Memorandum

Subject: **Oyster Creek Stabilization Project, 5-year Monitoring Summary**

Date: April 18, 2025

To: Michael Baron, El Dorado Irrigation District

From: Brian Piontek, Montrose Environmental

The El Dorado Irrigation District (EID) completed construction of the Oyster Creek Stabilization Project (Project) in October 2019. The Project used biotechnical techniques to stabilize a portion of Oyster Creek and its North Tributary. Stabilization techniques used along Oyster Creek included installation of Lemmon's willow stakes (*Salix lemmonii*), mountain alder (*Alnus incana* spp. *tenuifolia*) container plants and live staking, and coir rolls. Stabilization techniques used along the North Tributary included a log/rock energy dissipation area and brush pack at the upstream end of the tributary, Lemmon's willow stakes, mountain alder container plants, quaking aspen (*Populus temuloides*) stakes harvested onsite, live willow fascines, and coir rolls. Erosion pins (wooden stakes) were installed throughout the site to assist in monitoring erosion rates.

Five years of post-construction monitoring were required under the Oyster Creek Monitoring Maintenance and Reporting Plan (MMRP) (EID 2014). Monitoring began in 2020 and was completed in 2024. Monitoring included annual assessments of tree survival and vegetation cover and geomorphic monitoring at Oyster Creek and the North Tributary. Photo points were also taken. Montrose Environmental (Montrose), formerly Horizon Water and Environment (Horizon), and EID participated in each of the annual monitoring events.

This memo provides a summary of annual monitoring results and adaptive management activities conducted during the 5-year monitoring period.

Year 1 – 2020

Monitoring activities during Year 1 were conducted on July 10, 2020, and August 28, 2020, by Montrose biologist Robin Hunter and EID environmental review analyst Michael Baron. Monitoring results showed both sites met Year 1 performance criteria for tree survival and percent vegetative cover. Mountain alder and quaking aspen plantings at the North Tributary had low survival rates, however willows and aspens had high survival, thereby achieving the overall performance criteria.

Erosion pin monitoring at Oyster Creek showed an overall minor change in pin exposure and hence erosion levels from the installation date, but within anticipated performance criteria. However, it was noted that although performance criteria was met, a pre-existing area of overhang at the top of the bank was slumping onto the pins, burying one pin and partially covering the remaining three pins.

Monitoring of the three headcuts at the North Tributary found no upstream advancement along the main portion of the tributary, and minor advancement at both side channel headcuts. Overall, performance criteria for headcut monitoring for Year 1 was met.

Signs of drought stress were noted during the August 2020 monitoring visit. EID provided supplemental hand watering to plantings at the North Tributary on September 16, 2020. Recommendations provided by Montrose in the 2020 monitoring report included future monthly watering of the plantings in the North Tributary in July, August, and September and minor vegetation clearing around the North Tributary willow stakes during 2021 monitoring.

Year 2 – 2021

Monitoring could not be completed in 2021 due to the Caldor Fire, a large wildlife that burned through portions of the Sierra Nevada mountains from August 14 to October 21, 2021. The two restoration sites were not burned; however, the surrounding area was impacted by the fire and access to the site was restricted.

Year 3 – 2022

Year 3 monitoring activities were conducted on June 8, 2022, by Montrose biologist Brian Piontek. The Oyster Creek restoration site met performance criteria for percent vegetative cover but underperformed for tree survival. The low tree survival was attributed to additional slumping of the overhanging creek bank, which buried willow stakes planted above the coir log. This also contributed to another erosion pin being lost (buried) and the remaining pins to be further covered.

Both vegetative cover and tree survivorship performance criteria were met at the North Tributary restoration site. During monitoring, it was noted that the fascines and the rock channel were performing as intended by capturing sediment behind the features and aggrading the channel, thus creating a more gradual bed slope. However, the aggradation unintentionally lowered supervisorship of woody plants. Nonetheless, the site met performance criteria through surviving plantings supplemented by naturally recruiting aspen from an adjacent stand. Monitoring of the three headcuts at the North Tributary site found no upstream advancement since Year 1 measurements, and performance criteria for headcut monitoring was met.

Recommendations provided by Montrose in the 2022 monitoring report included additional willow stake installation at both sites to increase percent survival and monthly watering of the plantings in the North Tributary in July, August, and September. It was also recommended to cut the overhanging bank at the Oyster Creek restoration site into sod blocks and to place those blocks along the mid-bank line with wooden stakes to secure the blocks in place.

EID implemented these adaptive measures in October 2022. Overhanging bank vegetation along an approximately 25-foot-long section of the Oyster Creek restoration site were cut into 1-foot by 1-foot (minimum) sod blocks, repositioned on the mid- and lower bank slopes above the existing coir log, and pinned into place with wood stakes. EID staff also installed approximately 40 willow stakes and 10 alder cuttings on the mid- to lower-slopes of Oyster Creek restoration site and 14 willow stakes and 6 aspen cuttings at the North Tributary site.

Year 4 – 2023

Year 4 monitoring activities were conducted on August 7, 2023, by Montrose biologist Brian Piontek. The Oyster Creek restoration site continued to meet performance criteria for percent vegetative cover, tree survivorship, and erosion rates. The adaptive measures (sod blocks) implemented along the creek bank in October 2022 were found to be intact and functioning as intended by increasing the vegetation cover along the mid- and lower bank, capturing soil and material behind the blocks, and increasing the stability of the lower bank and toe. The additional willow and alder plantings from 2022 were healthy, and tree survivorship also exceeded performance standards.

The North Tributary restoration site also met vegetative cover and tree survivorship performance standards in Year 4. Supplemental willow stakes planted in 2022 were noted to have a low survivorship, but supplemental aspen planting and natural recruitment were significantly high. Fascines continued to function and contribute to the channel becoming densely vegetated with herbaceous species.

Monitoring of the three headcuts at the North Tributary found no upstream advancement along the main portion of the tributary and minor advancements of both the side channel headcuts. Performance criteria was still achieved. However, it was noted that a scour hole was forming in the main tributary just downstream of the rock energy dissipation feature. EID staff repaired the scour hole under the supervision of Montrose biologist Jessica González on November 2, 2023. Repairs were made using a mixture of rock and native soil to backfill the scour hole and prevent the expansion and upstream migration of the scour hole.

No additional adaptive management actions were deemed necessary by Montrose in the 2023 monitoring report, based on both sites meeting or exceeding performance criteria.

Year 5 – 2024

Year 5 monitoring activities were conducted on August 2, 2024, by Montrose biologist Brian Piontek. As with the prior year, both restoration sites exceeded performance criteria standards for percent vegetative cover and tree survival. Success criteria were also met for erosion monitoring at Oyster Creek restoration site and the three headcuts at the North Tributary site. A qualitative assessment of conditions along Oyster Creek found no excessive erosion or sedimentation areas along the streambed and that the streambank appears to be progressing to a more stable and resilient condition.

Conclusion

The MMRP stipulates a 60 percent survivability target for plantings throughout the five-year monitoring period. It also stipulates that the restoration sites shall provide similar vegetative cover as the reference sites (+/- 25 percent). Finally, it stipulates that restoration sites experience similar or lower erosion rates as reference sites (within 25 percent).

The Oyster Creek and North Tributary restoration sites both achieved successful outcomes at the end of the five-year monitoring period with vegetative cover, tree survival, and geomorphic stability exceeding performance standards and reference site conditions. Both restoration sites appear to be in a more stable geomorphic condition providing both ecological uplift and water quality benefits through reduced channel erosion and downstream siltation. Representative photographs of the restoration sites are provided on the following page to provide a comparison of Year 0 to Year 5 conditions.

Photo No. 1a		**Photo No. 1b**	
Date: 10/24/2019	**Year:** 0	**Date**: 8/4/2024	**Year: 5**
Description: Oyster Creek post-construction, facing north.		**Description:** Bank vegetation density has increased along the lower bank and tree surviroship along the wetted channel remains high.	
			

Photo No. 2a		**Photo No. 2b**	
Date: 10/24/2019	**Year:** 0	**Date**: 8/4/2024	**Year: 5**
Description: North tributary, post-construction, facing east.		**Description:** North tributary is densely vegetated with a mix of native tree and herbaceous species.