Hydrology Assessment with Aerial Imagery-Recording Form[1]

Project Name: Byron Solar Date: 10/21/2020 County: Dodge and Olmsted

Investigator: David Kuhlmann Legal Description (S, T, R): Sections 2, 3, 10-15 T116N, R16W and Section 35, T107N, R16W

Summary Table

Photo Year[2]	Image Source[2]	Actual/ Estimated Photo Date[3]	Climate condition (wet, dry, normal)[4,5]	Interpretation (list hydrology indicators observed, e.g. crop stress, drowned out, etc.)[6]																								
				Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Area 9	Area 10	Area 11	Area 12	Area 13	Area 14	Area 15	Area 16	Area 17	Area 19	Area 20	Area 21	Area 22	Area 23	Area 24	Area 25	Area 26	
2018	**Google Earth**	**9/22**	**Dry**	NV	WS	WS	NV	NV	WS	WS	WS	WS	WS	SS	WS	WS	WS	WS	WS	WS	WS	SS	SS	NV	NV	WS	WS	WS	
2017	**WMS (FSA)**	**8/31**	**Normal**	NV	WS	WS	NV	CS	WS	WS	WS	CS	SGO	CS	WS	WS	WS	CS	WS	WS	WS	NV	CS	NV	CS	WS	WS	WS	
2015	**WMS (FSA)**	**10/11**	**Normal**	NV	WS	WS	NV	NV	WS	WS	WS	WS	SGO	NV	WS	WS	WS	WS	WS	WS	NV	NV	DP	NV	NV	WS	WS	WS	
2013	**WMS (FSA)**	**7/18**	**Wet**	NV	WS	WS	NV	NV	WS	WS	WS	WS	WS	SS	WS	WS	WS	WS	WS	WS	WS	CS	DP	NV	DP	WS	WS	WS	
2011	**Google Earth**	**7/3**	**Normal**	NV	WS	WS	NV	CS	WS	WS	WS	WS	WS	NV	WS	WS	WS	WS	WS	WS	WS	NV	NV	NV	DP	NV	NV	NV	
2010	**WMS (FSA)**	**7/2**	**Normal**	NV	WS	WS	NV	NV	WS	WS	WS	WS	WS	NV	WS	WS	WS	WS	WS	WS	WS	NV	NV	NV	DP	NV	NV	NV	
2009	**WMS (FSA)**	**6/26**	**Normal**	NV	WS	WS	NV	NV	WS	WS	WS	DP	WS	NV	WS	WS	WS	WS	WS	WS	WS	NV	NV	NV	NV	NV	NV	NV	
2008	**WMS (FSA)**	**6/23**	**Normal**	CS	WS	WS	CS	NV	WS	WS	WS	WS	WS	NV	DP	WS	WS	WS	WS	WS	WS	DP	WS	NV	DP	NV	NV	NV	
2006	**Google Earth**	**5/31**	**Wet**	CS	WS	WS	CS	CS	WS	WS	WS	WS	WS	AP	WS	WS	WS	WS	WS	WS	WS	NV	NV	NV	NV	NV	NV	NV	
2004	**Google Earth**	**8/2**	**Wet**	NV	WS	WS	NV	NV	WS	WS	WS	WS	WS	AP	AP	WS	WS	WS	WS	WS	WS	NV	WS	NV	CS	NV	NV	NV	
2003	**WMS (FSA)**	**7/18**	**Normal**	NV	WS	WS	CS	NV	WS	WS	WS	WS	AP	DP	WS	WS	WS	WS	WS	WS	WS	NV	DP	NV	DP	NV	NV	NV	
1992	**WMS (FSA)**	**5/2**	**Normal**	NV	SGO	WS	DP	NV	WS	WS	DP	DP	WS	AP	WS	WS	WS	WS	WS	WS	WS	NV	NV	NV	NV	NV	NV	NV	

Summary Table

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Area 9	Area 10	Area 11	Area 12	Area 13	Area 14	Area 15	Area 16	Area 17	Area 19	Area 20	Area 21	Area 22	Area 23	Area 24	Area 25	Area 26	
# Years of aerial photography	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
# Normal Years (1991-2017)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
#Normal Yrs with signatures	1	8	8	3	2	8	8	8	8	8	3	8	8	8	8	8	8	7	1	4	0	5	2	2	3	
# signatures in wet years	1	3	3	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	1	2	0	2	1	1	1	
# Signatures in dry years	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	
# signatures in all years	2	12	12	4	3	12	12	12	12	12	7	12	12	12	12	12	12	11	3	7	0	7	4	4	4	
% Usable Yrs with wet signatures[7]	1/8= 13%	8/8= 100%	8/8= 100%	3/8= 38%	2/8= 25%	8/8= 100%	8/8= 100%	8/8= 100%	8/8= 100%	3/8= 38%	3/8= 38%	8/8= 100%	8/8= 100%	8/8= 100%	8/8= 100%	8/8= 100%	8/8= 100%	7/8= 88%	1/8= 13%	4/8= 50%	0/8= 0%	5/8= 63%	2/8= 25%	2/8= 25%	2/8= 25%	

(sm)= smaller area than whole area showed signature

[1] Form adapted from BWSR/USACE Technical Guidance, July 1, 2016.

[2] Photo selection for historical aerial photography review are from the MnGEO WMS GIS server, Google Earth, and GIS sources such as County, watersheds, or cities.

[3] July 1 was used as the date for aerial photographs when determining antecedent precipitation when an actual date could not be determined. Other aerial photography from County GIS, Google imagery, NAIP, etc. was dated based on available information.

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[6] Key below is used label photo interpretations. It is imperative the reviewer read and understand the guidance associated with the use of the labels.

[7] Equal number of most recent wet and dry years used if 5 normal years were not available. Otherwise only Normal years.

*Base photo for suspect areas

Definitions

Field data sheet reference (if applicable): _____

WS-wetland signature CS-crop stress SGO-something going on	DO-drowned out NC-not cropped SS- soil wetness signature	SW-standing water AP-altered pattern DP-drainage pattern	NV-normal vegetative cover DNC-dry not cropped NSS- no soil wetness (sm)- smaller area
WS is typically used for interpretation in non-cropped areas or green areas in dry conditions			

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Summary Table

Photo Year[2]	Image Source[2]	Actual/ Estimated Photo Date[3]	Climate condition (wet, dry, normal)[4,5]	Interpretation (list hydrology indicators observed, e.g. crop stress, drowned out, etc.)[6]																	
				Area 27	Area 28	Area 29	Area 30	Area 31	Area 32	Area 33	Area 34	Area 35	Area 37	Area 38	Area 39	Area 46	Area 48	Area 49	Area 50	Area 51	Area 52	
2018	Google Earth	9/22	Dry	WS	WS	WS	DP	DP	DP	WS	DP	DP	WS	WS	NV	WS	WS	NV	WS	NV	NV	
2017	WMS	8/31	Normal	WS	WS	WS	NV	DP	DP	WS	CS	DO	WS	WS	CS	SGO	WS	CS	WS	CS	NV	
2015	WMS (FSA)	10/11	Normal	WS	WS	WS	NV	NV	DP	WS	NV	SS	WS	WS	NV	WS	WS	NV	DP	NV	NV	
2013	WMS (FSA)	7/18	Wet	WS	WS	WS	DP	DO	DP	DP	DP	DO	WS	WS	DP	WS	WS	DP	DP	DP	DP	
2011	Google Earth	7/3	Normal	WS	WS	WS	DO	NV	DP	WS	DP	SW	WS	WS	DP	SGO	WS	DP	DP	NV	NV	
2010	WMS (FSA)	7/2	Normal	WS	WS	WS	NV	NV	DP	DP	NV	CS	WS	WS	NV	SGO	WS	NV	DP	NV	NV	
2009	WMS (FSA)	6/26	Normal	WS	WS	WS	NV	NV	DP	DP	NV	NV	WS	WS	DP	SGO	WS	DP	DP	DP	NV	
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2004	Google Earth	8/2	Wet	WS	WS	NV	NV	NV	DP	WS	DP	NV	WS	WS	DP	SGO	WS	DP	DP	DP	DP	
2003	WMS (FSA)	7/18	Normal	WS	WS	WS	CS	CS	WS	DP	NV	NV	WS	DP	DP	SGO	WS	DP	DP	DP	NV	
1992	WMS (FSA)	5/2	Normal	WS	WS	WS	NV	CS	DP	DP	NV	NV	WS	WS	NV	SGO	WS	NV	NV	DP	NV	

Summary Table

	Area 27	Area 28	Area 29	Area 30	Area 31	Area 32	Area 33	Area 34	Area 35	Area 37	Area 38	Area 39	Area 46	Area 48	Area 49	Area 50	Area 51	Area 52
# Years of aerial photography	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
# Normal Years (1991-2017)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
#Normal Yrs with signatures	8	8	8	2	3	8	8	2	4	8	8	5	8	8	4	7	5	0
# signatures in wet years	3	3	2	1	1	3	3	3	2	3	3	2	3	3	2	3	3	2
# Signatures in dry years	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0
# signatures in all years	12	12	11	4	5	12	12	6	7	12	12	7	12	12	6	11	8	2
% Usable Yrs with wet signatures[7]	8/8= 100%	8/8= 100%	8/8= 100%	2/8= 25%	3/8= 38%	8/8= 100%	8/8= 100%	2/8= 25%	4/8= 50%	8/8= 100%	3/8= 38%	5/8= 63%	8/8= 100%	8/8= 100%	4/8= 50%	7/8= 88%	5/8= 63%	0/8= 0%

(sm)= smaller area than whole area showed signature

[1] Form adapted from BWSR/USACE Technical Guidance, July 1, 2016.

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Photo Year[2]	Image Source[2]	Actual/ Estimated Photo Date[3]	Climate condition (wet, dry, normal)[4,5]	Interpretation (list hydrology indicators observed, e.g. crop stress, drowned out, etc.)[6]																	
				Area 53	Area 54	Area 55	Area 56	Area 57	Area 58	Area 59	Area 60	Area 61	Area 62	Area 63	Area 64	Area 65					
2018	Google Earth	9/22	Dry	DP	DP	CS	SGO	NV	NV	WS	WS	WS	WS	SS	WS	NV					
2017	WMS	8/31	Normal	DP	DP	CS	SGO	CS	NV	WS	WS	WS	WS	CS	CS	SS					
2015	WMS (FSA)	10/11	Normal	NV	NV	NV	SGO	NV	NV	WS	WS	WS	WS	CS	WS	NV					
2013	WMS (FSA)	7/18	Wet	CS	CS	NV	SGO	CS	CS	WS	WS	WS	WS	AP	AP	CS					
2011	Google Earth	7/3	Normal	DP	DP	NV	SGO	NV	DP	WS	WS	WS	WS	CS	WS	NV					
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1992	WMS (FSA)	5/2	Normal	NV	NV	NV	SGO	NV	NV	WS	WS	WS	WS	NV	WS	SS					

Summary Table

	Area 53	Area 54	Area 55	Area 56	Area 57	Area 58	Area 59	Area 60	Area 61	Area 62	Area 63	Area 64	Area 65					
# Years of aerial photography	12	12	12	12	12	12	12	12	12	12	12	12	12					
# Normal Years (1991-2017)	8	8	8	8	8	8	8	8	8	8	8	8	8					
#Normal Yrs with signatures	5	5	2	8	1	2	8	8	8	8	7	8	2					
# signatures in wet years	2	2	0	3	2	1	3	3	3	3	2	2	2					
# Signatures in dry years	1	1	1	1	0	0	1	1	1	1	1	1	0					
# signatures in all years	8	8	3	12	3	3	12	12	12	12	11	11	4					
% Usable Yrs with wet signatures[7]	5/8= 63%	5/8= 63%	2/8= 25%	8/8= 100%	1/8= 13%	2/8= 25%	8/8= 100%	8/8= 100%	8/8= 100%	8/8= 100%	7/8= 88%	8/8= 100%	2/8= 25%					

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Wetland Determination from Aerial Imagery – Recording Form

Project Name: Byron Solar Date: 10/21/20 County: Dodge and Olmsted

Investigator: David Kuhlmann Legal Description (T, R, S): See Pages 1 and 2

Use the Decision Matrix below to complete Table 1.

Hydric Soils present[1]	Identified on NWI or other wetland map[2]	Percent with wet signatures from Exhibit 1	Field verification required[3]	Wetland?
Yes	Yes	>50%	No	Yes
Yes	Yes	30-50%	No	Yes
Yes	Yes	<30%	Yes	Yes, if other hydrology indicators present
Yes	No	>50%	No	Yes
Yes	No	30-50%	Yes	Yes, if other hydrology indicators present
Yes	No	<30%	No	No
No	Yes	>50%	No	Yes
No	Yes	30-50%	No	Yes
No	Yes	<30%	No	No
No	No	>50%	Yes	Yes, if other hydrology indicators present
No	No	30-50%	Yes	Yes, if other hydrology indicators present
No	No	<30%	No	No

[1] The presence of hydric soils can be determined from the "Hydric Rating by Map Unit Feature" under "Land Classifications" from the Web Soil Survey. "Not Hydric" is the only category considered to not have hydric soils. Field sampling for the presence/absence of hydric soil indicators can be used in lieu of the hydric rating if appropriately documented by providing completed field data sheets.

[2] At minimum, the most updated NWI data available for the area must be reviewed for this step. Any and all other local or regional wetland maps that are publicly available should be reviewed.

[3] Area should be reviewed in the field for the presence/absence of wetland hydrology indicators per the applicable 87 Manual Regional Supplement, including the D2 indicator (geomorphic position).

Table 1.

Area	Hydric Soils Present	Identified on NWI or other wetland map	Percent with wet signatures from Exhibit 1	Other hydrology indicators present[1]	Wetland?
Area 1	No	No	13%		No
Area 2	Yes	No	100%		Yes
Area 3	Yes	No	100%		Yes
Area 4	No	No	38%		Yes, if other hydrology indicators present
Area 5	No	No	25%		No
Area 6	Yes	Yes	100%		Yes
Area 7	Yes	Yes	100%		Yes
Area 8	Yes	No	100%		Yes
Area 9	Yes	No	100%		Yes
Area 10	No	No	100%		Yes, if other hydrology indicators present
Area 11	Yes	No	38%		Yes, if other hydrology indicators present
Area 12	Yes	No	100%		Yes
Area 13	Yes	No	100%		Yes
Area 14	Yes	Yes	100%		Yes
Area 15	Yes	Yes	100%		Yes
Area 16	No	No	100%		Yes, if other hydrology indicators present
Area 17	Yes	Yes	100%		Yes

Area	Hydric Soils Present	Identified on NWI or other wetland map	Percent with wet signatures from Exhibit 1	Other hydrology indicators present[1]	Wetland?
Area 19	No	No	88%		Yes, if other hydrology indicators present
Area 20	Yes	No	13%		No
Area 21	Yes	No	50%		Yes, if other hydrology indicators present
Area 22	Yes	No	0%		No
Area 23	Yes	No	63%		Yes
Area 24	Yes	No	25%		No
Area 25	Yes	No	25%		No
Area 26	No	No	25%		No
Area 27	Yes	Yes	100%		Yes
Area 28	Yes	No	100%		Yes
Area 29	Yes	Yes	100%		Yes
Area 30	Yes	No	25%		No
Area 31	Yes	No	38%		Yes, if other hydrology indicators present
Area 32	Yes	No	100%		Yes
Area 33	Yes	Yes	100%		Yes
Area 34	Yes	No	25%		No
Area 35	Yes	No	50%		Yes, if other hydrology indicators present
Area 37	Yes	Yes	100%		Yes
Area 38	Yes	Yes	100%		Yes
Area 39	Yes	No	63%		Yes
Area 46	Yes	No	100%		Yes
Area 48	Yes	Yes	100%		Yes
Area 49	Yes	No	50%		Yes, if other hydrology indicators present
Area 50	Yes	No	88%		Yes
Area 51	Yes	No	63%		Yes
Area 52	Yes	No	0%		No
Area 53	No	No	63%		Yes, if other hydrology indicators present
Area 54	No	No	63%		Yes, if other hydrology indicators present
Area 55	No	No	25%		No
Area 56	Yes	No	100%		Yes
Area 57	No	No	13%		No
Area 58	Yes	No	25%		No
Area 59	Yes	Yes	100%		Yes
Area 60	Yes	Yes	100%		Yes
Area 61	Yes	Yes	100%		Yes
Area 62	Yes	Yes	100%		Yes
Area 63	Yes	No	88%		Yes
Area 64	Yes	No	100%		Yes
Area 65	No	No	25%		No

[1] Answer “N/A” if field verification is not required and was not conducted.