Cottonwood CONSULTING

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September 1, 2020

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

RE: Tiffany Gathering
August 2020 Vegetation Monitoring

Dear Mr. Moskal,

Cottonwood Consulting LLC (Cottonwood) is pleased to provide you with the results of the vegetation monitoring conducted on August 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 August 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 90% in Transect 1 and 100% in Transect 2 during the August 2020 vegetation monitoring event, which is a 22% increase in vegetation cover in Transect 1 from the July 2020 monitoring event. Vegetation cover in Transect 2 was consistent with the July 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 July 2020 monitoring event. 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 August 21, 2020, the vegetation within the flow path on the Tiffany Gathering site is consistent with seasonal conditions and surrounding vegetative conditions. Vegetation cover in Transect 1 increased compared to the July 2020 monitoring event.

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

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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
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%
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%

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.

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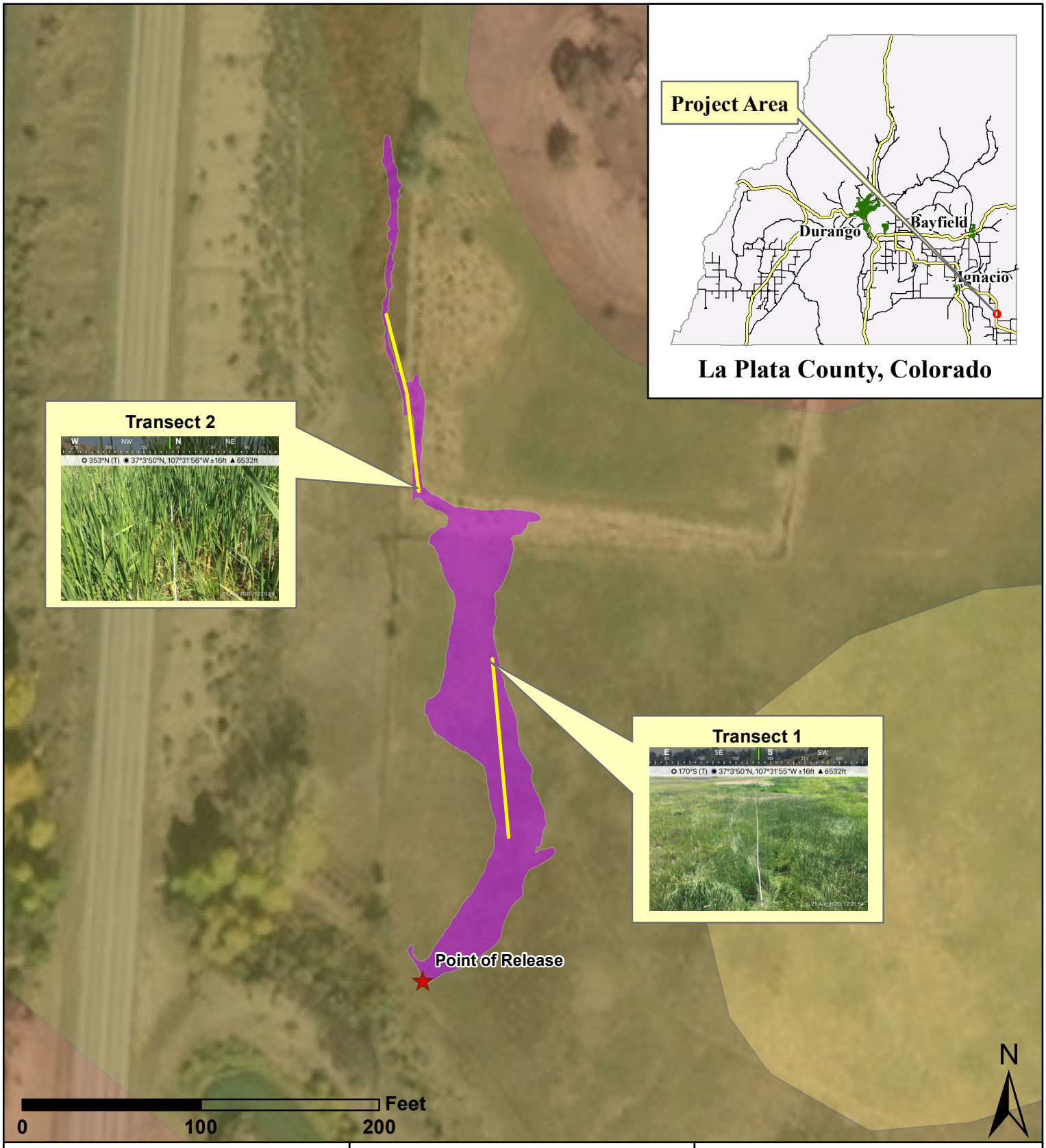
FIGURE 1



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%

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Mapping by: E. Millar & T. Lehto, 8/25/2020
Coordinate System:
NAD 1983 UTM Zone 13 N

Location: Sec 32 T33N R6W NMPM

Tiffany Gathering
August 2020
Vegetation Monitoring Map
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ATTACHMENT 1

Tiffany Gathering
Vegetation Monitoring
Photographic Log
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Photo 1: Start of Transect 1, 8/21/2020.

Photo 2: Start of Transect 2, 8/21/2020.

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ATTACHMENT 2

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

Project: Tiffany Gathering
Transect: T1
Direction: 342°
Date: 8/21/2020

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

Notes:
% Vegetation Cover (top canopy intercepts) = 90%
% 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

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

Project: Tiffany Gathering
Transect: T2
Direction: 340°/346°
Date: 8/21/2020

Observer: EM
Recorder: TL
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	Broadleaf plantain	-	S	26	Cattail	-	-	S
2	Cattail	Sedge	Lady's thumb	S	27	Cattail	-	-	S
3	Cattail	-	-	W	28	Cattail	-	-	W
4	Cattail	-	-	W	29	Cattail	-	-	S
5	Cattail	-	-	W	30	Cattail	-	-	S
6	Cattail	-	-	W	31	Cattail	HL	-	S
7	Cattail	-	-	W	32	Cattail	HL	-	S
8	Cattail	-	-	W	33	Cattail	Bugleweed	Lady's thumb	S
9	Cattail	-	-	W	34	Cattail	Bugleweed	HL	S
10	Cattail	-	-	W	35	Cattail	Rush	HL	S
11	Cattail	-	-	W	36	Cattail	Rush	HL	S
12	Cattail	-	-	W	37	Cattail	-	-	Cattail
13	Cattail	-	-	W	38	Cattail	Bugleweed	HL	S
14	Cattail	-	-	W	39	Cattail	Rush	HL	S
15	Cattail	-	-	W	40	Cattail	HL	-	S
16	Cattail	-	-	W	41	Cattail	Unknown grass 1	-	S
17	Cattail	-	-	W	42	Cattail	HL	-	S
18	Cattail	-	-	W	43	Cattail	HL	-	S
19	Cattail	-	-	W	44	Cattail	HL	-	S
20	Cattail	-	-	W	45	Cattail	HL	-	S
21	Cattail	-	-	W	46	Cattail	HL	-	S
22	Cattail	Bugleweed	-	S	47	Cattail	HL	-	S
23	Cattail	HL	-	S	48	Cattail	HL	-	S
24	Cattail	-	-	S	49	Cattail	HL	-	S
25	Cattail	-	-	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

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Species Table
Tiffany Gathering
BP America Production Company

Scientific Name	Common Name	Life Form
-	Unknown grass 1	Grass
Phleum pratense	Timothy	Grass
Echinochloa crus-galli	Cockspur grass	Grass
Alopecurus ventricosus	Creeping meadow foxtail	Grass
Panicum capillare	Witchgrass	Grass
Carex sp.	Sedge	Grass-like
Juncus sp.	Rush	Grass-like
Typha latifolia	Cattail	Grass-like
Barbarea vulgaris	Yellow rocketcress	Forb
Lycopus uniflorus	Bugleweed	Forb
Taraxacum officinale	Dandelion	Forb
Portulaca oleracea	Purselane	Forb
Persicaria maculosa	Lady's thumb	Forb
Plantago major	Broadleaf plantain	Forb