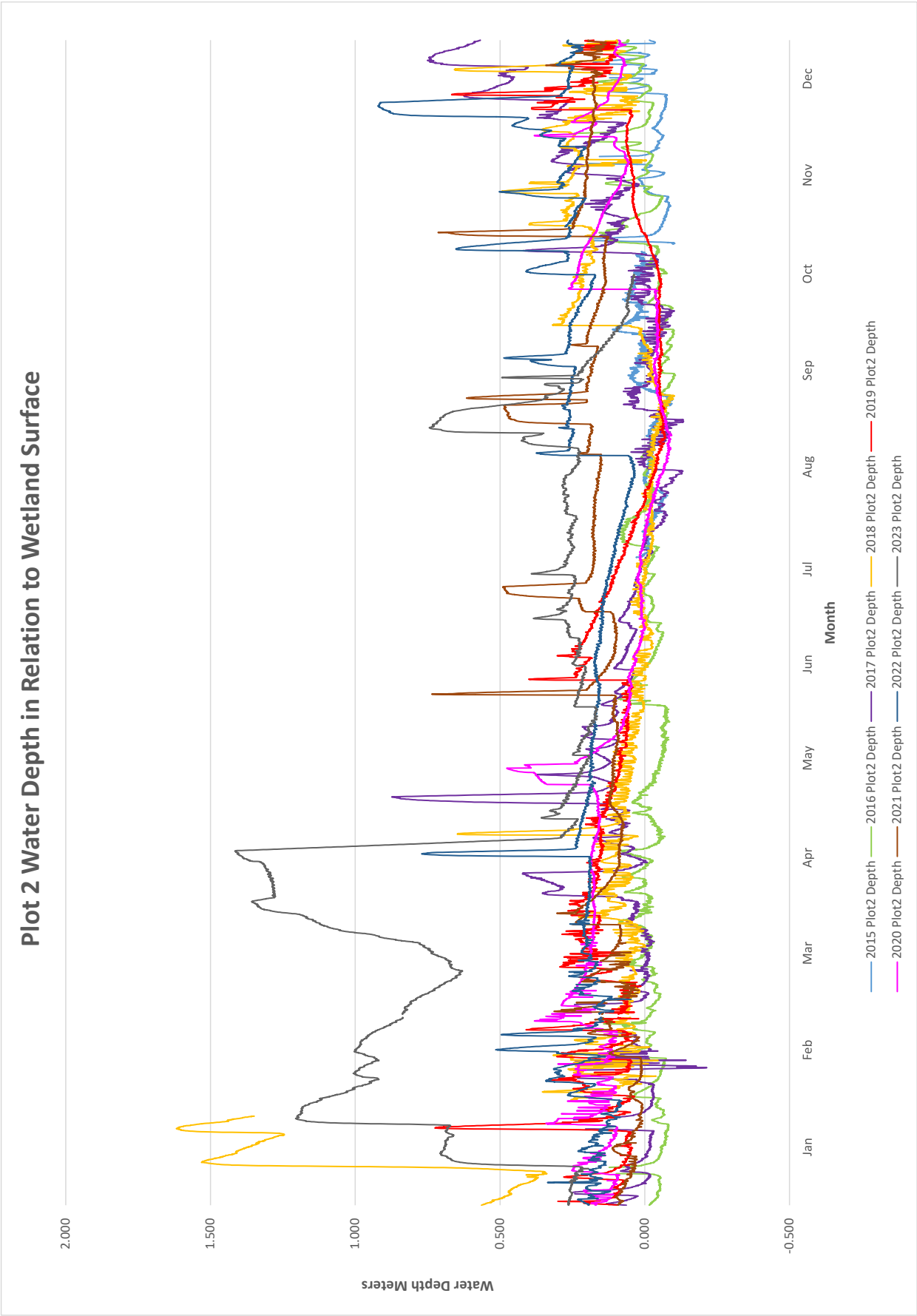


Figure 5. Water levels in relation to wetland surface, Plot 3, Great Meadow, Mount Desert Island 2015-2023.

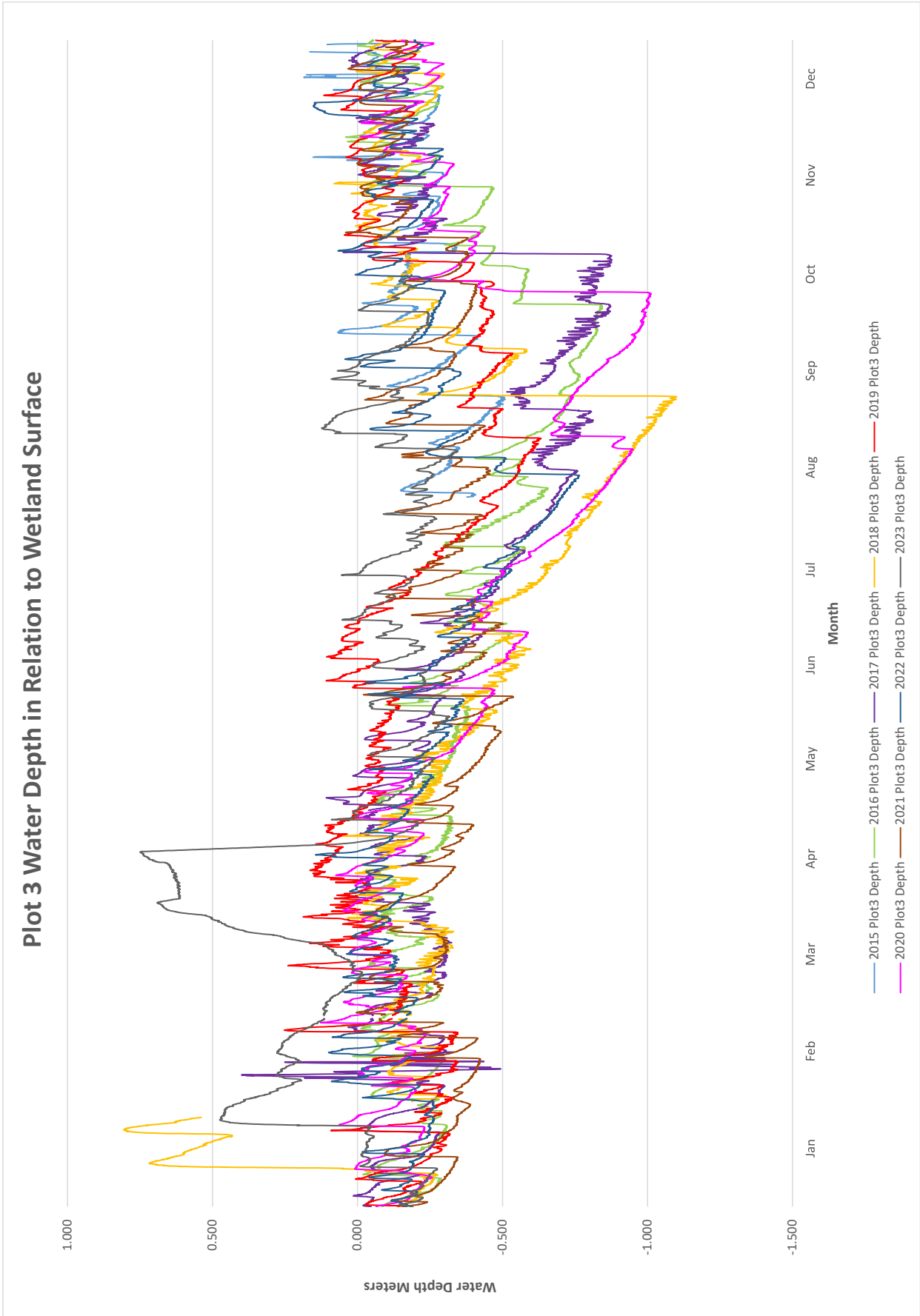


Figure 6. Water levels in relation to wetland surface, Plot 4, Great Meadow, Mount Desert Island 2015-2023.

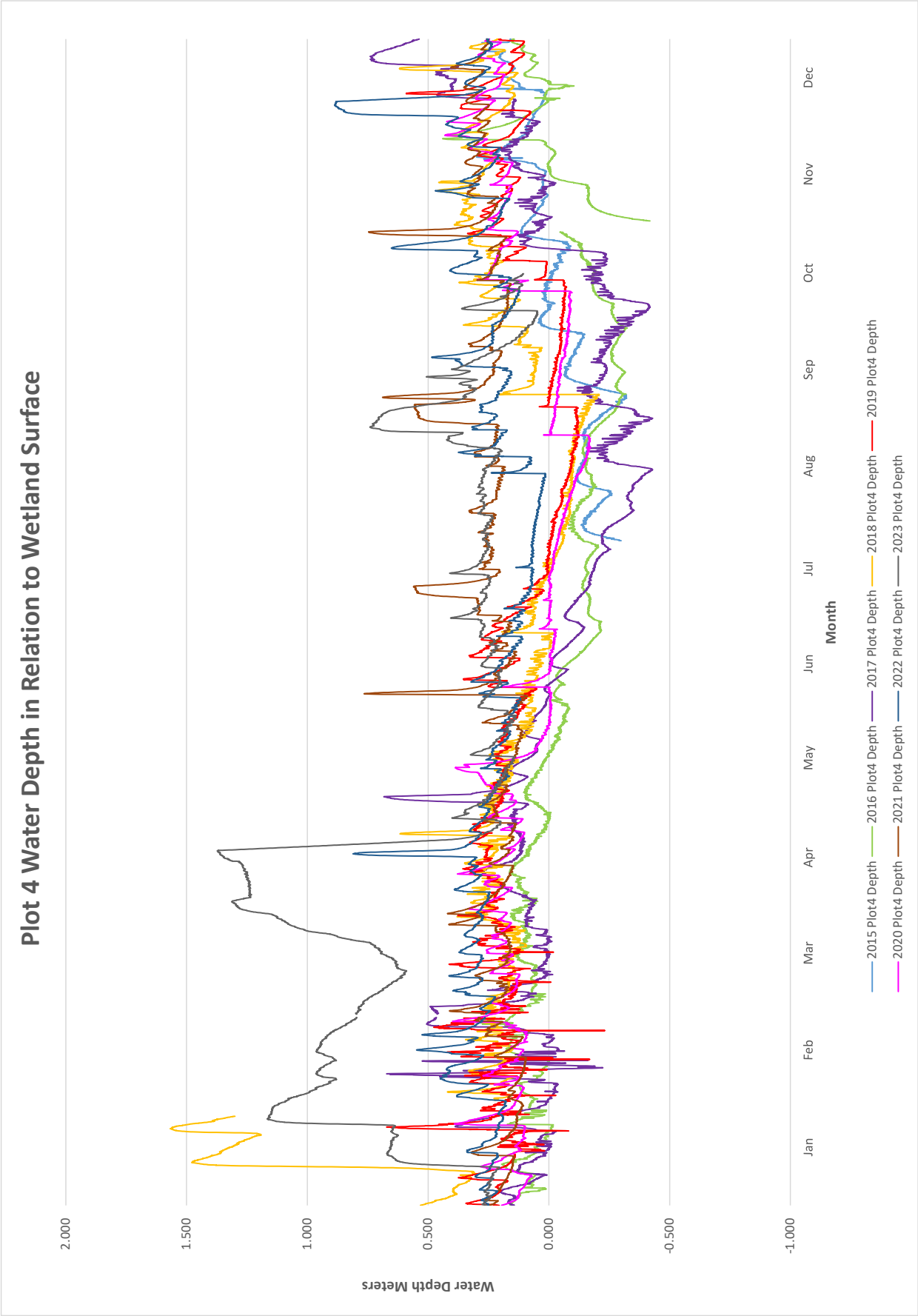


Figure 7. Water levels in relation to wetland surface, Plot 5, Great Meadow, Mount Desert Island 2015-2023.

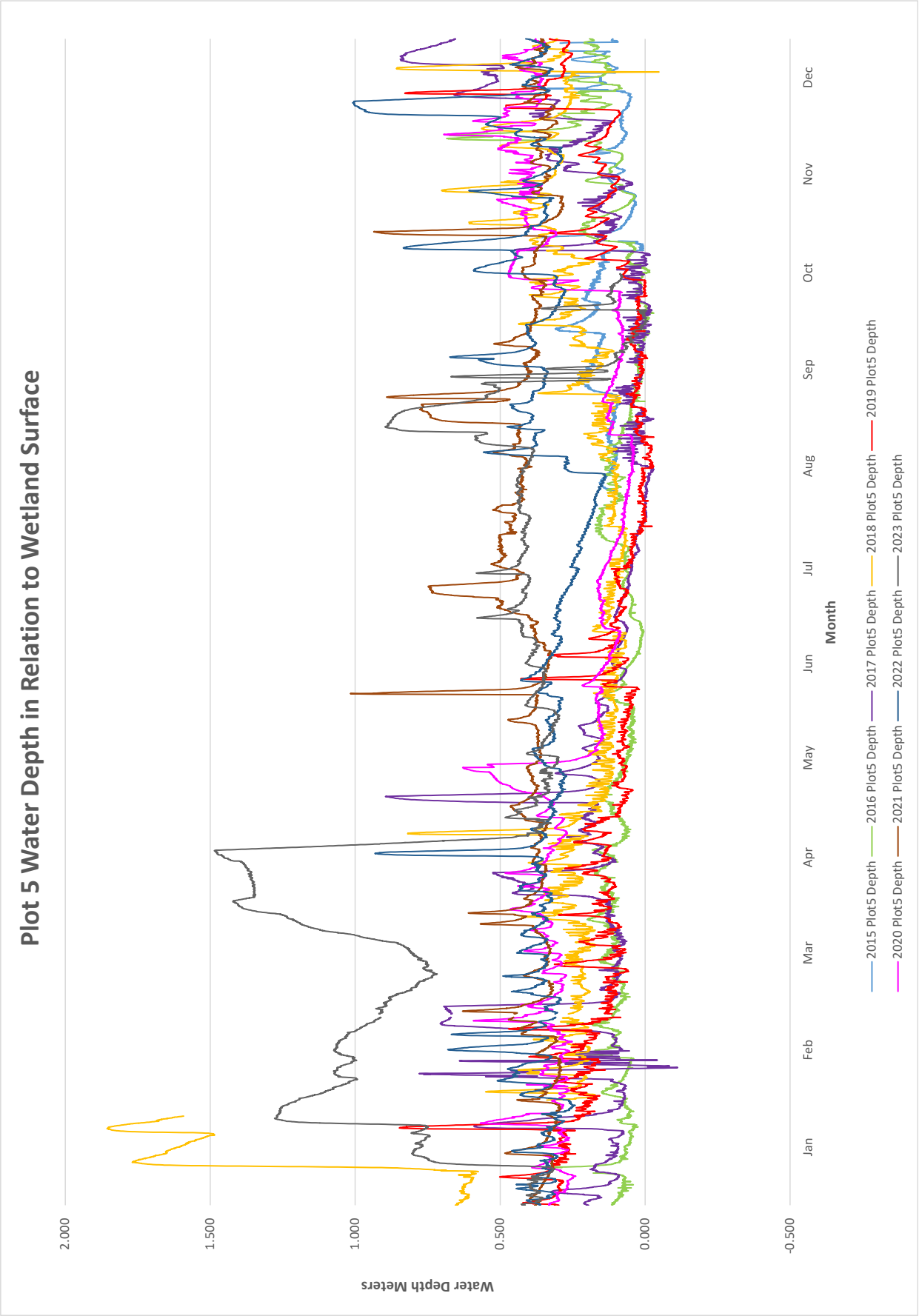


Figure 8. Water levels in relation to wetland surface, Plot 6, Great Meadow, Mount Desert Island 2015-2023.

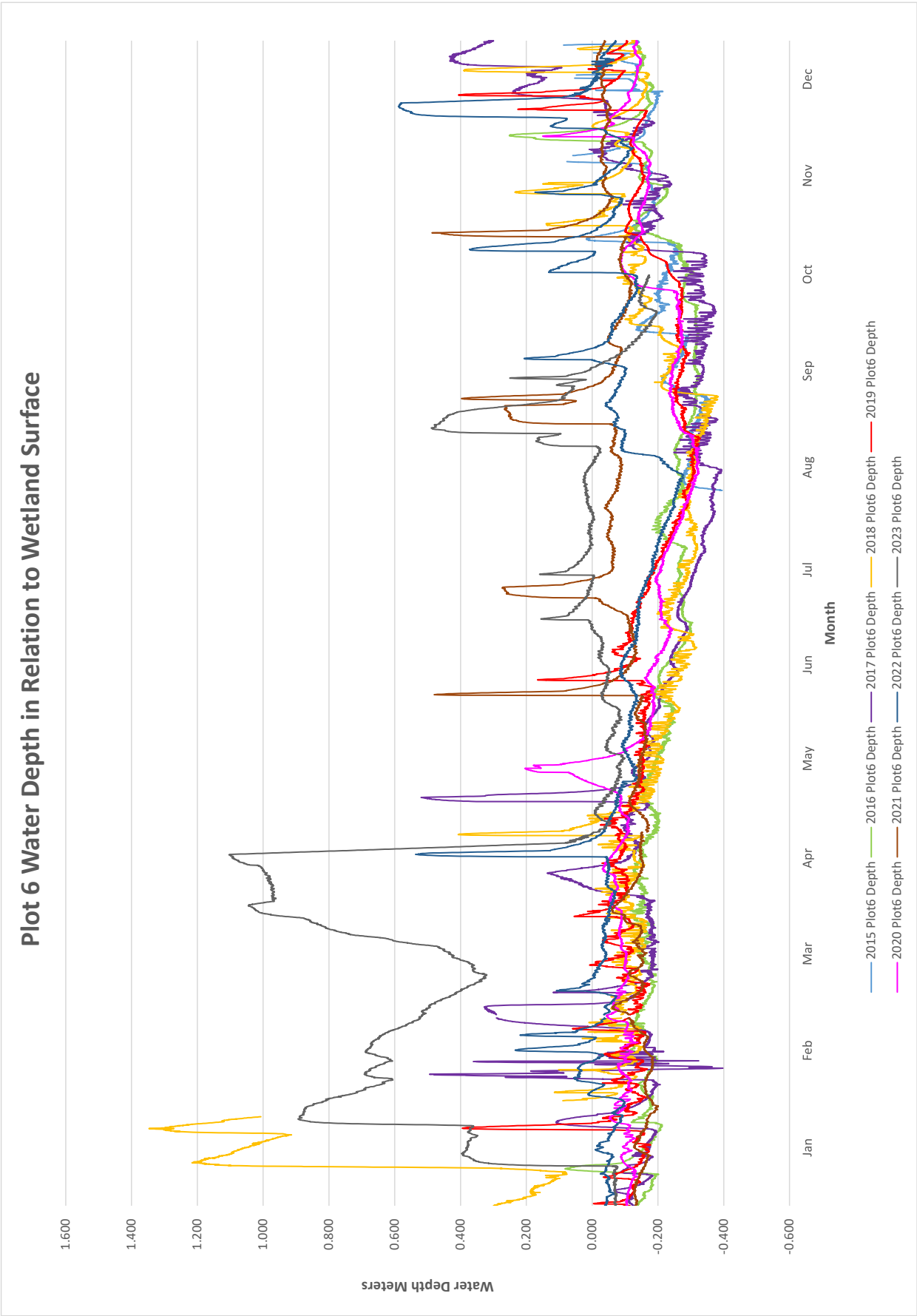


Figure 9. Water levels and daily precipitation, Plot 1, Great Meadow, Mount Desert Island Oct 2022 to Oct 2023.

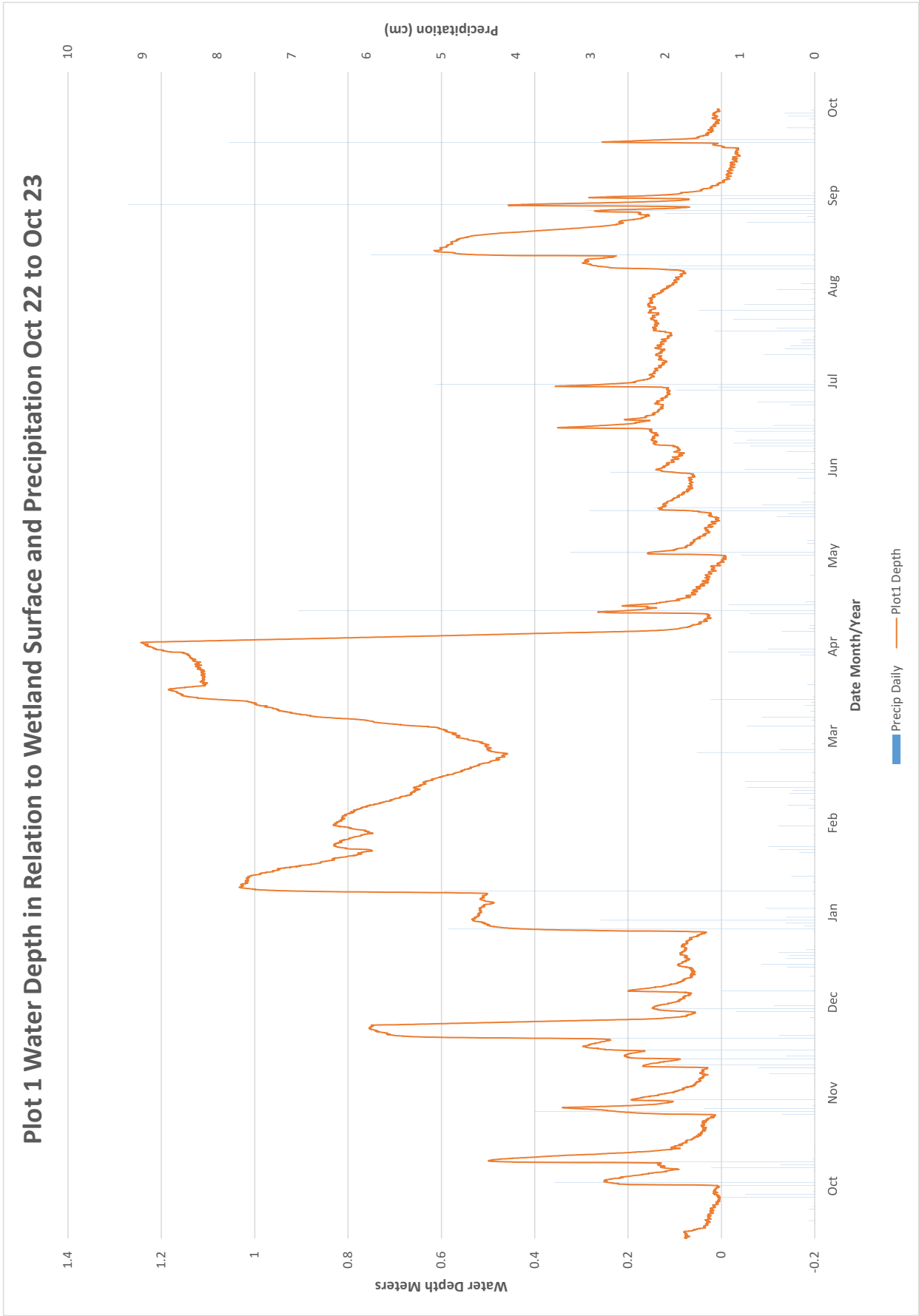


Figure 10. Water levels and daily precipitation, Plot 2, Great Meadow, Mount Desert Island Oct 2022 to Oct 2023.

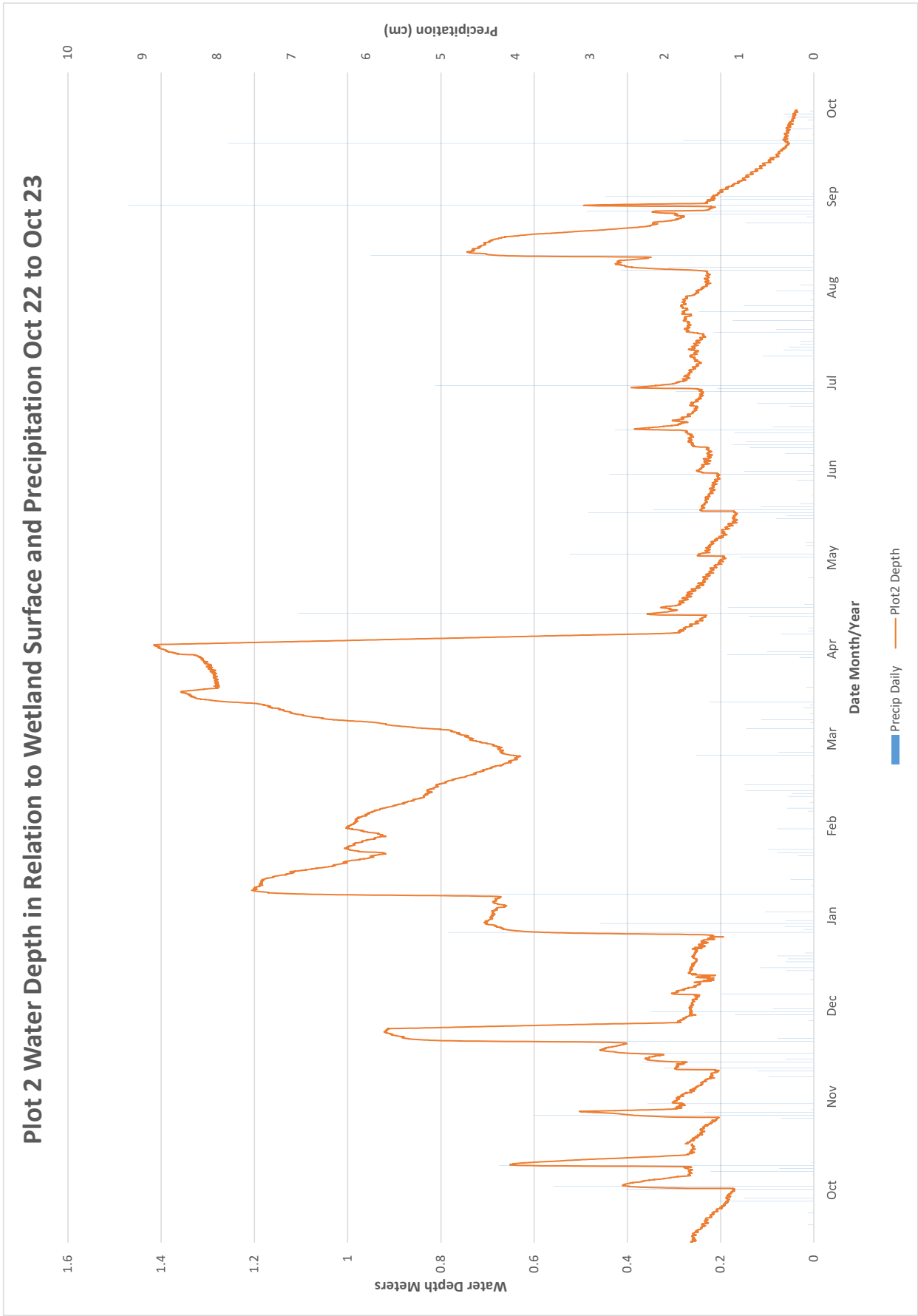


Figure 11. Water levels and daily precipitation, Plot 3, Great Meadow, Mount Desert Island Oct 2022 to Oct 2023.

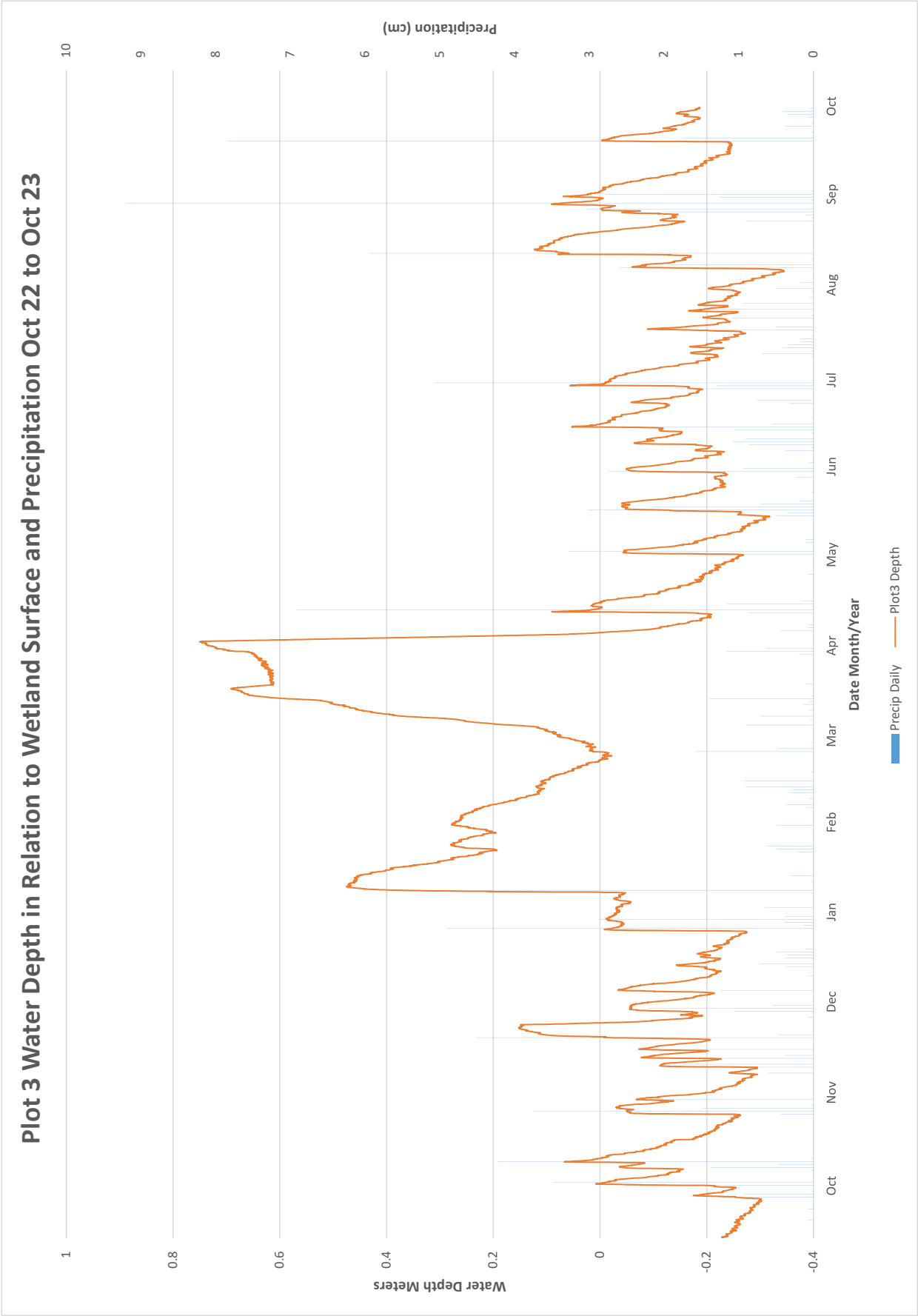


Figure 12. Water levels and daily precipitation, Plot 4, Great Meadow, Mount Desert Island Oct 2022 to Oct 2023.

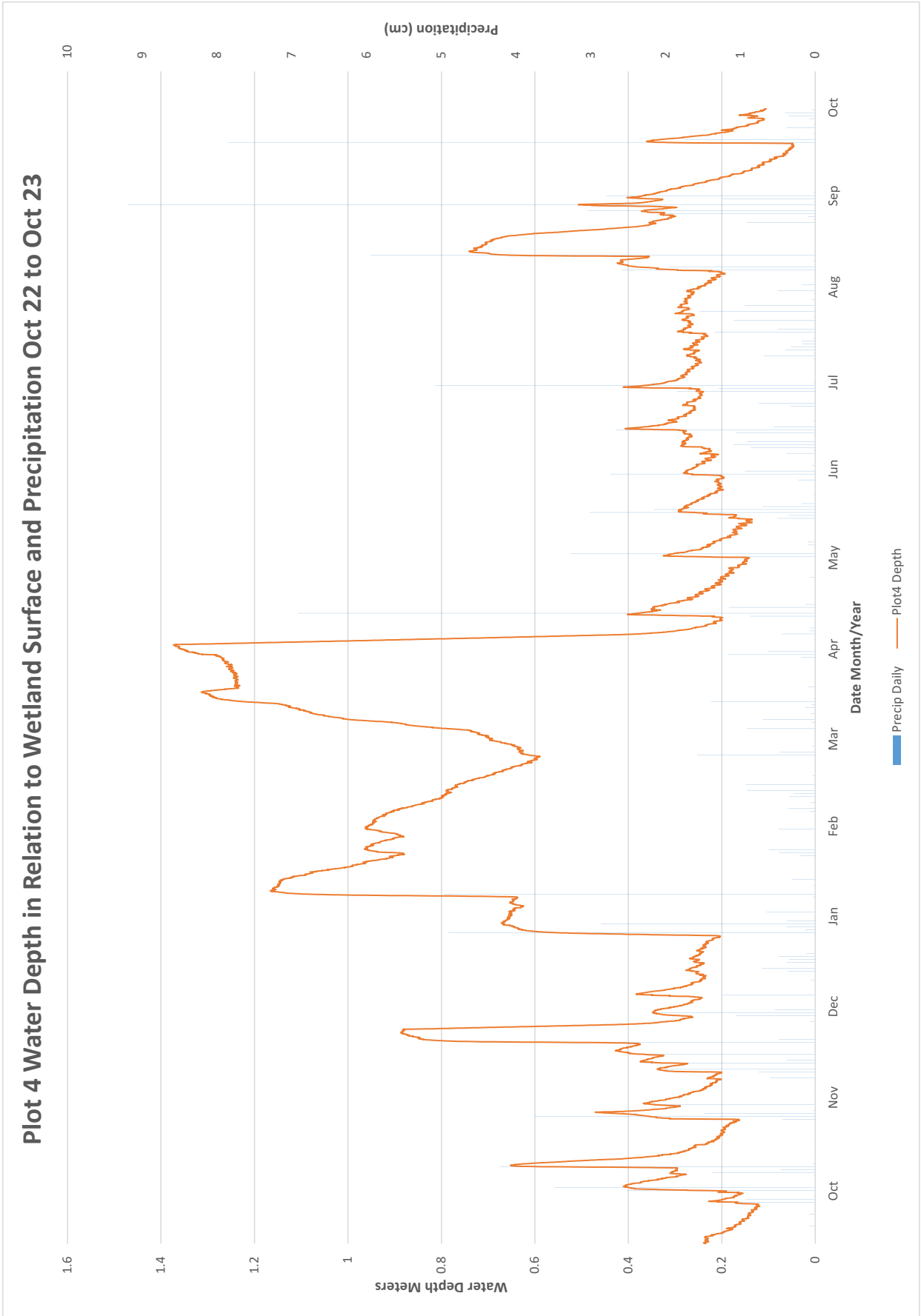


Figure 13. Water levels and daily precipitation, Plot 5, Great Meadow, Mount Desert Island Oct 2022 to Oct 2023.

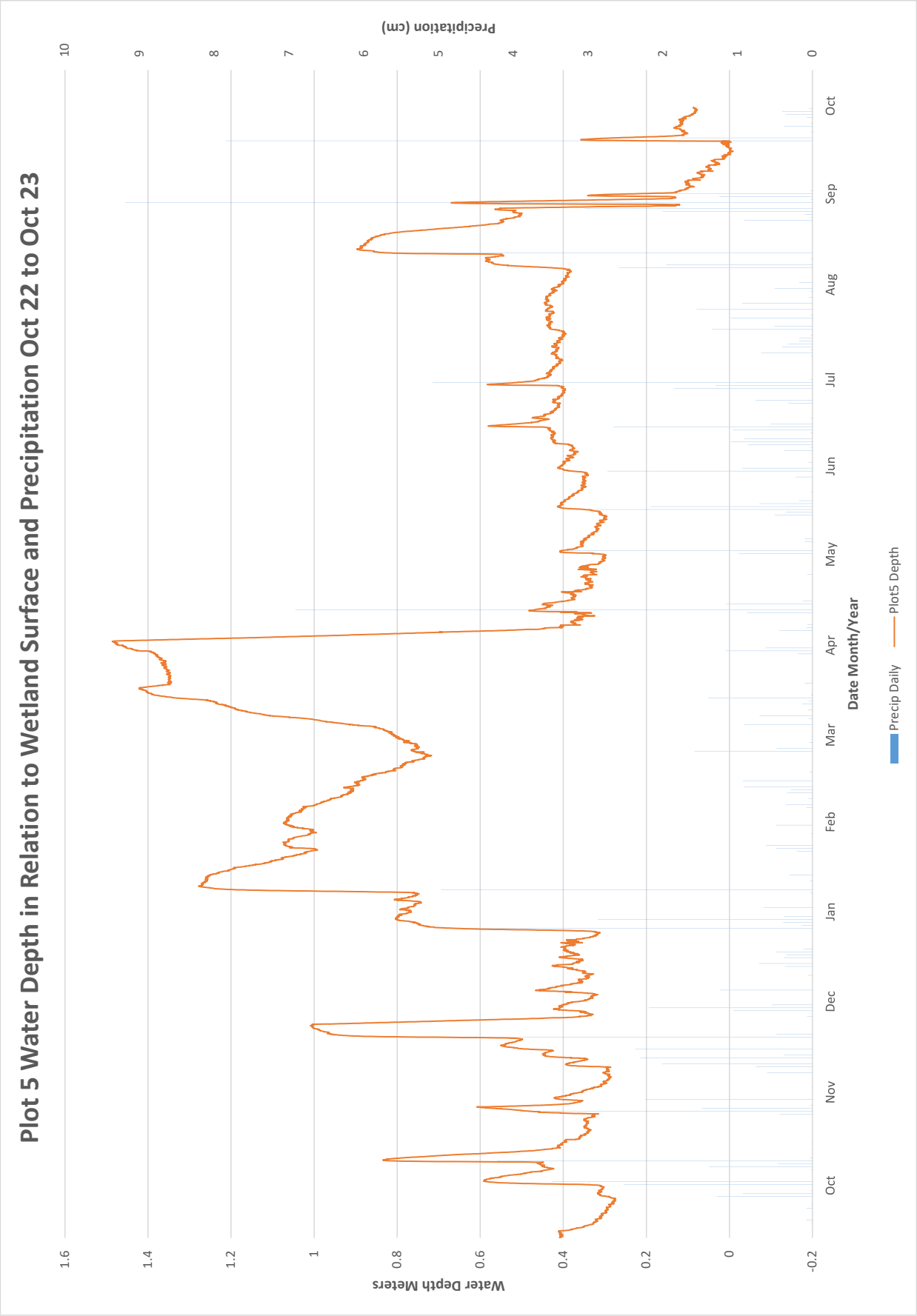


Figure 14. Water levels and daily precipitation, Plot 6, Great Meadow, Mount Desert Island Oct 2022 to Oct 2023.



cies, such as amur maple. Greene (1999) conducted surveys of aquatic plants in Great Meadow and documented 5 aquatic species in the deeper portions of the wetland not documented in this study, bringing the total number of species documented in Great Meadow to 122: vernal water-starwort (*Callitriche palustris*), needle spikeweed (*Eleocharis aciculatus*), blunt spikeweed (*Eleocharis obtusa*), ribbon-leaved pondweed (*Potamogeton epiphydrus*), and southern wild rice (*Zizania aquatica*).

A total of 11 species were documented in greater than 50% of the plots sampled during 2023: red maple (*Acer rubrum*), gray birch (*Betula populifolia*), Canada reed grass (*Calamagrostis canadensis*), lakeside sedge (*Carex lacustris*), tussock sedge (*Carex stricta*), glossy false buckthorn (*Frangula alnus*), common winterberry (*Ilex verticillata*), swamp yellow-loosestrife (*Lysimachia terrestris*), sweetgale (*Myrica gale*), cinnamon fern (*Osmundastrum cinnamomeum*), and white meadowsweet (*Spiraea alba*). All of these species are native, with the exception of glossy false buckthorn which is non-native and invasive. Canada reed grass was the only species that was located in all plots.

A total of 40 species were documented in plots during the 2015 or 2020 field work but were not documented during 2023 (Table 2). A total of 4 species not previously documented from plots during the 2015 or 2020 field work were documented during 2023: tall cottonsedge (*Eriophorum angustifolium*), Berchtold's pondweed (*Potamogeton berchtoldii*), grassy pondweed (*Potamogeton gramineus*), and smooth blackberry (*Rubus canadensis*).

Generally, there were fewer species detected in the timed surveys of the grid cells during 2023 than during 2015 or 2020. This was likely related to the recent flooding of the meadow, which submerged plants for quite some time and likely caused some species to disappear from the plots. In addition, the vegetation in the open portion of the wetland was much denser and taller in 2023, making it much more difficult to cover much ground during the timed surveys, so less of the plots could be checked.

Photopoints from the plot center in the four cardinal directions are shown in Appendix 2. Raw vegetation survey results are given in Appendix 3.

Literature cited

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- Hunter, M.L., Jr., A.J.K. Calhoun, and M. McCollough. 1999. Maine amphibians and reptiles. MjM University of Maine Press, Orono, ME.
- Manville, R.H. 1942. Notes on the mammals of Mount Desert Island, Maine. Journal of Mammalogy 23:391-398.

Table 2. Species documented from vegetation plots in Great Meadow on Mount Desert Island, summer 2023, 2020, & 2015. The codes for the species in each plot for 2023 are as follows: h = species documented during 2015 or 2020, but not found in plot during 2023; x = species found during 2023, but not found in plot during 2015 and/or 2020; X = species found in plot during both 2015 & 2020 & 2023; r = rare, u = uncommon, o = occasional, c = common. ↑ = species appears to be noticeably increasing in plot from 2020 to 2023. ↓ = species appears to be noticeably declining in plot from 2020 to 2023.

Species (bold = detected in 2023)	Common	Native	Invasive	Plot Number									
				1	2	3	4	5	6	7	8	9	10
<i>Abies balsamea</i>	balsam fir	Native				h							
<i>Acer pensylvanicum</i>	striped maple	Native				Xr							
<i>Acer rubrum</i>	red maple	Native		Xu	Xr	Xc	Xc	h	Xc	Xo	Xr	Xu	
<i>Agrostis perennans</i>	autumn bentgrass	Native					xr						
<i>Agrostis stolonifera</i>	creeping bentgrass	Exotic						h			h		h
<i>Alnus incana ssp. rugosa</i>	speckled alder	Native		Xu	Xo↓			xr	Xu	Xu↓			
<i>Aralia nudicaulis</i>	wild sarsaparilla	Native				h							
<i>Aronia melanocarpa</i>	black chokeberry	Native		h					h				
<i>Betula alleghaniensis</i>	yellow birch	Native				Xu						h	
<i>Betula papyrifera</i>	paper birch	Native				Xu	Xo		Xr			Xu	
<i>Betula populifolia</i>	gray birch	Native		Xu	Xr	Xr	Xo	Xo	Xo	Xu	Xo		
<i>Brachyelytrum aristosum</i>	northern long-awned wood grass	Native					Xr						
<i>Calamagrostis canadensis</i>	Canada reed grass	Native		Xc	Xc	xu↑	Xo↑	Xc	Xu	Xc	Xc	Xr	Xc
<i>Carex atlantica</i>	prickly bog sedge	Native		xr			xr		Xu↑			Xr	
<i>Carex brunnescens</i>	brownish sedge	Native			xr	xr	Xr	h	Xu↑		h	Xr	
<i>Carex canescens</i>	hoary sedge	Native		h					xr			xr	
<i>Carex debilis</i>	white-edged sedge	Native				xr	Xu		xu↑			Xr	
<i>Carex echinata</i>	star sedge	Native							Xu				
<i>Carex folliculata</i>	northern long sedge	Native					xr		Xr			Xr	
<i>Carex lacustris</i>	lakeside sedge	Native		Xr	xo↑		h	Xu	Xr	xr	Xc		Xo
<i>Carex lasiocarpa</i>	woolly-fruited sedge	Native			h			Xo			Xo		Xc
<i>Carex lenticularis</i>	lake shore sedge	Native						h					
<i>Carex novae-angliae</i>	New England sedge	Native				h	Xr		h			h	
<i>Carex scoparia</i>	pointed broom sedge	Native			h								
<i>Carex stricta</i>	tussock sedge	Native		Xc↑	xu	Xc↑	Xc	h	Xc	Xc	Xr	Xo	xo↑
<i>Carex trisperma</i>	three-seeded sedge	Native				h	Xr		Xr			Xr	
<i>Carex utriculata</i>	swollen-beaked sedge	Native			Xu↓			Xc			xu		xo
<i>Carex vesicaria</i>	lesser bladder sedge	Native						h	h	h	xr		h
<i>Chamaedaphne calyculata</i>	leatherleaf	Native			Xr				Xu		h	Xr	

Table 2 (continued).

Species (bold = detected in 2023)	Common	Native	Invasive	Plot Number										
				1	2	3	4	5	6	7	8	9	10	
<i>Danthonia spicata</i>	poverty oatgrass	Native					h							
<i>Doellingeria umbellata</i>	tall white-aster	Native			h	Xr	Xr	h				h	Xr	
<i>Dryopteris campyloptera</i>	mountain wood fern	Native				Xr								
<i>Dryopteris carthusiana</i>	spinulose wood fern	Native		h			Xu						h	
<i>Dryopteris cristata</i>	crested wood fern	Native		h	xr	Xr	Xr							
<i>Dryopteris intermedia</i>	evergreen wood fern	Native				h	h							
<i>Dulichium arundinaceum</i>	three-way sedge	Native		xr	h			Xr	xr	xr	h	h		h
<i>Eleocharis</i> sp.		Native			h									
<i>Equisetum arvense</i>	field horsetail	Native		h								h		
<i>Eriophorum angustifolium</i>	tall cottonsedge	Native							xr					
<i>Eurybia radula</i>	rough wood-aster	Native								h				
<i>Frangula alnus</i>	glossy false buckthorn	Exotic	Yex	Xr	Xu	Xr↑	Xr		Xu	xr	h	Xr↓	h	
<i>Fraxinus pennsylvanica</i>	green ash	Native				h								
<i>Galium tinctorium</i>	stiff three-petaled bedstraw	Native			h			h						
<i>Galium trifidum</i>	three-petaled bedstraw	Native												
<i>Gaylussacia baccata</i>	black huckleberry	Native		h										
<i>Glyceria borealis</i>	northern manna grass	Native		h				Xr						
<i>Glyceria canadensis</i>	rattlesnake manna grass	Native		Xr				h		xr				
<i>Glyceria laxa</i>	flaccid manna grass	Native								h		h		
<i>Glyceria striata</i>	fowl manna grass	Native				h								
<i>Ilex mucronata</i>	mountain holly	Native			xr	Xr	h	h	h		xr	h		
<i>Ilex verticillata</i>	common winterberry	Native		Xu	xr	Xu	Xr	h	h	Xu	Xr	Xr		
<i>Impatiens capensis</i>	spotted touch-me-not	Native						h				h		
<i>Iris versicolor</i>	blue iris	Native		xr	h	Xr		h	h	h	h	h		
<i>Juncus brevicaudatus</i>	short-tailed rush	Native		h				h			h			
<i>Juncus canadensis</i>	Canada rush	Native		h				h			h	h		h
<i>Juncus effusus</i>	common soft rush	Native						h	h					
<i>Juncus pylaei</i>	Pylae's soft rush	Native		xr	h									
<i>Juncus tenuis</i>	path rush	Native							h					h

Table 2 (continued).

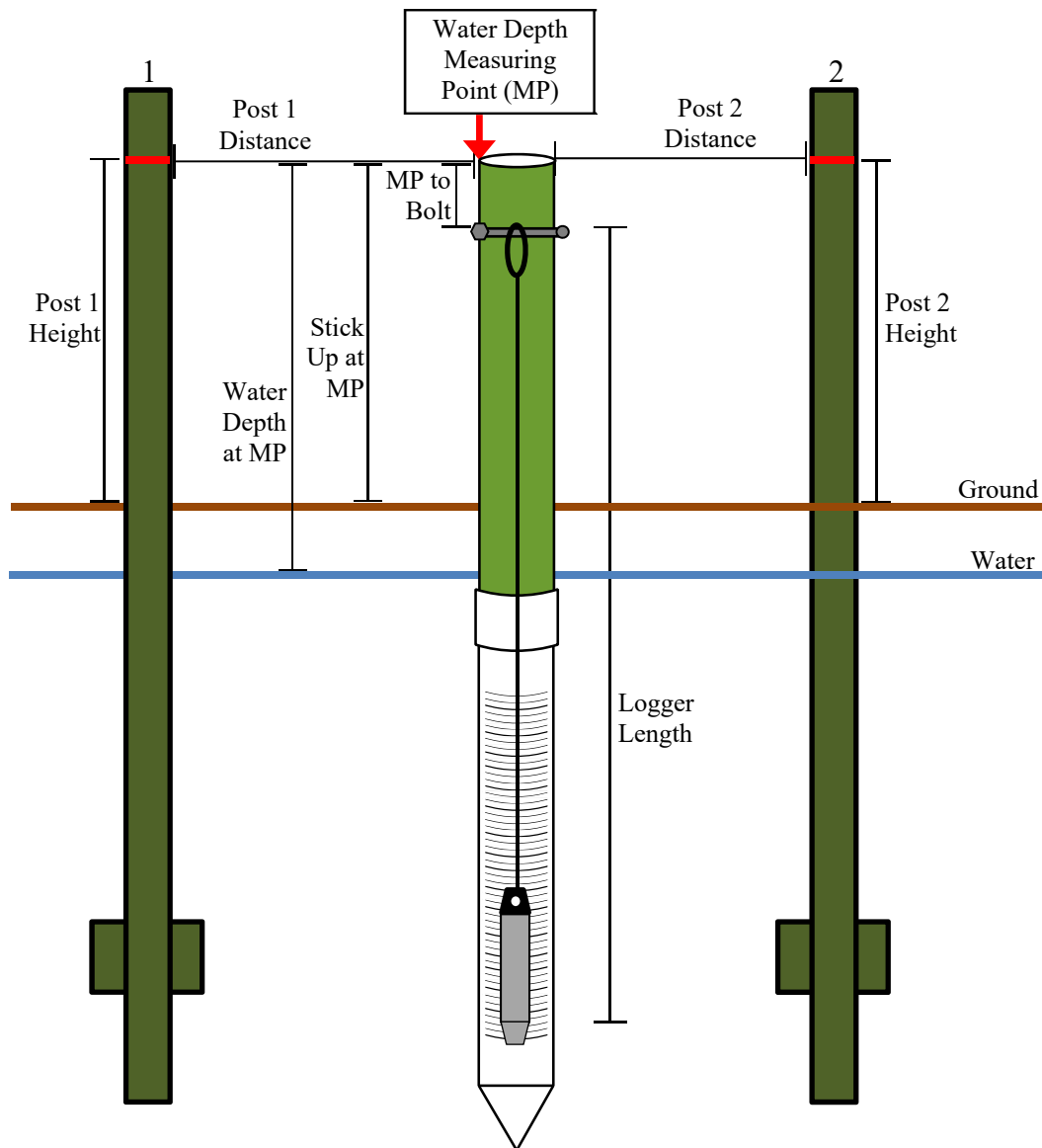
Species (bold = detected in 2023)	Common	Native	Invasive	Plot Number									
				1	2	3	4	5	6	7	8	9	10
<i>Kalmia angustifolia</i>	sheep American-laurel	Native		h	h		h		Xr	h	h	Xo↑	
<i>Larix laricina</i>	American larch	Native		h	h		xr		Xr			Xr	
<i>Lonicera villosa</i>	mountain honeysuckle	Native			h								
<i>Lycopodium uniflorum</i>	northern water-horehound	Native			h		xr						
<i>Lysimachia borealis</i>	starflower	Native		h		Xu	Xu		Xr			Xu	
<i>Lysimachia terrestris</i>	swamp yellow-loosestrife	Native		h	Xu↓	h	Xr	h	Xu	Xr	Xr	h	Xr
<i>Maianthemum canadense</i>	Canada-mayflower	Native				Xr	Xr		h		xr	h	
<i>Malus sieboldii</i>	Toringo crab apple	Exotic			h	h	xr	h	h				
<i>Monotropa uniflora</i>	one-flowered Indian-pipe	Native				h	h					h	
<i>Myrica gale</i>	sweetgale	Native		Xo↑	Xo↓			Xu	Xr	Xo	Xc		Xr
<i>Nuphar variegata</i>	bullhead pond-lily	Native						Xr					
<i>Oclemena acuminata</i>	sharp-toothed nodding-aster	Native				h	h					h	
<i>Onoclea sensibilis</i>	sensitive fern	Native		h	Xr	h					Xr		
<i>Osmunda regalis</i>	royal fern	Native		Xr	Xr	Xu	xr			Xu		h	
<i>Osmundastrum cinnamomeum</i>	cinnamon fern	Native		Xu	Xr	Xo	Xu		Xu	Xu		Xo↑	
<i>Parathelypteris noveboracensis</i>	New York fern	Native				h							
<i>Phegopteris connectilis</i>	long beech fern	Native				h						h	
<i>Picea rubens</i>	red spruce	Native				Xr	Xr					h	
<i>Pinus strobus</i>	eastern white pine	Native				Xr	Xr			xr	Xr		
<i>Populus grandidentata</i>	big-toothed poplar	Native					h						
<i>Populus tremuloides</i>	quaking poplar	Native				h					Xr		
<i>Potamogeton berchtoldii</i>	Berchtold's pondweed	Native						xr			xr		
<i>Potamogeton gramineus</i>	grassy pondweed	Native						xr					
<i>Quercus rubra</i>	northern red oak	Native				Xr	Xr		h		xr	xr	
<i>Rhododendron canadense</i>	rhodora	Native		h					Xr			Xu↓	
<i>Rhododendron groenlandicum</i>	Labrador-tea	Native							xr			h	
<i>Rosa nitida</i>	shining rose	Native		h	h			h					
<i>Rubus canadensis</i>	smooth blackberry	Native				xr			xr				
<i>Rubus hispidus</i>	bristly blackberry	Native		h		h	Xu		h	h		Xr	
<i>Rubus pubescens</i>	dwarf raspberry	Native					xr			xr		xr	
<i>Sagittaria latifolia</i>	common arrowhead	Native						Xr					
<i>Salix bebbiana</i>	long-beaked willow	Native			Xr					h	xr		

Table 2 (continued).

Species (bold = detected in 2023)	Common	Native	Invasive	Plot Number									
				1	2	3	4	5	6	7	8	9	10
<i>Salix petiolaris</i>	meadow willow	Native			Xu	h	h				Xu	Xr	h
<i>Scirpus atrocinctus</i>	black-girdled woolsedge	Native		h	Xr			h			h		
<i>Scirpus cyperinus</i>	common woolsedge	Native					xr	h	Xr		Xr	xr	Xr
<i>Scutellaria galericulata</i>	hooded skullcap	Native			h			h					
<i>Solidago altissima</i>	tall goldendrod	Native									h		
<i>Solidago rugosa</i>	Wrinkle-leaved goldenrod	Native									h		
<i>Solidago uliginosa</i>	bog goldenrod	Native	h										
<i>Sorbus americana</i>	American mountain-ash	Native				xr	h						
<i>Sparganium emersum</i>	simple-stemmed bur-reed	Native						Xr					
<i>Sparganium</i> sp.	Bur-reed	Native	h										
<i>Spiraea alba</i>	white meadowsweet	Native		Xr	Xr↓	h	h	Xu	h	Xr	Xr↓	xr	h
<i>Spiraea tomentosa</i>	rosy meadowsweet	Native		h	h			h	h				
<i>Thalictrum pubescens</i>	tall meadow-rue	Native			h								
<i>Thebypteris palustris</i>	marsh fern	Native		Xr	Xr	xr	xr		xr	Xr	xr		
<i>Thuja occidentalis</i>	northern white-cedar	Native				Xu							
<i>Triadenum fraseri</i>	Fraser's marsh-St. John's-wort	Native		h	Xr		xr	h		h	h		h
<i>Triadenum virginicum</i>	Virginia marsh-St. John's-wort	Native		h									
<i>Tsuga canadensis</i>	eastern hemlock	Native				Xr	h						
<i>Typha latifolia</i>	broad-leaved cat-tail	Native			Xc								xr
<i>Utricularia vulgaris</i>	greater bladderwort	Native			xr			xr			xr		xr
<i>Vaccinium angustifolium</i>	common lowbush blueberry	Native					h				xr	Xr↓	
<i>Vaccinium corymbosum</i>	highbush blueberry	Native	h	h	Xr	Xu↓	Xu		Xo	h	h	Xu	
<i>Vaccinium macrocarpon</i>	large cranberry	Native			h								
<i>Vaccinium myrtilloides</i>	velvet-leaved blueberry	Native	h									h	
<i>Viburnum dentatum</i>	smooth arrowwood	Native								xr			
<i>Viburnum nudum</i>	withe-rod	Native				h							
<i>Viola pallens</i>	smooth white violet	Native								h	h		
<i>Bryophytes</i>				Xu↓	Xr	Xr	Xu		Xu↓	Xo	h	X0↑	

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Appendix 1. Well and water depth measurements, Great Meadow, Mount Desert Island, for the previous 5 years.



All measurements in cm.

The reference water level used to correct water levels in relation to the surface of the wetland were calculated using the following formula: $\text{Stick Up at MP} - \text{Water Depth (measured inside well)} = \text{Reference Water Level}$

Appendix 1 (continued). Well and water depth measurements, Great Meadow, Mount Desert Island, for the previous 5 years.

Site: GreatMeadow Plot1

Logger Serial #: 20669759 (replaced Oct-15-2019) (Next replacement Fall of 2024)

Original Launch Date & Time: July 16, 2015: 0830

Date	5/23/19	10/15/19	5/17/20	10/13/20	4/27/20	10/21/21	5/13/22	11/03/22	5/17/23	10/19/23
Stick Up at MP	4.2	3.9	5.0	4.7	4.2	3.5	4.0	4.6	3.2	3.9
Post 1 Height	2.9	4.5	4.5	3.9	3.2	3.0	3.0	3.0	0	0
Post 1 Distance	30.5	30.5	30.5	30.6	30.6	30.5	30.5	30.5	30.5	30.8
Post 2 Height	3.3	3.0	2.9	2.8	3.7	1.5	1.5	1.5	0	0
Post 2 Distance	26	26.0	26.0	26.0	26.1	25.3	25.3	25.3	26.0	26.4
Logger Length	169.2	169.2	169.2	169.2	169.2	169.2	169.2	169.2	169.2	169.2
MP to Bolt	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Water Depth	15.3	25.7	-23.8	28.9	11.4	-3.7	6.7	-2.8	1.7	3.4
WD Meas. Time	9:24	10:44	9:23	7:53	7:41	9:52	6:17	8:45	7:38	8:25

Site: GreatMeadow Plot2

Logger Serial #: 20669760 (replaced Oct-15-2019) (Next replacement Fall of 2024)

Original Launch Date & Time: July 22, 2015: 1200

Date	5/23/19	10/15/19	5/17/20	10/13/20	4/27/20	10/21/21	5/13/22	11/03/22	5/17/23	10/19/23
Stick Up at MP	37.6	34.3	37.0	34.7	34.3	31.4	34.2	31.3	34.2	34.4
Post 1 Height	33.2	31.9	32.0	32.6	32.1	24.9	24.0	24.0	29.5	29.8
Post 1 Distance	29.7	29.8	29.9	29.9	29.7	30.3	30.4	30.4	30.2	30.2
Post 2 Height	36.5	35.4	36.0	37.2	40.5	35.7	35.0	35.0	32.6	36.5
Post 2 Distance	29.3	29.3	29.4	29.4	28.9	28.9	28.9	28.9	28.9	28.9
Logger Length	171.2	171.2	171.2	171.2	171.2	171.2	171.2	171.2	171.2	171.2
MP to Bolt	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Water Depth	26.3	39.2	-10.7	38.5	26.2	17.6	16.2	5.2	12.1	30.5
WD Meas. Time	7:48	9:10	9:20	6:39	6:35	8:18	5:08	7:05	6:08	7:26

Site: GreatMeadow Plot3

Logger Serial #: 20669761 (replaced Oct-15-2019) (Next replacement Fall of 2024)

Original Launch Date & Time: Aug 10, 2015: 1029

Date	5/23/19	10/15/19	5/17/20	10/13/20	4/27/20	10/21/21	5/13/22	11/03/22	5/17/23	10/19/23
Stick Up at MP	16.2	18.1	16.3	18.4	17.1	17.0	16.5	18.0	8.6	8.0
Post 1 Height	18	20.1	20.5	21.1	18.6	19.5	19.5	20.5	8.7	10.1
Post 1 Distance	30.9	30.7	30.9	30.8	30.7	30.9	30.9	31.1	31.2	31.2
Post 2 Height	16.2	18.3	20.0	20.6	16.2	18.2	18.2	18.6	8.3	8.8
Post 2 Distance	30.9	30.8	31.0	30.8	30.9	30.8	30.8	30.8	30.7	30.7
Logger Length	146.0	146.0	146.0	146.0	146.0	146.0	146.0	146.0	146.0	146.0
MP to Bolt	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Water Depth	38	60.3	23.4	119.6	53.3	52.1	39.8	32.6	30.4	26.7
WD Meas. Time	10:13	11:38	10:09	8:29	8:20	10:43	6:56	9:33	8:36	9:05

Appendix 1 (continued). Well and water depth measurements, Great Meadow, Mount Desert Island, for the previous 5 years.

Site: GreatMeadow Plot4

Logger Serial #: 20669762 (replaced Oct-15-2019) (Next replacement Fall of 2024)

Original Launch Date & Time: Jul 22, 2015: 1325

Date	5/23/19	10/15/19	5/17/20	10/13/20	4/27/20	10/21/21	5/13/22	11/03/22	5/17/23	10/19/23
Stick Up at MP	11.2	11.2	9.7	10.0	13.0	13.4	14.5	12.9	11.0	9.9
Post 1 Height	6.9	8.1	8.2	7.4	5.5	5.0	5.0	5.0	6.4	5.0
Post 1 Distance	28.9	29.1	29.0	29.0	28.9	28.8	28.8	28.8	29.1	29.1
Post 2 Height	9.1	8.9	9.0	8.2	8.5	8.0	8.0	8.0	8.3	7.3
Post 2 Distance	30.7	30.7	30.7	30.7	30.7	30.6	30.6	30.6	30.5	30.6
Logger Length	171.7	171.7	171.7	171.7	171.7	171.7	171.7	171.7	171.7	171.7
MP to Bolt	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Water Depth	-12.1	17.6	-29.0	19.0	-1.9	-9.9	-6.6	-12.1	-7.2	-0.6
WD Meas. Time	9:53	11:05	9:45	8:09	7:59	10:17	6:36	9:05	8:05	8:44

Site: GreatMeadow Plot5

Logger Serial #: 20669763 (replaced Oct-15-2019) (Next replacement Fall of 2024)

Original Launch Date & Time: Aug 10, 2015: 0850

Date	5/23/19	10/15/19	5/17/20	10/13/20	4/27/20	10/21/21	5/13/22	11/03/22	5/17/23	10/19/23
Stick Up at MP	25.9	16.5	22.4	19.5	18.7	21.7	18.6	17.9	17.9	15.2
Post 1 Height	18.3	18.2	18.2	19.2	14.3	18.0	16.0	16.0	7.7	13.5
Post 1 Distance	21.8	22.0	22.1	22.0	22.0	22.0	22.0	22.0	22.1	22.2
Post 2 Height	19.7	6.9	12.0	16.2	15.5	12.0	12.0	12.0	8.3	14.2
Post 2 Distance	43.8	43.7	43.7	43.5	43.6	44.5	44.0	44.0	42.9	43.8
Logger Length	161.1	161.1	161.1	161.1	161.1	161.1	161.1	161.1	161.1	161.1
MP to Bolt	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Water Depth	-5.3	10.4	-40.4	10.8	-16.9	-19.1	-10.6	-19.1	-15.6	6.6
WD Meas. Time	8:42	10:01	8:25	7:12	7:06	9:06	5:40	8:02	6:55	7:55

Site: GreatMeadow Plot6

Logger Serial #: 20669764 (replaced Oct-15-2019) (Next replacement Fall of 2024)

Original Launch Date & Time: Aug 10, 2015: 1126

Date	5/23/19	10/15/19	5/17/20	10/13/20	4/27/20	10/21/21	5/13/22	11/03/22	5/17/23	10/19/23
Stick Up at MP	20.6	20.4	19.9	20.9	20.1	19.1	18.8	16.6	12.8	13.9
Post 1 Height	19.9	22.2	23.0	23.5	20.6	20.1	20.1	14.8	11.2	13.8
Post 1 Distance	34.6	34.7	34.7	34.6	34.7	34.8	34.8	34.8	34.7	34.9
Post 2 Height	19.2	20.7	20.9	21.0	21.6	17.8	17.8	12.9	12.0	12.5
Post 2 Distance	30.1	30.2	30.0	30.1	30.2	30.2	30.2	30.2	30.2	30.2
Logger Length	172.8	172.8	172.8	172.8	172.8	172.8	172.8	172.8	172.8	172.8
MP to Bolt	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Water Depth	35.4	47	-0.5	46.9	35.4	28.3	28.1	18.7	21.4	31.2
WD Meas. Time	10:04	11:16	9:45	8:18	8:10	10:27	6:46	9:18	8:19	8:54

Appendix 2. Photopoints



Great Meadow Plot 1 - North transect, July 16, 2015.



Great Meadow Plot 1 - North transect, August 14, 2020.



Great Meadow Plot 1 - North transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 1 - South transect, July 16, 2015.



Great Meadow Plot 1 - South transect, August 14, 2020.



Great Meadow Plot 1 - South transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 1 - East transect, July 16, 2015.



Great Meadow Plot 1 - East transect, August 14, 2020.



Great Meadow Plot 1 - East transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 1 - West transect, July 16, 2015.



Great Meadow Plot 1 - West transect, August 14, 2020.



Great Meadow Plot 1 - West transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 2 - North transect, July 23, 2015.



Great Meadow Plot 2 - North transect, August 12, 2020.



Great Meadow Plot 2 - North transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 2 - South transect, July 23, 2015.



Great Meadow Plot 2 - South transect, August 12, 2020.



Great Meadow Plot 2 - South transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 2 - East transect, July 23, 2015.



Great Meadow Plot 2 - East transect, August 12, 2020.



Great Meadow Plot 2 - East transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 2 - West transect, July 23, 2015.



Great Meadow Plot 2 - West transect, August 12, 2020.



Great Meadow Plot 2 - West transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 3 - North transect, July 28, 2015.



Great Meadow Plot 3 - North transect, August 14, 2020.



Great Meadow Plot 3 - North transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 3 - South transect, July 28, 2015.



Great Meadow Plot 3 - South transect, August 14, 2020.



Great Meadow Plot 3 - South transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 3 - East transect, July 28, 2015.



Great Meadow Plot 3 - East transect, August 14, 2020.



Great Meadow Plot 3 - East transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 3 - West transect, July 28, 2015.



Great Meadow Plot 3 - West transect, August 14, 2020.



Great Meadow Plot 3 - West transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 4 - North transect, July 30, 2015.



Great Meadow Plot 4 - North transect, August 14, 2020.



Great Meadow Plot 4 - North transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 4 - South transect, July 30, 2015.



Great Meadow Plot 4 - South transect, August 14, 2020.



Great Meadow Plot 4 - South transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 4 - East transect, July 30, 2015.



Great Meadow Plot 4 - East transect, August 14, 2020.



Great Meadow Plot 4 - East transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 4 - West transect, July 30, 2015.



Great Meadow Plot 4 - West transect, August 14, 2020.



Great Meadow Plot 4 - West transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 5 - North transect, August 11, 2015.



Great Meadow Plot 5 - North transect, August 12, 2020.



Great Meadow Plot 5 - North transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 5 - South transect, August 11, 2015.



Great Meadow Plot 5 - South transect, August 12, 2020.



Great Meadow Plot 5 - South transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 5 - East transect, August 11, 2015.



Great Meadow Plot 5 - East transect, August 12, 2020.



Great Meadow Plot 5 - East transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 5 - West transect, August 11, 2015.



Great Meadow Plot 5 - West transect, August 12, 2020.



Great Meadow Plot 5 - West transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 6 - North transect, August 10, 2015.



Great Meadow Plot 6 - North transect, August 14, 2020.



Great Meadow Plot 6 - North transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 6 - South transect, August 10, 2015.



Great Meadow Plot 6 - South transect, August 14, 2020.



Great Meadow Plot 6 - South transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 6 - East transect, August 10, 2015.



Great Meadow Plot 6 - East transect, August 14, 2020.



Great Meadow Plot 6 - East transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 6 - West transect, August 10, 2015.



Great Meadow Plot 6 - West transect, August 14, 2020.



Great Meadow Plot 6 - West transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 7 - North transect, August 14, 2015.



Great Meadow Plot 7 - North transect, August 14, 2020.



Great Meadow Plot 7 - North transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 7 - South transect, August 14, 2015.



Great Meadow Plot 7 - South transect, August 14, 2020.



Great Meadow Plot 7 - South transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 7 - East transect, August 14, 2015.



Great Meadow Plot 7 - East transect, August 14, 2020.



Great Meadow Plot 7 - East transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 7 - West transect, August 14, 2015.



Great Meadow Plot 7 - West transect, August 14, 2020.



Great Meadow Plot 7 - West transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 8 - North transect, August 14, 2015.



Great Meadow Plot 8 - North transect, August 12, 2020.



Great Meadow Plot 8 - North transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 8 - South transect, August 14, 2015.



Great Meadow Plot 8 - South transect, August 12, 2020.



Great Meadow Plot 8 - South transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 8 - East transect, August 14, 2015.



Great Meadow Plot 8 - East transect, August 12, 2020.



Great Meadow Plot 8 - East transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 8 - West transect, August 14, 2015.



Great Meadow Plot 8 - West transect, August 12, 2020.



Great Meadow Plot 8 - West transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 9 - North transect, August 14, 2015.



Great Meadow Plot 9 - North transect, August 14, 2020.



Great Meadow Plot 9 - North transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 9 - South transect, August 14, 2015.



Great Meadow Plot 9 - South transect, August 14, 2020.



Great Meadow Plot 9 - South transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 9 - East transect, August 14, 2015.



Great Meadow Plot 9 - East transect, August 14, 2020.



Great Meadow Plot 9 - East transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 9 - West transect, August 14, 2015.



Great Meadow Plot 9 - West transect, August 14, 2020.



Great Meadow Plot 9 - West transect, July 27, 2023.

Appendix 2. Photopoints



Great Meadow Plot 10 - North transect, August 14, 2015.



Great Meadow Plot 10 - North transect, August 12, 2020.



Great Meadow Plot 10 - North transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 10 - South transect, August 14, 2015.



Great Meadow Plot 10 - South transect, August 12, 2020.



Great Meadow Plot 10 - South transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 10 - East transect, August 14, 2015.



Great Meadow Plot 10 - East transect, August 12, 2020.



Great Meadow Plot 10 - East transect, July 25, 2023.

Appendix 2. Photopoints



Great Meadow Plot 10 - West transect, August 14, 2015.



Great Meadow Plot 10 - West transect, August 12, 2020.



Great Meadow Plot 10 - West transect, July 25, 2023.

Appendix 3. Raw vegetation survey data, Great Meadow, Mount Desert Island.

Site: GreatMeadow Plot1, vegetation data from the 80 meter diameter assessment area, 2015-2023. x = present; R = present and rare (just 1 or 2 stems/clumps), and a cover <1%; U = present and uncommon (more than 1 or 2 stems/clumps, but still not much in area), and a cover generally <5%; if a percentage is given, this represents the rough coverage estimate the species occupies (either as a monoculture or mixed in with other species) in the quarter of the assessment area.

Species	NE			SE			SW			NW		
	2015	2020	2023	2015	2020	2023	2015	2020	2023	2015	2020	2023
<i>Acer rubrum</i>	x	U	4%	x	R	1%	x	U	8%	x	U	3%
<i>Alnus incana</i> ssp. <i>rugosa</i>	x	U	2%	x	3%	1%	x	U	U			
<i>Aronia melanocarpa</i>	x							R		x		
<i>Betula populifolia</i>		U		x			x	R	R	x	40%	30%
<i>Calamagrostis canadensis</i>	x	60%	65%	x	20%	60%	x	20%	55%	x	10%	10%
<i>Carex atlantica</i>	x					R						
<i>Carex canescens</i>	x											
<i>Carex lacustris</i>	x			x		R					R	
<i>Carex stricta</i>	x	20%	10%	x	10%	15%	x	8%	30%	x	40%	70%
<i>Dryopteris cristata</i>							x			x		
<i>Dulichium arundinaceum</i>					R	R						
<i>Frangula alnus</i>	x	1%				1%	x	1%			1%	
<i>Gaylussacia baccata</i>				x								
<i>Glyceria borealis</i>		R			R							
<i>Glyceria canadensis</i>		R				R			R	x		
<i>Ilex verticillata</i>		U		x			x	U	R	x	U	1%
<i>Iris versicolor</i>	x					R						
<i>Juncus pylaei</i>	x		R									
<i>Kalmia angustifolia</i>		R					x			x	R	
<i>Larix laricina</i>											R	
<i>Lysimachia borealis</i>										x		
<i>Lysimachia terrestris</i>	x	R		x			x			x		
<i>Myrica gale</i>	x	8%	35%	x	20%	29%	x	20%	30%	x	3%	9%
<i>Onoclea sensibilis</i>	x											
<i>Osmunda regalis</i>	x	R	R	x	R	R	x	U	R			
<i>Osmundastrum cinnamomeum</i>	x	R	1%				x	6%	R	x	10%	2%
<i>Rhododendron canadense</i>	x	U		x			x	U		x	U	
<i>Rosa nitida</i>				x								
<i>Rubus hispidus</i>	x											
<i>Scirpus atrocinctus</i>	x			x								
<i>Solidago uliginosa</i>							x					
<i>Sparganium</i> sp.	x											
<i>Spiraea alba</i>	x	R	R	x	R		x	R	R	x	R	
<i>Spiraea tomentosa</i>	x											
<i>Thelypteris palustris</i>	x	R		x		R		R	R			
<i>Triadenum fraseri</i>		R			R							
<i>Triadenum virginicum</i>	x			x								
<i>Vaccinium corymbosum</i>							x	R				
<i>Vaccinium myrtilloides</i>							x					
Bryophytes	x	10%	4%	x	2%	2%	x	20%	3%	x	3%	15%
TOTAL # OF TAXA	25	19	10	18	11	14	19	16	13	16	14	8

Appendix 3. Raw vegetation survey data, Great Meadow, Mount Desert Island.

Site: GreatMeadow Plot2, vegetation data from the 80 meter diameter assessment area, 2015-2023.

Species	NE			SE			SW			NW		
	2015	2020	2023	2015	2020	2023	2015	2020	2023	2015	2020	2023
Acer rubrum	x	U	2%	x				R	R	x	R	U
Alnus incana ssp. rugosa	x	15%	12%	x	U	R	x	U	R	x	30%	2%
Betula populifolia	x	U	R	x	R			R		x	U	R
Calamagrostis canadensis	x	30%	40%	x	40%	15%	x	30%	10%	x	15%	25%
Carex brunnescens						R						R
Carex lacustris	x			x			x			x		
Carex lasiocarpa		R	35%			25%			15%		R	35%
Carex scoparia	x						x					
Carex stricta	x		25%	x		10%	x		5%	x		15%
Carex utriculata	x	40%		x	50%			35%			25%	7%
Chamaedaphne calyculata		U		x	R	4%		R		x	R	3%
Doellingeria umbellata	x											
Dryopteris carthusiana				x								
Dryopteris cristata												R
Dulichium arundinaceum		R			R		x	R				
Eleocharis sp.				x								
Equisetum arvense										x		
Frangula alnus	x	8%		x			x	2%	2%	x	1%	R
Galium trifidum	x			x								
Ilex mucronata						R						
Ilex verticillata	x		R							x		
Iris versicolor		R										
Juncus brevicaudatus	x											
Juncus canadensis	x											
Juncus pylaei	x											
Kalmia angustifolia				x								
Larix laricina				x								
Lonicera villosa							x			x		
Lycopus uniflorus	x	U		x						x	R	
Lysimachia terrestris	x	U		x	8%	R	x	4%	R	x	U	R
Malus sieboldii	x											
Myrica gale		30%	R	x	45%	5%	x	45%	15%	x	25%	10%
Onoclea sensibilis				x	R		x	R		x	R	R
Osmunda regalis	x	U	R	x						x	R	R
Osmundastrum cinnamomeum	x	U	R							x	R	R
Rosa nitida	x											
Salix bebbiana	x	R		x						x	R	R
Salix petiolaris	x	R	R	x	5%	R	x	5%	2%	x	9%	2%
Scirpus atrocinctus	x	R	R		R		x	R				
Scutellaria galericulata	x									x		
Spiraea alba	x	U	R	x	U	R	x	R	R	x	U	U
Spiraea tomentosa				x	R							
Thalictrum pubescens								R				
Thelypteris palustris		U					x			x	R	R
Triadenum fraseri	x		R	x	R			R				R
Typha latifolia	x	60%	6%	x	65%	70%	x	80%	70%	x	30%	40%
Utricularia vulgaris						R						
Vaccinium corymbosum	x	R	R									
Vaccinium macrocarpon					R			R				
Bryophytes	x			x			x	2%		x	2%	R
TOTAL # OF TAXA	30	22	16	26	16	13	17	19	11	24	20	23

Appendix 3. Raw vegetation survey data, Great Meadow, Mount Desert Island.

Site: GreatMeadow Plot3, vegetation data from the 80 meter diameter assessment area, 2015-2023.

Species	NE			SE			SW			NW		
	2015	2020	2023	2015	2020	2023	2015	2020	2023	2015	2020	2023
<i>Abies balsamea</i>		R						R				
<i>Acer pensylvanicum</i>	x			x	R		x	R	R	x	R	
<i>Acer rubrum</i>	x	60%	60%	x	60%	75%	x	75%	70%	x	35%	80%
<i>Aralia nudicaulis</i>				x			x			x		
<i>Betula alleghaniensis</i>	x	3%	2%	x	3%	6%	x	6%	8%	x	5%	8%
<i>Betula papyrifera</i>	x	30%	20%		20%	15%	x	10%	20%	x	8%	10%
<i>Betula populifolia</i>	x	U	R	x	U	R	x			x	R	
<i>Calamagrostis canadensis</i>		R	10%		R	8%			6%		U	4%
<i>Carex brunnescens</i>					R	R						
<i>Carex debilis</i>					R	R						
<i>Carex novae-angliae</i>				x	R							
<i>Carex stricta</i>	x	40%	70%	x	30%	40%	x	20%	40%	x	20%	10%
<i>Carex trisperma</i>				x			x			x		
<i>Doellingeria umbellata</i>	x		R	x	R		x		R			
<i>Dryopteris campyloptera</i>	x	R	R		R	R		R			R	
<i>Dryopteris cristata</i>	x	R	R	x		R		R	R	x	R	R
<i>Dryopteris intermedia</i>		R										
<i>Frangula alnus</i>		1%	2%	x	1%	2%	x	1%	2%		1%	2%
<i>Fraxinus pennsylvanica</i>				x								
<i>Glyceria striata</i>	x			x			x			x		
<i>Ilex mucronata</i>				x						x	U	R
<i>Ilex verticillata</i>	x	R	1%	x	U	U	x		U	x	U	U
<i>Iris versicolor</i>	x	R	R			R						
<i>Lysimachia borealis</i>	x	U	U	x	U	U	x	U	U	x	U	U
<i>Lysimachia terrestris</i>	x	R			R							
<i>Maianthemum canadense</i>	x	U	R	x	U	U	x			x		
<i>Malus sieboldii</i>	x			x			x					
<i>Monotropa uniflora</i>							x					
<i>Oclemena acuminata</i>		R		x								
<i>Onoclea sensibilis</i>	x			x						x		
<i>Osmunda regalis</i>	x	U	R	x	U	R	x	U	R	x	U	R
<i>Osmundastrum cinnamomeum</i>	x	U	8%	x	20%	12%	x	60%	45%	x	5%	18%
<i>Parathelypteris noveboracensis</i>		U			R		x					
<i>Phegopteris connectilis</i>		R										
<i>Picea rubens</i>		U	R				x			x	R	
<i>Pinus strobus</i>	x	R	1%	x	R	R	x	R			R	
<i>Populus tremuloides</i>	x			x								
<i>Quercus rubra</i>				x			x	R	R	x	R	
<i>Rubus canadensis</i>			R			R			R			
<i>Rubus hispidus</i>	x			x	R							
<i>Salix petiolaris</i>	x											
<i>Sorbus americana</i>												R
<i>Spiraea alba</i>	x			x								
<i>Thelypteris palustris</i>	x		R	x			x		R	x		R
<i>Thuja occidentalis</i>			R					1%	U	x	6%	8%
<i>Tsuga canadensis</i>		R	R	x			x	R		x	R	
<i>Vaccinium corymbosum</i>		U					x	U	R		R	
<i>Viburnum nudum</i>		R		x			x					
Bryophytes	x	2%	R	x	2%	R	x	1%		x	8%	
TOTAL # OF TAXA	26	27	23	31	23	20	27	18	18	23	22	15

Appendix 3. Raw vegetation survey data, Great Meadow, Mount Desert Island.

Site: GreatMeadow Plot4, vegetation data from the 80 meter diameter assessment area, 2015-2023.

Species	NE			SE			SW			NW		
	2015	2020	2023	2015	2020	2023	2015	2020	2023	2015	2020	2023
Acer rubrum	x	15%	40%	x	20%	70%	x	40%	70%	x	60%	75%
Agrostis perennans									R		R	R
Betula papyrifera	x	20%	U	x	30%	4%	x	15%	3%	x	10%	2%
Betula populifolia	x	U	15%	x		R				x		2%
Brachyelytrum aristosum									3%	x	R	
Calamagrostis canadensis	x	8%	35%	x	2%	10%	x		4%	x	U	2%
Carex atlantica						R						R
Carex brunnescens	x	R	U	x	R	U	x	R	R	x	R	U
Carex debilis		U	4%	x	U	6%		U	10%		U	8%
Carex folliculata		R			R	R						
Carex lacustris	x											
Carex novae-angliae	x			x	R	R	x	R		x	R	
Carex stricta	x	45%	40%	x	60%	80%	x	45%	80%	x	45%	70%
Carex trisperma	x	R		x	R	R	x			x		
Danthonia spicata										x	R	
Doellingeria umbellata	x	R		x	R		x	R	R	x	R	R
Dryopteris carthusiana	x	U		x	U		x	U	R	x	U	R
Dryopteris cristata	x		R		R	R	x	R	R			R
Dryopteris intermedia	x	R						R			R	
Frangula alnus	x	1%		35%	1%	2%	x	1%	1%	x	1%	1%
Ilex mucronata							x			x		
Ilex verticillata		R	R	x	R		x	R	U	x	R	U
Kalmia angustifolia	x											
Larix laricina		R							R			
Lycopus uniflorus									R			
Lysimachia borealis	x	U	U	x	U	U	x	R	R	x	U	U
Lysimachia terrestris	x	U	R	x		R		R			R	
Maianthemum canadense	x	R	R	x	R		x	R	R	x	R	R
Malus sieboldii				x					R	x		
Monotropa uniflora				x			x					
Oclemena acuminata							x	R				
Osmunda regalis								R	R		R	
Osmundastrum cinnamomeum	x	U	8%	x	U	2%	x	U	8%	x	U	14%
Picea rubens		R	R	x	R	R	x	R	R			
Pinus strobus	x	R		x	R	R	x	R	R	x	U	1%
Populus grandidentata										x		
Quercus rubra				x					R	x	R	
Rubus hispids	x	R	U	x	R	U	x	U	U	x	R	U
Rubus pubescens			U						R			R
Salix petiolaris							x			x		
Scirpus cyperinus												R
Sorbus americana				x								
Spiraea alba							x					
Thelypteris palustris				x					1%			
Triadenum fraseri									R			
Tsuga canadensis							x					
Vaccinium angustifolium	x			x	R		x			x		
Vaccinium corymbosum	x	U	U	x	U	U	x	U	R	x	U	U
Bryophytes	x	12%	4%	x	4%	6%	x	2%	10%	x	2%	3%
TOTAL # OF TAXA	24	24	18	28	23	21	27	23	29	27	25	23

Appendix 3. Raw vegetation survey data, Great Meadow, Mount Desert Island.

Site: GreatMeadow Plot5, vegetation data from the 80 meter diameter assessment area, 2015-2023.

Species	NE			SE			SW			NW		
	2015	2020	2023	2015	2020	2023	2015	2020	2023	2015	2020	2023
<i>Acer rubrum</i>							x					
<i>Agrostis stolonifera</i>					R			R				
<i>Alnus incana</i> ssp. <i>rugosa</i>					R	R						
<i>Calamagrostis canadensis</i>	x	25%	35%	x	50%	40%	x	70%	60%	x	90%	60%
<i>Carex brunnescens</i>											R	
<i>Carex lacustris</i>	x	6%	10%	x	6%	20%	x	4%	25%	x	3%	35%
<i>Carex lasiocarpa</i>	x	60%		x	60%	15%	x	10%	20%	x	4%	20%
<i>Carex lenticularis</i>	x			x			x			x		
<i>Carex scoparia</i>							x					
<i>Carex stricta</i>	x			x			x			x		
<i>Carex utriculata</i>	x	45%	40%		50%	20%		30%	25%	x	20%	25%
<i>Carex vesicaria</i>								5%			15%	
<i>Dulichium arundinaceum</i>							x	U	1%	x	U	1%
<i>Galium tinctorium</i>							x					
<i>Glyceria borealis</i>							x	R	R	x		
<i>Glyceria canadensis</i>	x						x			x	U	
<i>Impatiens capensis</i>				x								
<i>Iris versicolor</i>				x						x		
<i>Juncus brevicaudatus</i>	x	R										
<i>Juncus canadensis</i>		R					x			x	R	
<i>Juncus effusus</i>							x					
<i>Lysimachia terrestris</i>	x			x	R		x	U		x	U	
<i>Malus sieboldii</i>										x		
<i>Myrica gale</i>	x	R		x	R	2%	x	5%	4%	x	5%	3%
<i>Nuphar variegata</i>							x	R	1%	x	U	
<i>Potamogeton berchtoldii</i>									R			R
<i>Potamogeton gramineus</i>									R			
<i>Rosa nitida</i>							x					
<i>Sagittaria latifolia</i>							x	R	U			
<i>Scirpus atrocinctus</i>	x	R		x						x	R	
<i>Scirpus cyperinus</i>	x	R		x	R		x	R		x		
<i>Scutellaria galericulata</i>	x						x			x		
<i>Sparganium emersum</i>							x	R	1%	x		R
<i>Spiraea alba</i>	x	R		x	U	3%	x	U	3%	x	U	
<i>Triadenum fraseri</i>	x			x	R		x	R		x	R	
<i>Utricularia vulgaris</i>						U			R			U
Bryophytes												
TOTAL # OF TAXA	15	10	3	13	11	8	23	16	14	21	15	9

Appendix 3. Raw vegetation survey data, Great Meadow, Mount Desert Island.

Site: GreatMeadow Plot6, vegetation data from the 80 meter diameter assessment area, 2015-2023.

Species	NE			SE			SW			NW		
	2015	2020	2023	2015	2020	2023	2015	2020	2023	2015	2020	2023
<i>Acer rubrum</i>	x	20%	20%	x	15%	20%	x	45%	60%	x	40%	60%
<i>Betula papyrifera</i>					U					x		3%
<i>Betula populifolia</i>	x	15%	6%	x	8%	20%	x	30%	2%	x	20%	10%
<i>Calamagrostis canadensis</i>	x	U	10%	x	U	6%			12%	x	U	8%
<i>Carex atlantica</i>	x		3%	x	R	4%			R	x		10%
<i>Carex brunnescens</i>	x	R	10%		R	15%	x		30%	x		10%
<i>Carex canescens</i>			U			U						U
<i>Carex debilis</i>								R	8%		R	6%
<i>Carex echinata</i>		R	6%	x	U			U	10%		U	10%
<i>Carex folliculata</i>		R			R		x	R	R			1%
<i>Carex lacustris</i>	x	2%	9%					R	R			R
<i>Carex novae-angliae</i>		R			R			R			R	
<i>Carex stricta</i>	x	50%	50%	x	60%	70%	x	10%	30%	x	20%	60%
<i>Carex trisperma</i>		R							R	x	R	
<i>Carex vesicaria</i>	x											
<i>Chamaedaphne calyculata</i>	x	5%	20%	x	5%	10%			R		U	R
<i>Doellingeria umbellata</i>							x					
<i>Dulichium arundinaceum</i>									R		R	
<i>Eriophorum angustifolium</i>			R						R			
<i>Frangula alnus</i>	x	7%	4%	x	3%	4%	80%	2%	3%	60%	4%	2%
<i>Ilex mucronata</i>		U										
<i>Ilex verticillata</i>		R			R		x	R				
<i>Juncus effusus</i>				x								
<i>Juncus tenuis</i>								R				
<i>Kalmia angustifolia</i>	x	U	U	x	U	U				x		
<i>Larix laricina</i>		R	R	x					R			
<i>Lysimachia borealis</i>				x	R		x	R	U	x	R	U
<i>Lysimachia terrestris</i>	x		2%	x	U	4%		U	1%	x	U	4%
<i>Maianthemum canadense</i>							x					
<i>Malus sieboldii</i>							x					
<i>Myrica gale</i>					R	R				x		
<i>Osmundastrum cinnamomeum</i>	x	U	1%	x	U		x	U	4%	x	U	2%
<i>Quercus rubra</i>				x								
<i>Rhododendron canadense</i>	x	2%	U	x	U	U	x			x		
<i>Rhododendron groenlandicum</i>			R	x								
<i>Rubus canadensis</i>									R			
<i>Rubus hispidus</i>				x	R		x	R		x		
<i>Scirpus cyperinus</i>				x	R	R			1%		R	R
<i>Spiraea alba</i>		R										
<i>Spiraea tomentosa</i>		R										
<i>Thelypteris palustris</i>				x								R
<i>Vaccinium corymbosum</i>	x	10%	40%	x	8%	5%	x	5%	3%	x	20%	6%
Bryophytes	x	20%	6%	x	20%		x	5%	3%	x	2%	6%
TOTAL # OF TAXA	16	22	20	22	23	15	16	17	23	18	17	21

Appendix 3. Raw vegetation survey data, Great Meadow, Mount Desert Island.

Site: GreatMeadow Plot7, vegetation data from the 80 meter diameter assessment area, 2015-2023.

Species	NE			SE			SW			NW		
	2015	2020	2023	2015	2020	2023	2015	2020	2023	2015	2020	2023
<i>Acer rubrum</i>	x	5%	3%	x	8%	10%	x	6%	8%	x	25%	9%
<i>Alnus incana</i> ssp. <i>rugosa</i>	x	U	3%		8%	15%	x	10%	2%	x	6%	1%
<i>Aronia melanocarpa</i>		R										
<i>Betula populifolia</i>	x	9%	10%	x	8%	6%	x	20%	18%	x	25%	12%
<i>Calamagrostis canadensis</i>	x	60%	65%	x	25%	15%	x	60%	50%	x	70%	30%
<i>Carex lacustris</i>				x		U						
<i>Carex stricta</i>	x	50%	25%	x	20%	20%	x	10%	50%	x	25%	60%
<i>Carex vesicaria</i>	x			x						x		
<i>Dulichium arundinaceum</i>						R						
<i>Eurybia radula</i>										x		
<i>Frangula alnus</i>		3%			1%				1%			1%
<i>Glyceria canadensis</i>			R			R						
<i>Glyceria laxa</i>	x			x								
<i>Ilex verticillata</i>	x	5%	R	x	5%	U		5%	1%	x	3%	4%
<i>Iris versicolor</i>											R	
<i>Kalmia angustifolia</i>							x	R			R	
<i>Lysimachia terrestris</i>				x		R	x	R		x	R	
<i>Myrica gale</i>	x	20%	50%	x	20%	15%	x	10%	1%	x	10%	15%
<i>Osmunda regalis</i>	x	U	U	x	5%	U	x	U	R	x	U	6%
<i>Osmundastrum cinnamomeum</i>	x	U	U	x	R	U	x	U	R	x	U	8%
<i>Pinus strobus</i>								R	1%			
<i>Rubus hispidus</i>							x	R				
<i>Rubus pubescens</i>								R	R			
<i>Salix bebbiana</i>	x									x		
<i>Spiraea alba</i>	x	R	U	x	R		x	R	1%	x	U	1%
<i>Spiraea tomentosa</i>							x	R				
<i>Thelypteris palustris</i>				x	R	R		R	R	x		
<i>Triadenum fraseri</i>	x	R			R							
<i>Viburnum dentatum</i>					R	R						
<i>Viola pallens</i>							x					
Bryophytes	x	30%	10%	x	30%	12%	x	60%	36%	x	10%	25%
TOTAL # OF TAXA	15	14	12	15	15	16	15	18	15	15	14	12

Appendix 3. Raw vegetation survey data, Great Meadow, Mount Desert Island.

Site: GreatMeadow Plot8, vegetation data from the 80 meter diameter assessment area, 2015-2023.

Species	NE			SE			SW			NW		
	2015	2020	2023	2015	2020	2023	2015	2020	2023	2015	2020	2023
Acer rubrum	x	U	10%	x	R	R	x			x	R	
Agrostis stolonifera					R			U			R	
Alnus incana ssp. rugosa	x	18%	10%	x	8%	4%		R		x	6%	R
Betula populifolia	x	U	R	x	U	25%				x		
Calamagrostis canadensis	x	25%	6%	x	10%	14%	x	20%	50%	x	40%	60%
Carex brunnescens	x										R	
Carex lacustris	x	60%	30%	x	60%	50%	x	50%	20%	x	40%	30%
Carex lasiocarpa		U	10%	x	20%		x	15%	15%	x	10%	15%
Carex stricta	x	10%		x		2%	x			x	10%	
Carex utriculata		U	10%		U	20%		15%	10%		10%	15%
Carex vesicaria			15%			15%				x		
Chamaedaphne calyculata		U										
Doellingeria umbellata					R							
Dulichium arundinaceum					R		x	R		x		
Equisetum arvense				x								
Frangula alnus					1%							
Ilex mucronata			R									
Ilex verticillata		R	R	x	U	2%					R	
Impatiens capensis		R										
Iris versicolor	x				R							
Juncus canadensis					R					x		
Kalmia angustifolia		R										
Lysimachia terrestris	x	U	R	x	U	2%	x			x	R	R
Maianthemum canadense						R						
Myrica gale	x	60%	40%	x	40%	14%	x	15%	18%	x	30%	10%
Onoclea sensibilis	x	U	R									
Pinus strobus	x	R	R									
Populus tremuloides				x	U	R						
Potamogeton berchtoldii		R			R			U	R			R
Quercus rubra						R						
Salix bebbiana	x		R	x	R							
Salix petiolaris	x	15%	20%	x	10%	U	x	5%	R	x	4%	R
Scirpus atrocinctus								R				
Scirpus cyperinus	x	R			R		x	U	R	x	U	
Solidago altissima		R										
Solidago rugosa					R							
Spiraea alba	x	5%	R	x	5%	1%	x			x	U	R
Thelypteris palustris			R	x								
Triadenum fraseri					R		x					
Utricularia vulgaris					R	R		U	U		R	U
Vaccinium angustifolium			R									
Vaccinium corymbosum					R							
Bryophytes											1%	
TOTAL # OF TAXA	16	21	19	16	26	17	12	13	9	15	17	11

Appendix 3. Raw vegetation survey data, Great Meadow, Mount Desert Island.

Site: GreatMeadow Plot9, vegetation data from the 80 meter diameter assessment area, 2015-2023.

Species	NE			SE			SW			NW		
	2015	2020	2023	2015	2020	2023	2015	2020	2023	2015	2020	2023
Acer rubrum	x	6%	3%	x	6%	20%	x	4%	30%	x	15%	10%
Betula alleghaniensis								R				
Betula papyrifera		U	R	x	U	5%	x	15%	12%	x	8%	10%
Betula populifolia	x	8%	30%	x	40%	15%	x	10%	10%	x	U	6%
Calamagrostis canadensis	x			x		2%		R	3%	x	U	3%
Carex atlantica	x	R		x	R	R	x	R		x	R	
Carex brunnescens				x	R	U	x	R	R		R	U
Carex canescens					R	R%			R		R	7%
Carex debilis	x		R	x	R			R	R		R	
Carex folliculata				x	R	R	x	R	U			R
Carex novae-angliae	x	R			R			R		x	R	
Carex stricta			1%		U	12%	x	6%	35%	x	40%	25%
Carex trisperma				x	R	R	x			x	R	
Chamaedaphne calyculata	x	R	4%									
Doellingeria umbellata	x	R		x		R	x	R	R	x	U	U
Dryopteris carthusiana					R			R		x		
Frangula alnus	x	6%		x	8%	3%	x	8%		x	5%	1%
Glyceria laxa							x					
Ilex mucronata	x	U		x	4%					x	U	
Ilex verticillata			8%				x		R		R	R
Kalmia angustifolia	x	6%	60%	x	8%	30%		2%	15%	x	U	5%
Larix laricina	x	R	4%	x	R	R	x	R	R		R	R
Lysimachia borealis	x	15%	8%	x	5%		x	U		x	U	R
Lysimachia terrestris			R			8%			R		R	
Maianthemum canadense	x						x	R		x	R	
Monotropa uniflora				x								
Oclemena acuminata					R							
Osmunda regalis											R	
Osmundastrum cinnamomeum	x	U	R	x	U	6%	x	5%	20%	x	5%	15%
Phegopteris connectilis					R							
Picea rubens										x		
Pinus strobus			R	x		U	x	R	U	x	R	
Quercus rubra			R		R			R			U	R
Rhododendron canadense	x	30%	8%	x	30%			5%		x	1%	
Rhododendron groenlandicum		R		x	U			R			R	
Rubus hispidus					R		x	R	R	x	R	R
Rubus pubescens						R			U			U
Salix petiolaris	x				R	R			R			
Scirpus cyperinus									R	x		R
Spiraea alba				x					R			
Vaccinium angustifolium		U	R		U		x	U	R	x	U	
Vaccinium corymbosum	x	6%	14%	x	2%	3%	x	2%	1%	x	1%	U
Vaccinium myrtilloides								R				
Bryophytes	x	1%	1%	x	8%	20%	x	3%	25%	x	10%	20%
TOTAL # OF TAXA	19	18	18	23	28	21	21	28	24	24	30	21

Appendix 3. Raw vegetation survey data, Great Meadow, Mount Desert Island.

Site: GreatMeadow Plot10, vegetation data from the 80 meter diameter assessment area, 2015-2023.

Species	NE			SE			SW			NW		
	2015	2020	2023	2015	2020	2023	2015	2020	2023	2015	2020	2023
Agrostis stolonifera		R										
Calamagrostis canadensis	x	70%	70%	x	70%	30%	x	30%	20%	x	10%	20%
Carex lacustris	x	30%	15%	x	30%	10%	x	20%	20%	x	5%	15%
Carex lasiocarpa	x	30%	10%	x	30%	10%	x	60%	10%	x	75%	10%
Carex stricta	x		20%	x		20%	x		20%	x		20%
Carex utriculata		30%	20%		30%	20%		20%	20%		20%	20%
Carex vesicaria	x	10%			10%			10%			15%	
Dulichium arundinaceum							x			x	R	
Frangula alnus										x		
Juncus canadensis		R					x					
Lysimachia terrestris		R	R		R		x					
Myrica gale		U	R	x	U	R	x	U	R		R	R
Salix petiolaris	x	R		x							R	
Scirpus cyperinus	x	R	R				x					
Spiraea alba	x	R		x			x	R		x	R	
Triadenum fraseri	x	R					x				R	
Typha latifolia												R
Utricularia vulgaris		5%	U		2%	U		1%	U		2%	U
Bryophytes												
TOTAL # OF TAXA	9	14	9	7	8	7	11	8	7	7	11	8