



# Status Report on Beaver Restoration Pilot Projects

## California Department of Fish and Wildlife

### Beaver Restoration Program

April 2025

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## Introduction

As part of Governor Newsom's *Initiative to Expand Nature-Based Solutions*, in 2022 the California Department of Fish and Wildlife (CDFW) was tasked with creating a Beaver Restoration Program (Program) to support habitat restoration and species conservation, restore ecosystem function, and improve climate change, drought, and wildfire resilience throughout California. The Program's mission is to gather a comprehensive understanding of where, when, and how beavers can be utilized to restore ecosystem processes and habitats in California, communicate those findings in clear and meaningful ways, and with that knowledge, effectively utilize beavers as a nature-based solution in restoring and conserving habitats and watersheds for the species under CDFW's purview.

Implementation of the Program includes:

- Conducting beaver restoration projects (via beaver translocation) on private, public, and tribal lands for a suite of ecological objectives, as well as to support re-establishment of beaver populations on tribal lands
- Supporting non-lethal management of human-beaver conflicts through the use of non-lethal deterrents or translocation, where feasible options for either exist
- Developing a Beaver Management and Restoration Plan, which guides California's beaver restoration activities, justifies the Program's processes for decision-making and project prioritization, identifies potential constraints, and highlights needs for research and additional information

While development of California's Beaver Management and Restoration Plan is underway, the Program is implementing beaver restoration pilot projects to facilitate development of the Program's translocation protocols and procedures, create the process for project development and implementation, and establish the mechanisms for identifying conflict beavers to translocate into restoration project sites.

In collaboration with the Maidu Summit Consortium and Tule River Tribe, in 2023-2024 the Program initiated two beaver restoration pilot projects (Figure 1). These projects represent two distinctly different beaver restoration scenarios:

- Tásmam Koyóm (Humbug Valley, Plumas County): This project location exhibits highly suitable, low-gradient meadow habitat, that is characterized by a moderate abundance of woody vegetation for dam-building, abundant deep pool habitat, abundant cattail and willow stands for food resources, and soil banks and substrate to allow for burrows and bank lodges. In addition to naturally occurring characteristics, there are several man-made ponds and beaver dam analogs that were previously installed in the system. One resident beaver is known to persist in the local system. Project objectives include increasing wildfire resilience, improving habitat for native biodiversity, and increasing water storage on the landscape. This project represents a high probability of beaver population establishment and subsequent ecosystem-restoring activities,

with few translocation events and relatively minimal input required from the Program and Maidu Summit Consortium.

- Tule River Reservation (Tulare County): This project location exhibits reduced habitat suitability due to recent high flow and significant flood events. It is characterized by high stream gradient, abundant woody vegetation for dam-building, sparse pool habitat, minimal cattail and willow stands for food resources, and a moderate prevalence of granite banks and substrate constraining burrowing and damming opportunities. In addition to naturally occurring characteristics, propagation of willows and installation of beaver dam analogs to create pool habitat have been necessary inputs for release site preparation. Predator densities are high, with some predators being novel to the translocated beavers. Though historically native to the watershed, beavers have not been [known to be] present in the system for several decades, making this project a more intensive species reintroduction effort. Project objectives include increasing water storage, increasing drought and wildfire resilience, improving local fisheries and habitat for native species, and restoring the culturally significant species to the Tribe's lands. Population establishment will require many translocation events by the Program, significant site preparation input from the Tule River Tribe, and ongoing surveys for additional suitable release sites by both. Though reaching project success will be more challenging, this project represents greater opportunities for refinement of Program procedures and the Tribe's objectives represent greater restoration potential.



Figure 1. The CDFW Beaver Restoration Program is currently implementing two beaver translocation pilot projects at sites in Plumas County (Tasmam Koyom) and Tulare County (Tule River Reservation).

The California Department of Fish and Wildlife recognizes the effort, partnership, and commitment put forth by the Tule River Tribe and Maidu Summit Consortium in the initiation of and restoration activities carried out by the Beaver Restoration Program. Their willingness to enable the return of the beaver to their lands in California has propelled California's Beaver Restoration Program. CDFW is committed to continuing this partnership with them and other Tribes to bring beavers back for the resilience of our landscapes.

Here, after one year of beaver translocation activities in California, we present a status update on the translocated beavers and restoration sites, describe lessons learned, and highlight next steps for the pilot projects and beaver restoration in California.

## Translocation Summary

In late 2023, the Program translocated a family of seven beavers onto Maidu Summit Consortium land in Plumas County, which marked the first beaver conservation translocation in the state of California in nearly 75 years. Over the following year, four additional translocations were conducted from June through September; five beavers were translocated to one additional site on Maidu Summit Consortium land and 16 beavers were translocated to three sites on the Tule River Reservation in Tulare County (Table 1).

The translocated beavers were trapped and relocated from municipal, state, and conservancy lands where the beavers were causing depredation or otherwise in conflict with local infrastructure management. Source sites were in Sutter, El Dorado, Merced, and Fresno counties. These human-beaver conflicts could not be feasibly resolved with non-lethal deterrents so in lieu of CDFW issuing depredation permits for lethal take of the beavers, the Program translocated them into beaver restoration project sites. These translocations served to temporarily remedy landowners’ human-beaver conflict and gave the beavers an opportunity to persist in ecosystems where their natural behaviors are both beneficial and desired.

Following capture, all beavers were transported to one of CDFW’s two wildlife holding facilities, which are located in Los Banos (Merced County) and Rancho Cordova (Sacramento County). The beavers were held for a quarantine period while being evaluated for overall health and condition and until the remainder of the family group was captured to ensure groups were translocated intact. All beavers received internal and external tags for unique identification during quarantine and following release. Each beaver received Floy ear tags in distinguishing color combinations for unique identification while in captivity for quarantine, when visually observed in the field, and when captured on game cameras following release. Passive Integrated Transponder (PIT) tags were implanted (subdermal, inguinal) and used for detection via portable PIT antennas submersed at or near the release sites. A portion of adult and subadult beavers were also tagged with tail-mounted GPS or VHF transmitters to facilitate tracking on the landscape, monitoring for dispersal from release sites, and documenting habitat utilization.

*Table 1. Summary of beaver trapping efforts, translocations, and survival, by year, as of February 2025.*

	2023	2024	2025	To Date
<b>Potential Release Sites Surveyed</b>	7	12	4	23
<b>Trap Nights</b>	147	414	0	561
<b>Beavers Trapped</b>	8	22	0	30
<b>Translocation Events/Sites</b>	1	4	0	5
<b>Beavers Translocated</b>	7	21	0	28
<b>Translocated Beaver Mortalities (known or presumed)</b>	0	10	1	11

Following the translocations, the Program began conducting post-translocation monitoring of the beavers, including release-site fidelity, dispersal or movement, survival, habitat use, reproduction, and engineering activities (i.e., building of lodges, dams, canals, or burrows). These parameters are simple measures of translocation success and help inform the translocation strategy for future beaver releases at a translocation site. Post-translocation monitoring is constrained by winter conditions that limit site access and the Program’s ability to deploy and retrieve monitoring equipment. As a result, the translocated beavers and restoration sites are typically not monitored from January through March, and therefore the observations presented here are current through December 2024.

## Release Site Summaries

In 2023, the Program began collaborating with the Maidu Summit Consortium and the Tule River Tribe on two pilot beaver translocation projects. At each pilot project, multiple sites were surveyed to assess beaver habitat suitability, restoration potential, and risk of potential conflicts. In October 2023, the first pilot beaver translocation was conducted, with four more translocations occurring during 2024. Details of the translocations, status of the released beavers, and updates on the pilot projects are summarized by release site below.

### Tásmam Koyóm (Maidu Summit Consortium)

#### *Site MSC-1*

##### Translocated Beavers

On October 18<sup>th</sup>, 2023, a family group of seven beavers was translocated to a pilot project release site (MSC-1) in Plumas County. The initial family group (Table 2) was comprised of five males and three females, with an adult breeding pair, one subadult, and four kits from two litters; three were larger, early-season kits and one was a small, late-season kit. An eighth beaver captured as part of the group, a related adult male, was euthanized while in captivity after developing symptoms that precluded the animal from translocation or release and warranted immediate euthanasia. Subsequent necropsy performed by the California Animal Health & Food Safety Laboratory (CAHFS Lab) revealed tracks of chronic inflammation in the brain (encephalitis), a finding seen in other beavers with neurological signs and believed to be due to larval migration of the parasitic roundworm *Baylisascaris* sp. The necropsy also revealed pneumonia, as well as degeneration of the heart tissue, which was likely related to capture myopathy.

*Table 2. Beaver ID, sex, age class, intake weight, and transmitter information for beavers translocated to site MSC-1.*

<b>Beaver ID</b>	<b>Sex</b>	<b>Age Class</b>	<b>Intake Weight (Kg)</b>	<b>Transmitter Type</b>
23MSC-01	M	Subadult	15.6	VHF
23MSC-02	F	Adult	20.2	GPS
23MSC-03	F	Kit	7.0	-
23MSC-04	F	Kit	1.4	-
23MSC-05	M	Adult	22.2	GPS
23MSC-06	M	Kit	6.6	-
23MSC-07	M	Kit	8.4	-

After release, the majority of the family group, with the exception of the adult female and subadult male, stayed near the release location for the following two months. Over the three days immediately following their release, the adult female (23MSC-02) made a large, exploratory movement roughly nine kilometers downstream, but quickly returned upstream to rejoin the family group at the release site. In late November, roughly six weeks post-release, rising water levels caused the family group to migrate and establish in a new site several hundred meters downstream.

At nine days post-release, the subadult male (23MSC-01) dispersed downstream and began occupying the same area as the valley's one known resident beaver. Subsequently, in early December, the subadult and the resident beaver were observed at the same camera station within hours of each other, suggesting the two began to occupy the same territory.



*Figure 2. A GPS-tagged adult beaver (23MSC-05) seen on camera at the family group's lodge in June 2024, eight months post-translocation.*

### Survival and Reproduction

By monitoring with telemetry, camera stations (Figure 2), PIT antennas, and visual observation surveys, we were able to detect five of the released beavers on multiple occasions through the end of 2023. Three of the beavers have been repeatedly observed throughout 2024. However, one of the beavers has not been detected since the first two weeks following translocation (Table 3). This is potentially due to difficulty in identifying similarly-sized individuals. Nighttime camera images in black and white limit our ability to distinguish the uniquely colored ear tags. Therefore, the identification of similarly-sized animals becomes difficult for those without tail transmitters or distinct physical features.

Within the original family group, the adult breeding pair produced at least one litter of kits in 2024 (Figure 3). A separate litter of kits was also born to the valley's resident beaver in 2024. Because the subadult (23MSC-01) inhabited the same area as the resident beaver through the fall and winter of 2023, we believe the two have formed a mated pair. In December 2023, the pair was observed at the same camera station within hours of each other. During the summer of 2024, and in the same general area as the previous observations, two adult beavers and at least one kit were observed on the same camera from June through October (Figure 4).

Table 3. Beaver ID, initial date of detection following their release on October 18, 2023, last date of detection, current status, and the date mortality was confirmed for beavers translocated to site MSC-1.

Beaver ID	Initial date of detection	Last date of detection	Current status	Mortality date
23MSC-01	10/19/23 (VHF telemetry)	12/28/23 (VHF telemetry)	Presumed alive	-
23MSC-02	10/19/23 (GPS telemetry)	12/28/23 (GPS telemetry)	Unknown	-
23MSC-03	10/30/23 (PIT detection)	12/5/24 (PIT detection)	Presumed alive	-
23MSC-04	10/19/23 (Visual observation)	10/19/23 (Visual observation)	Unknown	-
23MSC-05	10/22/23 (Camera detection)	11/24/24 (PIT detection)	Presumed alive	-
23MSC-06	10/19/23 (Visual observation)	12/8/23 (Camera detection)	Unknown	-
23MSC-07	10/20/23 (Camera detection)	12/5/24 (PIT detection)	Mortality	1/23/25



Figure 3. A wild-born kit observed in June 2024 alongside the released adult (23MSC-05), at the family group's lodge at site MSC-1.



*Figure 4. The translocated subadult, 23MSC-01 (top left), observed in December 2023, hours before the untagged resident beaver (top right) was observed harvesting willows from the same location and transporting them in the same direction. The following summer, in June 2024, a kit was observed in the same general area (lower left). In October 2024, an adult and kit were observed together in the same location (lower right).*

In January of 2025, the Program was alerted to and recovered two beaver carcasses from the project area. Of the two mortalities, neither had ear tags, but one was identified via PIT tag as one of the larger, early-season kits (23MSC-07) released in October 2023. The second beaver, a slightly smaller female, had no detectable PIT tag, transmitter, nor ear tags for identification. Based on size, sex, and reproductive immaturity, the beaver is presumed be a wild-born kit from a spring 2024 litter. Additionally, the beavers were found approximately five meters apart, but neither beaver showed signs of injury from fighting, indicating they were likely from the same family group. CDFW Wildlife Health Laboratory staff physically examined, necropsied, and radiographed the carcasses, finding no signs of trauma or indicated causes of death, but noting significant lung abnormalities in both individuals. The carcasses were subsequently submitted to the CAHFS Lab for further analyses. Final results were not yet available at the time this report was released, but preliminary histological results indicate severe pneumonia and probable tularemia, which is an acute disease that would have been contracted in the post-translocation environment.

### Restoration Progress

In the weeks following the October 2023 release, beavers excavated a bank burrow at the release site. After the beavers moved to the downstream pond, they built a bank lodge that is still in use (Figure 5). To date, the beavers have constructed at least seven dams, the longest of which is nearly 100 meters long and spans the entire downstream perimeter of the pond which they currently inhabit. A 1-meter-tall dam on the mainstem of the stream has diverted streamflow onto the floodplain and into the beaver's pond complex, raising the water levels within. The beaver dams began to spread water laterally (Figure 6), wetting previously dry portions of meadow in areas within 50-100 meters of the mainstem stream channel before the flow reconnects back into the channel. Beavers have begun to dig a network of canals within the pond complex, which is expected to further connect the floodplain hydrologically. The Program has begun analyzing aerial imagery to quantify changes over time in surface water following beaver establishment in the project area (Figure 7). Following the October 2023 release, preliminary estimates indicate a 22.7% increase in surface water area from November 2023 (8,592 m<sup>2</sup>) to November 2024 (11,110 m<sup>2</sup>). A time series slider comparing the imagery collected pre- and post- beaver establishment is available [here](#) and will be updated as additional imagery is incorporate over time.



*Figure 5. The family group's new bank lodge as of June 2024. Initial construction on the lodge at site MSC-1 was first observed in late November 2023.*





*Figure 6. A 1-meter-tall beaver dam constructed on the mainstem of the stream at site MSC-1 (top left). A 100-meter-long beaver dam on the downstream perimeter of a beaver pond at release site MSC-1 (top right). An aerial view of the 100-meter-long beaver dam (delineated in red; bottom).*

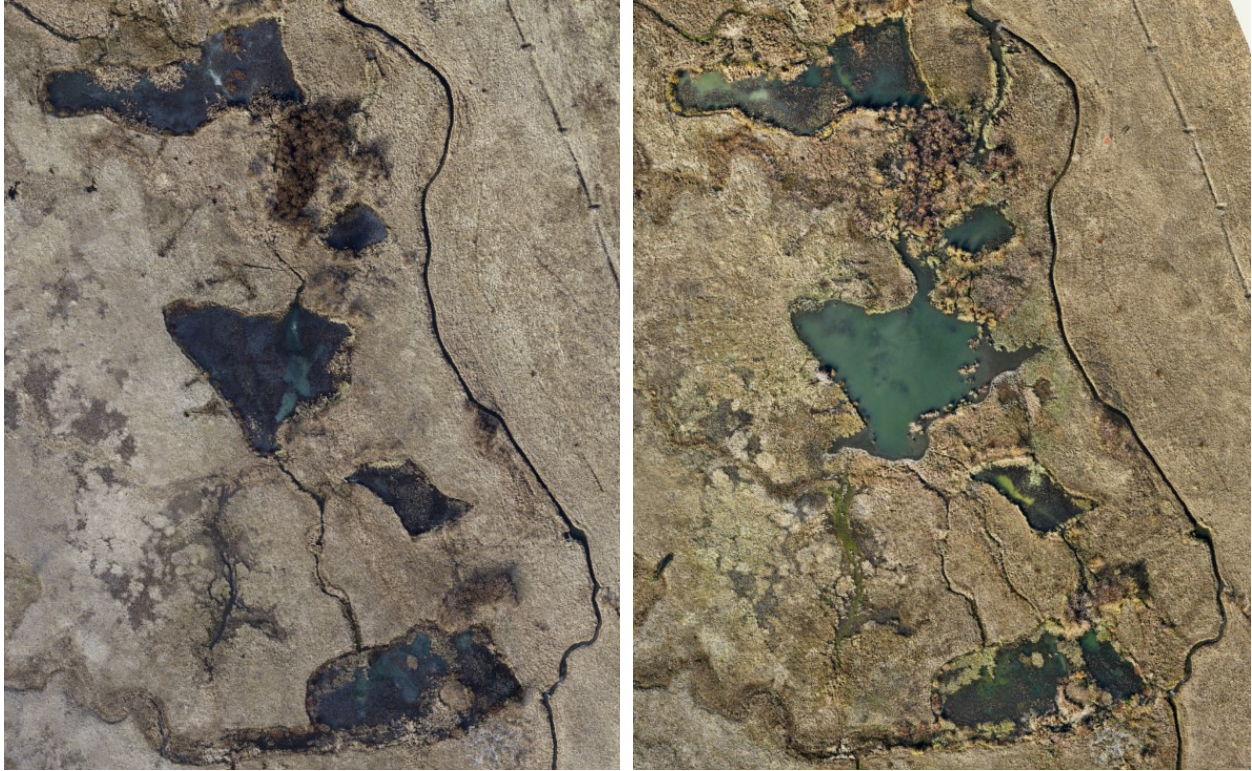


Figure 7. Aerial imagery of site MSC-1 immediately following the release of translocated beavers (left; November 2023) and one-year post-release, following their establishment (right; November 2024).

### Site MSC-2

#### Translocated Beavers

On July 25<sup>th</sup>, 2024, an additional family group (Table 4) of five beavers was translocated to a second site (MSC-2) within the pilot project area. The family group was comprised of two males and three females, with one adult, three subadults, and a kit. A sixth beaver, a female kit, was also captured with the group. However, the kit was found deceased after five days in captivity. Subsequent necropsy found the kit to be in poor body condition with minimal to no fat stores, a possible selenium deficiency, and a bacterial bronchopneumonia (*Aeromonas hydrophila*) which spread systemically. *Aeromonas* spp. bacteria were present in the lung, liver, and pericardial tissues.

Table 4. Beaver ID, sex, age class, intake weight, and transmitter information for beavers translocated to site MSC-2.

Beaver ID	Sex	Age Class	Intake Weight (Kg)	Transmitter Type
24MSC-18	M	Subadult	18	GPS
24MSC-20	F	Subadult	11.2	-
24MSC-21	M	Subadult	17.8	VHF
24MSC-22	F	Adult	20.8	VHF
24MSC-23	F	Kit	5	-

Immediately following their release, the family group remained near the release site. After one month, one of the subadult males (24MSC-21) migrated downstream roughly 700 meters and has since remained

in that area. Subsequent tracking via telemetry showed 24MSC-21 residing within the downstream stretch for several months. However, at approximately 3 weeks post-translocation, the release site no longer showed signs of beaver presence; it is possible the two beavers without transmitters followed the subadult downstream or dispersed elsewhere. However, it is also plausible these beavers did not survive, based on the prevalence of illness and mortalities in the family group as described below.

Survival and Reproduction

In addition to the mortality that occurred in captivity, two mortalities have been confirmed in the group of translocated beavers to date. Three weeks after the release, the carcasses of the adult female (24MSC-22) and the other subadult male (24MSC-18) were found near the release site. A subsequent necropsy of the adult female showed poor body condition, minimal fat stores, pneumonia of unknown origin (e.g., bacterial, viral, or toxin exposure), and ulcers on the hind feet, which can be a route for bacteria to enter the body.

A necropsy of 24MSC-18 could not be conducted given its advanced state of decomposition. Based on the other two family members’ necropsies and the lack of predation and scavenging, it is possible 24MSC-18 may have also succumbed to pneumonia. We suspect these mortalities resulted from opportunistic infection by bacteria already present in their systems. These infections were likely due to increased susceptibility caused by the cumulative stress of capture, captivity, and translocation.

*Table 5. Beaver ID, initial date of detection following their release on July 25, 2024, last date of detection, current status, and the date mortality was confirmed for beavers translocated to site MSC-2.*

<b>Beaver ID</b>	<b>Initial date of detection</b>	<b>Last date of detection</b>	<b>Current status</b>	<b>Mortality date</b>
24MSC-18	7/26/24 (Visual confirmation)	7/26/24 (GPS telemetry)	Mortality	8/15/24
24MSC-20	7/26/24 (Visual confirmation)	7/26/24 (Visual confirmation)	Unknown	-
24MSC-21	7/26/24 (VHF telemetry)	9/3/24 (VHF telemetry)	Presumed alive	-
24MSC-22	7/26/24 (VHF telemetry)	8/15/24 (VHF telemetry)	Mortality	8/15/24
24MSC-23	N/A	No detections after release	Unknown	-

The remaining subadult male (24MSC-21) continued to inhabit the downstream stretch before eventually dropping its VHF transmitter in early October. The transmitter was found in the stream with no indications of predation (e.g., bite marks, remnant tissue), therefore 24MSC-21 is presumed alive (Table 5). The other two beavers in the group, 24MSC-20 and 24MSC-23, currently have an unknown status as they have not been seen on camera or detected on PIT antenna since the first two days following their release. As noted, the two could have moved downstream with 24MSC-21; this particular stretch of stream has extremely dense vegetation, making monitoring difficult and relatively ineffective. Monitoring activities will resume in spring of 2025 to determine if beavers remain at the site and if any interactions with the other family groups are observed.

## Restoration Progress

While still present at the site, the beavers built one small dam on the stream's mainstem, just downstream of the initial release location. Additional surveys will occur in 2025 to identify the extent of any additional engineering activities at this or any other site newly inhabited by the beavers.

### *Future Plans for MSC*

The beavers released at site MSC-2 were intended to serve as a third source of genetics in the valley's incipient population, helping to increase the genetic diversity of the beaver population at Tásmam Koyóm and further advance the project's restoration objectives by helping to populate the valley more rapidly. The Program will assess the population in 2025 to determine whether additional translocations are necessary to further increase genetic diversity or help advance population establishment in the valley. Annual monitoring of the beaver population and associated ecosystem changes is expected to continue over the next 3-5 years.

## Tule River Reservation

### *Site TRT-1*

#### Translocated Beavers

On June 12<sup>th</sup>, 2024, a family group of seven beavers was translocated to the first pilot site on the Tule River Reservation. The family group (Table 6) was comprised of three adults, one subadult, and three kits, which included four males and three females.

*Table 6. Beaver ID, sex, age class, intake weight, and transmitter information for beavers translocated to site TRT-1.*

<b>Beaver ID</b>	<b>Sex</b>	<b>Age Class</b>	<b>Intake Weight (Kg)</b>	<b>Transmitter Type</b>
24TRT-09	F	Adult	23.8	GPS
24TRT-10	M	Adult	24.55	VHF
24TRT-11	F	Kit	2.5	-
24TRT-12	M	Adult	19.5	VHF
24TRT-13	M	Subadult	13.75	VHF
24TRT-14	F	Kit	2.85	-
24TRT-15	M	Kit	2.5	-

Beavers were released in a high elevation meadow, where significant effort had been undertaken by the Tule River Tribe to prepare the site to receive beavers. Beaver dam analogs (BDAs) were constructed to create deep pools of water, which serve as escape cover, and willow cuttings were planted several weeks in advance of the translocation in an effort to supplement the food supply at the release site.

In the days following release, exploratory movements of several hundred meters upstream and downstream were common among the adult and subadult beavers. The kits (Figure 8) remained within the ponded habitat of the release site. As intended, the kits' reluctance to leave the release site appeared to keep the adult and subadult beavers tethered to the release site as well.



*Figure 8. Two kits with uniquely color-coded Floy ear tags captured on game camera near their temporary lodge structure following release.*

### Survival and Reproduction

While monitoring the site in August 2024, one and a half months post-translocation, no beaver activity or presence was found. Review of the telemetry, game camera, and PIT antenna data revealed that predation occurred within four weeks of the release. The last detection of a beaver on camera or PIT antenna at the release site was on July 9, 2024. The transmitter from one of the adult males (24TRT-10) was recovered 200 meters from the release site, with the carcass discovered nearby and surrounded by abundant black bear sign. Similarly, the transmitter from the subadult male (24TRT-13) was tracked to a carcass that was actively being fed on by a black bear. The transmitter from the other adult male (24TRT-12) was recovered over 1 km from the release site, with remnants of the tail still attached; bite marks on the transmitter suggest predation by a large predator.

The last remaining tagged beaver, an adult female (24TRT-09), was not seen again after July 9<sup>th</sup>. By August 2024, the beaver's transmitter was no longer emitting a signal, which could have been due to a dead battery or predation-induced damage. Given the abundance of predator activity in the immediate vicinity of the release site and the confirmed predation of the other adults and subadult, it is highly likely the adult female (24TRT-09) and kits were also predated. Abundant black bear activity was observed on the site's game cameras on a consistent basis (Figure 9) and gray wolf activity was also documented in the area. With PIT antennas in the stream channel both upstream and downstream of the release site, we expect we would have detected one of the beavers' PIT tags on the antenna if they were dispersing from the area within the stream channel. In the future, this stream system may be opportunistically monitored for beaver activity in case any of the family group managed to avoid predation.

Table 7. Beaver ID, initial date of detection following their release on June 12, 2024, last date of detection, current status, and the date mortality was confirmed for beavers translocated to site TRT-1.

Beaver ID	Initial date of detection	Last date of detection	Current status	Mortality date
24TRT-09	6/13/24 (Camera detection)	7/9/24 (Camera detection)	Presumed mortality	-
24TRT-10	6/13/24 (VHF telemetry)	7/8/24 (Camera detection)	Mortality	8/1/24
24TRT-11	6/13/24 (Camera detection)	6/24/24 (Camera detection)	Presumed mortality	-
24TRT-12	6/13/24 (PIT detection)	7/9/24 (Camera detection)	Mortality	8/2/24
24TRT-13	6/13/24 (PIT detection)	7/5/24 (Camera detection)	Mortality	8/1/24
24TRT-14	6/18/24 (Camera detection)	6/22/24 (Camera detection)	Presumed mortality	-
24TRT-15	6/13/24 (Camera detection)	6/28/24 (Camera detection)	Presumed mortality	-



Figure 9. A small black bear investigating and moving the temporary lodge structure at site TRT-1 in July of 2024.

### Restoration Progress

Within the few weeks following release, the beavers built one small dam immediately upstream of the release location. No burrows or canals were constructed during their time at the release site and no new beaver activity has been observed since the confirmed mortalities were discovered in early August 2024. Water levels in the stream were rapidly dropping in the weeks following the release, so the site will be revisited in 2025 to determine the extent to which the dam may be contributing to water retention and creation of pools in the area.

*Site TRT-2*

Translocated Beavers

On June 17<sup>th</sup>, 2024, a second group of beavers (Table 8) was translocated to a second tributary on the Tule River Reservation. This group was comprised of one adult male and one subadult female. Following translocation, both beavers were observed moving and foraging several hundred meters upstream and downstream of the release site (Figure 10).

*Table 8. Beaver ID, sex, age class, intake weight, and transmitter information for beavers translocated to site TRT-2.*

Beaver ID	Sex	Age Class	Intake Weight (Kg)	Transmitter Type
24TRT-16	M	Adult	23.08	GPS
24TRT-17	F	Subadult	16.55	VHF

Survival and Reproduction

Both beavers were regularly detected through telemetry, PIT antennas, game cameras, and visual observations for over four months following their release (Table 9). No mortalities have been observed to date; however, the pair has not been detected since October. With no sign of predation, we question whether these beavers may have dispersed downstream to a site with more abundant food resources. It is important to note that monitoring equipment at this site was tampered with on multiple occasions around the time the beavers were last detected, suggesting that the site may have been, to an unknown extent, disturbed by humans. Monitoring will continue in 2025 to determine if the beavers are still present within the system.



*Table 9. Beaver ID, initial date of detection following their release on June 17, 2024, last date of detection, current status, and the date mortality was confirmed for beavers translocated to site TRT-2.*

Beaver ID	Initial date of detection	Last date of detection	Current status	Mortality date
24TRT-16	6/18/24 (PIT detection)	9/29/24 (PIT detection)	Unknown	-
24TRT-17	6/18/24 (PIT detection)	10/30/24 (PIT detection)	Unknown	-

## Restoration Progress



*Figure 11. (Left) The translocated beavers assumed the maintenance of the beaver dam analog installed at the site and felled a conifer for additional building material. (Right) A bank burrow excavated at the head of the release pool. The burrow has entrances both under water (under the overhanging bank) and on the surface (excavated hole).*

Following release in June 2024, beavers assumed maintenance of the BDA that was constructed to create the release pool at this site, adding material to increase the height of the dam as well as the water level and surface water area (Figure 11). Several trees surrounding the pond have been felled for food and construction materials. Beavers also excavated a bank burrow at the head of the pool. Despite the beavers no longer being present at this site, their burrow can be readily utilized by any beavers that may be released at the site in the future, providing shelter and protection for recently released beavers while they become acclimated with the release site. Additional surveys are necessary to determine the extent of ecosystem benefits provided by beaver activity at this site.

### *Site TRT-3*

#### Translocated Beavers

On September 21<sup>st</sup>, 2024, a third translocation was conducted in a third tributary/pilot site on the Reservation. The family group of seven beavers was comprised of one adult male, one subadult female, one female kit, and four additional kits of unconfirmed sexes (Table 10). In the days following release, all but one of the beavers, kit 24TRT-29, were detected either on game camera, PIT antenna, or through telemetry. Within the first three days, the other four kits and the subadult had explored and been detected 150 meters downstream of the release site (Figure 12).



Table 10. Beaver ID, sex, age class, intake weight, and transmitter information for beavers translocated to site TRT-3.

Beaver ID	Sex	Age Class	Intake Weight (Kg)	Transmitter Type
24TRT-24	-	Kit	8.45	-
24TRT-25	-	Kit	6.05	-
24TRT-26	-	Kit	3.3	-
24TRT-27	M	Adult	19.9	VHF
24TRT-28	F	Kit	2.75	-
24TRT-29	-	Kit	3.75	-
24TRT-30	F	Subadult	16.15	GPS



Figure 12. A kit (left) and subadult (24TRT-30; right) seen on camera after translocation to release site TRT-3.

### Survival and Reproduction

Since late September and early October 2024, none of the beavers have been detected on any monitoring equipment at or near the release site (Table 11). Subsequent surveys in mid-December found that at least a portion of the beavers had migrated upstream. Willow cuttings were discovered upstream at least as far as 700 meters from the release site and continued upstream into the bordering Sequoia National Forest. Additional surveys will be required in 2025 to determine if any beavers survived the winter and where they have established. No mortalities have been definitively confirmed at the site, but in November 2024 the adult male's (24TRT-27) VHF tag was recovered nearly 200 meters from the stream channel, indicating the beaver was likely predated. Given the timing of the release, no reproduction would be expected before spring of 2025.

Table 11. Beaver ID, initial date of detection following their release on September 21, 2024, last date of detection, current status, and the date mortality was confirmed for beavers translocated to site TRT-3.

Beaver ID	Initial date of detection	Last date of detection	Current status	Mortality date
24TRT-24	N/A	9/21/24 (PIT detection)	Presumed alive	-
24TRT-25	9/23/24 (PIT detection)	9/23/24 (PIT detection)	Presumed alive	-
24TRT-26	9/22/24 (PIT detection)	9/22/24 (PIT detection)	Presumed alive	-
24TRT-27	9/22/24 (VHF telemetry)	10/3/24 (VHF telemetry)	Presumed mortality	Transmitter recovered 11/14/24
24TRT-28	N/A	9/21/24 (PIT detection)	Presumed alive	-
24TRT-29	N/A	No detections after release	Presumed alive	-
24TRT-30	9/22/24 (GPS telemetry)	9/22/24 (Visual confirmation)	Presumed alive	-

### Restoration Progress

No dam-building or other engineering activity was observed at the release site prior to the beavers' upstream dispersal in the late fall. Monitoring from the release site to the upstream sites with observed beaver sign will resume in 2025.

### *Future Plans for TRT*

Given that this restoration project is a reintroduction of the species to the watershed, several additional releases will be required to sufficiently propagate a beaver population on the Tule River Reservation. To increase the likelihood of beaver survival and establishment for future translocations, the Program has identified two primary needs: increased suitability of release sites and improved predator avoidance strategies. Release sites need a greater abundance of preferred food plants and increased escape cover (e.g., large deep pools, dense vegetation, overhanging banks). Release sites with more suitable conditions may be identified by surveying for and selecting different release sites or created through efforts to prepare sites for translocation by installing BDAs to increase pool habitat and planting willows to increase the abundance of food resources. To improve predator avoidance strategies, the Program will explore whether release timing (i.e., seasonality) and site elevations may influence the density of predators encountered by translocated beavers. While the Program initially explored the use of temporary lodge structures at release sites to provide more immediately available cover, we ultimately found that these likely increased the risk of predation by attracting predators and reducing the beavers' drive to begin constructing burrows or lodges. The Program will closely coordinate with the Tribe and local CDFW staff to better understand predator activity near potential release sites.

Additionally, the Program will evaluate the use of source beavers from locations with conditions more comparable to the release site(s), with initial considerations including elevation, [food] plant community, and predator community. It is worth acknowledging that the source beavers translocated to the TRT sites had no experience with gray wolves or black bears. Further, their primary food plants were cattails and willows, with no expected exposure to alders (*Alnus* spp.) and other dominant food plants in the project area.

Once the Program ensures survival and establishment of translocated groups, we will then focus on ensuring adequate genetic diversity of the population in the watershed. Ongoing monitoring of the release

sites and the released beavers will continue for several years to ensure that a healthy population, capable of withstanding predation rates, establishes within the watershed and is able to function as a source for adjacent areas.

## Pilot Projects Summary

Of the translocation projects implemented to date, dam-building activity occurred within at least three of the five release sites, with extensive dam-building and associated increases in surface water area occurring at site MSC-1. Overall, translocated beaver survival may be as high as 60% but is presumed to be in the range of 40-50%. There is substantial disparity in beaver survival between the two pilot projects, with the Tule River Reservation currently having a mortality rate twice that of Tásmam Koyóm. To date, the primary causes of beaver mortality have been predation and illnesses related to underlying conditions and capture-related stressors. We have, however, observed reproduction in all sexually-mature beavers released in 2023, resulting in two new litters of kits in Tásmam Koyóm in 2024.

The Program will continue with implementation of the existing pilot projects with the goals of pursuing beaver population establishment and restoration objectives, further refining program procedures, evaluating variables and strategies that influence the likelihood of beaver establishment and project successes, and delving deeper into monitoring of ecosystem parameters to document the effects of beaver re-establishment on the landscape.

## Looking Ahead

### Future Projects

To begin expanding the scale of CDFW's beaver restoration efforts, the Program has created a process for the submission of external beaver restoration project proposals. In the future, the Program anticipates conducting translocations for three types of beaver restoration projects: 1) external requests on public and private lands, 2) internal projects on CDFW lands, and 3) CDFW-proposed or -supported, large-scale/multi-landowner collaborations in priority watersheds. To submit interest in receiving beavers for a restoration project, landowners, or land managers acting on their behalf, are asked to submit fundamental information using a project proposal form and additional information spreadsheet when applicable (e.g., for projects involving multiple collaborating landowners or numerous parcels). These forms and additional information about the process are available on the Program's website ([www.wildlife.ca.gov/beaver](http://www.wildlife.ca.gov/beaver)).

Projects prioritized for implementation within a given year are evaluated and selected based on their potential ecological benefits, readiness of the habitat to support beaver establishment, risk of conflicts or unintended impacts, and proximity to known beaver populations (as an indicator of translocation need). Potential ecological benefits, quantified as conservation/restoration value, will be presented with the Program's Beaver Restoration Prioritization Model, which will identify priority watersheds for beaver restoration and facilitate the ranking of received project proposals. The model is currently under development and will be detailed within the Department's forthcoming Beaver Management and Restoration Plan. Additionally, implementation of beaver restoration projects must consider whether translocations are needed or if beaver establishment can be facilitated through habitat improvements and migration from adjacent source populations within a watershed. To incorporate these considerations, the

Program has compiled a [North American beaver distribution map](#) (Figure 13), which is based on currently available beaver presence data. In the absence of any comprehensive beaver population surveys in California, the Program is seeking submission of additional presence data through its [Beaver Observation Survey Tool](#).



Figure 13. The California Beaver Restoration Program’s North American Beaver (*Castor canadensis*) distribution map. The map depicts documented beaver presence at the HUC (Hydrologic Unit Code) 10 watershed level and, in few instances, the HUC 8 sub-basin level, based on currently available presence data from CDFW’s Wildlife Incident Reporting system and Nutria Eradication Program survey data, iNaturalist research-grade observations, verified observations reported through the California Beaver Observation Survey Tool, iBeaver, and research and practitioner datasets.

## Source Beaver Selection

The extent of human-beaver conflicts reported each year is far greater than the number and geographic distribution of beaver family groups that can be translocated for restoration projects each year. As such, and since other beavers often readily migrate into recently vacated beaver habitat, translocation should not be considered a primary solution for resolving beaver depredation. For these reasons, as well as for the ecological benefits beavers provide to the ecosystem, the Department encourages human-beaver coexistence through implementation of non-lethal deterrents as the primary solution for depredation. In alignment with the Program's efforts to improve human-beaver coexistence and reduce conflicts, when and where possible, the Program intends to capture and translocate beavers from conflict scenarios not feasibly resolved with non-lethal deterrents and that would likely otherwise be lethally taken via depredation permit. Capture locations and target beavers will be selected from active depredation complaints in the Department's [Wildlife Incident Reporting \(WIR\) system](#).

Factors that must be considered when selecting source beavers are proximity of the beavers (i.e., daily trapping efforts) to the Department's husbandry/quarantine facilities, ability to safely and effectively implement trapping operations at the site, presence of diseases, pathogens, or invasive species of concern, timeline for beaver restoration project approvals and subsequent translocations, group demographics relative to project needs, and, when important, similarity of the source habitat to the receiving habitat. Given that the translocation process is inherently stressful and stress can result in increased susceptibility to illness, the mortalities observed at Site MSC-2 indicate that poor water quality at potential source sites should also be considered, which may preclude the selection of some candidate beavers in order to improve translocation outcomes.

## Next Steps

The Program's top priority for 2025 will be finalizing the California Beaver Management and Restoration Plan. This plan will define what the Department recognizes as the North American beaver's native range in California and therefore determine the maximum geographic extent of beaver translocations in the state. Additionally, the plan will highlight California's priority watersheds for beaver restoration implementation and guide the Program in recruiting projects and associated partners to advance California's ecological objectives. Further, the plan will highlight outstanding questions and areas where additional information or science is needed. In 2025, the Program will expand engagement with its Technical Advisory Group, which consists of many of the very best scientific, academic, and practitioner experts in the field of beaver restoration across the U.S. These partners will help to ensure that the plan and Program implementation rely on the best available science and are able to effectively contribute to expanding the best available science on beaver translocation and restoration.