



**DISCLAIMER:** Preliminary Minimum Habitat Criteria were based on an evaluation of Cooperative Agreement and Program whooping crane data collected between 2001 and spring 2011 and generally were set to incorporate 90% of whooping crane observations. These criteria are subject to revision based on Program evaluation of future monitoring and research data.

**PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM  
Whooping Crane Minimum Habitat Criteria Descriptions**

**Terminology for Quantifying Whooping Crane Habitat Availability**

- **Obstruction** – Object  $\geq 1.5$  meters above ground level at a reference point or the waterline for wetted areas.
- **Unobstructed Channel** – Along a line perpendicular to the channel that extends from obstruction to obstruction and passes through a reference point, the unobstructed channel is the area that lies between the vegetation lines of the island or bank that contain the obstructions that lie on the line and on each side of the reference point.
- **Disturbance Feature** – Road, town, residence, out-building, etc that may influence whooping crane use of an area. Bridges are an in-channel disturbance feature only.
- **Benchmark Flows** – To be determined by the Program’s Technical Advisory Committee. Year-1 Assessment will be conducted @ 1,700cfs, 2,400cfs, and observed flows.

**Whooping Crane In-channel Minimum Habitat Criteria (Appendix 1)**

- |   |  |
|---|--|
| <b>1. Channel Depth</b>                   | <b><math>\leq 8</math> inches</b>  |
| <b>2. Suitable Channel Area</b>           | <b><math>\geq 40\%</math> of the channel <math>\leq 8</math> inches or bare sand</b>                             |
| <b>3. Distance to Disturbance Feature</b> | <b><math>\geq 160</math> feet and <math>\geq 1,320</math> feet (<math>\frac{1}{4}</math> mile) from a bridge</b> |
| <b>4. Distance to Obstruction</b>         | <b><math>\geq 75</math> feet</b>   |
| <b>5. Unobstructed Channel Width</b>      | <b><math>\geq 280</math> feet</b>  |
| <b>6. Wetted Channel Width</b>            | <b><math>\geq 250</math> feet</b>  |
| <b>7. Unobstructed View Width</b>         | <b><math>\geq 330</math> feet</b>  |

**Channel Depth**

- **Definition** – Depth of channel from the surface of the water to the bed of the channel at benchmark and observed flows.
- **Criterion** – Channel areas  $\leq 8$  inches deep at benchmark and observed flows are habitat if the areas meet all additional in-channel minimum habitat criteria.

**Suitable Channel Area**

- **Definition** – Proportion of the channel  $\leq 8$  inches deep or bare sand.
- **Criterion** – Areas where  $\geq 40\%$  of the channel is  $\leq 8$  inches deep or bare sand at benchmark and observed flows are habitat if the areas meet all additional in-channel minimum habitat criteria.

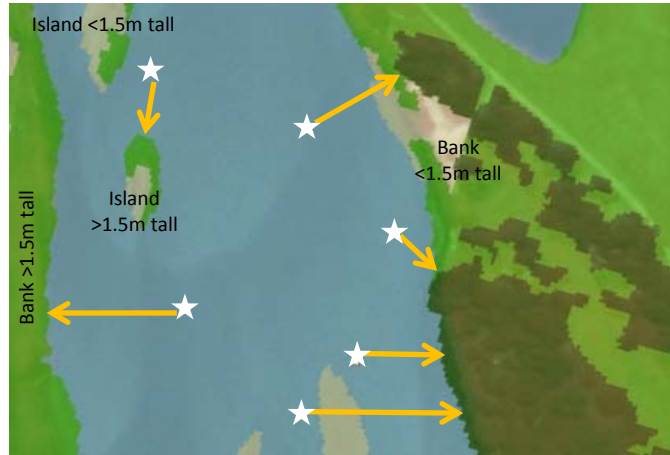
**Distance to Disturbance**

- **Definition** – Distance from a point in any direction to the nearest disturbance feature.
- **Criterion** – Areas within individual channels that are  $\geq 160$  feet from all disturbance features and  $\geq 1,320$  feet ( $\frac{1}{4}$  mile) from a bridge are habitat if the areas meet all additional in-channel minimum habitat criteria.



**Distance to Obstruction**

- Definition – Distance from a point in any direction to the nearest obstruction (Figure 1).

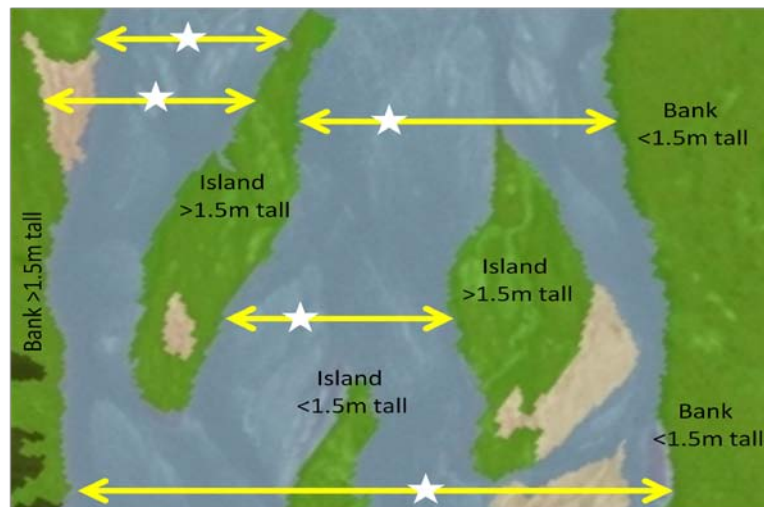


**Figure 1.** Distance to Obstruction

- Criterion – Areas within individual channels that are  $\geq 75$  feet from an obstruction are habitat if the areas meet all additional in-channel minimum habitat criteria.

**Unobstructed Channel Width**

- Definition – Measured width of the unobstructed channel at benchmark or observed flows (Figure 2). Unobstructed channel width measurements start and end at the vegetated portion of islands or banks containing the obstruction in either direction from the reference point (i.e., unobstructed channel width does not extend beyond vegetated bank lines). Unobstructed channel width includes bare sand areas and vegetated sandbars that do not contain an obstruction that lies on a line running perpendicular to the channel.



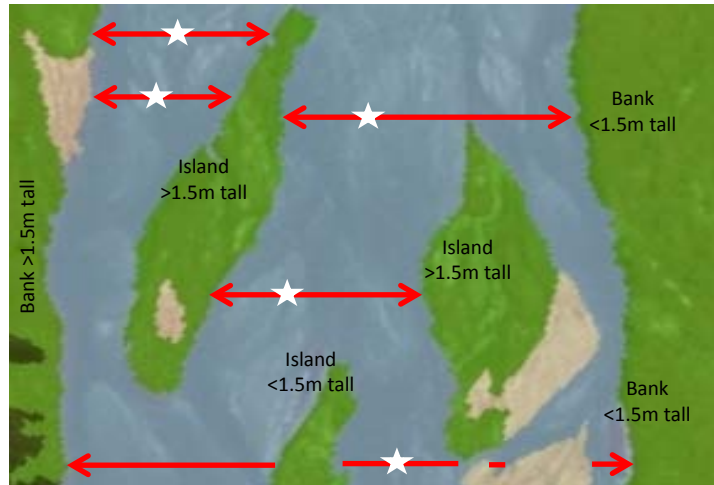
**Figure 2.** Unobstructed Channel Width

- Criterion – Areas with unobstructed channel widths  $\geq 280$  feet at benchmark or observed flows are habitat if the areas meet all additional in-channel minimum habitat criteria.



**Wetted Channel Width**

- *Definition* – Distance within the unobstructed channel that is covered by water at benchmark or observed flows (Figure 3). Wetted channel width measurements exclude bare sand and vegetated sandbar areas within the unobstructed channel.

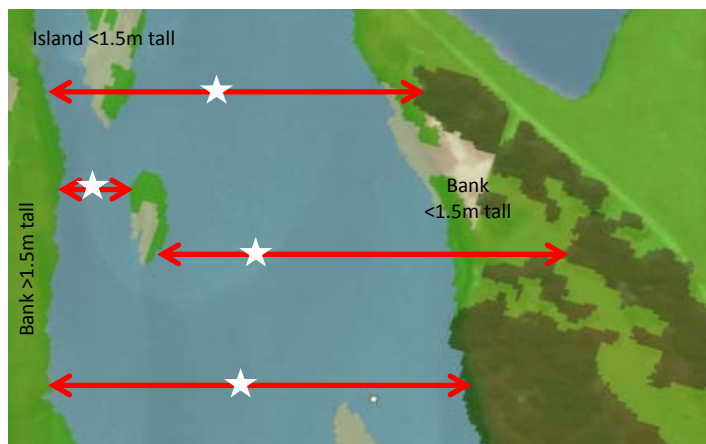


**Figure 3. Wetted Channel Width**

- *Criterion* – Areas with wetted channel widths  $\geq 250$  feet at benchmark or observed flows are habitat if the areas meet all additional in-channel minimum habitat criteria.

**Unobstructed View Width**

- *Definition* – Along a line perpendicular to the channel that extends from obstruction to obstruction and passes through a reference point, the unobstructed view width is the distance between the obstructions (Figure 4). Unobstructed view width includes all island/bare sand, vegetated sandbars, and banks between the first obstruction on either side of the reference point.



**Figure 4. Unobstructed View Width**

- *Criterion* – Areas with unobstructed view widths  $\geq 330$  feet at benchmark or observed flows are habitat if the areas meet all additional in-channel minimum habitat criteria.



**Whooping Crane Off-channel Minimum Habitat Criteria (Appendix 2)**

1. **Area** **≤3.5 miles of main channel or ≤2 miles of side channel**
2. **Landcover Type and Structure**
  - i. **Corn, soybean, alfalfa, wheat, grassland, wet meadow, and palustrine wetland**
    1. Suitable grassland acres determined by visiting a sample of sites
    2. Suitable cropland acres determined by reports of percent of crop fields harvested prior to the migration season
  - ii. **Wet Meadow Criteria**
    1. Wet Meadow Working Group (WMWG) identified potential wet meadow areas
    2. Habitat availability assessment contractor classify all grassland types as grassland
      - i. Identified grasslands that conform to the Program’s Wet Meadow Habitat Guidelines (Appendix 3) and meet all Program WC Minimum Habitat Criteria will be classified as whooping crane wet meadow habitat by the habitat availability assessment contractor; however, the WMWG will make the final determination of whooping crane wet meadow areas on a site-by-site basis.
  - iii. **Palustrine Wetland Criteria (Roost Habitat)**
    1. ≥5 acres of water area ≤18 inches deep
    2. ≥25% of the water area ≤12 inches deep
    3. at least 1 water area that is 500 feet × 500 feet
3. **Distance to Obstruction** **≥75 feet**
4. **Unobstructed View Width** **≥330 feet**
5. **Distance to Disturbance Feature** **≥285 feet**

**Area**

- *Definition* – Program Associated Habitat Area
- *Criterion* – Areas ≤3.5 miles of the main channel or ≤2 miles of side channel or the Platte River are habitat if the areas meet all additional minimum habitat criteria.

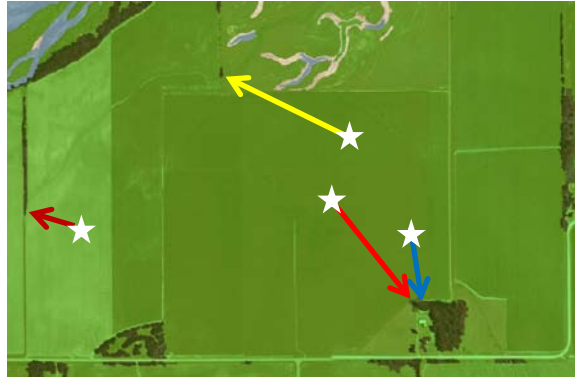
**Landcover Type and Structure**

- *Definition* – Landcover types suitable for whooping crane use
- *Criterion* – Areas of corn, soybean, alfalfa, wheat, grassland, wet meadow, and palustrine wetland are habitat if the areas meet all additional off-channel minimum habitat criteria.
  - *Cropland* – Suitable acres of cropland will be determined by reducing the total acres by the proportion of each crop type reported to have been harvested prior to 1 November each year.
  - *Grasslands* – Suitable acres of grassland will be determined by visiting a sample of grassland sites and reducing the total acres by the proportion of the sample that were of unsuitable structure for whooping crane use.
  - *Wet Meadow* – Wet Meadow areas will be delineated by the Program’s Wet Meadow Working Group. Once an area is classified wet meadow habitat, it will remain wet meadow until management activities change the landcover type.
  - *Palustrine Wetland* – ≥5 acres of water area ≤18 inches deep with ≥25% of the water area ≤12 inches deep and at least 1 water area that is 500 feet × 500 feet.



**Distance to Obstruction**

- *Definition* – Distance from a point in any direction to the nearest obstruction (Figure 5).



**Figure 5.** Distance to Obstruction

- *Criterion* – Areas that are  $\geq 75$  feet from an obstruction are habitat if the areas meet all additional off-channel minimum habitat criteria.

**Unobstructed View Width**

- *Definition* – Along a line passing through a reference point in any direction, unobstructed view width is the distance between obstructions (Figure 6). Unobstructed view width includes the area between the first obstruction on each side of the reference point.



**Figure 6.** Unobstructed View Width

- *Criterion* – Areas with unobstructed view widths  $\geq 330$  feet are habitat if the areas meet all additional off-channel minimum habitat criteria.



**Distance to Disturbance Feature**

- *Definition* – Distance from a point in any direction to the nearest human disturbance feature (Figure 7).



**Figure 7.** Distance to Disturbance Feature

- *Criterion* – Areas that are  $\geq 285$  feet from a disturbance feature are habitat if the areas meet all additional off-channel minimum habitat criteria.



**Appendix 1.** Percentiles for in-channel habitat metrics collected at whooping crane roost locations on the central Platte River, 2001 – Spring 2011.

Metric	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
Channel Depth (in)	0.5	1.1	1.7	2.2	3.3	3.9	4.3	4.7	5.2	6.1	6.9	6.9	7.1	7.8	8.6	10.1	10.6	12.1	17.0	21.3
Suitable Channel Area	19%	38%	45%	50%	54%	59%	64%	67%	68%	73%	79%	81%	86%	90%	94%	96%	97%	99%	100%	100%
Distance to Obstruction (ft)	46	72	98	118	135	135	138	161	190	197	233	249	292	302	328	394	479	584	630	787
Unobstructed Channel Width (ft)	212	281	350	390	440	467	521	550	591	620	632	683	714	751	751	813	846	891	950	1207
Wetted Channel Width (ft)	208	256	290	328	341	370	402	417	473	493	516	553	571	614	646	652	689	781	868	1310
Unobstructed View Width (ft)	253	331	381	472	530	622	666	722	750	766	810	840	878	920	1031	1092	1175	1175	1237	1537
Flow (cfs)	94	154	175	220	256	342	427	487	582	698	830	965	1074	1161	1183	1480	1720	2568	3670	4240
Sandbar Roost Height (in)	0.1	0.1	0.2	0.3	0.4	0.6	0.8	0.8	1.0	1.0	2.0	2.1	2.4	3.4	3.6	4.2	5.2	6.8	8.2	10.2
Average Distance to Obstruction (ft)	173	215	258	272	290	300	335	376	433	448	490	497	530	554	621	650	791	809	1166	1351
Channel Openness (acres)	3	4	5	7	8	10	13	14	16	17	20	22	27	31	35	37	47	58	126	241
Transect Channel Depth (in)	4.3	4.5	5.1	5.7	5.7	6.0	6.6	7.0	7.4	8.2	8.4	8.7	9.6	10.1	10.6	11.5	12.6	14.8	17.2	25.5

**Appendix 2.** Percentiles for off-channel habitat metrics collected at whooping crane use locations along the central Platte River, 2001 – spring 2011.

Metric	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
Distance to Obstruction (ft)	33	49	82	164	164	197	210	246	322	328	328	328	361	492	656	820	984	1312	1640	4921
Distance to Disturbance (ft)	105	164	328	328	361	492	656	820	935	984	984	1312	1312	1640	1640	2297	2625	2625	3937	5905
Habitat Type	Channel	Sandbar	Corn	Soybean	Alfalfa	Wheat	Grassland	Wet Meadow	Palustrine Wetland											



**Appendix 3.** Initial guidelines for classifying Program Wet Meadow Habitat (Revised by the WMWG 2-15-12)

Wet Meadow Habitat	Characteristics	When to measure
Location	Within 3.5 miles of main channel or 2 miles of a side channel of the Platte River	During land review process
'Gold Standard' acreage	≥40 acres not less than 0.25-mile from potential disturbance or appropriately screened from roads, railroads, occupied dwellings, bridges, etc	During land review process
Distance from disturbance	Wet meadow habitat areas for whooping cranes will be ≥285 feet from a potential disturbance feature and will conform to the Gold Standard acreage requirements; sites evaluated by WMWG on a case-by-case basis	During land review process
Vegetation composition	Manage for native prairie grasses and herbaceous vegetation; mosaic of wetland (hydrophytic) and upland (non-hydrophytic) plants	Survey after acquisition, after application of management, and annually thereafter
Hydrology	Continuously saturated soils during the WC migration season 2 out of 3 years if possible	Survey after application of management and annually thereafter
Water management	Between February and April, mean monthly groundwater levels are at or above the ground surface in swales 25% to 75% of the time	Survey after application of management and annually thereafter
Topography and soils	Level or low undulating surface with swales and depressions; wetland soils with low salinity in swales and non-wetland soils in uplands	Survey after acquisition and after application of management
Flora and fauna	Supports characteristic aquatic, semi-aquatic, and terrestrial fauna and flora (especially aquatic invertebrates, beetles, insect larvae, and amphibians)	Survey after acquisition, after application of management, and annually thereafter
Whooping crane habitat requirements	Size – 640 contiguous acres or more when possible Unobstructed view area – As far as possible (330 feet = minimum habitat criteria) Low vegetative structure area – As much as possible Water area – As much as possible while maintaining wet meadow flora and fauna	During land review process then evaluate annually