

July 28, 2021
2018-047.031

Mr. Mark Gim
Los Angeles County Public Works
900 South Fremont Avenue, 9th Floor
Alhambra, California 91803

Re: *Devil's Gate Reservoir Restoration Project – Phase 2 Restoration Plant Establishment Period Monitoring Conducted on July 15, 2021*

1.0 INTRODUCTION

The purpose of this letter report is to document the results of Plant Establishment Period (PEP) monitoring conducted for the Devil's Gate Reservoir Restoration Project (Project), located in the City of Pasadena, Los Angeles County, California. The PEP monitoring was conducted in the planted and or seeded portions of the Phase 2 mitigation areas including DG-W-1 (Johnson Field), DG-2, DG-2 New Channels, DG-2 WOUS, DG-W-2 (Mining Pit), DG-W-2 Outlet, DG-4 Sheet Flow (northern), and DG-SF-1. Other areas included in Phase 2 include DG-4 Sheet Flow (southern), DG-4 WOUS, DG-4 Drainage, and DG-SF-2; however, due to the dynamic nature of these areas and/or uncertainty of hydrologic conditions prior to the completion of sediment removal for the Project, these areas were not planted or seeded during Phase 2. It is anticipated that most, if not all, of these areas will be planted with willow (*Salix* sp.) and mulefat (*Baccharis salicifolia*) stakes during the fall and winter of 2021. The monitoring is being conducted in accordance with the Final Habitat Restoration Plan for the Project (HRP). Active sediment removal is still occurring within the sediment removal areas for the Project and habitat restoration is being conducted onsite around the perimeter of the sediment removal areas.

ECORP is responsible for conducting qualitative monitoring and compliance review of restoration efforts in each of the mitigation areas. ECORP is also responsible for preparing monitoring reports, which typically include the following information:

- Overall health of container plants
- Observations and recommendations related to container plant establishment
- Germination of native plant species from seed application and natural recruitment
- Level of germination of nonnative plant species
- Soil condition

- Other observations and recommendations as appropriate

PEP monitoring was conducted by Carley Lancaster on July 15, 2021. Field data collected during the monitoring event is provided as Attachment A. This report documents the third PEP monitoring visit for the Phase 2 mitigation areas.

2.0 PEP MONITORING IN THE PHASE 2 MITIGATION AREAS

2.1 Brief Summary of Plant Installation

During the Phase 2 Installation effort, which was completed on May 5, 2021, a total of 11,440 one-gallon container plants were installed in the DG-W-1 (Johnson Field), DG-W-2 (Mining Pit), DG-W-2 Outlet, DG-2, DG-2 New Channels, DG-2 WOUS, DG-4 Sheet Flow (northern), and DG-SF-1 mitigation areas. Container plants were not installed in the DG-4 Sheet Flow (southern), DG-4 WOUS, DG-4 Drainage, or DG-SF-2 mitigation areas; however, these areas were included in the weed removal effort and will be planted with willow and mulefat stakes in the fall and winter of 2021. Table 1 lists container plant species and the numbers installed in each of the Phase 2 mitigation areas.

Scientific Name	Common Name	DG-					TOTAL
		DG-W-1 (Johnson Field)	DG-2/ DG-2 New Channels/ DG-2 WOUS	DG-W-2 (Mining Pit)	DG-W-2 Outlet	DG-4 Sheet Flow/ DG-SF-1	
<i>Artemisia douglasiana</i>	Mugwort	349	448	187	50	31	1,065
<i>Baccharis pilularis</i>	Coyote brush	349	375	187	50	31	992
<i>Baccharis salicifolia</i>	mulefat	673	827	228	61	37	1,826
<i>Populus fremontii</i>	Fremont's cottonwood	349	375	187	50	31	992
<i>Rosa californica</i>	California rose	349	375	187	50	31	992
<i>Rubus ursinus</i>	California blackberry	349	375	141	38	23	926
<i>Salix gooddingii</i>	Black willow	698	896	373	101	61	2,129
<i>Salix laevigata</i>	Red willow	349	375	187	50	31	992
<i>Salix lasiolepis</i>	Arroyo willow	349	375	187	50	31	992
<i>Sambucus mexicana</i>	Mexican elderberry	175	225	94	25	15	534
Total		3989	4646	1958	525	322	11,440

All plants were installed according to the methods described in Section 4.11 of the HRP. Planting holes for all container plants were dug to a width twice the size of the root ball and to a depth slightly deeper than the depth of the root ball so that the root crown was one inch below grade following installation. Prior to installation, all plants were thoroughly watered in their containers and the soil in planting holes was wetted with at least one gallon of water. Planting holes were backfilled with native soil and irrigation basins, approximately two feet in width, were formed around the base of each plant. Rocks greater than

two inches in diameter were removed to the extent possible from the backfill soil. All container plants were irrigated with at least one gallon of water immediately following installation and basin creation.

2.2 PEP Monitoring Methods

PEP monitoring occurs monthly for the first four months following plant installation. Following the 120-day PEP, qualitative monitoring will occur monthly for the remainder of Year 1 (8 months). Following Year 1, qualitative monitoring will occur quarterly during Years 2 and 3 and twice per year during Years 4 through 10. The purpose of the PEP and qualitative monitoring is to assess container plant health and vigor and monitor the success of the mitigation areas.

During the July 15, 2021 visit, all Phase 2 mitigation areas were walked, the health and vigor of container plants were documented, germination from seeding and natural recruitment was noted, and the irrigation lines were inspected for functionality. In addition, the level of nonnative and invasive weed cover was estimated for each of the Phase 2 mitigation areas.

2.3 Qualitative Monitoring Results

2.3.1 DG-W-1 (Johnson Field)

The overall health of the container plants in DG-W-1 was noted as being good. Approximately five to ten percent of the container plants in DG-W-1 were noted as showing varied levels of stress and a negligible number were noted as being dead or missing. This is the same percentage of plants that were showing stress during the last monitoring event. Stress may be occurring as a result of 1) transplant shock 2) herbivory by rabbits or other wildlife, 3) competition from nonnative and invasive weeds, 4) misplaced emitters, 5) recreational traffic through the mitigation areas, or 6) drought stress caused by recent high temperatures. Formal mortality counts were taken for DG-W-1 during the 2021 quantitative monitoring and will be included in the 2021 annual reporting. Some of the container plants were noted as lacking well defined basins and should have their basins properly constructed and/or repaired. The installation of plants in the DG-W-1 mitigation area appears to have been completed successfully. The current issues identified during the monitoring visit are not expected to have an effect on the continued growth of the plants in the mitigation area. Photos 1 through 2 in Attachment B document the mitigation area during the monitoring visit.

Minimal native plant growth was noted throughout the DG-W-1 mitigation area, but what was present is likely from both natural recruitment and from seeding. Native plants such as annual bursage (*Ambrosia acanthicarpa*), tall flatsedge (*Cyperus eragrostis*), Jimson weed (*Datura wrightii*), Canada horseweed (*Erigeron canadensis*), cardinal monkey flower (*Erythranthe cardinalis*), California poppy (*Eschscholzia californica*), telegraph weed (*Heterotheca grandiflora*), caterpillar phacelia (*Phacelia cicutaria*), and Parry's phacelia (*Phacelia parryi*) were observed sprouting in the DG-W-1 mitigation area. In addition, dodder (*Cuscuta* sp.) was observed growing on some of the young container plants and should be removed during maintenance activities.

Nonnative weed cover in DG-W-1 was estimated at less than five percent, which is approximately the same level of weed cover that was observed during the previous monitoring visit. Nonnative species

observed in DG-W-1 included pigweed amaranthus (*Amaranthus albus*), black mustard (*Brassica nigra*), lamb's quarters (*Chenopodium album*), and horehound (*Marrubium vulgare*), tree tobacco (*Nicotiana glauca*). Most of the nonnative weeds observed in this mitigation area are still vegetative with very few going to flower or seed. Weed abatement was last conducted in this area on May 24th, 2021.

2.3.2 DG-2/DG-2 New Channels/DG-2 WOUS

The overall health of the container plants in DG-2, DG-2 New Channels, and DG-2 WOUS was noted as being good. Approximately five to ten percent of the container plants were noted as showing varied levels of stress and a negligible number were noted as being dead or missing. This is the same percentage of plants that were showing stress during the last monitoring event. Stress may be occurring due to similar reasons described for DG-W-1. Formal mortality counts were taken for DG-2, DG-2 New Channels, and DG-2 WOUS during the 2021 quantitative monitoring and will be included in the 2021 annual reporting. Some of the container plants were noted as lacking well defined basins and should have their basins properly constructed and/or repaired. The installation of plants in the DG-2, DG-2 New Channels, and DG-2 WOUS mitigation areas appears to have been completed successfully. The current issues identified during the monitoring visit are not expected to have an effect on the continued growth of the plants in the mitigation area. Photos 3 through 6 in Attachment B document the mitigation areas during the monitoring visit.

Minimal native plant growth was noted throughout the DG-2, DG-2 New Channels, and DG-2 WOUS mitigation areas, but what was noted is likely from both natural recruitment and from seeding. Native plants such as annual bursage, California sagebrush (*Artemisia californica*), mugwort (*Artemisia douglasiana*), Canada horseweed, California poppy, caterpillar phacelia, and Parry's phacelia were observed sprouting in the mitigation areas.

Weed abatement was observed to be actively occurring in the DG-2, DG-2 New Channels, and DG-2 WOUS mitigation areas during the monitoring visit. Nonnative weed cover in these mitigation areas was estimated at less than one percent in areas recently weeded and approximately 30 percent in the southern portion of these mitigation areas where weed abatement had not yet been completed. Nonnative species observed included black mustard, poison hemlock (*Conium maculatum*), perennial pepperweed (*Lepidium latifolium*), and tree tobacco. Most of the nonnative weeds observed in this mitigation area were vegetative with only some starting to flower and go to seed.

2.3.3 DG-W-2 (Mining Pit)

The overall health of the container plants in mitigation area DG-W-2 was noted as being good. Approximately 15 to 20 percent of container plants were showing varied levels of stress which is approximately five percent more than the level of stress observed during the last monitoring event. Stress may be occurring due to similar reasons described for DG-W-1; however, recent high temperatures appear to be contributing to a higher level of drought stress in this mitigation area. Formal mortality counts were taken for DG-W-2 during the 2021 quantitative monitoring and will be included in the 2021 annual reporting. Some of the container plants were noted as lacking well defined basins and should have their basins properly constructed and/or repaired. In addition, minor herbivory of young plants was observed within the DG-W-2 mitigation area and should continue to be monitored. The installation of

plants in the DG-W-2 mitigation area appears to have been completed successfully and the issues noted during the monitoring are not expected to have an impact on the continued growth of the plants. Photos 7 through 9 in Attachment B document the mitigation area during the monitoring visit.

Minimal native plant growth was noted throughout the DG-W-2 mitigation area, and what was present is likely from both natural recruitment and from seeding. Native plants such as annual bursage, mulefat (*Baccharis salicifolia*), tall flatsedge, Jimson weed, thick leaved yerba santa (*Eriodictyon crassifolium*), salt heliotrope (*Heliotropium curassavicum*), telegraph weed, Parry's phacelia, and rough cocklebur (*Xanthium strumarium*) were observed sprouting in the DG-W-2 mitigation area.

Nonnative weed cover in DG-W-2 was estimated at approximately less than five percent, which is over 55 percent less than the level of nonnative cover that was observed during the last monitoring event. Nonnative species observed in DG-W-2 included black mustard, Jerusalem oak (*Dysphania botrys*), perennial pepperweed, and tree tobacco. Weed abatement was last conducted in this area on July 1, 2021.

2.3.4 DG-W-2 Outlet

The overall health of the container plants in mitigation area DG-W-2 Outlet was noted as being good. Approximately 10 to 15 percent of the container plants were noted as showing varied levels of stress and a negligible number were noted as being dead or missing. Stress may be occurring due to similar reasons described for DG-W-1; however, recent high temperatures appear to be contributing to a higher level of drought stress in this mitigation area. Formal mortality counts were taken for DG-W-2 Outlet during the 2021 quantitative monitoring and will be included in the 2021 annual reporting. Some of the container plants were noted as lacking well defined basins and should have their basins properly constructed and/or repaired. In addition, minor herbivory of young plants was observed within the DG-W-2 Outlet mitigation area and should continue to be monitored. The installation of plants in the DG-W-2 Outlet mitigation area appears to have been completed successfully and the issues noted during the monitoring are not expected to have an impact on the continued growth of the plants. Photos 10 through 13 in Attachment B document the mitigation area during the monitoring visit.

Minimal native plant growth was noted throughout the DG-W-2 Outlet mitigation area, and what was present is likely from both natural recruitment and from seeding. Native plants such as annual bursage, mulefat, tall flatsedge, Jimson weed, cardinal monkey flower, Hooker's evening primrose (*Oenothera elata*), caterpillar phacelia, Parry's phacelia, and rough cocklebur were observed sprouting in the DG-W-2 Outlet mitigation area.

Nonnative weed cover in DG-W-2 Outlet was estimated at approximately less than five percent which is more than 55 percent less than the level of weed cover that was observed in portions of DG-W-2 during the previous monitoring visit. Nonnative species observed in DG-W-2 included pigweed amaranthus, black mustard, lamb's quarters, poison hemlock, and perennial pepperweed. Most of the nonnative weeds in this mitigation area were just starting to germinate and were not going to flower or seed. Weed abatement was last conducted in this area on July 1, 2021.

2.3.5 DG-4 Sheet Flow/DG-SF-1

The overall health of the container plants in mitigation areas DG-4 Sheet Flow (northern) and DG-SF-1 was noted as being good. Approximately five to ten percent of container plants were showing varied levels of stress which is approximately five percent less than the percentage of container plants that were showing stress during the previous monitoring event. Stress may be occurring due to similar reasons described for DG-W-1; however, recent high temperatures appear to be contributing to a higher level of drought stress in this mitigation area. Formal mortality counts were taken during the 2021 quantitative monitoring and will be included in the 2021 annual reporting. Some of the container plants were noted as lacking well defined basins and should have their basins properly constructed and/or repaired. In addition, minor herbivory of young plants was observed within the DG-4 Sheet Flow and DG-SF-1 areas and should continue to be monitored. The installation of plants in the DG-4 Sheet Flow and DG-SF-1 mitigation areas appears to have been completed successfully and the issues noted during the monitoring are not expected to have an impact on the continued growth of the plants. Photo 14 in Attachment B documents the mitigation area during the monitoring visit.

Minimal native plant growth was noted throughout the DG-4 Sheet Flow and DG-SF-1 mitigation area, and what was present is likely from both natural recruitment and from seeding. Native plants such as tall flatsedge and Canada horseweed were observed sprouting in the DG-4 Sheet Flow and DG-SF-1 mitigation areas.

Nonnative weed cover in DG-4 Sheet Flow and DG-SF-1 was estimated at approximately five percent which is approximately 80 percent less than what was observed during the previous monitoring visit. Nonnative species observed in DG-4 Sheet Flow and DG-SF-1 included poison hemlock and perennial pepperweed. Most of the nonnative weeds in this area were just starting to germinate and were not going to flower or seed. Weed abatement was last conducted in this area on June 28, 2021.

3.0 RECOMMENDATIONS

3.1 Nonnative Plant Control

Nonnative weed cover ranged from approximately less than one percent to 30 percent in the various mitigation areas, with the majority of the mitigation areas having weed cover less than five percent. During the monitoring visit, weed abatement was actively occurring within the DG-2, DG-2 New Channels, and DG-2 WOUS mitigation areas. Because weed abatement had recently occurred in most of the mitigation areas, weed growth was just beginning to germinate and most weeds were not going to flower or seed. Regular maintenance and removal of nonnative weeds is of the highest priority for all of the mitigation areas to reduce competition between native and nonnative plants. In addition, eucalyptus stumps that are starting to re-sprout should be trimmed back frequently. A focus should be placed on removing the weeds and nonnatives from the basins of each of the container plants and cuttings; however, nonnative weeds just outside of the planting areas can migrate into the planting areas via seed dispersal. Outside of the nesting bird season, a focus should also be made to remove nonnative weeds in areas where least Bell's vireos are likely to nest during the breeding season (i.e., in the vicinity of the least Bell's vireo nest that was active in 2020). Nonnative plants and weeds that have gone to seed should be

bagged and removed from the mitigation area. Without the use of herbicides, control of the nonnatives will be extremely difficult so the frequency and level of effort will need to be increased to provide control until the native plants and seedlings have a chance to grow and outcompete the nonnatives. In particular, it is important to maintain long-term perennial pepperweed management to reduce competition and allow for native plants to germinate. In addition, dodder should be removed from container plants in the mitigation areas. Although many species of dodder are native, this parasitic plant can be harmful to younger shrubs and trees that are not yet established and can even cause mortality.

3.2 Irrigation

The irrigation system was inspected for functionality and appeared to be properly installed. Irrigation was actively occurring during the monitoring visit and the soil for most container plants was found to be moist at and below the surface. Some of the emitters were observed to be outside of the container plant basins, likely due to erosion, water flow, and/or public interference. Twice weekly watering events should be conducted for the container plants unless adequate rainfall occurs. After watering, the container plant basins should have at least 0.5 inch of saturation depth. Continual maintenance of the irrigation system should be conducted to ensure all plants are evenly watered and the tube emitters are placed at the base of the container plants. Watering of the seeded only areas is not recommended.

3.3 Herbivory

Rabbit herbivory of container plants was observed in the Phase 2 mitigation areas. California rose appeared to be the most affected by herbivory. Minor herbivory generally will not kill the plants, but continued monitoring should be conducted during future visits to determine the level of the herbivory isn't such that plants are dying. As the plants become more established, they will be less susceptible to the effects of herbivory. It should be noted that cages were installed by Nature's Image around container plants that appeared to be most susceptible to herbivory following container plant installation; however, if browsing by rabbits or other animals begins to worsen, additional caging around affected and/or favored container plants may be warranted.

3.4 Erosion

Erosion issues were generally not observed within the Phase 2 mitigation areas. However, until more native perennial plants become established in these areas, there is the potential that intense rainfall may create erosion problems. During future monitoring events, erosion should continue to be monitored in all planted areas and if warranted, erosion Best Management Practices (BMPs) should be installed in appropriate areas. This may only require the installation of straw wattles at select sites to prevent existing rills from becoming larger.

If you have any questions about the information presented in this letter, please contact me at CLancaster@ecorpconsulting.com or (714) 648-0630.

Sincerely,

A handwritten signature in black ink, appearing to read 'Carley Lancaster', with a long horizontal flourish extending to the right.

Carley Lancaster
Staff Biologist

ATTACHMENT A

Field Notes

Devil's Gate PET Monitoring

7/15/21

C. Lancaster

DG-1

- Cont. plants mostly healthy ~5-10% w/ stress → appears to be mostly drought stress from recent ↑ temps
- Minimal native germ: AMBACA, CYPERA, DATURI, ERICAN, ERYCAR, ESCCAL, HETERA, PHACIC, PHAPAR
- Nonnative germ: AMAALB, BRANIG, CHEALB, MARUIL, NICGLA <5% cover
- Overall site looks good

DG-2 / New channels / WOUS

- Cont. plants mostly healthy & becoming well est. ~5-10% stressed
- Some basins in need of repair
- Minimal native germ: ARTICAE, ARTDOU, AMBACA, ERICAN, ESCCAL, PHACIC, PHAPAR
- Nonnative germ: CONMAC, BRANIG, LEPLAT, NICGLA → weed abatement actively occurring
- 17% cover to ~30% cover (rest in the rain)

D6-W-2

- Cont. plants mostly healthy but some showing drought stress, ~15-20%. Stressed

- Recent \uparrow temps may be causing drought stress

- Minor herbivory obs.

- Minimal native germ:

AMBACA, BALSAL, CYPERA, DATWRI, ERICRA, HELCUR, HETGKA, PHAPAR, XANSTR

- Nonnative germ: BRANIK, DYSBOT, LEPLAT, NICOLA <5%. \rightarrow recently weeded

D6-W-2 outlet

- Cont. plants mostly healthy \rightarrow some stressed from recent ^{some herbivory}

- \uparrow temps ~10-15%. Stressed

- Minimal native growth: AMBACA, BALSAL, CYPERA, DATWRI, ERYCAR, OENELA, PHACIC, PHAPAR, XANSTR

- Nonnative germ: AMAAUB, BRANIK, CHEAUB, CONMAL, LEPLAT <5%. \rightarrow recently weeded

- Overall site looks good

Plt-sheet Flow / SF-1

- Overall cont. plants appear healthy \rightarrow 5-10% showing stress
- Minimal native germ: ERICAC, CYPERA
- Nonnative germ: CONMAC, LEPLAT ~ 5% cover \rightarrow recently weeded

ATTACHMENT B

Photo Documentation



Photo 1: Overview Mitigation Area DG-W-1 (Johnson Field)



Photo 2: Overview Mitigation Area Overview Mitigation Area DG-W-1 (Johnson Field)



Photo 3: Overview Mitigation Area Overview Mitigation Area DG-2 & DG-2 New Channels



Photo 4: Overview Mitigation Area DG-2 & DG-2 New Channels



Photo 5: Overview Mitigation Area DG-2 & DG-2 WOUS



Photo 6: Overview Mitigation Area DG-2, DG-2 New Channels, DG-2 WOUS



Photo 7: Overview Mitigation Area DG-W-2 (Mining Pit)



Photo 8: Overview Mitigation Area DG-W-2 (Mining Pit)



Photo 9: Overview Mitigation Area DG-W-2 (Mining Pit)



Photo 10: Overview Mitigation Area DG-W-2 (Mining Pit Outlet)



Photo 11: Overview Mitigation Area DG-W-2 (Mining Pit Outlet)



Photo 12: Overview Mitigation Area DG-W-2 (Mining Pit Outlet)



Photo 13: Overview Mitigation Area DG-W-2 (Mining Pit Outlet)



Photo 14: Overview Mitigation Area DG-4 Sheet Flow/DG-SF-1