



**TO:** Governance Committee (GC)  
**FROM:** Executive Director's Office (EDO)  
**SUBJECT:** 2016 EDO Technical Series  
#03 – Mechanical Creation and Maintenance Strategy Performance Memo  
**DATE:** August 31, 2016  
**CC:** Technical Advisory Committee (TAC) and Independent Scientific Advisory Committee (ISAC)

### **Mechanical Creation and Maintenance (MCM) Management Strategy**

The MCM strategy is one of two management strategies contemplated in the Platte River Recovery Implementation Program's (Program or PRRIP) Adaptive Management Plan (AMP). The MCM strategy focuses on creation and maintenance of on- and off-channel target species habitat by mechanical and other means without the need for pulse flows.<sup>1</sup> On-channel habitat creation includes mechanical widening and vegetation control as well as construction of least tern and piping plover nesting islands. Off-channel habitat includes creation of palustrine wetland and flooded crop field roosting habitat for whooping cranes and off-channel sand and water (OCSW) nesting sites for the least tern and piping plover.<sup>2</sup>

### **Origins of MCM**

The MCM management strategy was incorporated into the AMP near the end of First Increment negotiations as an alternative to the Flow-Sediment-Mechanical management strategy. On-channel components of the MCM strategy were based on ongoing channel maintenance activities undertaken by conservation organizations and water users.<sup>3</sup> Off-channel least tern and piping plover OCSW habitat was based on sandpit nesting habitat managed by water users. Off-channel palustrine wetland habitat was included because it was the primary roosting habitat type used by whooping cranes during migration.

### **MCM in Relation to PRRIP Water Supply and Management**

The Program's First Increment water objective is to reduce deficits to United States Fish and Wildlife Service (USFWS) target flows by an average of 130,000 – 150,000 acre-ft annually. The on-channel component of the MCM strategy focuses on channel maintenance without the need for short duration high flows, these flows would require most of the Program's manageable water in dry and normal years.<sup>4</sup> This would leave the entirety of Program water supply to directly offset deficits to species target flows. The off-channel component of the MCM strategy focuses on the creation and maintenance of non-riverine habitat that does not require flow augmentation.

### **MCM Effectiveness**

All proposed on- and off-channel MCM management actions have been implemented during the First Increment. The Program has concurrently collected geomorphic data to assess channel response and target species data to identify on- and off-channel characteristics that are highly suitable for species use and reproduction (in the case of the least tern and piping plover).

#### *On- and Off-Channel Least Tern and Piping Plover Nesting Habitat.*

The Program constructed on-channel nesting islands at four habitat complexes during the period of 2012 - 2015.<sup>5</sup> The largest and highest mechanical islands were used by the species in high flow years. However,

<sup>1</sup> The term "pulse flows" is used in the AMP and refers to short duration high flows.

<sup>2</sup> Total First Increment off-channel MCM habitat was limited to 800 acres in the AMP.

<sup>3</sup> Conservation groups began implementing mechanical channel improvement activities in the early 1980s. At the time of First Increment negotiations, conservation organizations, water users and the USFWS were all implementing mechanical management actions to maintain on- and off-channel target species habitat.

<sup>4</sup> See SDHF memorandum.

<sup>5</sup> Island height and size were varied as part of an experimental design to evaluate on-channel habitat selection.



reproductive success was very low due, primarily, to island erosion during natural peak flow events. The Program has also rehabilitated and/or constructed seven off-channel OCSW sites since 2007. Use and reproductive success at those sites has generally been high. In 2015, the Program's Governance Committee entered into a structured decision making process to adjust management actions to meet least tern and piping plover management objectives. The revised management approach focuses on creation and maintenance an additional 60 acres off-channel sand and water nesting habitat along with maintenance of 10 acres of mechanically-created on-channel habitat.<sup>6</sup> The Governance Committee also addressed the use of flow, concluding that Program water should not be used solely for the purpose of tern and plover nest initiation or moating during the brood rearing period.<sup>7,8</sup>

#### *Off-Channel Whooping Crane Roosting Habitat*

The Program has constructed and/or enhanced off-channel palustrine wetland roosting habitat at four locations since 2007. The Program is also attempting to acquire at least one additional site but the paucity of potentially restorable wetlands in the AHR have made this difficult. As of spring 2016, none of the Program's palustrine wetlands have been used for roosting since they were acquired and restored. This is likely due to the limited proportion of migrating whooping cranes that encounter Program palustrine wetlands during any given migration. Given the paucity of potentially restorable wetland sites in the AHR, it is not feasible to acquire and restore enough wetland sites to ensure most cranes would encounter palustrine wetlands in the AHR during migration. Accordingly, palustrine wetlands are not a feasible alternative to riverine roosting habitat.

#### *On-Channel Whooping Crane Habitat*

Whooping crane resource selection analyses indicated cranes select for unobstructed channel width and distance to riparian forest. Channels with unobstructed widths of 500-700 ft and unforested widths of 1,000 ft are highly suitable for whooping crane roosting. Data collected during the period of 2007-2015 was used to perform an analysis of the influence of hydrologic, geomorphic, and mechanical management variables on total unvegetated channel width and the maximum width of the channel unobstructed by vegetation. Hydrologic metrics included annual peak and minimum discharges, June discharge and growing season discharge. Geomorphic metrics included bank-full channel width, bed material grain size, river mile, and channel slope. Mechanical management metrics included herbicide application and channel disking. Multiple regression analyses indicate that unvegetated channel width was best explained by 40-day peak discharge, wetted width of the channel at bank-full discharge, bed material grain size, and the presence or absence of herbicide and disking. Disking and herbicide increased total unvegetated width by an average of 118 ft. Results were similar for unobstructed channel width except that the increase was higher (164 ft). When compared to observed UOCWs, the average increase in UOCW due to mechanical actions is large enough to produce highly-suitable UOCW for whooping crane roosting in all but the very driest years.

#### **Assessment of MCM Effectiveness**

Off-channel components of the MCM management strategy were based on the hypothesis that least tern, piping plover, and whooping crane management objectives could be achieved in absence of riverine habitat. Tern and plover management objectives can and are being achieved via off-channel nesting habitat with the caveat that the river is necessary for foraging. The Program cannot achieve least tern and piping plover management objectives with mechanical on-channel nesting islands due to flow-induced habitat loss and associated nest/brood failure.

<sup>6</sup> On-channel habitat is anticipated to provide limited benefits to terns and plovers while increasing suitability for whooping cranes and sediment supply.

<sup>7</sup> Tern and plover benefits could be identified as part of the rationale for water releases made for other purposes.

<sup>8</sup> This was a consensus recommendation to the USFWS acknowledging that they have authority over flow releases.



88 Whooping crane management objectives cannot be achieved with off-channel palustrine wetland habitat  
89 due to the lack of potential wetland sites in the AHR. The Program can mechanically create and maintain  
90 highly-suitable on-channel roosting habitat and has done so at the Program's habitat complexes. The major  
91 limitation of mechanical channel maintenance is the lack of a system-scale effect given that the benefits of  
92 disking and/or spraying are limited to the point of application. Accomplishing reach-scale improvements  
93 in habitat suitability requires permission to access a large quantity of private property. Although  
94 challenging, it has been accomplished in the past by the Platte Valley Weed Management Area and USFWS  
95 Partners for Fish and Wildlife.