Fall Short-Duration High Flow (SDHF) Release Monitoring Protocol

The purposes of the Fall short duration high flow (SDHF) release monitoring under this protocol is to document the spatial extent of in-channel vegetation removal associated with Fall SDHF releases throughout the Associated Habitat Reach (AHR). Several priority hypotheses identified in the Program's Adaptive Management Plan (AMP) are directly linked to river morphology and are also influenced by in-channel vegetation. This protocol will serve as effectiveness monitoring for Program management actions implemented under the AMP, and it will also serve as a resource for evaluating existing and future Program hypotheses. Information gained from the monitoring will be summarized for inclusion in planning documents related to implementation of the AMP and the Environmental Account Annual Operating Plan (AOP).

Plant ecologists have often focused their studies on the summer period, largely ignoring the fact that processes after the growing season can also impact vegetation dynamics. High-flow events following shortly after vegetation establishment could prove important for removing seedling vegetation on elevated sandbars and could potentially help drive the maintenance of wide unobstructed channel widths. The objective of this study is to determine if the efficacy of Fall SDHF releases at removing established 1–2-year old vegetation within the channel. Results of this study will be used to inform Program water management and modeling activities.

METHODS

In April of 2019, the Program began developing an updated Adaptive Management Plan (AMP) to be implemented during the First Increment Extension, 2020-2032. Early discussions indicate that there may be an interest in evaluating the efficacy of Fall SDHF releases at scouring vegetation from low to mid-elevation sandbars for the purpose of maintaining suitable unobstructed channel widths. As such, established vegetation will be monitored prior to and following fall SDHF releases to determine the efficacy of this strategy at removing established vegetation that is ≤2 years old.

Vegetation Scour Monitoring

Field Data Collection Efforts

Prior to Fall SDHF releases, in-channel vegetation assessments will be made based on general vegetation characteristics differentiated by type, height and percent vegetative cover that appear to be key to whooping crane roost-site selection. The vegetation data will be collected by EDO staff members and locations will be identified using handheld GeoXT or GeoXH GPS units. Vegetation data will be collected in the field by placing the vegetation at each of a series of points into one of the following seven general vegetation classes:

1. Tall Perennial Herbaceous: Areas of perennial vegetation between 2 feet and 6 feet in height.
2. Short Dense Perennial Herbaceous: Areas of dense perennial vegetation (>75% vegetative cover) less than 2 feet in height.

3. Short Sparse Perennial Herbaceous: Areas of sparse perennial vegetation (<75% and >25% vegetative cover) less than 2 feet in height.
4. Tall Cottonwood Seedling: Areas of cottonwood seedlings between 2 feet and 6 feet in height.
5. Short Cottonwood Seedling: Areas of cottonwood seedlings less than 2 feet in height.
6. Dense Annual Herbaceous: Areas of dense annual vegetation (>75% vegetative cover).
7. Sparse Annual Herbaceous: Areas of sparse annual vegetation (<75% and >25% vegetative cover).

Vegetation data will be collected at a minimum of 20 points (where possible) within uniformly distributed patches of each vegetation class within each Program Complex each year. All vegetation patches will be a minimum of 100 ft^2 in size, and to the extent possible, will be located on Program or other conservation organization-owned lands. A photograph will be taken at each point where vegetation data is recorded. The photograph of each vegetation sampling point will be taken approximately 2 yards from each point at a 45-degree angle to the ground.

Following Fall SDHF releases, all vegetation sampling points will be re-visited and vegetation scour will be documented by placing vegetation into the categories identified above and a photograph of each vegetation sampling point will be taken as described above to document the effects of the release on the vegetation. The data will be collected as close in time as practical prior to and following fall SDHF releases via airboat survey.

Time-lapse Cameras

In addition to field monitoring efforts, two or three time-lapse cameras will be placed at each Program complex to monitor the effects of the flow release on low and mid-elevation sandbars with established vegetation. Each camera will be placed to monitor sandbars with newly established (<2-years) annual and perennial vegetation. These cameras will be set to record a photograph of vegetated sandbars every hour during the daytime. The time-lapse cameras will be set on the bank of the main channel and will be oriented perpendicular to the channel.

System-Scale Geomorphology and Vegetation Monitoring

In addition to field data collection efforts, the Program collects imagery and bathometric LiDAR data annually during June/July and again during October/November when flows are low. This data will be used in conjunction with the Program's system-scale geomorphology and vegetation monitoring protocol to document annual changes in vegetation distribution and height and unobstructed channel widths.

STUDY IMPLICATIONS

After 12 years of study (2007–2018), the Program has concluded short duration high flow (SDHF; 5,000–8,000 cfs for three–five days days) releases during the spring or early summer are highly unlikely to create or maintain suitable least tern and piping plover nesting habitat or whooping crane roosting habitat. As a result, the Program has opted to abandon the construction of in-channel islands for interior least terns and piping plovers in favor of off-channel options. Contrarily, the

Program has observed little use of off-channel habitats (palustrine wetlands and wet meadows) by whooping cranes and has committed to maintaining ≥650-foot unobstructed channel widths on Program complexes where possible. Results from this study will help to determine the efficacy of Fall SDHF releases at maintaining these wide unobstructed channel widths. If found to be effective, Fall SDHF Environmental Account (EA) flow releases could be considered for a potential Second Increment flow management action.