

LAKE CACHUMA OAK TREE RESTORATION PROGRAM

2022 ANNUAL REPORT

with

Fiscal Year 2022/2023 Financials and Water Usage



Replanted oak trees at Live Oak Camp

Prepared for: Cachuma Operation and Maintenance Board

Prepared by: Timothy H. Robinson (COMB), Scott J. Volan (COMB), Daniel Razo (COMB), and Kenneth A. Knight (Kenneth A. Knight, Consulting)

August 30, 2023

Executive Summary

The following is the annual report for the Lake Cachuma Oak Tree Restoration Program that contains the results of the 2022 annual inventory of all planted mitigation oak trees and the Fiscal Year 2022-2023 financial and water usage details. The results of the 2015 Lakeshore Survey set the mitigation number for the Lake Cachuma Oak Tree Restoration Program at 4,722 by 2025 (COMB, 2016). This number included the established mitigation ratio of two to one (2:1) (4,002) and an 18% mortality rate that was determined from the 2015 and 2016 annual survey reports (COMB, 2017a; COMB, 2017b). The determined mortality rate provides the margin needed to reach the specific mitigation target number of 4,002 alive and self-sustaining oak trees at the end of 2025. As of the end of this year's inventory, 5,740 oak trees have been planted (and 57 adopted trees for a total of 5,797 trees) and 4,637 are alive which is a survival rate of 79.99% (Figures 1, 3 and 4). No new mitigation trees will be planted next year since it takes approximately 3 years for an oak tree to become self-sustaining. From now until the end of 2025, a slow decline in the number of alive trees is expected heading to the end of 2025. The current margin (alive minus target) is 635 trees above the target number of 4,002 trees. The cost of the program during Fiscal Year 2022/2023 was \$88,368 with a total cost of the program since it started in 2005 of \$2,111,452. Water usage for irrigation over the year was 0.56 acre-feet.

Recommendations for next year to meet the program mitigation objective in 2025 would be to continue to provide routine irrigation support as needed to the newer trees (Year 11, 12, and 13), mulch as many trees as possible, weed as many trees as possible at the end of the wet season, remove deer cages when trees are taller than 6 feet, and perform structural pruning of selected trees in the winter.

Introduction/Background

This Annual Report presents the results of the 2022 oak tree inventory and Fiscal Year 2022/2023 (FY22/23) maintenance with water use and financials for the Lake Cachuma Oak Tree Restoration Program (Program). For Program details and objectives, see the 2-Year Plan for Fiscal Years 2013/14 and 2014/15 (COMB, 2014). This annual report contains oak tree survival rates, maintenance with water usage, financials, and suggested program improvements. Annual Reports have been written for each year of the Program. References for the recent reports are as follows: 2015 (COMB, 2017a), 2016 (COMB, 2017b), 2017 (COMB, 2018), 2018 (COMB, 2019), 2019 (COMB, 2020), 2020 (COMB, 2021), and 2021 (COMB, 2022).

There were 6 new oak trees planted and 75 oak trees replanted during FY22/23 at Lake Cachuma County Park (including Live Oak Camp) in the Year (YR) 13, YR12, YR10, YR9, and YR8 year classes (Figure 2). The survey results for this reporting period are presented by the year of the program that they were planted that includes the financials and maintenance effort.

Results

The 2022 inventory (or survey) of the oak trees planted through the Lake Cachuma Oak Tree Restoration Program was completed on 5/19/23 with the data entry and quality-assurance/quality-control occurring during the following week. The objective of the annual survey is to determine the status and success rate of the trees planted since the beginning of the program with thirteen years of plantings; Year 1 (2005-2006), Year 2 (2006-2007), Year 3 (2007-2008), Year 4 (2008-2009), Year 5 (2009-2010), Year 6 (2010-2011), Year 7 (2014-2015), Year 8 (2015-2016), Year 9 (2016-2017), Year 10 (2018-2019), Year 11 (2019-2020), Year 12 (2020-2021), Year 13 (2021-2022), and the Dam Tender (DT) trees (approximately 2005 through 2018). Annual surveys traditionally are conducted in the late fall and early winter to best document the survival after the dry season and growth since the last survey. With the increased number of planted trees in recent years (and the extremely wet year

conditions), the annual inventory takes longer with the objective now of completion by late spring of the following year. Methods for reducing the survey time continue to be investigated and implemented.

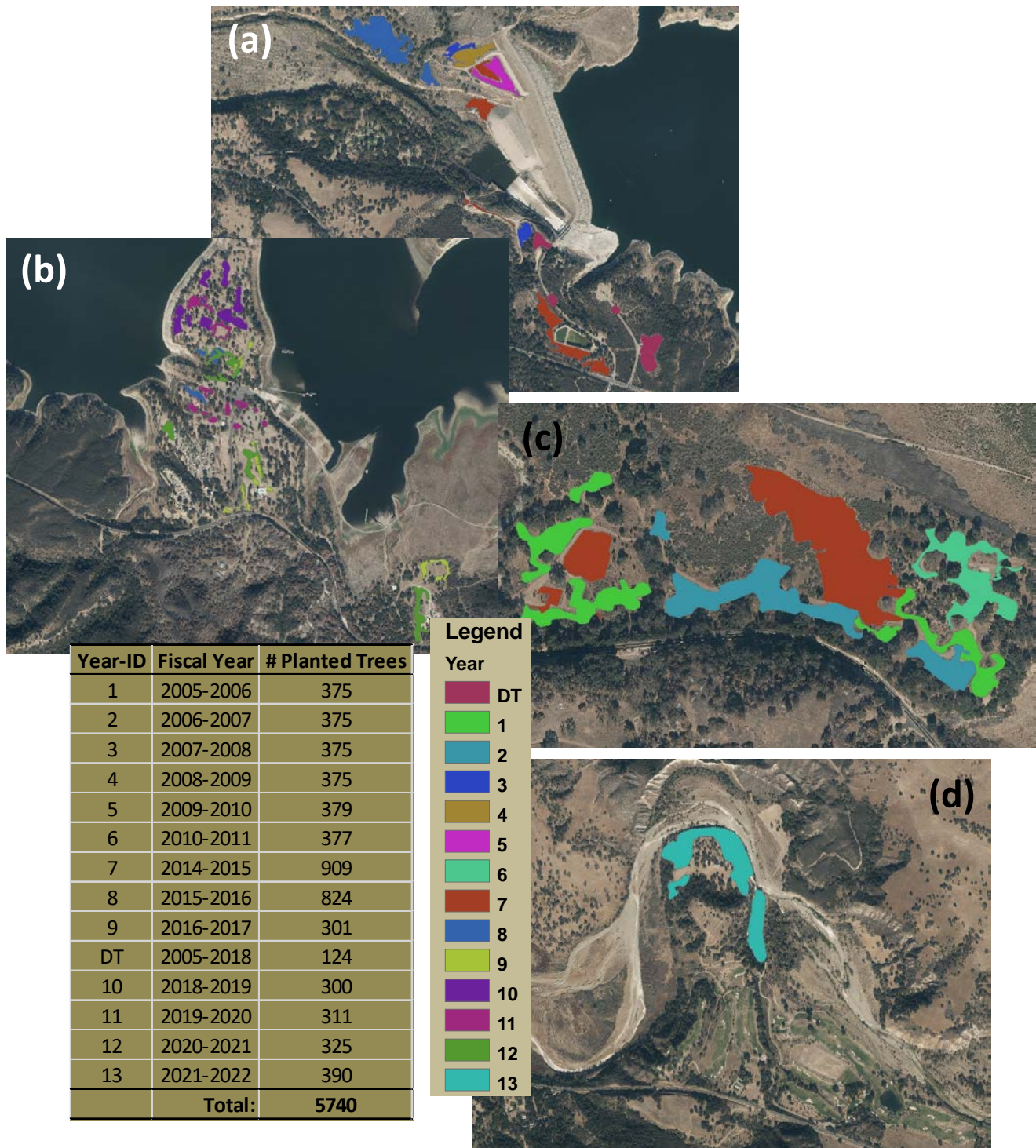


Figure 1: Oak tree planting locations by year planted (Year-ID) at; (a) Bradbury Dam area, (b) Cachuma Lake Recreation Area (County Park), (c) Storke Flats, and (d) Live Oak Camp.

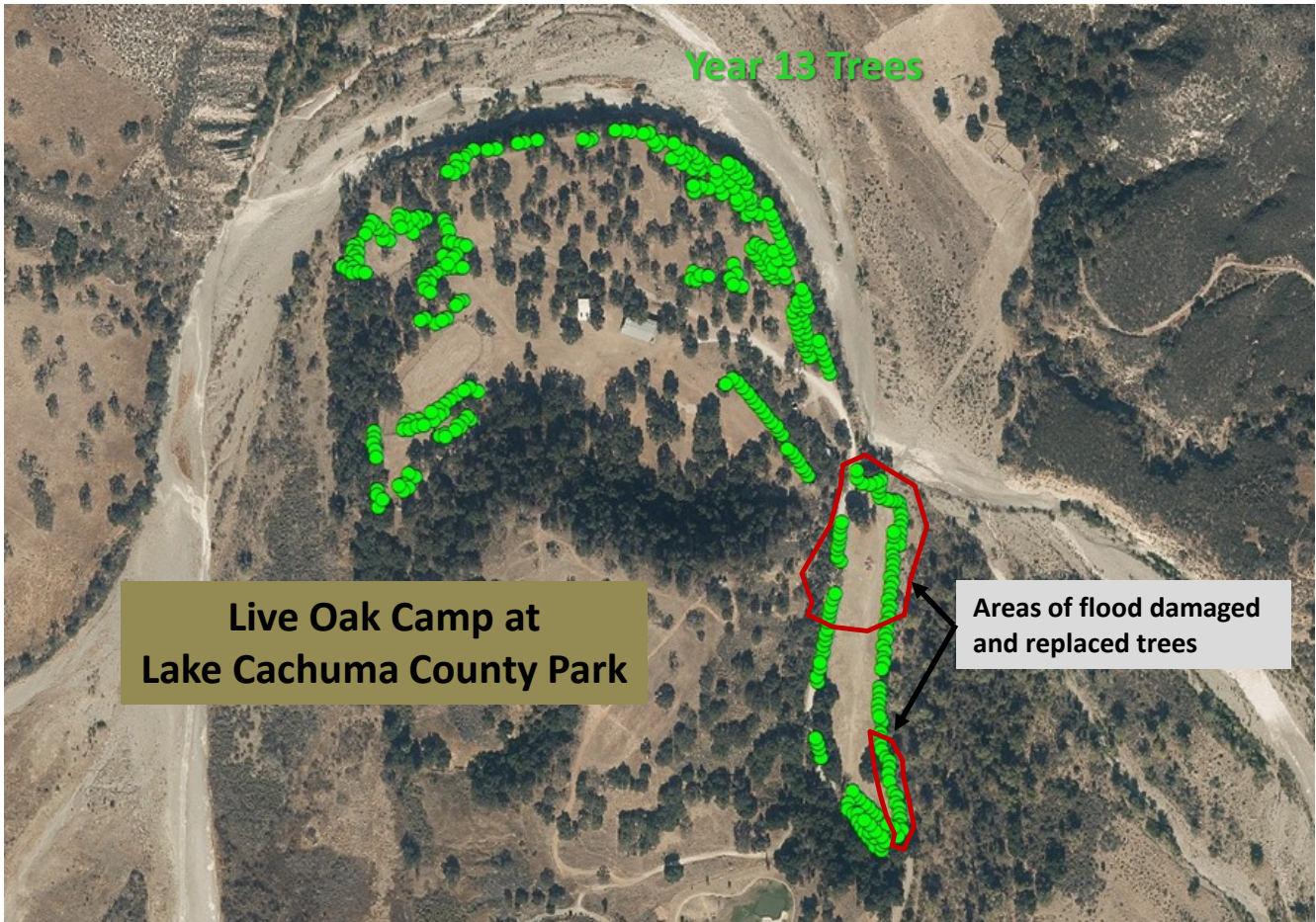


Figure 2: Year 13 trees within Live Oak Camp at Lake Cachuma County Park highlighting the area of flood damaged in 2023 and replaced trees.

The following figures and tables are the results of the survey in 2022 with 2021 results included for comparison; overall success rates in 2021 and 2022 (Figures 3 and 4) and success by planting year in 2021 and 2022 (Figures 5-18). The overall success rate went from 81.37% in 2021 to 79.99% in 2022; which includes Year 13 trees and replaced dead trees in Year 8, Year 9, Year 10, Year 12, and Year 13.

Prior to WY2017, six consecutive years of below average rainfall were observed that made it difficult for planted trees to survive particularly in the Year 1 through Year 6 trees that were thought to be self-sustaining by now at a minimum of ten years since planted. The number of required mitigated trees from the Lake Cachuma Surcharge Project was set in 2015 and reported in the 2015 Lakeshore Survey Report (COMB, 2016). The required mitigation ratio is two to one (2:1) survival rate (self-sustaining) in 2025. The results of the 2015 Lakeshore Survey found there were 879 dead and 1,122 at-risk oak trees. With a 2:1 mitigation ratio and an estimated 18% mortality rate, it was estimated that 4,722 trees would need to be planted to meet our mitigation requirement of 4,002 alive oak trees in 2025. To date, there are 4,637 planted alive trees suggesting a 635 tree margin to reach the mitigation target number of 4,002.

The large storms of WY2023 resulted in significant stream runoff that flooded and caused damage to areas where Program oak trees were planted. Specifically, the lower section of the planting areas at Live Oak Camp got flooded due to an adjacent creek jumping its banks and flowing right through the

parking lot and the planting area (Figure 19). Multiple trees were washed away or damaged. The County worked with the landowner to clear out the stream and recondition the parking area once flows subsided and the area dried out. It wasn't until the beginning of May that the crew could access the area and replant damaged or lost mitigation trees to return the number of alive Year 13 trees back to 100% (Figure 20).

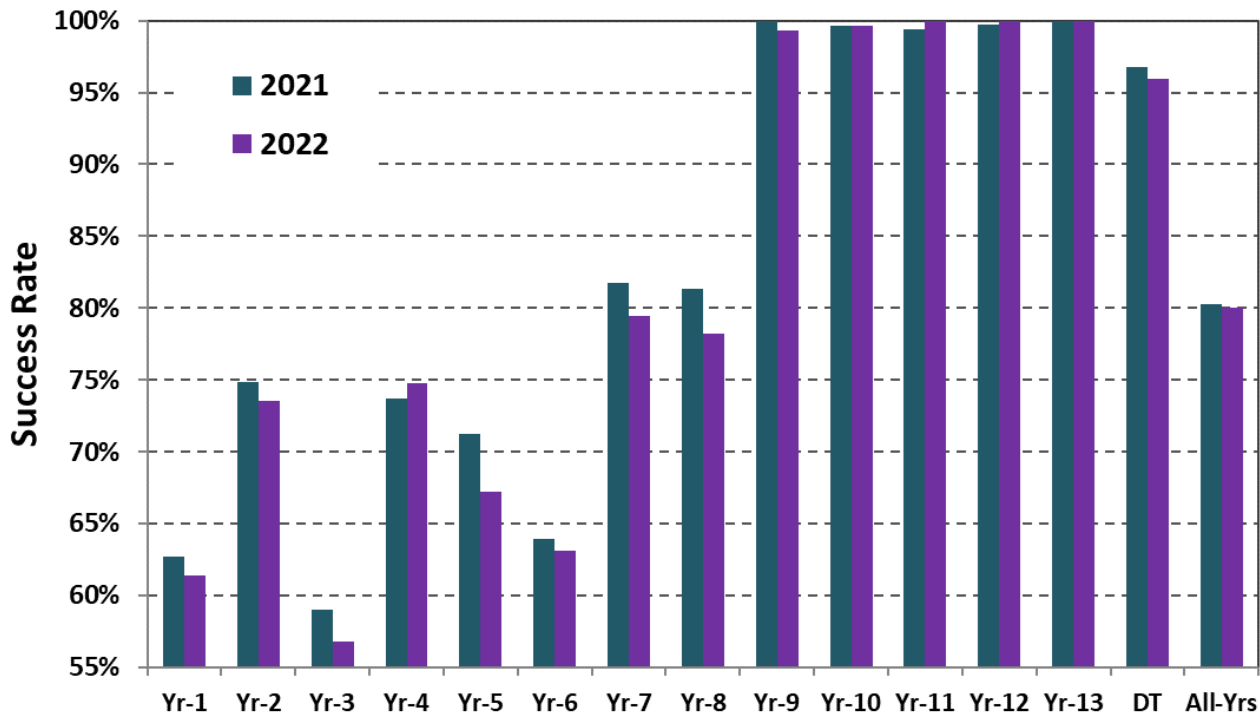


Figure 3: Success rate comparison from 2021 to 2022 for each and all tree years (Yr).

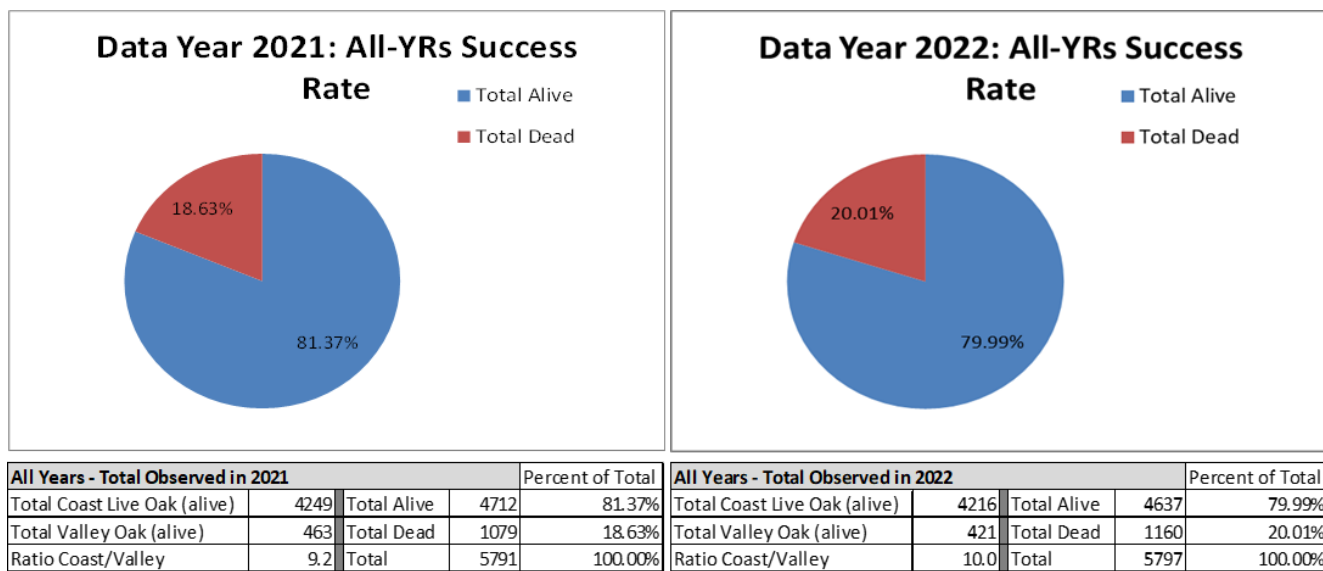


Figure 4: 2021 and 2022 status of oak trees from all years (Years 1 through 13) planted; including DT trees.

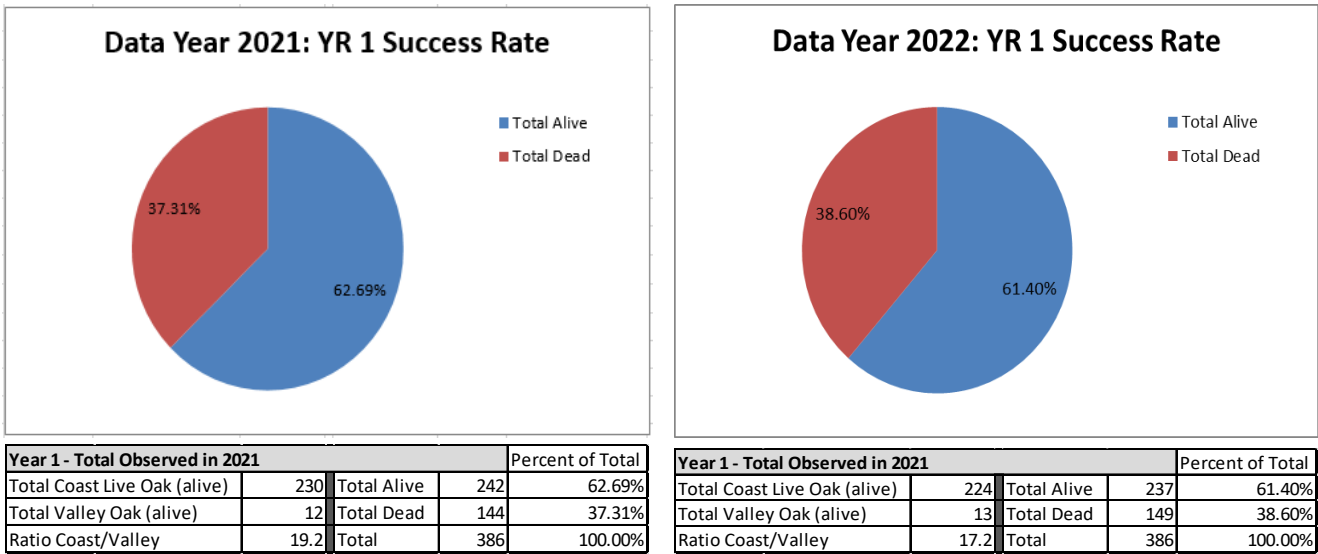


Figure 5: Status comparison of Year 1 trees from 2021 to 2022.

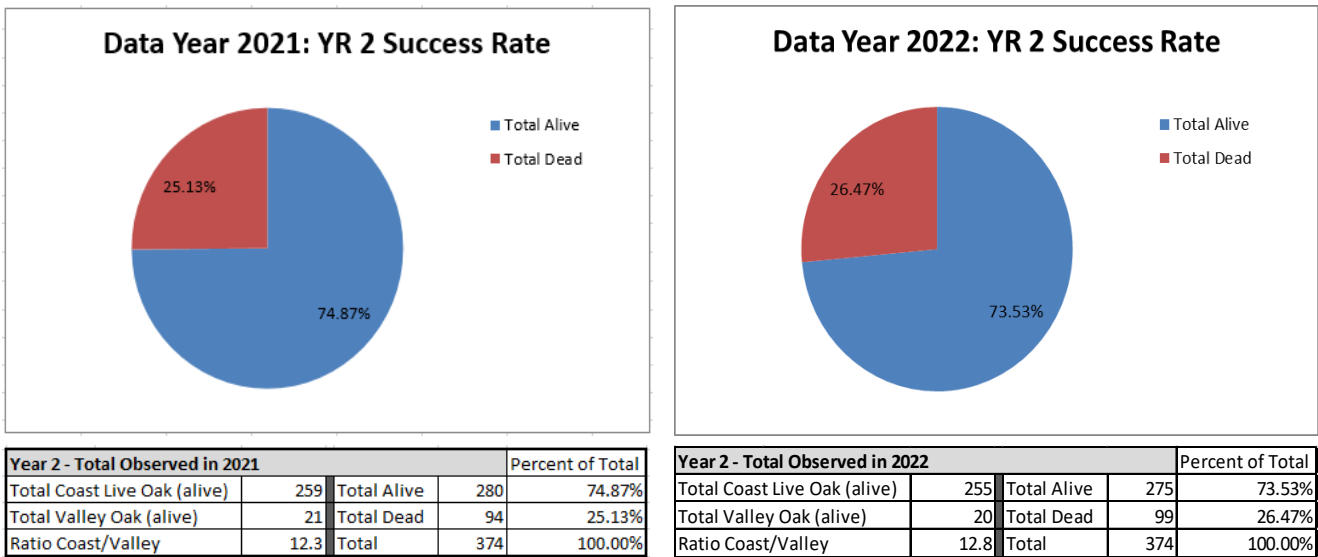
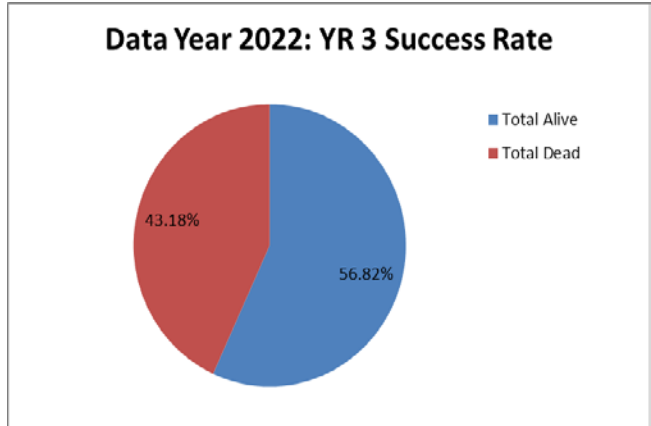
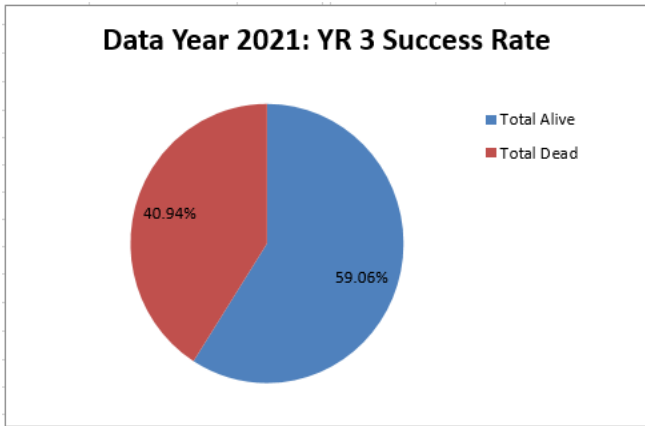


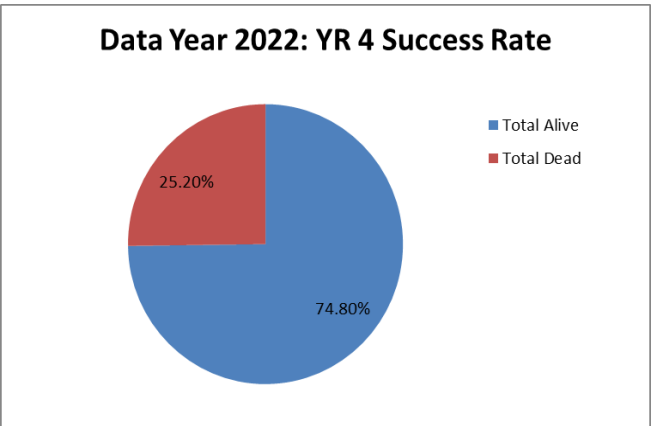
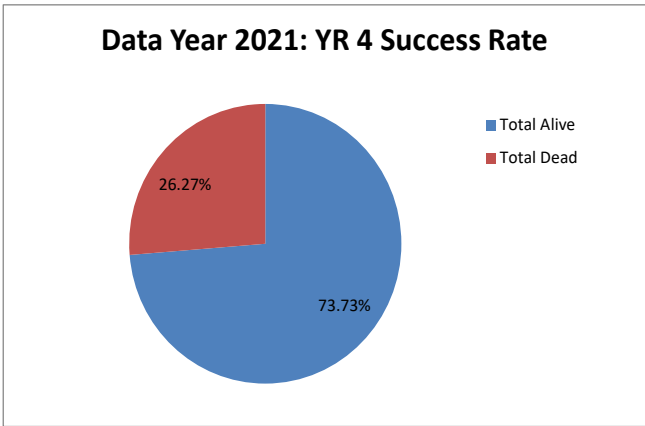
Figure 6: Status comparison of Year 2 trees from 2021 to 2022.



Year 3 - Total Observed in 2021			Percent of Total	
Total Coast Live Oak (alive)	214	Total Alive	238	59.06%
Total Valley Oak (alive)	24	Total Dead	165	40.94%
Ratio Coast/Valley	8.9	Total	403	100.00%

Year 3 - Total Observed in 2022			Percent of Total	
Total Coast Live Oak (alive)	209	Total Alive	229	56.82%
Total Valley Oak (alive)	20	Total Dead	174	43.18%
Ratio Coast/Valley	10.5	Total	403	100.00%

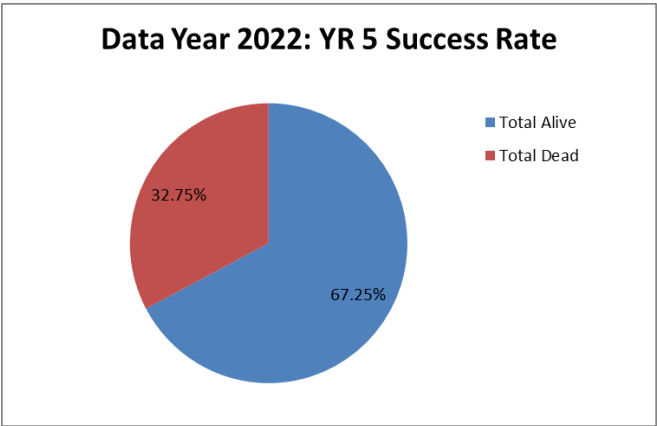
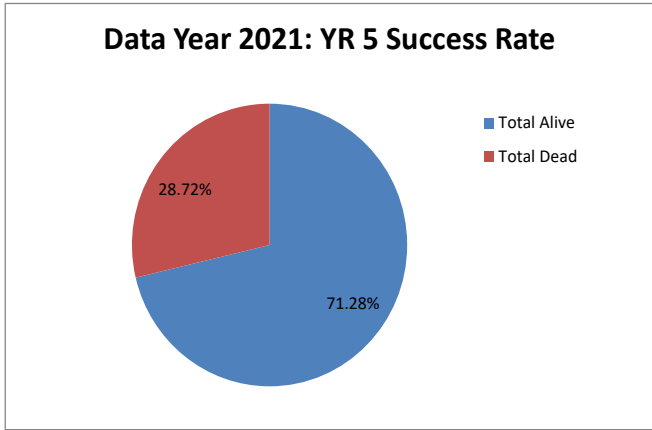
Figure 7: Status comparison of Year 3 trees from 2021 to 2022.



Year 4 - Total Observed in 2021			Percent of Total	
Total Coast Live Oak (alive)	249	Total Alive	275	73.73%
Total Valley Oak (alive)	26	Total Dead	98	26.27%
Ratio Coast/Valley	9.6	Total	373	100.00%

Year 4 - Total Observed in 2022			Percent of Total	
Total Coast Live Oak (alive)	254	Total Alive	279	74.80%
Total Valley Oak (alive)	25	Total Dead	94	25.20%
Ratio Coast/Valley	10.2	Total	373	100.00%

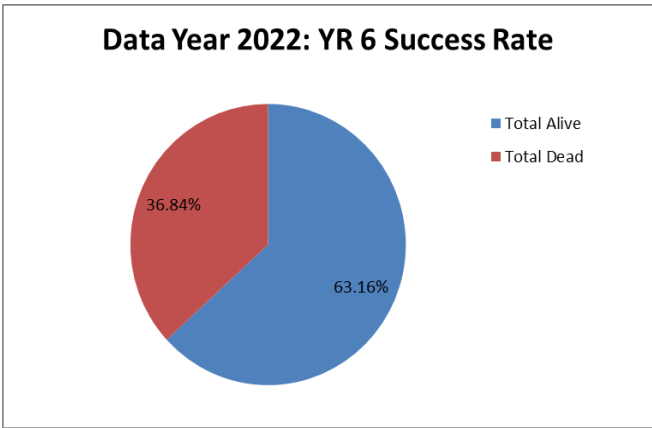
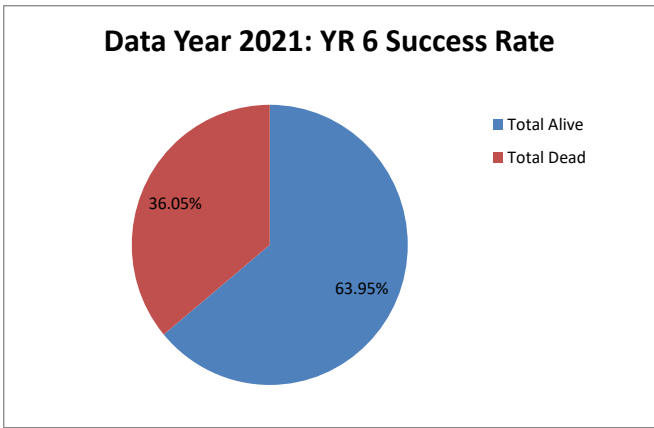
Figure 8: Status comparison of Year 4 trees from 2021 to 2022.



Year 5 - Total Observed in 2021			Percent of Total	
Total Coast Live Oak (alive)	232	Total Alive	283	71.28%
Total Valley Oak (alive)	50	Total Dead	114	28.72%
Ratio Coast/Valley	4.6	Total	397	100.00%

Year 5 - Total Observed in 2022			Percent of Total	
Total Coast Live Oak (alive)	231	Total Alive	267	67.25%
Total Valley Oak (alive)	36	Total Dead	130	32.75%
Ratio Coast/Valley	6.4	Total	397	100.00%

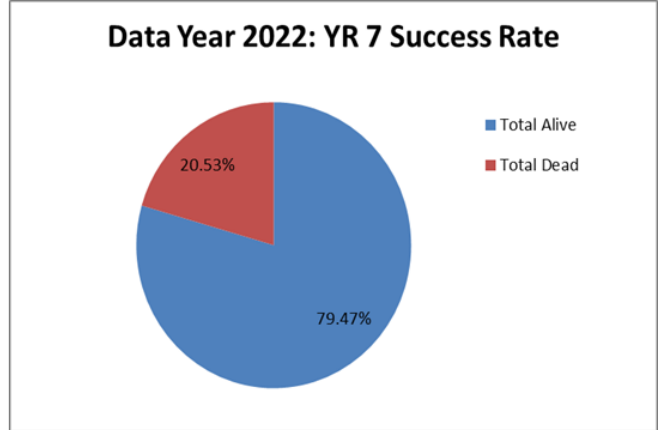
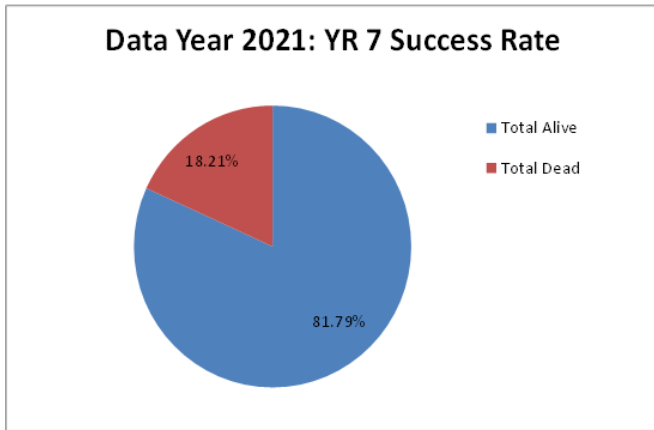
Figure 9: Status comparison of Year 5 trees from 2021 to 2022.



Year 6 - Total Observed in 2021			Percent of Total	
Total Coast Live Oak (alive)	212	Total Alive	243	63.95%
Total Valley Oak (alive)	31	Total Dead	137	36.05%
Ratio Coast/Valley	6.8	Total	380	100.00%

Year 6 - Total Observed in 2022			Percent of Total	
Total Coast Live Oak (alive)	212	Total Alive	240	63.16%
Total Valley Oak (alive)	28	Total Dead	140	36.84%
Ratio Coast/Valley	7.6	Total	380	100.00%

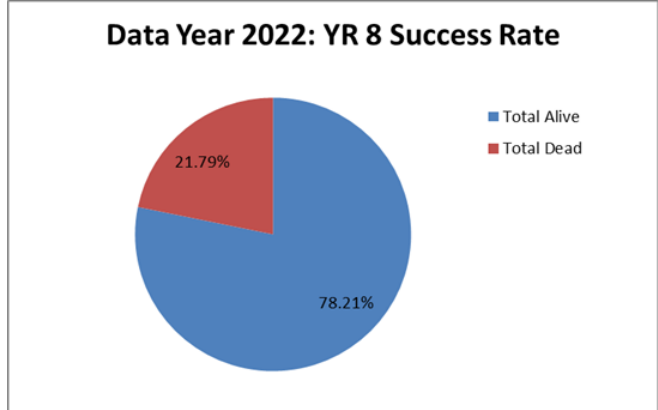
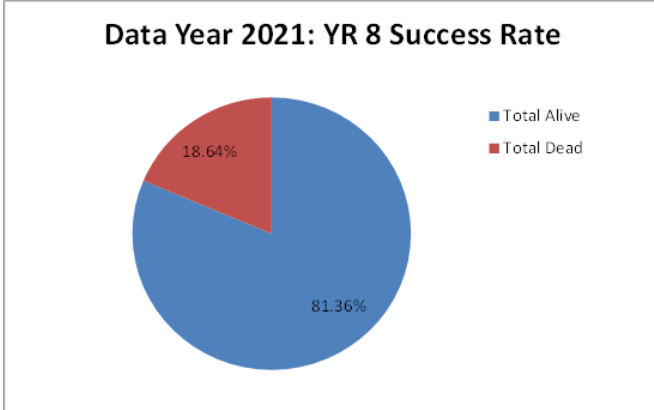
Figure 10: Status comparison of Year 6 trees from 2021 to 2022.



Year 7 - Total Observed in 2021		Percent of Total	
Total Coast Live Oak (alive)	610	Total Alive	741
			81.79%
Total Valley Oak (alive)	131	Total Dead	165
			18.21%
Ratio Coast/Valley	4.7	Total	906
			100.00%

Year 7 - Total Observed in 2022		Percent of Total	
Total Coast Live Oak (alive)	600	Total Alive	720
			79.47%
Total Valley Oak (alive)	120	Total Dead	186
			20.53%
Ratio Coast/Valley	5.0	Total	906
			100.00%

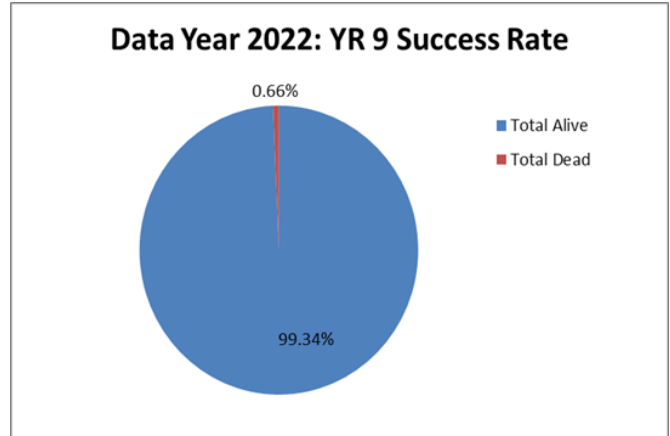
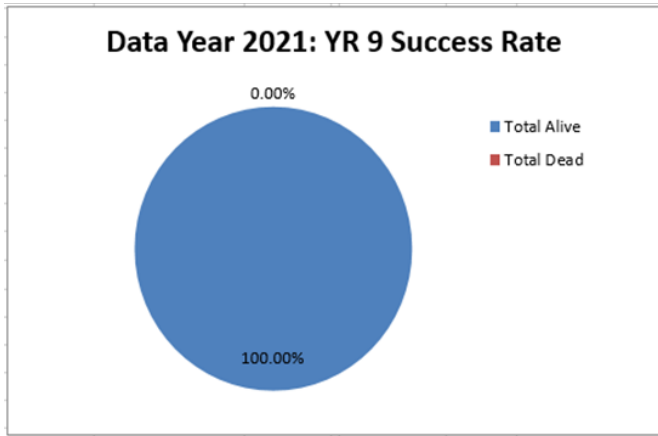
Figure 11: Status comparison of Year 7 trees from 2021 to 2022.



Year 8 - Total Observed in 2021		Percent of Total	
Total Coast Live Oak (alive)	625	Total Alive	672
			81.36%
Total Valley Oak (alive)	47	Total Dead	154
			18.64%
Ratio Coast/Valley	13.3	Total	826
			100.00%

Year 8 - Total Observed in 2022		Percent of Total	
Total Coast Live Oak (alive)	599	Total Alive	646
			78.21%
Total Valley Oak (alive)	47	Total Dead	180
			21.79%
Ratio Coast/Valley	12.7	Total	826
			100.00%

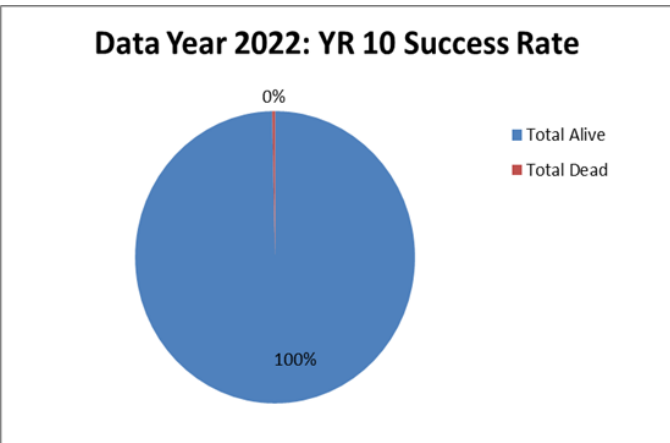
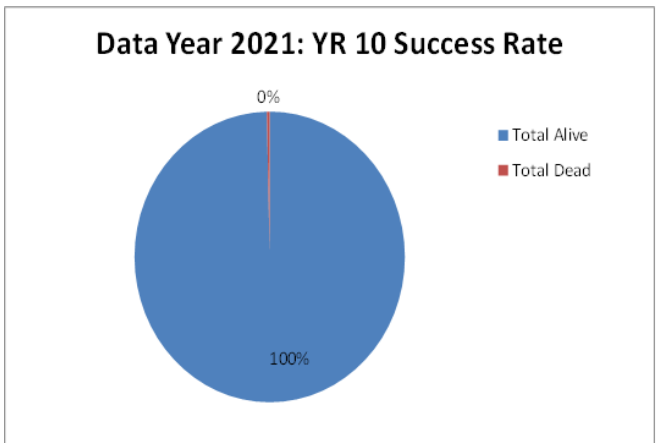
Figure 12: Status comparison of Year 8 trees from 2021 to 2022.



Year 9 - Total Observed in 2021		Percent of Total	
Total Coast Live Oak (alive)	283	Total Alive	301
Total Valley Oak (alive)	18	Total Dead	0
Ratio Coast/Valley	15.7	Total	301
			100.00%

Year 9 - Total Observed in 2022		Percent of Total	
Total Coast Live Oak (alive)	279	Total Alive	299
Total Valley Oak (alive)	20	Total Dead	2
Ratio Coast/Valley	14.0	Total	301
			100.00%

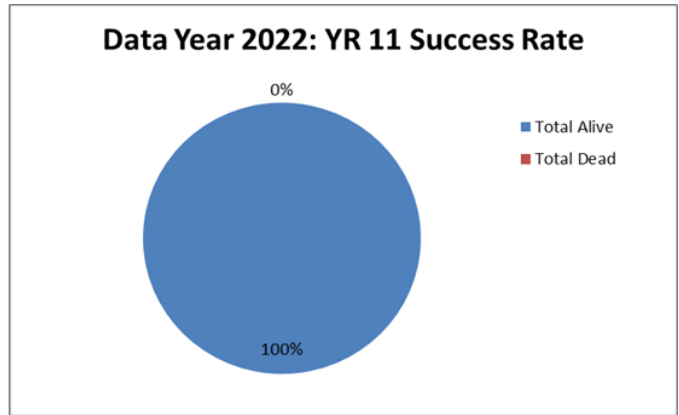
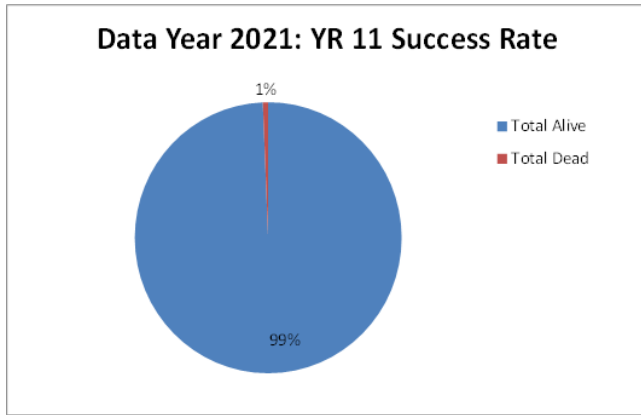
Figure 13: Status comparison of Year 9 trees from 2021 to 2022.



Year 10 - Total Observed in 2021		Percent of Total	
Total Coast Live Oak (alive)	272	Total Alive	299
Total Valley Oak (alive)	27	Total Dead	1
Ratio Coast/Valley	10.1	Total	300
			100.00%

Year 10 - Total Observed in 2022		Percent of Total	
Total Coast Live Oak (alive)	272	Total Alive	299
Total Valley Oak (alive)	27	Total Dead	1
Ratio Coast/Valley	10.1	Total	300
			100.00%

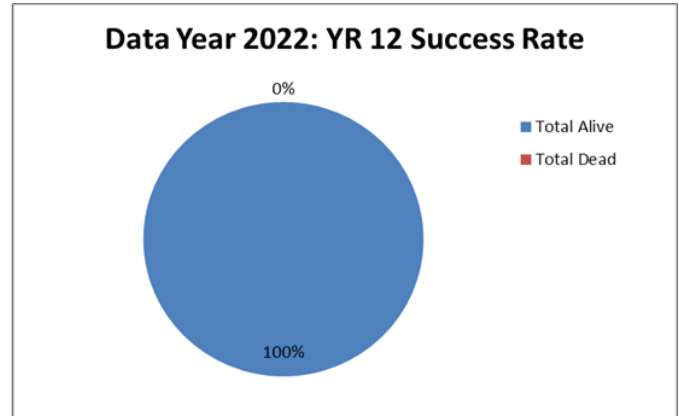
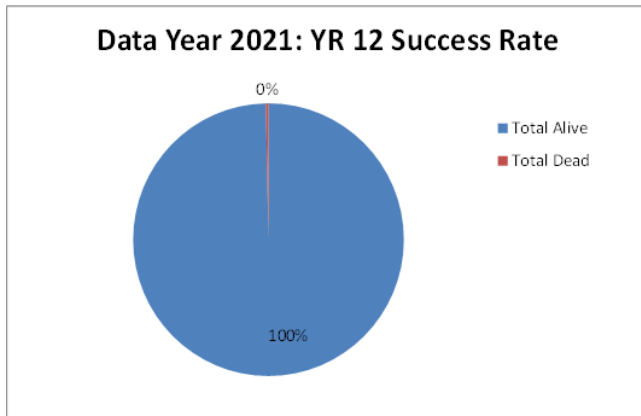
Figure 14: Status comparison of Year 10 trees from 2021 to 2022.



Year 11 - Total Observed in 2021		Percent of Total	
Total Coast Live Oak (alive)	285	Total Alive	310 99.36%
Total Valley Oak (alive)	25	Total Dead	2 0.64%
Ratio Coast/Valley	11.4	Total	312 100.00%

Year 11 - Total Observed in 2022		Percent of Total	
Total Coast Live Oak (alive)	287	Total Alive	312 100.00%
Total Valley Oak (alive)	25	Total Dead	0 0.00%
Ratio Coast/Valley	11.5	Total	312 100.00%

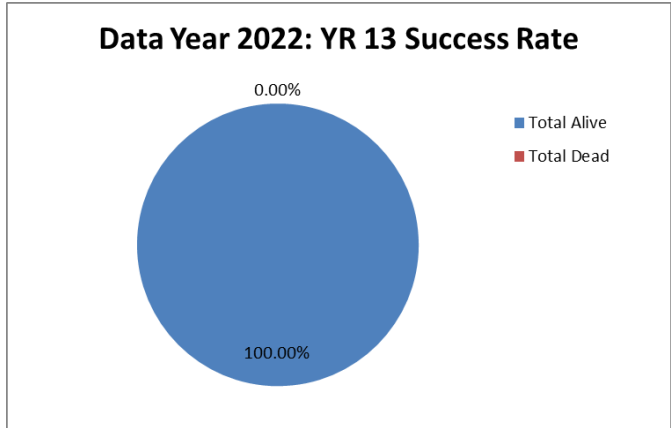
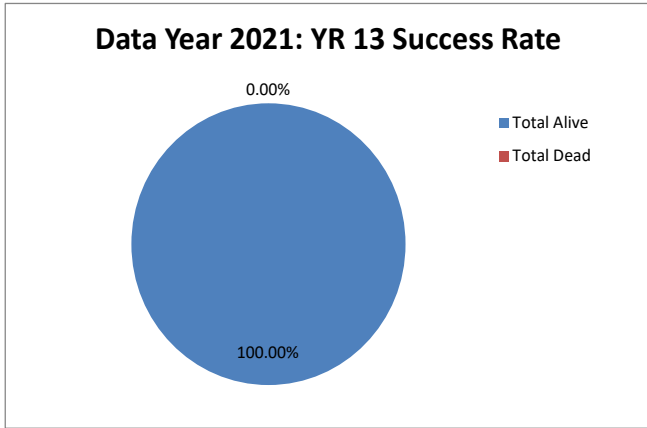
Figure 15: Status comparison of Year 11 trees from 2021 to 2022.



Year 12 - Total Observed in 2021		Percent of Total	
Total Coast Live Oak (alive)	316	Total Alive	324 99.69%
Total Valley Oak (alive)	8	Total Dead	1 0.31%
Ratio Coast/Valley	39.5	Total	325 100.00%

Year 12 - Total Observed in 2022		Percent of Total	
Total Coast Live Oak (alive)	317	Total Alive	325 100.00%
Total Valley Oak (alive)	8	Total Dead	0 0.00%
Ratio Coast/Valley	39.6	Total	325 100.00%

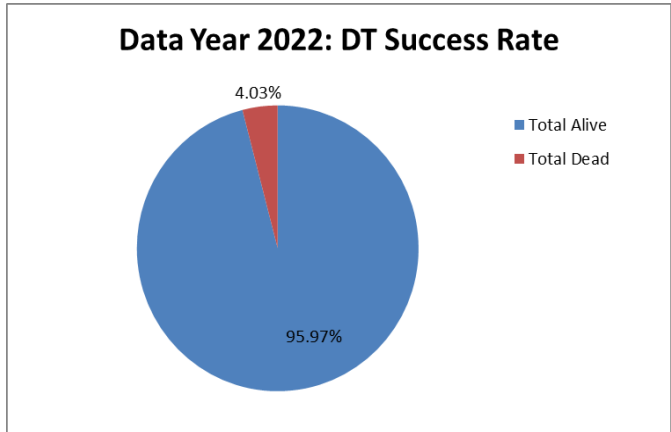
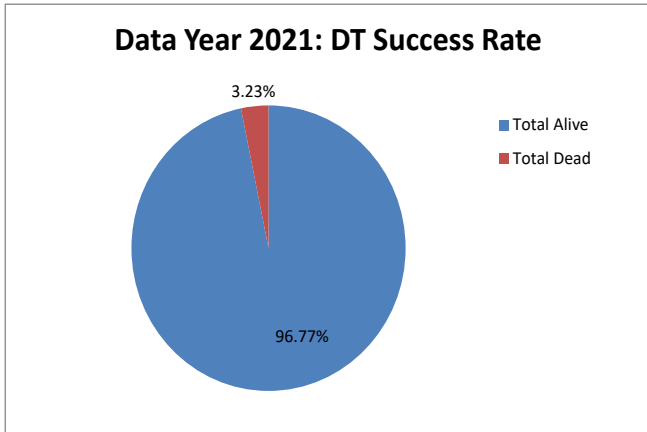
Figure 16: Status comparison of Year 12 trees from 2021 to 2022.



Year 13 - Total Observed in 2021			Percent of Total	
Total Coast Live Oak (alive)	368	Total Alive	384	100.00%
Total Valley Oak (alive)	16	Total Dead	0	0.00%
Ratio Coast/Valley	23.0	Total	384	100.00%

Year 13 - Total Observed in 2022			Percent of Total	
Total Coast Live Oak (alive)	381	Total Alive	390	100.00%
Total Valley Oak (alive)	9	Total Dead	0	0.00%
Ratio Coast/Valley	42.3	Total	390	100.00%

Figure 17: Status comparison of Year 13 trees from 2021 to 2022.



DT - Total Observed in 2021			Percent of Total	
Total Coast Live Oak (alive)	94	Total Alive	120	96.77%
Total Valley Oak (alive)	26	Total Dead	4	3.23%
Ratio Coast/Valley	3.6	Total	124	100.00%

DT - Total Observed in 2022			Percent of Total	
Total Coast Live Oak (alive)	96	Total Alive	119	95.97%
Total Valley Oak (alive)	23	Total Dead	5	4.03%
Ratio Coast/Valley	4.2	Total	124	100.00%

Figure 18: Status comparison of Dam Tender (DT) trees from 2021 to 2022.



Figure 19: Winer 2023 storm damages in January and February to the lower parking area of Live Oak Camp.



Figure 20: Replacing storm damaged trees in the lower parking area of Live Oak Camp in May using local mulch from the County.

Maintenance

Maintenance of all planted oak trees in FY22/23 included irrigating, weeding, mulching, and deer cage maintenance is presented in Table 1. The total amount of water used from Lake Cachuma to irrigate oak trees from all year classes in FY22/23 was 0.56 acre-feet, which was lower than last year at 0.80 acre-feet (Table 2).

Table 1: Cachuma Oak Tree Restoration Program completed maintenance in FY22/23.

	July 2022 ¹	August 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022 ¹	Jan 2023 ¹	Feb 2023 ¹	March 2023 ¹	April 2023 ¹	May 2023 ¹	June 2023 ¹
Year 13 Oaks (2021-2022)	Irrigated Weeded	Irrigated Weeded	Irrigated Weeded	Irrigated Weeded				Assess Clean-up		Replanting Gopher Baskets Fert/Comp Deer Cages Mulch/Irrigated	Irrigated Mulched Weeded Tree tags GPS/GIS	Irrigation Weeded
Year 12 Oaks (2020-2021)	Irrigated Weeded	Irrigated Weeded	Irrigated Weeded	Irrigated Weeded	Irrigated Weeded	Irrigated Weeded						
Year 11 Oaks (2019-2020)	Irrigated Weeded					Irrigated Weeded						
Year 10 Oaks (2018-2019)												
Year 9 Oaks (2016-2017)												
Year 8 Oaks (2015-2016)									Infrastructure Repair			
Year 7 Oaks (2014-2015)												
Year 6 Oaks (2005-2011)												

¹ Oak tree inventory.

Table 2: Cachuma Oak Tree Restoration Program water usage from Lake Cachuma for irrigation during FY22/23.

	Gallons	Acre-feet
July	37,275	0.114
August	10,650	0.033
September	32,000	0.098
October	35,650	0.109
November	20,400	0.063
December		
January		
February		
March		
April	4,000	0.012
May	7,650	0.023
June	34,250	0.105
Total:	181,875	0.56

Financials

Annual expenses by Fiscal Year since the beginning of the Lake Cachuma Oak Tree Restoration Program in FY05/06 are presented in Table 3. The totals include COMB staff (plus burden) and consulting arborist hours, material, supplies, fuel expenses, GPS mapping, conducting the annual inventory, replanting trees over the period, and reporting. The breakout for those costs is presented by

labor (Table 4) and the total cost (labor, materials, and supplies) (Table 5). The financials do include WY2022/23 planting and mapping efforts.

Table 3: Total program costs by Fiscal Year including planting, maintenance, mapping, conducting the annual inventory, and reporting by year (Year-ID) and number of trees planted during those years.

# of Years	Fiscal Year	Operator	Year-ID	# Planted Trees	Cost
1	2005-2006	Fournier	1	375	\$116,731
2	2006-2007	Fournier	2	375	\$117,620
3	2007-2008	Fournier	3	375	\$138,786
4	2008-2009	Fournier	4	375	\$137,872
5	2009-2010	Fournier	5	379	\$136,900
6	2010-2011	Fournier	6	377	\$137,878
7	2011-2012	Fournier	-	-	\$79,439
8	2012-2013	COMB	-	-	\$101,431
9	2013-2014	COMB	-	-	\$48,097
10	2014-2015	COMB	7	909	\$134,054
11	2015-2016	COMB	8	824	\$128,241
12	2016-2017	COMB	9	301	\$101,227
13	2005-2018	COMB	DT	124	\$128,752
14	2018-2019	COMB	10	300	\$120,573
15	2019-2020	COMB	11	311	\$140,775
16	2020-2021	COMB	12	325	\$119,113
17	2021-2022	COMB	13	390	\$135,594
18	2022-2023	COMB	-	57	\$88,368
			Total:	5797	\$2,111,452

Table 4: Labor costs for the Lake Cachuma Oak Tree Program during FY22/23.

	Total
COMB Staff (hours):	
Seasonal Biologist Aide A	498.75
Seasonal Biologist Aide B	262
Seasonal Biologist Aide C	246
Seasonal Biologist Aide D	2
Operations Supervisor	5
Water Service Worker II	27
Water Service Worker III	20
Water Service Worker III	5
Biologist	890.75
Project Biologist A	71.5
Project Biologist B	86
Senior Resource Scientist	82
Total Staff Hours:	2196.0
Cost - Labor plus burden	\$ 79,566.95
Consultant Service Hours (Ken Knight):	
	6.25
Consultant Cost	\$625.00
Total Personnel /Consultant Cost	\$80,191.95

Table 5: Total expenses (labor, materials and supplies) for the Lake Cachuma Oak Tree Program during FY22/23.

	Total
<i>Materials and Supplies:</i>	
Oak trees	\$1,693.85
Tree stakes	\$41.18
Mulch	FREE
Compost	\$173.94
Gopher baskets	\$736.37
Hand tools	\$500.92
Hoses	\$74.84
PPE	\$162.56
Cable ties	\$7.87
Equipment mobilization	\$577.50
<i>Vehicle Fuel Cost</i>	\$1,505.63
<i>Equipment Fuel Cost (incl. diesel H2O truck)</i>	\$2,701.64
<i>Total Materials and Supplies</i>	\$8,176.30
TOTAL EXPENSES (labor, materials + supplies)	\$88,368.25

The total cost of the Lake Cachuma Oak Tree Restoration Program in FY22/23 was \$88,368 which includes any replanting and mapping costs of the Year 13 trees. Again, the total reflects personnel cost (labor plus burden), materials, supplies, expenses (vehicle and equipment fuel), and consultant fees. For comparison, during the first six years of the project annual consultant costs were approximately \$136,000 to plant approximately 375 and maintain the previously planted trees. In FY16/17, COMB staff planted 301 trees and maintained all previously planted trees (4,290 trees) at a cost of \$101,227. The ability to keep costs down is attributed to multiple factors, which include but are not limited to:

- Relying on the COMB Fisheries Division seasonal staff to conduct the bulk of field activities.
- Minimizing the number of full-time staff being used.
- Reduced equipment needs as the bulk of purchases occurred during the fiscal year when COMB took over the project.
- Reduced consultant hours due to staff gaining more tree care experience.
- Reduced equipment (generator/pumps) gas consumption from more efficient irrigation hosing and better delivery technique for extracting water from Lake Cachuma.
- Repurposed salvaged deer cages and stakes from Program trees over 6 feet in height.

Summary and Recommendations for Program Improvements

There are 4,637 (including Year 13 trees) alive oak trees attributed to the mitigation effort of the Program. The survival rate to date is 79.99% (Years 1-13 and DT trees) which would be considered very respectful in any open range oak tree planting effort in a similar climate. It is recommended to continue providing irrigation support to the newest planted trees (Year 11, Year 12, and Year 13) and for all other trees weed, mulch, and remove deer cages when trees are larger than 6 feet. Replanting dead oak trees in the last two year classes would assist in maintaining the margin needed to meet target

objectives in 2025. The exact number of replacement trees would depend on survival success over the dry season but is not expected to be high given the routine maintenance and summer conditions so far.

Challenges for the Program, specifically tree survival, are seven of the last eleven years of the Program experienced extraordinary drought conditions (WY2012-WY2022, except WY2017, WY2019, WY2020, and WY2022), inadequate initial planting methodologies during the first six years (compromised gopher wire baskets, trees planted too low, deer cages removed too soon, auger hole planting, etc.), and a limited staff to take care of an extensive number of trees. Some planting areas have better soils and topography than others, for example the Year 3 planting area has shallow soils with southern exposure whereas the Year 7 planting area for the most part is just the opposite. We will need to continue to work with the County to maintain certain areas prone to stream/river and lake flooding.

Lessons learned by the COMB staff from many years of conducting this Program have been put into practice and are recommended for future work, specifically:

- Start the annual tree inventory as soon as possible in the fall and swap out unreadable tags with new ones.
- Consider using inventory software that can link to GPS coordinates and manage recording field data and exporting it to the annual report.
- Continue to carefully conduct the tree inventory to maximize accuracy, efficiency, and results. Provide sufficient time to properly train new staff on all elements of the Program.
- Systematically mulch as many trees as possible once a year, particularly newly planted trees, and obtain as clean a mulch as possible. It is important to keep the mulch away from the tree trunk and not cover the gopher basket. Obtain local mulch whenever possible from the County Park or Lucidity as it is often free and free of trash (Figure 20).
- Maintain deer cages for all trees below deer browsing level (approximately 6 feet).
- Clear the sluffed in dirt away from the tree trunk base to reduce prolonged moisture against the trunk.
- Expose the top of the gopher wire baskets (usually painted green) at the surface wherever possible to prohibit gopher travel over the top of the wire basket. This includes dirt and mulch. Also, fill gopher and ground squirrel holes while watering to discourage habitation and reduce irrigation water loss.
- Plant new trees in professional gopher wire baskets using backhoe dug holes (no auger holes that limit the spread of tree roots); plant the trees slightly above grade to accommodate subsidence; and use sturdy wire deer cages instead of netting or chicken wire.
- Plant well established trees from the nursery (at least a foot tall) instead of acorns as they have a better success rate.
- Conduct structural pruning of planted trees so that they can grow larger, taller, faster, and stronger than unpruned trees, thus becoming more likely to survive and be self-sustaining (Figure 21). The pruning should take place in the late fall or early winter when the trees are growing very little.
- Map all replacement trees by adding a column into the inventory field sheets to facilitate the workflow.
- Work with USBR and the County Park on what to do about dead planted oak trees at Mohawk camping area in the park from an extended period of lake surcharge over 753 feet of lake elevation (Figure 22).

- Reserve time for deer cage and tree stake removal once the oak trees are over 6 feet tall as this will need to be done as the Program sunsets.
- Carefully mow and/or weed-whack around trees for weed control and grade access roads to facilitate egress for all maintenance tasks.
- Continue to use Grow-Tubes as they appear to be quite successful particularly in areas with poor soils and where surface rodent impacts are noticed, such as near brushy natural vegetation found along the margins of planting areas. Remove the Grow-Tubes once the trees are taller than the tube.
- Clear brush near any planted trees to discourage herbivory of Program trees.
- Wrap the bottom of deer cages with fine mesh shade cloth to prohibit surface rodents from accessing planted trees in areas near the margins of planting areas.
- Gather acorns from the local area in August for Valley Oaks and September for Coast Live Oaks to be germinated and grown at a nursery for future plantings. Look for acorns being set on our planted trees that suggest tree maturity and planting success.
- Survey all planted oak trees for mistletoe and remediate as quickly as possible being careful to not leave any cuttings behind.
- Educate the public about the Oak Tree Program to create appreciation and stewardship, and work with the County Park managers to best protect newly planted trees.
- Have the water truck and water trailer taken in for annual maintenance during the winter when they are not in use.



Figure 21: Formative pruning workshop conducted by Program Arborist Ken Knight.



Figure 22: Mohawk camping area in the Park showing dead planted oak trees after an extended period of high surcharged lake water above maximum elevation.

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