6.0 LIST OF TABLES

Table 1. All vegetation treatment combinations tested in this study. The pre-emergent herbicide utilized was Torpedo™ with rate 1 = 580 g ha^{-1} and rate 2 = 1160 g ha^{-1}. The post-emergent herbicide utilized was Clearview™ at a rate of 230 g ha^{-1}.

Treatment ID	3500 stems ha^{-1} woody	10,000 stems ha^{-1} woody	Pre-emergent Herbicide rate 1	Pre-emergent Herbicide rate 2	Post-emergent herbicide	5,000 stems ha^{-1} goldenrod	5,000 stems ha^{-1} fireweed	8 kg ha^{-1} awned wheatgrass
1	x							
2	x		x			x		
3	x			x		x		
4	x				x			
5	x				x			x
6	x							x
7	x					x		
8	x						x	
9	x					x		x
10		x						
11		x				x		
12		x						x
13				control group - no treatment				
14				control group - no treatment				

Table 2. Deployment density listed by species for the baseline treatments of 3,500 and 10,000 stems ha^{-1} (see also treatments 1-9 and 10-12 in Table 1).

Species	Base density (stems ha^{-1})		# plants per plot	
	3,500	**10,000**	**3,500**	**10,000**
Green alder	500	1500	5	15
Paper birch	750	2000	8	20
White spruce	1000	3000	10	30
Poplar	750	2000	8	20
Willow	500	1500	5	15
Goldenrod / Fireweed	5000		50	50

Table 3. Estimated costs of deploying vegetation management treatments. Peripheral costs associated with travel to sites, accommodations, overhead expenses etc. are not considered in these calculations. Note that in treatments 2, 3, 7, 8, 9 and 11 native forbs were planted at 5,000 stems ha^{-1}, which increased the planting costs by $10,750 per hectare.

| Treatment #	Seedling purchase ($0.90 plant^{-1})	Planting cost ($1.25 plant^{-1})	Seed purchase ($150 per 22 kg bag)	Hand broadcasting (# hours ha^{-1})	Herbicide supplies	Herbicide application (# hours ha^{-1})	Labor cost ($100 ha^{-1})	Total cost ($ ha^{-1})
1	$3,150	$4,375	$0	0.00	$0	0.00	$0	$7,525
2	$7,650	$10,625	$0	0.00	$500	3.00	$300	$19,078
3	$7,650	$10,625	$0	0.00	$500	3.00	$300	$19,078
4	$3,150	$4,375	$0	0.00	$500	6.00	$600	$8,631
5	$3,150	$4,375	$55	3.00	$500	6.00	$900	$8,989
6	$3,150	$4,375	$55	3.00	$0	0.00	$300	$7,883
7	$7,650	$10,625	$0	0.00	$0	0.00	$0	$18,275
8	$7,650	$10,625	$0	0.00	$0	0.00	$0	$18,275
9	$7,650	$10,625	$55	3.00	$0	0.00	$300	$18,633
10	$9,000	$12,500	$0	0.00	$0	0.00	$0	$21,500
11	$13,500	$18,750	$0	0.00	$0	0.00	$0	$32,250
12	$9,000	$12,500	$55	3.00	$0	0.00	$300	$21,858
13	$0	$0	$0	0.00	$0	0.00	$0	$0
14	$0	$0	$0	0.00	$0	0.00	$0	$0

7.0 LIST OF FIGURES

Figure 1. Overview of the experimental layout and design at the Conoco Phillips Borrow Pit 1 (North). The plots in shades of green are those associated with the present study, the other blocks are associated with a separate research trial (refer to the figure legend for additional details).
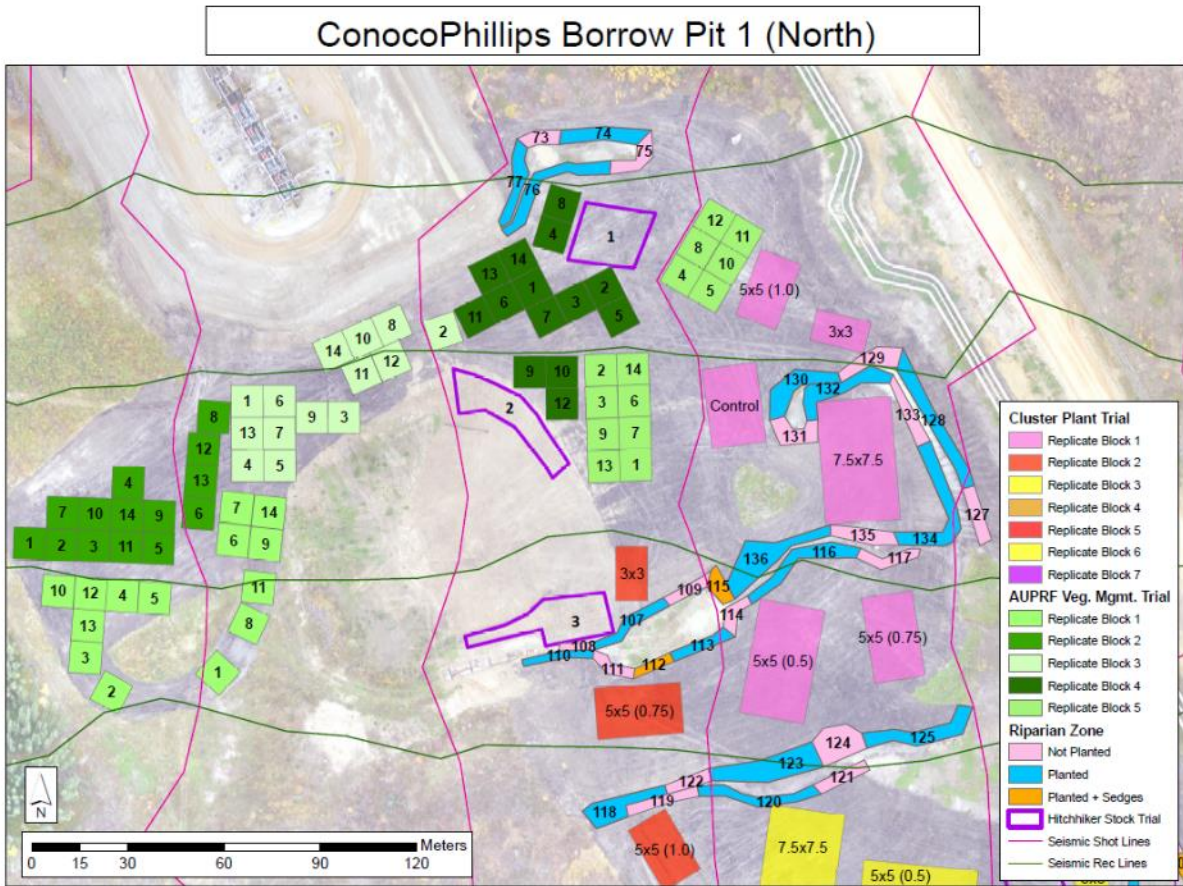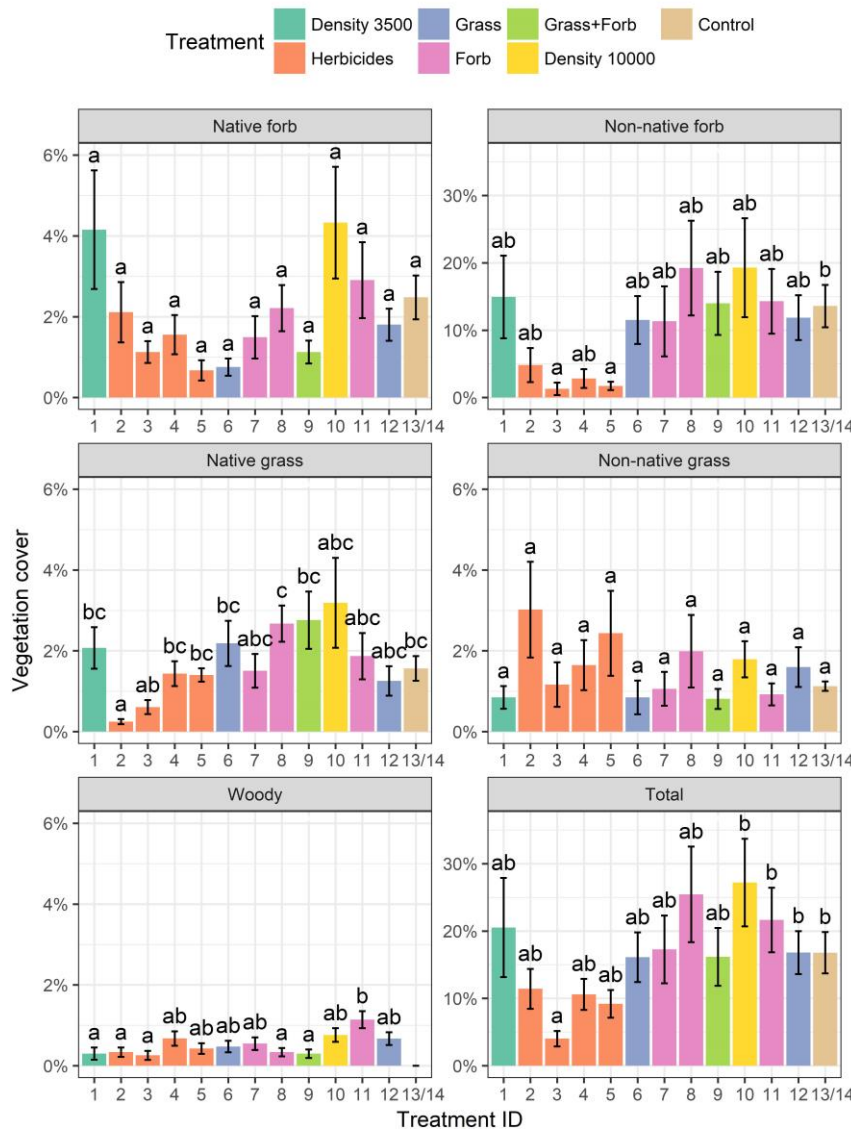
Figure 2. Least squares means of woody density (stems per hectare) for five planted species (green alder, paper birch, white spruce, balsam poplar, willow). Vegetation sub-treatments 1-14 are color-coded into broad categories but refer to Table 1 for full treatment combination detail. Standard errors represent the standard error of the mean (sample size = 5). Different lettering over bars indicates a statistical difference (p-value < 0.05) between treatment means.
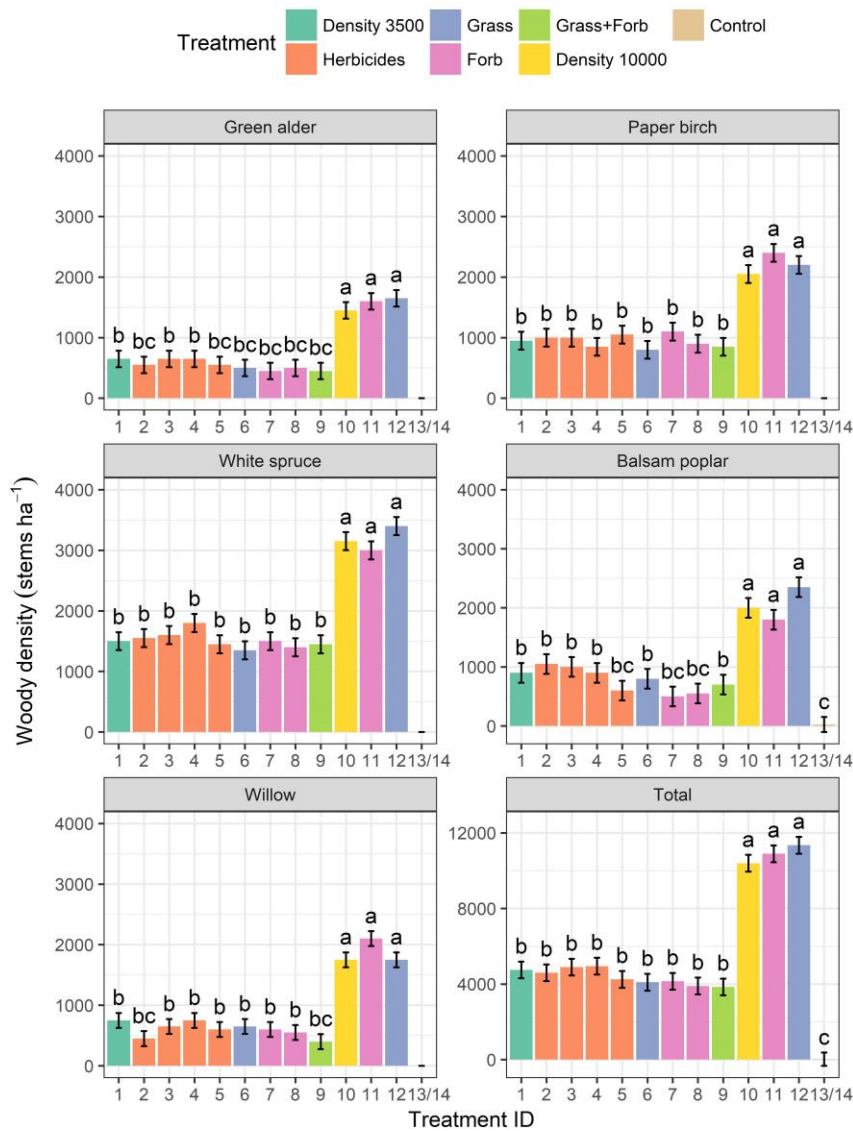
Figure 3. Least squares means of vegetation cover (% of ground area) for species groups including: native forbs, non-native forbs, native grasses, non-native grasses, woody species and total (all species combined). Vegetation sub-treatments 1-14 are color-coded into broad categories but refer to Table 1 for full treatment combination detail. Standard errors represent the standard error of the mean (sample size = 5). Different lettering over bars indicates a statistical difference (p-value < 0.05) between treatment means.

Figure 4. Least squares means of total plant height (cm) for five planted species (green alder, paper birch, white spruce, balsam poplar, willow). Vegetation sub-treatments 1-14 are color-coded into broad categories but refer to Table 1 for full treatment combination detail. Standard errors represent the standard error of the mean (sample size = 5). Different lettering over bars indicates a statistical difference (p-value < 0.05) between treatment means.
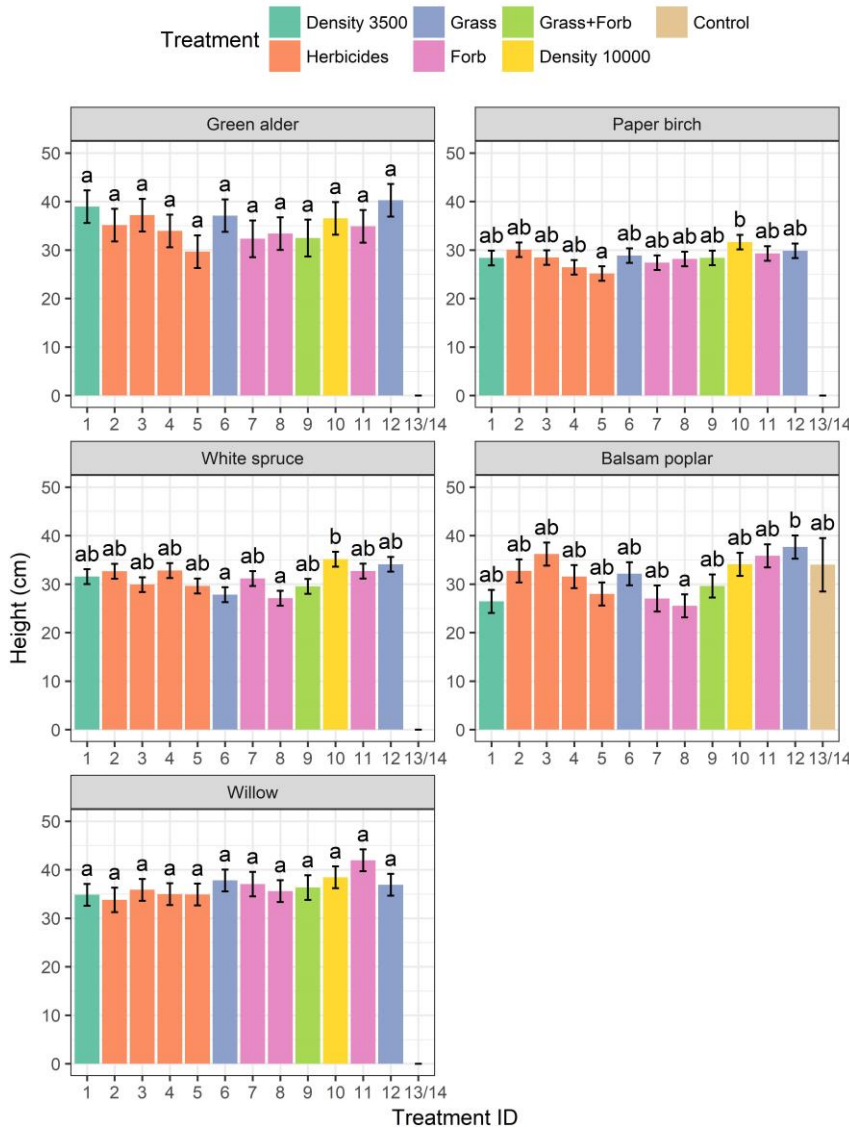
8.0 APPENDIX

Photos

A8.1. Field site photos and preliminary observations from May in contrast with August 2017: (a) Site was clear of vegetation, with only minor amounts of grasses and other species just starting to emerge. (b) Shows the same treatment plot with pre-emergent herbicide in September and (c) another view of study area from August where herbicide treated plots are visible in background.

(a)	(b)

(c)

A8.2. Field site photos and preliminary observations from mid-June 2017: (a) Recently sprayed with conventional herbicide. (b-c) close-up view of spray that was placed around individual seedlings (gaps of soil around blue areas).

(a)	(b)

(c)	
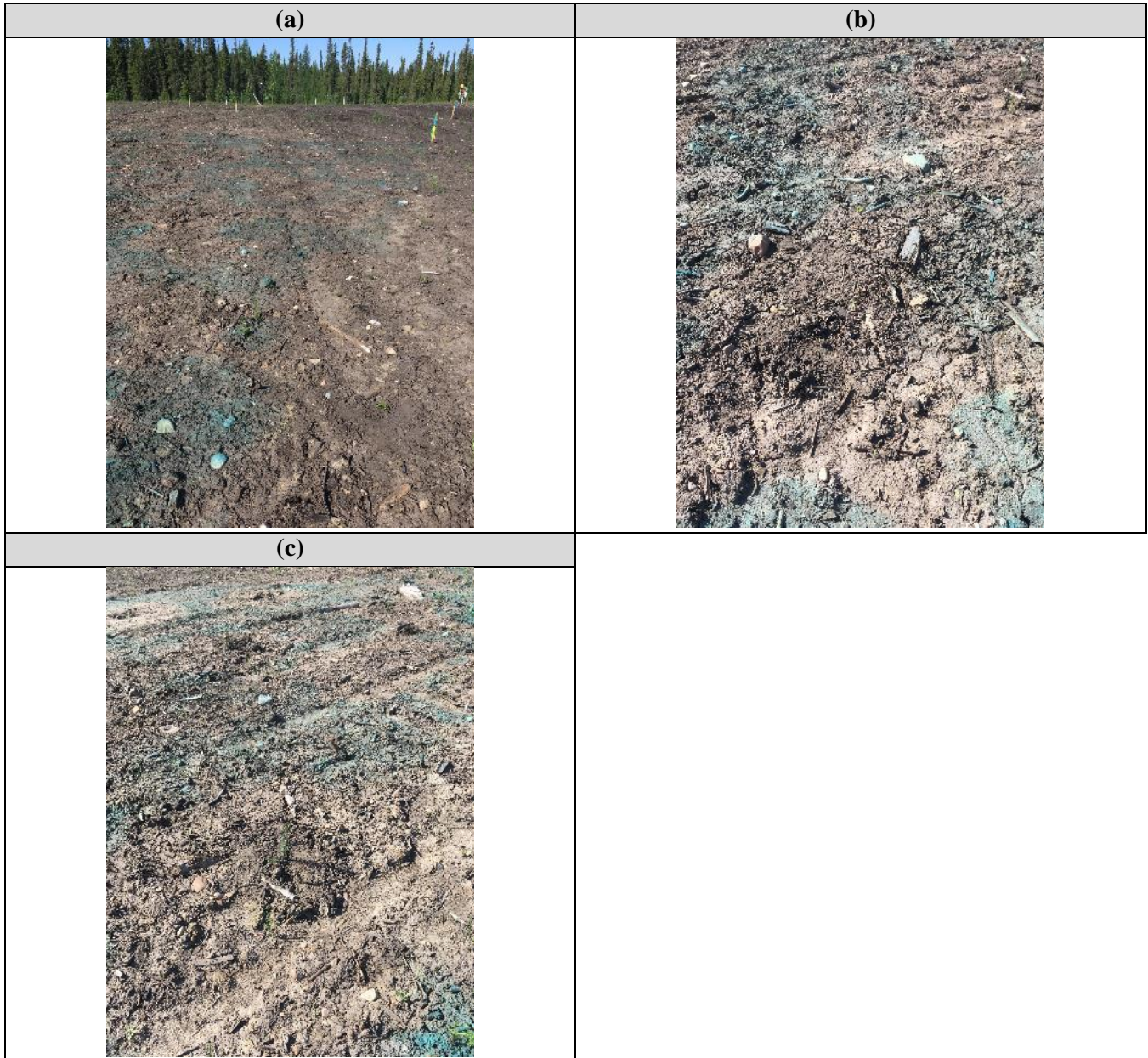
A8.3. Field site photos and preliminary observations from early August 2017 (at time of vegetation surveys): Treatment 1 in early August, showing (a) plot-view and close-up of individual species including (b) balsam poplar, (c) white spruce and (d) green alder.

(a)	(b)

(c)	(d)

A8.4. Field site photos and preliminary observations from early August 2017 (at time of vegetation surveys): (a-b) Visual effect of Clearview™ herbicide (treatments 4/5), showing good control of competing vegetation. Some visual damage to planted seedlings: (c) balsam poplar with curled leaves and (d) chlorotic white spruce.

(a)	(b)
(c)	**(d)**

A8.5. Field site photos and preliminary observations from early August 2017 (at time of vegetation surveys): Arrows in (a) and (b) pointing into plots (10 x 10 m) treated with pre-emergent herbicide (treatments 2 and 3). Examples of planted woody species (c) balsam poplar and (d) white spruce in Torpedo™ herbicide treatments.
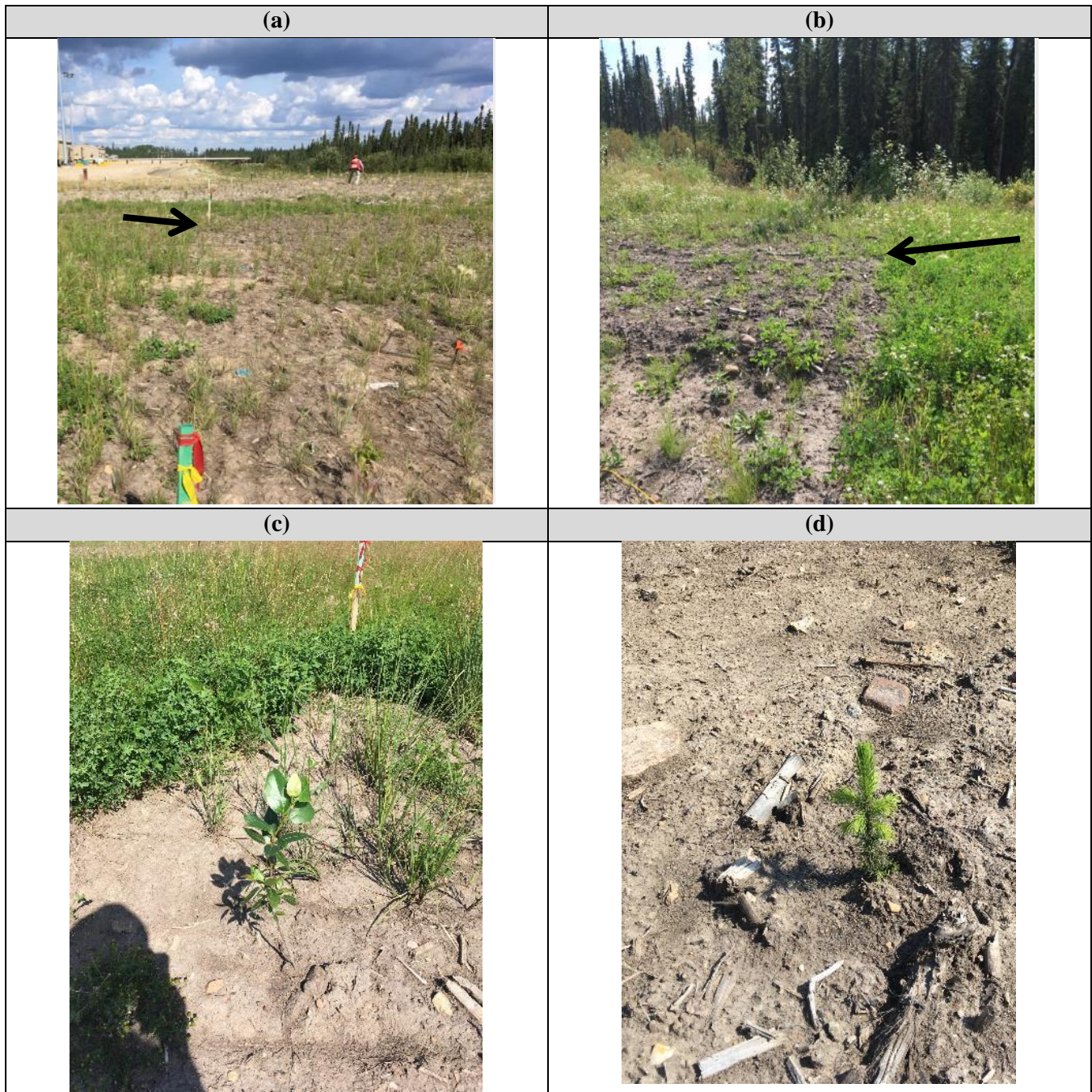
A8.6. Field site photos and preliminary observations from June, August and September 2017: Planted goldenrod seedlings in (a) August and (b) September 2017. Fireweed seedlings (c) at the time of planting in June and in (d) early August 2017.

(a)	(b)
(c)	(d)

A8.7. Field site photos and preliminary observations from early August 2017: Comparison of herbicide treatments: (a) pre-emergent treatment #2, (b) pre-emergent treatment #3, (c) post-emergent treatment #4 and (d) control (treatment #1) within block 1 to visually demonstrate the relative differences between treatments.

(a)	(b)
(c)	**(d)**