

September 30, 2020

Steve Moskal  
BP America Production Company  
1199 Main Ave Suite 101  
Durango, CO 81301

**RE: Tiffany Gathering  
September 2020 Vegetation Monitoring**

Dear Mr. Moskal,

Cottonwood Consulting LLC (Cottonwood) is pleased to provide you with the results of the vegetation monitoring conducted on September 22, 2020 at the Tiffany Gathering site. Details regarding the monitoring and results are summarized below.

### **Background**

A release occurred from a BP America Production Company (BP) pipeline known as the Tiffany Gathering in April 2020. Produced water was released and flowed across a hay field to an irrigation-influenced wetland, where the flow terminated. Soil sampling conducted on April 8, 2020 indicated that conductivity and SAR (sodium adsorption ratio) exceeded the Colorado Oil & Gas Conservation Commission Table 910-1 (COGCC) standard in some of the samples, but no hydrocarbons were detected above the COGCC Table 910-1 standard. BP received approval to perform monthly vegetation monitoring through the 2020 growing season to assess vegetative conditions within the flow path. Cottonwood conducted the first monthly monitoring event in May 2020 and reclamation activities, including the application of seed and mulch, occurred in the vicinity of the hay field shortly thereafter.

Based on a review of the National Resources Soil Conservation Service Web Soil Survey, the primary soil type within the project area is the Bayfield silty clay loam, 1-3 percent slopes. The Bayfield silty clay loam is considered prime farmland if irrigated and drained.

### **Methodology**

On September 22, 2020, a Cottonwood staff biologist conducted vegetation transect monitoring at the Tiffany Gathering release site. Cottonwood utilized the BLM's Line-point Intercept method to quantify soil cover, including vegetation, litter, rock and biotic crusts. Specific methodology can be referenced from *Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems, Second Edition (Herrick et al., 2017)*. Two transects were located within the release area. Transect 1 was 100 feet long and located within the wet area in the hay field. Transect 2 was located within

the irrigation-influenced wetland area and was divided into two segments in order to more accurately follow the flow path. The first segment was 56 ft long and the second segment was 44 ft long.

Vegetation was recorded by species to the extent practicable and the data were analyzed to determine percent (%) vegetation cover, % bare ground, and species composition. Photographs were also taken from either end of the transect line.

Transect locations and vegetation cover are provided in Table 1, a map of the project site with the transect locations can be found in Figure 1, photographs of the transects are provided in Attachment 1, and vegetation transect data can be found in Attachment 2.

## **Results**

Vegetation cover was 84% in Transect 1 and 100% in Transect 2 during the September 2020 vegetation monitoring event. Vegetation cover in Transect 2 was consistent with the August 2020 monitoring event. Bare ground made up 8% of Transect 1 and there was no bare ground observed in Transect 2, which is consistent with the August 2020 monitoring event. A portion of Transect 1 was saturated due to flood irrigation. Transect 2 was located within an irrigation-influenced wetland area with flowing water.

## **Conclusion**

Based on vegetation monitoring conducted on September 22, 2020, the vegetation within the flow path on the Tiffany Gathering site is consistent with seasonal conditions and surrounding vegetative conditions.

Future monitoring events will be used to evaluate potential site changes over time. The next monitoring event is scheduled for October 2020.

Should you have any questions, please do not hesitate to contact me at 208-610-6012. Cottonwood appreciates the opportunity to provide services to BP.

Sincerely,



Emma Millar, Biologist  
Cottonwood Consulting LLC

Attachments: Table 1 – Vegetation Monitoring Results  
Figure 1 – Vegetation Monitoring Map  
Attachment 1 – Photo Log  
Attachment 2 – Line-Point Intercept Data Forms and Species Composition Table

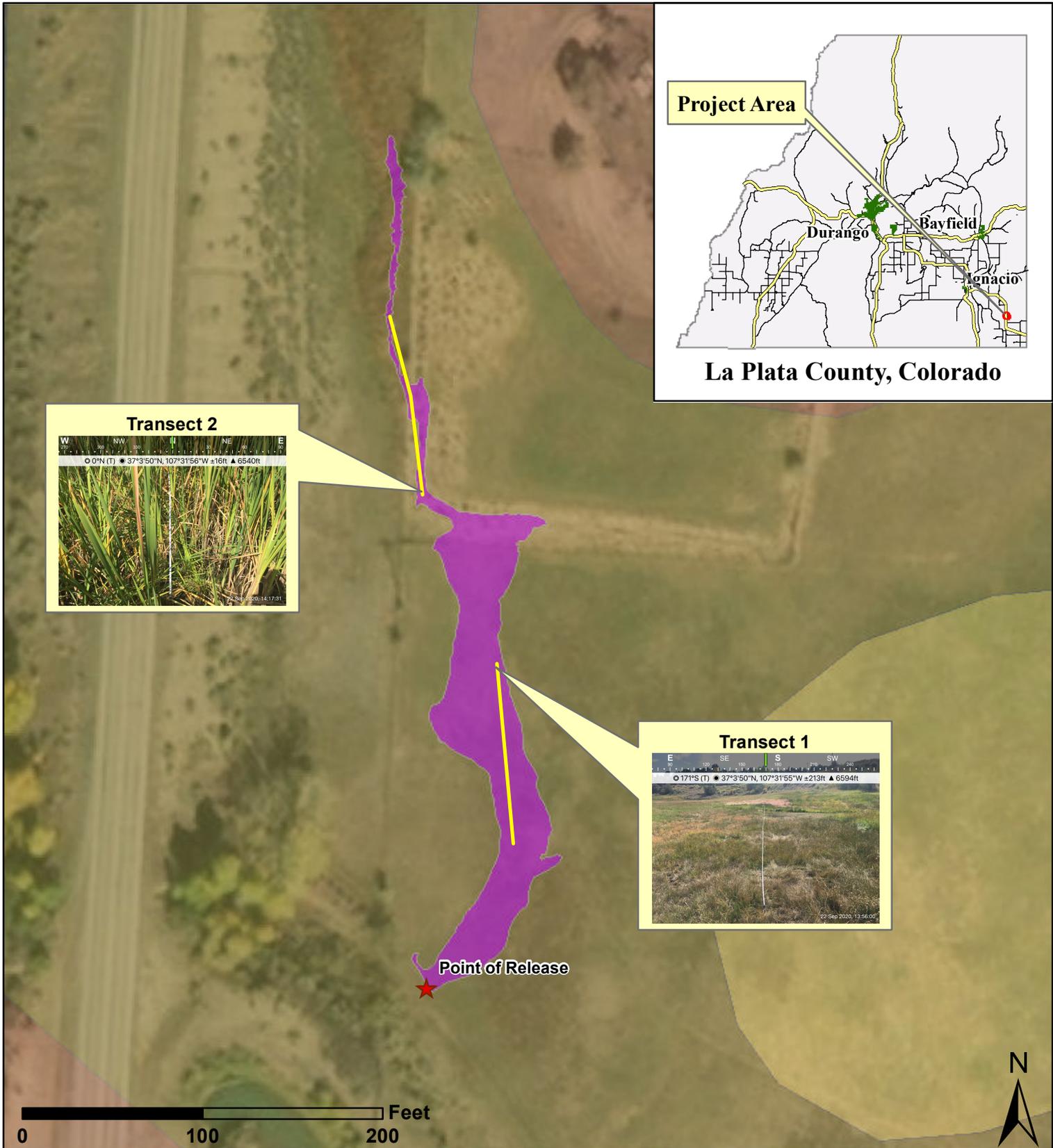
**TABLE 1**

**Table 1**  
**Vegetation Monitoring Results**  
**Tiffany Gathering**  
**BP America Production Company**

Transect	Azimuth	Location	Vegetation Cover	Vegetation Cover	Vegetation Cover	Vegetation Cover	Vegetation Cover
			May 2020	June 2020	July 2020	August 2020	September 2020
1 37.06387/-107.53212	342°	Flow path	Vegetation Cover = 66% Bare Ground = 6%	Vegetation Cover = 42% Bare Ground = 6%	Vegetation Cover = 68% Bare Ground = 18%	Vegetation Cover = 90% Bare Ground = 8%	Vegetation Cover = 84% Bare Ground = 8%
2 37.06413/-107.53228	340°/346°	Flow path	Vegetation Cover = 66% Bare Ground = 0%	Vegetation Cover = 90% Bare Ground = 0%	Vegetation Cover = 100% Bare Ground = 0%	Vegetation Cover = 100% Bare Ground = 0%	Vegetation Cover = 100% Bare Ground = 0%

**Notes:** Vegetation Cover includes all points with a top canopy present. Bare Ground includes points with no top or lower canopy present and only soil at the soil surface.

**FIGURE 1**



**Project Area**

Durango

Bayfield

Ignacio

**La Plata County, Colorado**

**Transect 2**



**Transect 1**



**Point of Release**

0 100 200 Feet



- Legend**
- ★ Point of Release
  - Vegetation Transects
  - Wet Area (4/8/2020)
- Soil Type**
- Bayfield silty clay loam, 1-3%
  - Sili clay loam, 3-6%
  - Zyme clay loam, 3-25%

**Cottonwood**  
CONSULTING

Mapping by: E. Millar, 9/22/2020  
Coordinate System:  
NAD 1983 UTM Zone 13 N

Location: Sec 32 T33N R6W NMPM

**Tiffany Gathering**  
**September 2020**  
**Vegetation Monitoring Map**  
**BP America Production Co.**

**ATTACHMENT 1**

Tiffany Gathering  
September Vegetation Monitoring  
Photographic Log  
BP America Production Co.



Photo 1: Start of Transect 1, 9/22/2020.



Photo 2: Start of Transect 2, 9/22/2020.

**ATTACHMENT 2**

**Line-Point Intercept Data Form  
Transect T1  
Tiffany Gathering  
BP America Production Company**

**Project:** Tiffany Gathering  
**Transect:** T1  
**Direction:** 342°  
**Date:** 9/23/2020

**Observer:** EM  
**Recorder:** EM  
**Transect Length:** 100ft  
**Spacing Interval:** 2ft

Pt.	Top Canopy	Lower Canopy Layers	Lower Canopy Layers	Soil Surface	Pt.	Top Canopy	Lower Canopy Layers	Lower Canopy Layers	Soil Surface
1	Rush	-	-	S	26	Purselane	HL	-	S
2	-	HL	-	S	27	Western wheatgrass	HL	-	S
3	Rush	Creeping meadow foxtail	-	S	28	Western wheatgrass	HL	-	S
4	Rush	HL	-	S	29	-	HL	-	S
5	Creeping meadow foxtail	-	-	S	30	Creeping meadow foxtail	Rush	-	S
6	Creeping meadow foxtail	Rush	HL	S	31	Rush	Timothy	-	S
7	Rush	HL	-	S	32	Timothy	HL	-	S
8	Rush	HL	-	S	33	Timothy	HL	-	S
9	Creeping meadow foxtail	Rush	HL	S	34	Timothy	-	-	S
10	Rush	HL	-	S	35	Water speedwell	Timothy	-	Irrigation ditch
11	Rush	Creeping meadow foxtail	HL	S	36	Rush	Creeping meadow foxtail	-	S*
12	Creeping meadow foxtail	-	-	S	37	Rush	Creeping meadow foxtail	-	S*
13	-	HL	-	S	38	Rush	Creeping meadow foxtail	-	S*
14	Rush	Creeping meadow foxtail	-	S	39	Rush	Creeping meadow foxtail	-	S*
15	Rush	HL	-	S	40	Rush	Creeping meadow foxtail	-	S*
16	Rush	HL	-	S	41	Rush	Creeping meadow foxtail	HL	S*
17	Rush	Creeping meadow foxtail	HL	S	42	Rush	-	-	S*
18	Creeping meadow foxtail	-	-	S	43	-	-	-	S*
19	-	-	-	S	44	Rush	Witchgrass	-	S*
20	Creeping meadow foxtail	-	-	S	45	Witchgrass	Rush	-	S*
21	Creeping meadow foxtail	HL	-	S	46	Rush	Witchgrass	-	S*
22	-	-	-	S	47	Witchgrass	Rush	-	S*
23	Western wheatgrass	HL	-	S	48	Witchgrass	Cocksbur grass	HL	S*
24	-	-	-	S	49	Witchgrass	Rush	-	S*
25	-	HL	-	S	50	Witchgrass	Rush	-	S*

**Notes:**

\* - Soil surface saturated by flood irrigation  
% Vegetation Cover (top canopy intercepts) = 84%  
% Bare Ground\*\* = 8%

\*\* - Bare ground occurs only when canopy layers are empty and Soil Surface = S.

Vegetation along the transect was consistent with seasonal and surrounding conditions.

Soil was saturated due to flood irrigation.

HL - Herbaceous Litter

S - Soil

**Line-Point Intercept Data Form  
Transect T2  
Tiffany Gathering  
BP America Production Company**

Project: Tiffany Gathering  
Transect: T2  
Direction: 340°/346°  
Date: 9/23/2020

Observer: EM  
Recorder: EM  
Transect Length: 100ft  
Spacing Interval: 2ft

Pt.	Top Canopy	Lower Canopy Layers	Lower Canopy Layers	Lower Canopy Layers	Soil Surface	Pt.	Top Canopy	Lower Canopy Layers	Lower Canopy Layers	Lower Canopy Layers	Soil Surface
1	Cattail	Lady's thumb	-	-	W	26	Cattail	HL	-	-	S
2	Cattail	-	-	-	Cattail	27	Cattail	HL	-	-	S
3	Cattail	-	-	-	S	28	Cattail	-	-	-	S
4	Cattail	-	-	-	S	29	Cattail	Northern bugleweed	-	-	S
5	Cattail	-	-	-	W	30	Cattail	Northern bugleweed	-	-	S
6	Cattail	-	-	-	W	31	Cattail	Northern bugleweed	-	-	S
7	Cattail	-	-	-	W	32	Cattail	Northern bugleweed	-	-	S
8	Cattail	-	-	-	W	33	Cattail	Northern bugleweed	HL	-	S
9	Cattail	Water speedwell	-	-	W	34	Cattail	Redtop	Redtop	HL	S
10	Cattail	-	-	-	S	35	Cattail	Redtop	Redtop	HL	S
11	Cattail	-	-	-	S	36	Cattail	HL	Redtop	HL	S
12	Cattail	-	-	-	S	37	Cattail	Western wheatgrass	Redtop	HL	S
13	Cattail	-	-	-	S	38	Cattail	HL	-	-	S
14	Cattail	-	-	-	S	39	Cattail	HL	-	-	S
15	Cattail	-	-	-	S	40	Cattail	HL	-	-	S
16	Cattail	-	-	-	S	41	Cattail	HL	-	-	S
17	Cattail	-	-	-	S	42	Cattail	HL	-	-	S
18	Cattail	-	-	-	S	43	Cattail	HL	-	-	S
19	Cattail	-	-	-	S	44	Cattail	HL	-	-	S
20	Cattail	Lady's thumb	-	-	S	45	Cattail	HL	-	-	S
21	Cattail	Northern bugleweed	-	-	S	46	Cattail	HL	-	-	S
22	Cattail	Northern bugleweed	HL	-	S	47	Cattail	HL	-	-	S
23	Cattail	HL	-	-	S	48	Cattail	HL	-	-	S
24	Cattail	HL	-	-	S	49	Cattail	Northern bugleweed	-	-	S
25	Cattail	HL	-	-	S	50	Cattail	HL	-	-	S

**Notes:**

% Vegetation Cover (top canopy intercepts) = 100%

% Bare Ground\* = 0%

\* - Bare ground occurs only when canopy layers are empty and Soil Surface = S.

Vegetation along the transect was consistent with seasonal and surrounding conditions.

Transect is located in an irrigation-influenced wetland with flowing water.

HL - Herbaceous Litter

W - Water

S - Soil

**Species Table**  
**Tiffany Gathering**  
**BP America Production Company**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Life Form</b>
<i>Phleum pratense</i>	Timothy	Grass
<i>Echinochloa crus-galli</i>	Cockspur grass	Grass
<i>Alopecurus ventricosus</i>	Creeping meadow foxtail	Grass
<i>Panicum capillare</i>	Witchgrass	Grass
<i>Pascopyrum smithii</i>	Western wheatgrass	Grass
<i>Agrostis gigantea</i>	Redtop	Grass
<i>Juncus</i> sp.	Rush	Grass-like
<i>Typha latifolia</i>	Cattail	Grass-like
<i>Veronica anagallis-aquatica</i>	Water speedwell	Forb
<i>Lycopus uniflorus</i>	Northern bugleweed	Forb
<i>Portulaca oleracea</i>	Purselane	Forb
<i>Persicaria maculosa</i>	Lady's thumb	Forb