

October 22, 2020

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

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

Dear Mr. Moskal,

Cottonwood Consulting LLC (Cottonwood) is pleased to provide you with the results of the vegetation monitoring conducted on October 21, 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 October 21, 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 78% in Transect 1 and 100% in Transect 2 during the October 2020 vegetation monitoring event. Bare ground made up 4% of Transect 1 and there was no bare ground observed in Transect 2. Transect 2 was located within an irrigation-influenced wetland area with some standing water.

## **Conclusion**

Based on vegetation monitoring conducted on October 21, 2020, the vegetation within the flow path on the Tiffany Gathering site is consistent with seasonal conditions and surrounding vegetative conditions.

Based on the vegetation monitoring results, it appears that the produced water release is not resulting in ongoing impacts to the surrounding vegetation. Therefore, Cottonwood is recommending closure for the Tiffany Gathering project.

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

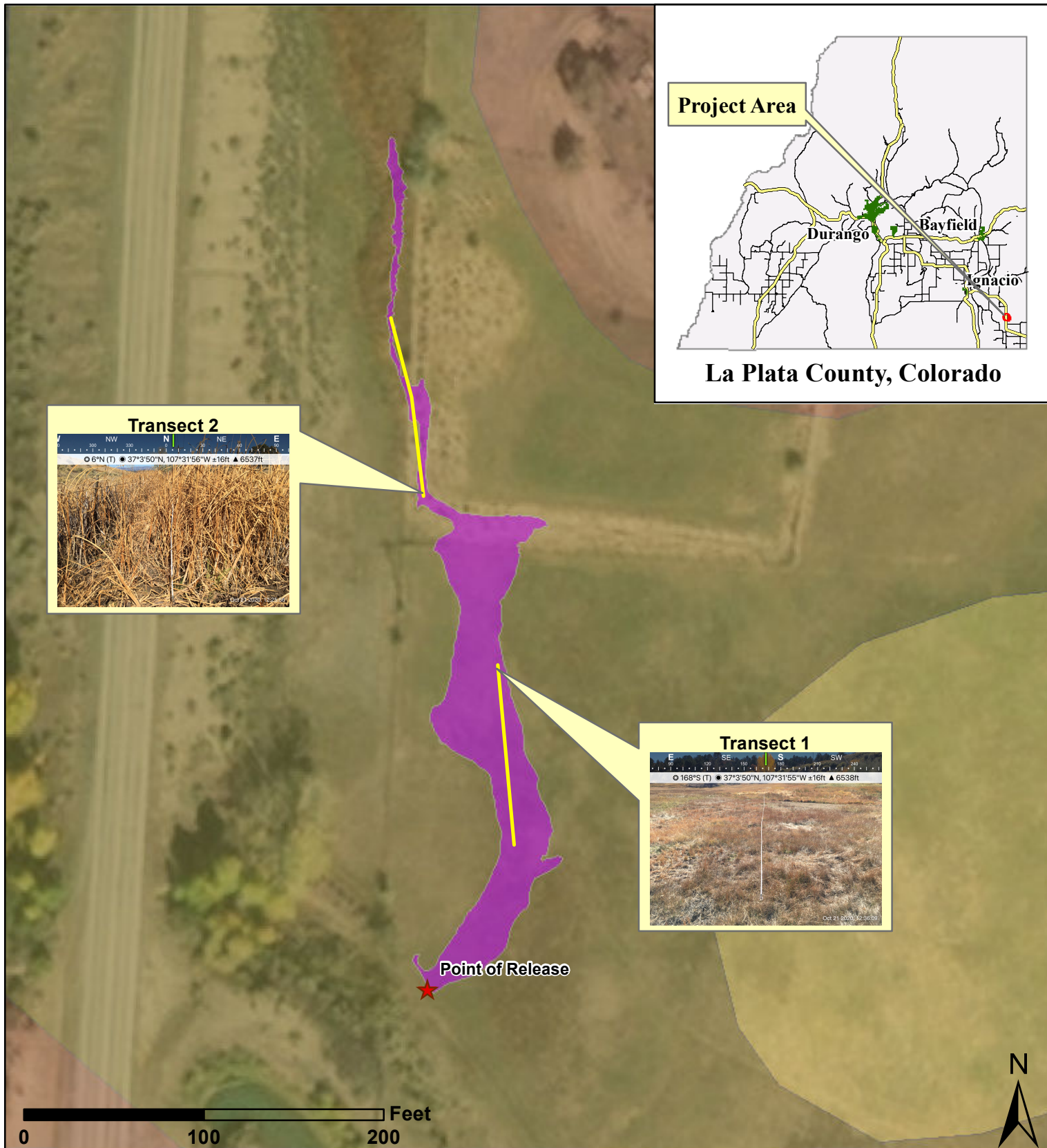
**TABLE 1**

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

Transect	Azimuth	Location	Vegetation Cover May 2020	Vegetation Cover June 2020	Vegetation Cover July 2020	Vegetation Cover August 2020	Vegetation Cover September 2020	Vegetation Cover October 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%	Vegetation Cover = 78% Bare Ground = 4%
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%	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**



## 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, 10/22/2020  
Coordinate System:  
NAD 1983 UTM Zone 13 N

Location: Sec 32 T33N R6W NMPM

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

## **ATTACHMENT 1**





Photo 1: Start of Transect 1, 10/21/2020.



Photo 2: Start of Transect 2, 10/21/2020.



## **ATTACHMENT 2**

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

Project: Tiffany Gathering  
Transect: T1  
Direction: 342°  
Date: 10/21/2020

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	Creeping meadow foxtail	-	S	26	-	HL	-	S
2	Rush	HL	-	S	27	Cockspur grass	-	-	S
3	Rush	HL	-	S	28	Western wheatgrass	HL	-	S
4	Creeping meadow foxtail	Rush	-	S	29	Western wheatgrass	HL	-	S
5	Rush	HL	-	S	30	-	HL	-	S
6	Rush	HL	-	S	31	Chicory	Western wheatgrass	HL	S
7	Rush	Creeping meadow foxtail	-	S	32	Rush	HL	-	S
8	Rush	Creeping meadow foxtail	HL	S	33	-	HL	-	S
9	Creeping meadow foxtail	HL	-	S	34	Rush	Western wheatgrass	HL	S
10	Creeping meadow foxtail	HL	-	S	35	Rush	Narrowleaf plantain	-	S
11	Creeping meadow foxtail	HL	-	S	36	Timothy	-	-	S
12	Rush	Creeping meadow foxtail	HL	S	37	Rush	-	-	Irrigation ditch/S
13	-	HL	-	S	38	Rush	Timothy	-	S
14	Rush	HL	-	S	39	Rush	Timothy	-	S
15	-	HL	-	S	40	Timothy	-	-	S
16	Rush	HL	-	S	41	Rush	-	-	S
17	-	HL	-	S	42	Rush	-	-	S
18	-	HL	-	S	43	Rush	-	-	S
19	Rush	HL	-	S	44	Rush	-	-	S
20	Rush	Narrowleaf plantain	HL	S	45	Rush	-	-	S
21	-	-	-	S	46	Witchgrass	-	-	S
22	-	HL	-	S	47	Rush	Witchgrass	-	S
23	Western wheatgrass	-	-	S	48	-	-	-	S
24	-	HL	-	S	49	Witchgrass	-	-	S
25	Western wheatgrass	-	-	S	50	Witchgrass	HL	-	S

**Notes:**

% Vegetation Cover (top canopy intercepts) = 78%

% Bare Ground\*\* = 4%

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

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

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: 10/21/2020

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	Cattail	HL	-	S	26	Cattail	-	-	S
2	Cattail	-	-	S	27	Cattail	HL	-	S
3	Cattail	-	-	S	28	Cattail	-	-	S
4	Cattail	-	-	S	29	Cattail	-	-	S
5	Cattail	-	-	S	30	Cattail	-	-	S
6	Cattail	-	-	S	31	Cattail	-	-	S
7	Cattail	-	-	S	32	Cattail	-	-	S
8	Cattail	HL	-	S	33	Cattail	-	-	S
9	Cattail	-	-	S	34	Cattail	-	-	S
10	Cattail	-	-	S	35	Cattail	-	-	S
11	Cattail	-	-	S	36	Cattail	-	-	S
12	Cattail	-	-	S	37	Cattail	HL	-	S
13	Cattail	-	-	S	38	Cattail	-	-	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	-	-	S
18	Cattail	-	-	S	43	Cattail	-	-	S
19	Cattail	-	-	S	44	Cattail	-	-	S
20	Cattail	-	-	S	45	Cattail	-	-	S
21	Cattail	-	-	S	46	Cattail	-	-	S
22	Cattail	-	-	S	47	Cattail	-	-	S
23	Cattail	-	-	S	48	Cattail	-	-	S
24	Cattail	-	-	S	49	Cattail	-	-	S
25	Cattail	-	-	S	50	Cattail	-	-	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 some standing water.

HL - Herbaceous Litter

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>Juncus</i> sp.	Rush	Grass-like
<i>Typha latifolia</i>	Cattail	Grass-like
<i>Plantago lanceolata</i>	Narrowleaf plantain	Forb
<i>Cichorium intybu</i>	Chicory	Forb