

## Director’s Note

The big story of the 2023-24 runoff year was the precipitation and resulting runoff. The immense snowpack that started to build in December 2022 slowly melted through the cooler-than-normal spring and summer. The prolonged runoff and flooding had both positive and negative impacts. On the positive side, the Owens River reached a flood stage not seen for decades, potentially promoting recruitment of riparian vegetation, and Owens Lake became a lake again. The downsides were extensive damage to infrastructure and spread of invasive weeds. It will take some time to fully understand the effects of the big precipitation year.

Not surprisingly, 2023-24 resulted in shallower groundwater levels in most wellfields and a corresponding increase in shrub and grass cover, year over year. Valley-wide, shrub cover was significantly higher than the mid-1980s baseline, while grass cover was roughly the same as baseline. The Inyo County Water Department (ICWD) continues to follow vegetation in a number of parcels that consistently do not meet baseline values, despite the large precipitation amounts of 2023-24 and higher groundwater levels.



Flooding on the Lower Owens River, 2023

One particular area of interest related to the 2023-24 runoff is the Lower Owens River Project (LORP). The spring 2023 snowmelt-derived runoff resulted in pulses of flow reaching 400-600 cubic feet per second (cfs), and flow spiked at 1170 cfs at the pumpback station in August as a result of Tropical Storm Hilary. Such flows have not been observed in the project area since at least 1969. ICWD is investigating the impacts of these high flows on various aspects of the LORP, including sedimentation, movement of channels, and tree recruitment. Findings will be documented in future annual reports.

We hope you find this edition of the Monitor useful and informative. Don’t forget that you can find more information on our website at <https://www.inyowater.org/documents/reports/inyo-county-water-dept-annual-report/> and various other pages linked in this newsletter. Happy reading! --Holly

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## Hydrologic conditions

### Runoff and pumping

For the 2023-24 runoff year (April 1, 2023 – March 31, 2024), the reported measured runoff was 886,147 acre-feet (ac-ft), approximately 216% of the 1971-2020 average. The reported runoff was a decrease from the prediction of 233% of average runoff. Total Los Angeles Department of Water and Power (LADWP) pumping within the Owens Valley from Laws to Lone Pine for 2023-24 was 35,220 ac-ft, which was 68% of LADWP's planned maximum pumping amount of 51,470 ac-ft. Reported Owens Valley water uses for 2023-24 were 105,009 ac-ft, including 53,353 ac-ft of irrigation, and Eastern Sierra water exports were approximately 345,032 ac-ft, which is 73% of LADWP's 2023-24 anticipated annual demand (472,000 ac-ft).

### Depth to groundwater

The very wet 2017, strong 2019, and record 2023 winters contributed to water table recovery from the recent drought periods. The record wet 2023 winter and moderate pumping during the preceding year increased groundwater levels, on average, in all wellfields. The wellfield average change in depth to water (DTW) from April 2023 to April 2024 was an increase (more shallow) of 3.3 feet, with a median increase of 2.7 feet in the 46 indicator monitoring wells. The largest increases were observed in Laws (6.1 ft), Big Pine (4.7 ft), Taboose-Aberdeen (4.3 ft), and Bairs-Georges (3.6 ft) wellfields. Thibaut-Sawmill (0.9 ft), Independence-Oak (1.7 ft), and Symmes-Shepherd (1.8 ft) wellfields saw more moderate increases. Groundwater levels declined in seven of the 46 indicator monitoring wells. Groundwater levels were below those of the mid-1980's vegetation baseline period in about 28% (13 of 46) of the indicator wells.

More wellfield-specific information can be found on ICWD's website: <https://www.inyowater.org/maps-data/hydrology/>.

### 2024-25 LADWP Operations Plan

Predicted runoff from the Owens River watershed during the 2024-25 runoff year is forecast to be 419,300 ac-ft or 102% of the 50-year (1971-2020) average. The

actual runoff value will be available in 2025. Planned pumping for 2024-25 is between 51,470 and 77,413 ac-ft. LADWP is predicting 95,130 ac-ft of water will be used in the Owens Valley, 50,400 ac-ft of which is planned for irrigation. The 2024-25 water exports from the Eastern Sierra (Inyo and Mono Counties) are planned to be lower than 2023-24 exports at 301,000 ac-ft, or 65% of LADWP anticipated annual need.

For most years, ICWD recommends reduced pumping amounts below LADWP's minimum proposed pumping. However, with the abundance of surface water due to the extreme high runoff for 2023-24, LADWP's minimum proposed pumping is below ICWD's estimated in-valley uses, so ICWD recommended that LADWP pump the proposed minimum.

Average groundwater levels are expected to decrease somewhat from spring 2024 levels in all wellfields under LADWP's 2024-25 maximum proposed pumping and decrease in five of seven wellfields under the minimum proposed pumping. The average groundwater level change in the 46 indicator wells is predicted to be a decrease of -2.2 ft under LADWP's maximum pumping scenario, a decrease of -1.2 ft with in-valley minimum pumping, and a decrease of -1.4 ft under LADWP's minimum pumping scenario.

## Soil Water Conditions

The Long Term Water Agreement establishes procedures to determine which LADWP pumping wells can be operated based on soil water and vegetation measurements. Through this program, termed On/Off, ICWD regularly measures depth to groundwater and soil water content at 25 monitoring sites in wellfields and eight sites in control areas. The purpose for monitoring soil water and the On/Off procedures is to manage pumping to protect plant communities that require periodic access to the water table for long-term survival. Generally, the sites with "On" status have wet soil and shallow water tables, and sites in "Off" status have dry soil and relatively deep water tables.

To assist in the evaluation of LADWP pumping proposals, ICWD examined the DTW and soil water data to determine whether groundwater was accessible to plants at the permanent monitoring sites at the beginning of the 2024 growing season. At the beginning of the 2023-24 runoff year (April 1, 2023), 19 sites were in "On" status. At the end of the runoff year (March 31, 2024), 20 sites were in "On" status as groundwater

tables rose. Most sites experienced some level of groundwater recharge into the rooting zone of plants (2-4m deep) in 2023-24. Soil moisture amounts increased in all seven wellfields as measured from April 1, 2023, to April 1, 2024. Control area soil moisture also increased overall year-to-year.

At the beginning of the 2024 growing season (April), the water table had supplied, or was capable of supplying, water to the root zone at 22 of the 25 wellfield monitoring sites. The trend from 2023-24 was for soil moisture at monitoring sites to become more connected to the water table as groundwater levels rose. Three wellfield sites (Independence Oak 2, Symmes Shepherd 2, and Symmes Shepherd 4) are now disconnected from the water table and have low soil moisture levels; none of these sites were mapped as Alkali Meadow vegetation during the baseline vegetation inventory of the mid-1980s. The eight control sites had groundwater supplied to their respective root zones.

## Vegetation Conditions

Every summer, ICWD staff and LADWP staff measure vegetation cover and composition on approximately 140 parcels in the Owens Valley using the line point intercept method. In the summer of 2023, staff read 1788 transects in 145 wellfield and control parcels. Because of the extreme runoff conditions, a number of parcels were flooded, making access difficult.

Given the large amounts of water flowing through the valley, vegetation cover was, not surprisingly, up from 2022, which was a drought year. This includes total cover, grass cover, and shrub cover in wellfield and control parcels. All increases were statistically significant.

When comparing 2023 vegetation cover to the 1984-87 baseline, however, the trends are not as clear. Overall cover and shrub cover were significantly higher than baseline for wellfield and control parcels. Grass cover was not different from baseline (higher or lower) in either wellfield or control parcels.

These overall trends mask trends in individual parcel-level data, for both wellfield and control parcels. A number of parcels have declined in overall, grass, and/or shrub cover as compared to the mid-1980s baseline. Cover in more than two dozen wellfield parcels has

been significantly below baseline for five years or more, with a number of these parcels chronically below baseline since the 1990s.

The Water Department is developing public-facing tools and applications for exploring these data. The first of these is a Green Book Vegetation Monitoring app (<https://inyo.shinyapps.io/inyoShiny/>), which allows the user to view various types of data for each parcel measured. This is an interactive version of the static parcel-level PDF plots the Water Department produces each year (which can still be accessed at <https://www.inyowater.org/documents/reports/inyo-county-water-dept-annual-report/>). More tools and informational sites will be rolled out as they are developed, and they will be available on the ICWD website.

## Rare Plants

Each year, ICWD monitors a number of rare plant species in Owens Valley in accordance with the Long Term Water Agreement goals to manage rare plants in a manner consistent with state and federal laws. Rare plant surveys take place in May, and staff notes presence, absence, and phenology.

Populations of two species that could be affected by groundwater pumping are monitored: Owens Valley checkerbloom (*Sidalcea covillei*) and Inyo County star-tulip (*Calochortus excavatus*). *S. covillei* is listed as endangered by the state of California and is a US Fish and Wildlife species of concern. Both species are listed under CNPS List 1B.1 (rare, threatened, or endangered in CA and elsewhere). In 2023, ICWD monitored four *S. covillei* sites and 31 *C. excavatus* sites. For 14 additional *S. covillei* sites that overlap with *C. excavatus* sites, *Sidalcea* were noted whether present or absent along with the phenology.

Along with *C. excavatus* and *S. covillei*, a few additional herbaceous perennial and shrub species are regularly documented. These species are noted as present or absent along with the phenology or counted as part of the vegetation cover. Species of interest are Silverleaf Milkvetch (*Astragalus argophyllus* var. *argophyllus*), Wheeler's Skeletonweed (*Chaetadelpba wheeleri*), Hall's Meadow Hawksbeard (*Crepis runcinata* ssp. *hallii*), White Flowered Rabbitbrush (*Ericameria albida*), Torrey's Blazing Star (*Mentzelia torreyi*), Frog's-bit Buttercup, (*Ranunculus hydrocharoides*), and Alkali Cordgrass (*Spartina gracilis*).

Due to the abundant winter precipitation, many annuals did grow in 2023, and Inyo County staff did look for some rare annual species that are only found in the wetter years. In wetter years species of interest are Geyer's Milkvetch (*Astragalus geyeri* var. *geyeri*), Wheeler's Skeletonweed (*Chaetadelpba wheeleri*), Yellow Spinescape (*Goodmania luteola*), Nevada Oryctes (*Oryctes nevadensis*), Inyo Phacelia (*Phacelia inyoensis*), and Parish's Popcorn Flower (*Plagiobothrys parishii*).

For more information on specific results from the 2023 monitoring, you can find the full rare plant report on the ICWD website: <https://www.inyowater.org/documents/reports/inyo-county-water-dept-annual-report/>.



Geyer's milkvetch at Farmers Pond

## Type D Study

The riparian vegetation (vegetation zone adjacent to a river), or Type D, monitoring program initiated by ICWD was limited in scope during summer 2023 due to record high flows on the Owens River. This project was initiated to fulfill two roles: 1) to prescribe and test methods to establish a long-term riparian monitoring program and 2) to understand mechanisms that promote tree recruitment to preserve riparian forest as a component of the riparian vegetation community. Full rationale and field methods are described in the draft plan ([https://www.inyowater.org/wp-content/uploads/2025/01/TypeD\\_AnnualReport\\_2023.pdf](https://www.inyowater.org/wp-content/uploads/2025/01/TypeD_AnnualReport_2023.pdf); see Appendix 1).



Above average flows on the Lower Owens in 2023

Riparian transects were established in 2020, 2021, and 2022 to sample understory vegetation, tree stem and canopy density, size (dbh, diameter at breast height) and height, and to collect tree cores for age estimates. The study characterizes the topographic surface elevation of each cored tree relative to river stage, and soils are collected for salinity and texture analyses.

In 2023, increment core collection (tree core samples) was the only component of the monitoring plan continued due to historic runoff conditions in inundating ground surfaces where transects would have been completed.

During four field seasons, 366 trees were sampled to be used for age estimation. A projected ideal quantity to adequately represent age distribution at the reach-scale is approximately 600, so about 60% of the total number of anticipated trees have been sampled. Full data analysis and reporting is expected in future annual reports.

## Bishop Cone Audit

The Bishop Cone Audit (Audit or BCA) is an annual comparison between LADWP's water usage on Los Angeles-owned lands on the Bishop Cone and its

amount of groundwater extraction from wells on the Bishop Cone (Cone). The BCA is required by the Inyo County/Los Angeles Long Term Water Agreement. The “Bishop Cone” is a reference to the legally defined area in the 1940 Hillside Decree which incorporates most of the Bishop Creek alluvial fan along with a portion of the northern Owens Valley from Bishop south towards Big Pine. The Water Agreement and the Green Book define the terms, conditions, and procedures of the BCA. ICWD staff compiles the BCA from data provided by LADWP. The BCA sums pumping and flowing well amounts and compares those totals to water use on Los Angeles-owned land during a given runoff year (April 1 to March 31) to determine whether LADWP’s groundwater extractions exceed its surface water uses on the Bishop Cone. The annual BCA reports are available on the ICWD website: <https://www.inyowater.org/documents/reports/bishop-cone/>.

For runoff year 2022-23, LADWP extracted 14,453 ac-ft of groundwater (9,566 ac-ft from pumped wells and 4,887 ac-ft from flowing wells). For runoff year 2023-24, LADWP extracted 7,680 ac-ft of groundwater (776 ac-ft from pumped wells and 6,904 ac-ft from flowing wells). LADWP groundwater extractions on the Bishop Cone for the 2023-24 runoff year decreased by 6,773 ac-ft compared to the previous year. Runoff year 2022-23 was below average and 2023-24 runoff was a historic high.

For runoff year 2022-23, LADWP used 27,339 ac-ft of water on Los Angeles-owned lands, which is more than the amount extracted. For runoff year 2023-24, LADWP used 71,015 ac-ft of water, which is also more than the amount extracted. The Water Agreement provides that, during any runoff year, total groundwater extraction by LADWP on the Bishop Cone shall not exceed water usage on Los Angeles-owned land on the Cone. Therefore, LADWP was in compliance with the above provision for runoff years 2022-23 and 2023-24 as the total uses on the Bishop Cone exceeded the total groundwater extractions for each year.

## New & Replacement Wells

In the past year or so, ICWD has received a number of proposals for new and replacement wells in the valley. The Water Agreement allows LA to drill new wells and replace existing wells in areas with favorable hydrologic conditions. The 1991 EIR details the locations and anticipated effects of 15 new wells. The role of the Water Department is to make sure conditions are favorable and that the wells will not have a significant impact on environmental resources.

In order to avoid such adverse impacts, LADWP’s strategy is to pump from the deep aquifer. While this strategy is in theory protective of vegetation, long-term impacts from pumping deep aquifers in the Owens Valley are not well understood. Inyo County has proposed a cooperative study to investigate impacts of pumping the deep aquifer. Data collected from drilling and testing some of the new and replacement wells will be helpful in this study.

There are currently five wells being considered in this process. The Technical Group approved the proposals for the replacement wells W247 in Laws and W379 in Big Pine. Although they are technically replacement wells, LADWP would drill new boreholes near the existing wells. LADWP has proposed new wells at sites B-2 and B-5 in Bishop, and Inyo County is currently conducting technical review of these proposals. Finally, LADWP wants to test W386 in Laws. This well, along with W385, is known to have caused significant impacts to vegetation in the Five Bridges area when they were pumped in the early 1990s. Pumping was discontinued, and LADWP has since sealed the shallow reaches of both wells so that they will only pump from the deep aquifer. A test of W385 took place in 2019-2020.

ICWD has created a webpage to track these projects and provide information to the public: <https://www.inyowater.org/wells-new-replacement/>.



Well 386 in the Laws wellfield

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## Owens Valley Groundwater Authority

The Water Department continues to serve as staff to the Owens Valley Groundwater Authority (OVGA). Since the submission of the Groundwater Sustainability Plan (GSP), the OVGA has been in the implementation phase. For the Owens Valley, the primary implementation activity is the well registration program. Under this program, groundwater pumpers who extract more than 2 acre-feet per year must register their wells with the OVGA and report pumping on an annual basis. This program was started in the summer of 2023, and as of the April 1, 2024, registration deadline, 25% of groundwater extractors had registered their wells. Staff will continue to encourage and seek out additional well registrations.

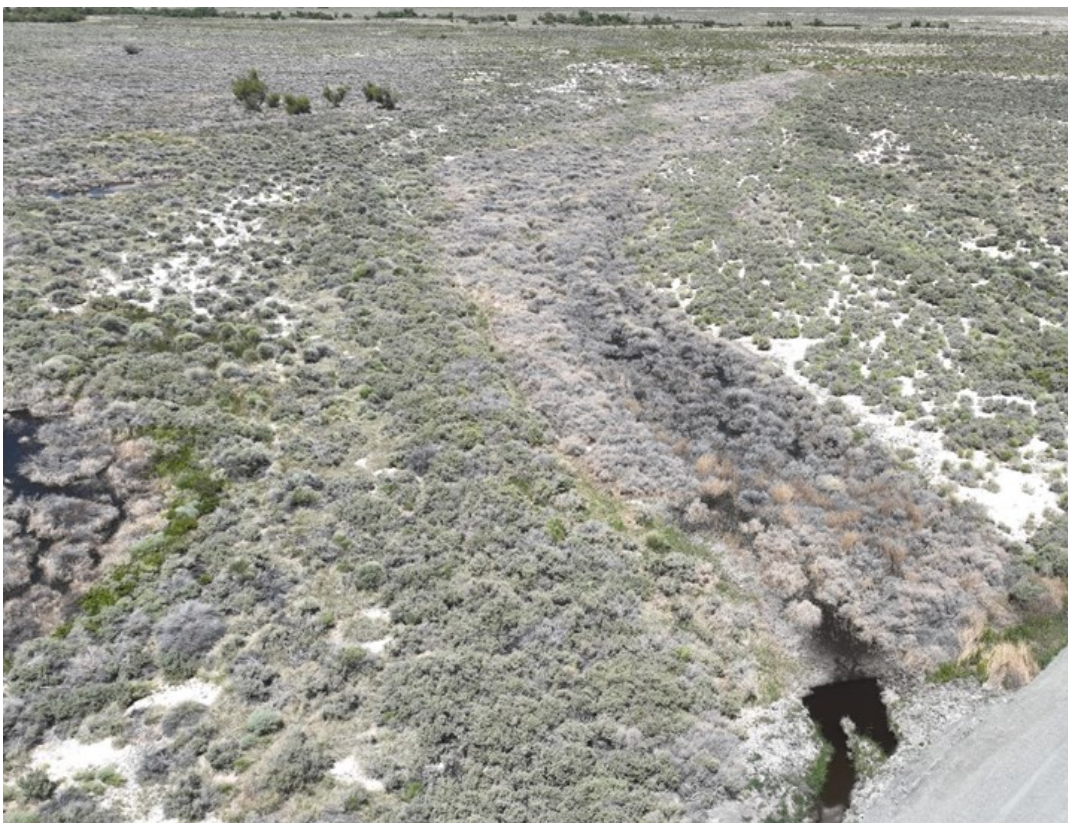
Another implementation activity detailed in the GSP is to produce a groundwater model for the Tri-Valley portion of the basin. The Tri-Valley Groundwater Management District has procured a grant through the Inyo-Mono Integrated Regional Water Management Program to hire a consultant to develop a model. Although this area is outside the purview of the OVGA, Tri-Valley GMD and Mono County have sought the assistance of ICWD to serve as the project manager and oversee the consultant's work. The consultant will be chosen later in 2024, and work will begin on the project after contracting is complete.

## Mitigation Projects

### MOU Party Mitigation Review Process

In June 2023, the Sierra Club and Owens Valley Committee invoked the 1997 Memorandum of Understanding (MOU) to address perceived deficiencies in fulfilling mitigation commitments prescribed in the 1991 EIR and subsequent agreements. Concerns first focused on the absence of comprehensive Mitigation, Monitoring, and Reporting Plans (MMRPs) required under CEQA. The lack of clear and comprehensive mitigation plans leaves many projects with vague goals, undefined timelines, and inadequate monitoring frameworks. As a result, some projects have lingered for decades, leading to mistrust among stakeholders. LADWP has agreed to participate in discussions aimed at resolving these issues.

Stakeholders have recommended a structured, transparent approach to completing mitigation projects. This includes developing detailed action plans with measurable goals, sound monitoring procedures, clear timelines, and regular reporting. The MOU Parties have been meeting regularly to discuss individual projects and receive updates on projects discussed in previous meetings. These meetings will continue in 2024-25.



Aerial view of Blackrock 16E mitigation project, May 2024

### Specific Project Updates

The Laws Type-E Transfer projects have been reviewed by the MOU Parties. LADWP and ICWD are collaborating on an amendment to address changes in the 2003 mitigation plan. Included in the amendment will be updated goals, revised monitoring requirements, and contingency measures if the project is off track.

The Blackrock 16E project, intended to restore meadow habitats, remains dominated by shrubs. LADWP has agreed to experimental measures to encourage grass growth, but no detailed design has yet been presented.

The Homestead project was to include a one-acre pond. What had been the beginning of a pond is now covered in emergent vegetation. Potential solutions include excavating a new pond or relocating the feature.

### Mitigation Monitoring Technological Advancement

In 2023, ICWD introduced the use of Unmanned Aerial Vehicles, or drones, to enhance project monitoring. This innovation holds promise for improving long-term monitoring and management of mitigation projects.

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ICWD conducts spring vegetation monitoring, summer 2023

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