California Department of Fish and Wildlife

Upland Game Bird Harvest Survey 2022-2023

2022-2023 California Upland Game Bird Stamp Art Contest, chukar

First Place, Jeffrey Klinefelter, Etna Green, Indiana

Prepared by:

Ian Dwight, Environmental Scientist

Katherine Miller, Environmental Scientist

Matt Meshriy, Environmental Scientist

Dan Skalos, Senior Environmental Scientist Supervisor

California Department of Fish and Wildlife

Wildlife and Fisheries Division

Wildlife Branch

1010 Riverside Parkway

West Sacramento, CA 95605

Table of Contents

Introduction 5
Survey Overview 6
Figure 1. Kernel density estimate of hunter age at point of license purchase during 2022-2023 hunting season. The shaded portions under the curve represent the distributions of hunters who provided an email address (light shading) overlapping those who did not (dark shading). The mean age of each distribution is represented by the dashed vertical lines. 8
Demographic and Non-response Bias 8
Figure 2. (a) The proportion of male and female hunters who responded to the survey; and (b) Mean age and standard deviation of hunters who responded to the survey, responded and hunted, responded but did not hunt, or did not answer the survey. 9
Figure 3. Boxplot comparison of nonrespondent and respondent groups for those who hunted six upland game bird species, respondent group is from original survey, non-respondent group is from supplementary survey sent after the original survey closed. 10
Sample Error 10
Results 11
Discussion 12
Acknowledgements 14
Literature Cited 14
Species Figures 15
Mountain quail 15
California Quail 16
Gambel's quail 17
Wild turkey Fall 2022 18
Wild turkey Spring 2023 19
Ruffed grouse 20
Sooty grouse 21
Ring-necked pheasant 22
Chukar 23
Band-tailed pigeon 24
Eurasian collared dove 25
White-winged dove 26

Mourning dove 27
Wilson's snipe 28
Fox squirrel 29
Gray squirrel 30
Jackrabbit 31
Cottontail rabbit 32
Tables 33
Table 1. Statewide estimated harvest and hunter effort for 18 species reported from the 2022–2023 Upland Game Bird and Small Game Mammal Harvest Survey. 33
Table 2. Estimated harvest, hunters, and hunter effort for mountain quail and California quail across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available. 34
Table 3. Estimated harvest, hunters, and hunter-effort for Gambel's quail across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available 36
Table 4. Estimated harvest, hunters, and hunter-effort for wild turkey across all California counties during the 2022-2023 hunting season. F and S refer to Fall 2022 and Spring 2023, respectively. Blank cells indicate no data available. 38
Table 5. Estimated harvest, hunters, and hunter-effort for ruffed grouse and sooty grouse across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available. 40
Table 6. Estimated harvest, hunters, and hunter-effort for ring-necked pheasant and chukar across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available. 42
Table 7. Estimated harvest, number of hunters, and number of days hunted for band-tailed pigeon and Eurasian collared-dove across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available. 44
Table 8. Estimated harvest, hunters, and hunter-effort for white-winged dove and mourning dove across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available. 46
Table 9. Estimated harvest, hunters, and hunter-effort for Wilson's snipe across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available 48
Table 10. Estimated harvest, hunters, and hunter-effort for fox squirrels and gray squirrels across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available. 50

Table 11. Estimated harvest, hunters, and hunter effort for jackrabbit and cottontail rabbit across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available. 52

Introduction

From 1948-2010, the California Department of Fish and Wildlife (hereafter, the Department) administered a “Game Take Hunter Survey” (GTHS) to estimate harvest and hunter effort in California. The GTHS was a mail-based survey sent to a random sample of people who purchased a hunting license. These surveys provided information on the number of each species harvested and the time spent by each hunter in the field by county. The GTHS included all game, non-game, and furbearing species that could be hunted and was the only survey for estimating state-wide and county-level harvest of upland game birds. Increased postal costs coupled with the statewide budget crisis in 2008 made the mail-based survey infeasible and the GTHS was discontinued after 2010. Harvest estimates for big game species transitioned to online tag reporting and the U.S. Fish and Wildlife Service assesses harvest of migratory birds eliminating the need for the Department to collect this information. However, a need to estimate harvest for resident upland game birds and small game mammals in California remained.

In more recent years, technological advances in automated license systems and changes to survey methodology provided new ways for biologists to conduct harvest surveys. For example, the advent of the Automated License Data System (ALDS) in the early 2000’s allowed the Department to report species-specific harvest based on tag returns (big game species) and permit reports (greater sage-grouse). Hunters can now submit tags and permit reports online through ALDS and biologists can facilitate surveys to license holder through this system. As the hunters have become more accustomed to consuming media and accessing many of their hunting needs online, it was clear that the use of ALDS to reach the customer base was the most cost-effective approach to conducting future surveys.

The Department investigated several different approaches for conducting upland game bird and small game mammal surveys. In 2014, the Department contracted with Responsive Management, a survey research firm, to complete a multi-modal survey meant to increase the response rate and test the feasibility of using email to reach potential respondents. The Department adopted methodologies developed by Responsive Management and began conducting the small game harvest survey on a biennial basis. In 2017, an internet-based survey that used only email to reach potential

respondents was implemented. This survey was specific to resident upland game birds and surveyed hunters during the 2016 hunting season (i.e., July 1, 2016 – June 30, 2017). In 2019, a similar survey was completed for the 2018 hunting season, broadening the scope to include resident small game mammals. In 2021, Department staff conducted a survey for both resident and migratory upland game birds to assess harvest during the 2020 hunting season. All previous survey reports dating back to 1950 are available on the Department's Upland Game Bird Hunting website, https://wildlife.ca.gov/Hunting/Upland-Game-Birds.

In 2023, Department staff completed a survey for upland game birds, including migratory species, and small game mammals harvested in the 2022 hunting season. These species included ten resident and four migratory upland game bird species, as well as four species of small game mammals. The U.S. Fish and Wildlife Service also estimates harvest for migratory upland game birds, but the Department included these species in the survey for comparison and in response to hunter-demand.

Survey Overview

Our goal was to estimate the total number of small game species (see title 14 section 257) harvested by county and assess hunter effort. Hunters who wish to hunt any small game species (i.e., upland game birds and small game mammals) must purchase an upland game bird validation. However, hunters who want to hunt small game mammals, and not upland game birds, need only a valid California hunting license. Therefore, our approach had to consider these pieces of information.

The Department evaluated different survey techniques, along with their implementation costs, potential sources of bias, and previous experiences with each method. Ultimately, the Department chose to develop an online survey of all hunters who purchased a license during the 2022 hunting season and who had an email address of record. The use of email is relatively new in comparison to recreational hunting, and this online survey relied on the hunter's email address to direct each hunter to the website. Each hunter was required to provide their GO-ID number to ensure that respondent and non-respondent groups could be compared, and so that duplicate survey responses could be removed.

While all hunting license holders in California are automatically assigned an individual GO-ID number in ALDS, the submission of an email address to the Department is optional, thus not all hunters in California could be surveyed by email. However, 77% of those who purchased a hunting license and 75% of those who purchased an upland game bird validation through ALDS during the 2022 hunting season voluntarily provided an email address. In comparison, 44% and 71% of those who purchased an upland validation during the 2016 and 2020 hunting seasons, respectively, had an email address of record. Based on this trend, the number of hunters who provide an email address will likely continue to increase. Therefore, an email-internet approach to conduct this survey is appropriate going forward, while mindful of potential bias. For example, bias among respondents with respect to age, and bias resulting from inherent differences in respondent and non-respondent groups are important to consider. The age of all hunters at the time of license purchase across the 2022 hunting season was determined and compared to mean age between two groups—those that provided an email address and those that did not (Fig.1).

For hunters to access the survey, we created a webpage with the survey questionnaire, created in Microsoft Forms, and directions for completing the survey embedded within the page. We used ALDS to generate the list of hunters with an email address and created a link to the survey page on the Department website. On the webpage, survey respondents were directed to report harvest location by county, number of individuals harvested by species, and the number of days spent hunting each species within a reported county.

Separate surveys and correspondence directing hunters to the webpage were created for small game hunters (i.e., hunters who purchased an Upland Game Bird Validation) and small game mammal hunters who purchased a license but not an Upland Game Bird Validation. Small game hunters were directed to a webpage with the full survey of all bird and mammal species being reported (Table 1), while small game mammal hunters without the validation were directed to a partial survey of the four mammal species only. The survey was open for 30 consecutive days, with two reminders sent out during the interval window following the initial survey email. Once

the survey was closed, the webpage no longer accepted new entries to the survey and responses were subsequently extracted and collated.

To account for potential non-response bias, a subset of license holders who did not respond to the original survey were randomly sampled by GO-ID and compared to the original survey results. A random sample of 1,000 hunters was drawn from a list of GO-IDs that were sent an original email for the survey but did not respond while the survey was open. This non-response survey was sent using a different survey platform (SurveyMonkey) and was simplified such that it only asked which species the hunter harvested the most during the 2022 hunting season.

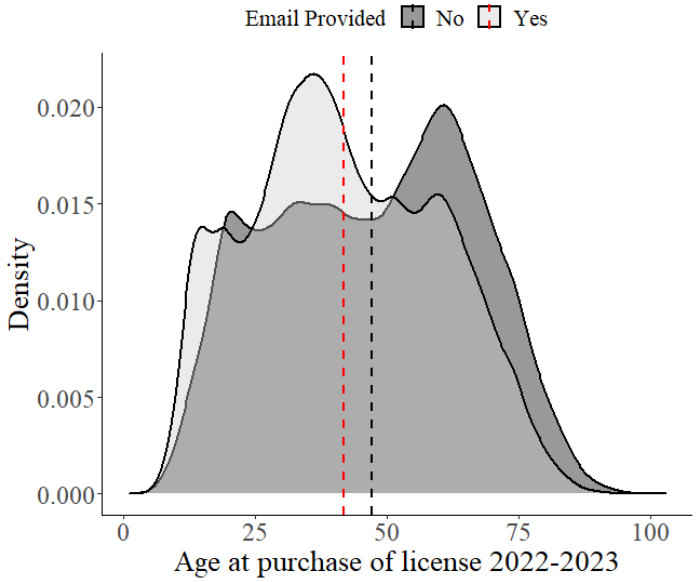


Figure 1. Kernel density estimate of hunter age at point of license purchase during 2022-2023 hunting season. The shaded portions under the curve represent the distributions of hunters who provided an email address (light shading) overlapping those who did not (dark shading). The mean age of each distribution is represented by the dashed vertical lines.

Demographic and Non-response Bias

To investigate potential bias related to demographic differences in the surveyed population, we approximated the age distribution of potential respondents using a kernel density estimate (Fig. 1). We estimated that 86% (standard error 0.21%) of the two age distributions overlapped, indicating a high degree of similarity in mean age for hunters between these groups. Hence, we were satisfied that our choice to sample those hunters that provided emails would not introduce substantial age bias among our survey

respondents. However, the difference in mean age between those who provided emails (42 years) and those who did not (47 years) has increased since the previous survey was completed in 2021. Additionally, most hunters who hunted upland game birds during the 2022 hunting season were male (Fig. 2a). The mean age of respondents who hunted was 51 years old, which was younger than respondents who did not hunt (~56 years) and younger than the mean age (~53 years) of all respondents. Hunters that did not respond to the survey were younger, on average, than those who responded (Fig. 2b).

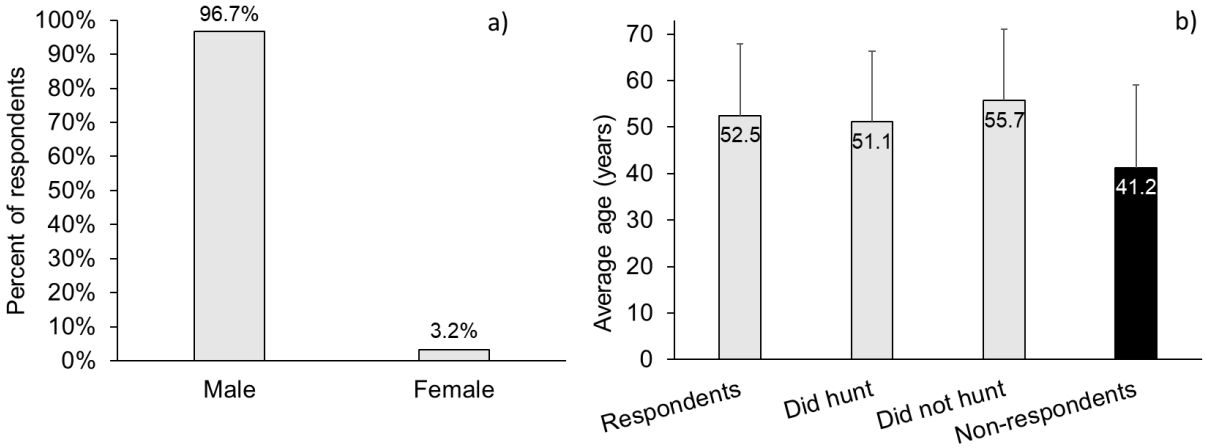


Figure 2. (a) The proportion of male and female hunters who responded to the survey; and (b) Mean age and standard deviation of hunters who responded to the survey, responded and hunted, responded but did not hunt, or did not answer the survey.

To investigate non-response bias, we compared the reported harvest and days hunted of those who completed the original survey to those who completed a supplemental “non-response” survey. Of the 1,000 randomly sampled hunters who did not respond to the original survey, 105 responded to this supplemental survey sent out after the original survey period ended. Mean and interquartile range (25 percentile to 75 percentile) of reported harvest overlapped for most species that could be compared (Fig. 3). Sample sizes were substantially different between groups, but mean values were similar. The similarity in reported harvest and hunter-days between the original and non-response surveys supported the use of the original survey results in final estimates of total hunters, harvest, and days hunted, by species and county.

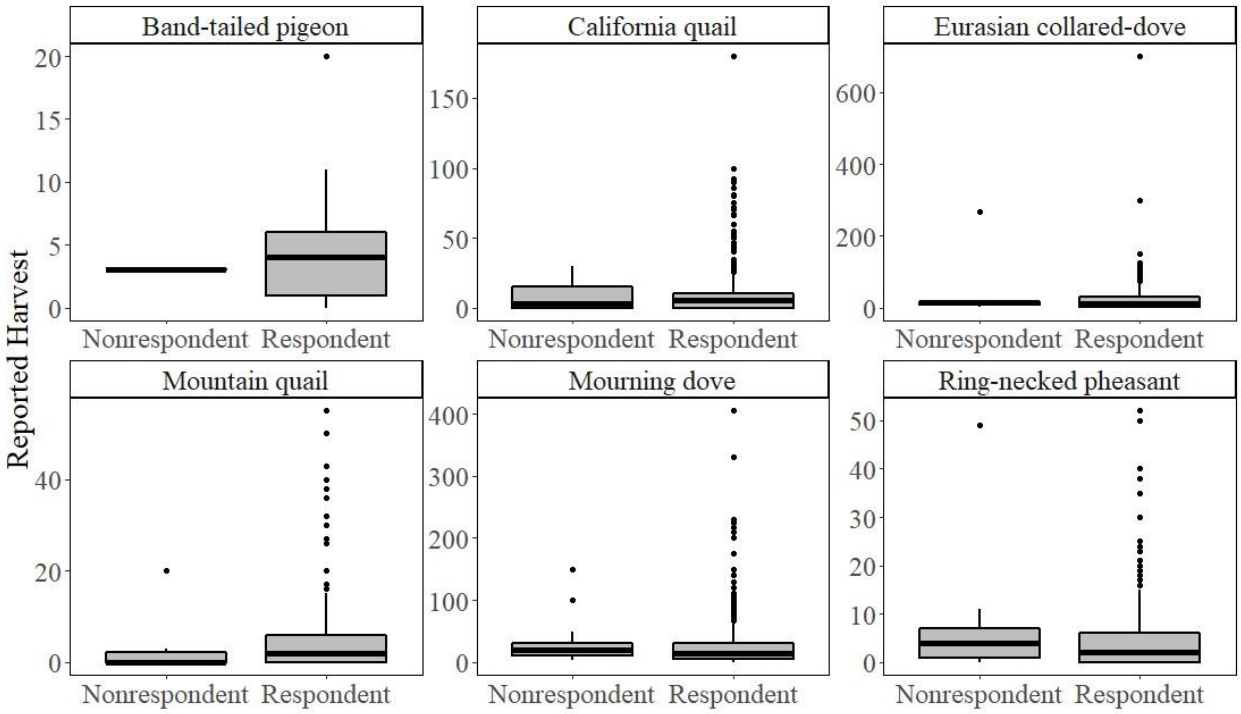


Figure 3. Boxplot comparison of nonrespondent and respondent groups for those who hunted six upland game bird species, respondent group is from original survey, non-respondent group is from supplementary survey sent after the original survey closed.

Sample Error

We estimated sampling error from a rearrangement of an equation from Dillman (2000):

$$B = \left(\sqrt{\frac{\frac{(Np)(p)(1-p)}{Ns} - (p)(1-p)}{(Np-1)}} \right) (1.96)$$

The total population of interest (*Np*) was 106,678, which represents all upland game hunters with an email on file in the 2022 hunting season. The sample size of respondents who completed the survey (*Ns*) was 11,569. Probability (*p*) was set to a value of 0.5, indicating an equal probability of a given respondent answering the survey. The *Z* statistic for a 95% confidence interval (1.96) was applied to the upper and lower bounds of error. The value of estimated error (*B*) was 0.0086 or 0.86 percentage points. Thus, the sampling error rate for our survey was ± 0.86%.

Results

In total, we received 15,005 responses (7.6% mean response rate) from hunters across both the small game hunter and small game mammal hunter harvest surveys. Of the 106,678 hunters with an upland game bird validation and email of record, 11,569 responses (10.8% response rate) were used to inform the harvest estimates of upland birds. We received 3,436 responses from the 90,828 hunters with an email of record who purchased a license but not an upland game bird validation (3.8% response rate). Of the respondents with an upland game bird validation, 70.2% (*n* = 8,123) stated that they hunted during the 2022 hunting season, 62.2% (*n* = 7,192) indicated that they hunted upland game birds, and 8.6% (*n* = 994) indicated that they hunted small game mammals. Of the total survey responses 64.7% (*n* = 9,710) stated that they hunted during the 2022 hunting season, and 8.5% (*n* = 1,280) said they hunted small game mammals. Approximately 35% (*n* = 5,295) did not hunt or only hunted on licensed game bird clubs and were excluded from further analysis. We estimated harvest and hunter effort for upland game birds by extrapolating the numbers reported by hunters who responded to the survey and had an upland game bird validation (*n* = 11,569) divided by the total number of upland game bird validated hunters (*n* = 141,816, 8.2%). For small game mammals, results were extrapolated by dividing reported harvest and hunter effort by the mean response rate of both surveys (7.6%).

We asked hunters to report on both resident and migratory upland game birds, as well as small game mammals. We asked hunters about their success and hunt effort on ten resident upland game bird species: mountain, California, and Gambel's quail, wild turkey, ruffed grouse, white-tailed ptarmigan, sooty grouse, ring-necked pheasant, chukar, and Eurasian collared-dove (Table 1). For wild turkey, we asked hunters to specify the hunting season in which turkey was hunted, that is, Fall 2022 or Spring 2023. We asked hunters with an upland game bird validation if they hunted white-tailed ptarmigan but did not ask how many birds were harvested. In total, 16 hunters indicated that they had hunted white-tailed ptarmigan. The Department issues permits for greater sage-grouse, however, no permits were issued in the 2022 hunting season, thus the species is not represented in this report. In addition to resident upland game birds, we asked hunters to report on four migratory upland game bird species: band-tailed pigeon,

white-winged dove, mourning dove, and Wilson's snipe. Lastly, we asked hunters to report on fox squirrels, gray squirrels, jackrabbits, and cottontail rabbits (Table 1).

The hunter harvest survey for upland game birds has been conducted biennially since 2014 therefore we will compare 2022 estimates to previous 3-survey averages (i.e., 2016, 2018, 2020). Total mountain quail harvest was up 11%, with total hunters up 7% and total days afield up 10% (Table 12). California quail harvest was down 25% with hunters down 18% and days afield down 15%. Gambel's quail harvest was down 29%, while hunters and days afield were down 16% and 11%, respectively. Total ruffed grouse harvest was down 44%, while hunters were down 20% and days afield was down 26%. Total sooty grouse harvest was down 11%, while total hunters and days afield were down 26% and 21%. Chukar harvest was up 18% while total hunters were down 14% and days afield were up 2%. Wild ring-neck pheasant harvest decreased by 13%, while total hunters and days afield decreased by 32% and 32%, respectively. Fall turkey harvest was down 12%, while total hunters and days afield were both down 9% and 11%, respectively. Spring turkey harvest was down 15% with hunters down 12% and days afield down 6%. While most of these numbers indicate decreases in total harvest, hunters and days afield most species, standardized estimates, specifically harvest per hunter and days afield per hunter show predominant increases, see Table 12.

The last survey that included small mammals was conducted in 2018 and the one prior to that was in 2010. Since averaging across a 10-year timeline doesn't make sense, we will compare the 2022 results directly to 2018. Compared to that survey, tree squirrel harvest was up 49% while squirrel hunters were up by 23% and days afield were up by 35% (Table 13). Cottontail rabbit harvest was down 33%, while cottontail hunters were down 6% but days afield were up 3%. Jackrabbit harvest was down 41%, while hunters were down 37% and days afield were down 20%.

Discussion

The summer and fall of 2022 were extremely dry and capped off the final year of a multiple-year drought. More than 250,000 acres of rice were fallowed in 2022, almost half of the regularly farmed acreage. Conversely, during water year 2023 (October 2022 to September 2023), California received 141% of average historical annual precipitation

and accumulated 237% of historical average snowpack by April 1. Hence, the fall of 2022 was much dryer than average, and the spring of 2023 was much wetter. These patterns of precipitation may have influenced harvest indirectly by impacting the distribution of available cover and resources on the landscape. Additionally, heavy rains and snow during the late fall and winter of 2022-2023 may have impacted hunter effort and harvest as access may have been limited.

Results of the survey indicated downward trends in total harvest, hunters and hunter effort however standardized data such as harvest per hunter and days afield per hunter showed the opposite result. This is not surprising as license sales and validations continue to decline but those who remain in sport-hunting tend to be avid and successful participants.

Statewide harvest of small game mammal species has declined substantially in the last 50 years. Cottontail and jackrabbit harvest have declined by 97.5% and 99.5%, respectively, since the peak of reported harvest in 1964. Similarly, tree squirrel harvest has decreased by 93% since 1977 and by 57% in the last 20 years (1998-2018). The number of hunters and hunter days have also declined in concert with harvest. Declines between the current and previous survey were observed and potentially consistent with the impact of rabbit hemorrhagic disease, which spread through the state in 2020. Except for the Responsive Management survey in 2014, previous reports did not differentiate species of tree squirrel. In the absence of previously collected data, long-term trends for fox squirrels and gray squirrels will be assessed after multiple years of collection. This may help the Department to characterize how common non-native squirrel species are, as they are known to put downward pressure on native tree squirrel populations through direct competition.

Based on comments from previous surveys, we found that hunters wanted to report on harvest and effort for migratory upland game bird species, specifically band-tailed pigeon, mourning dove, and white-winged dove. We chose to focus our first and second online surveys on resident upland game birds (quail, chukar, ring-necked pheasant, grouse, and wild turkey) because the HIP survey assesses hunter effort and harvest for doves and other migratory upland game bird species. We decided to include migratory upland game bird species in the 2020-2021 and 2022-2023 surveys, due to

hunters' comments and our own interest in having state and county-level estimates for all upland game bird species. Our harvest estimates differed from the HIP survey, especially mourning dove harvest. The HIP survey estimated 660,400 doves were harvested statewide, which suggests that 16.5% fewer individuals were harvested than our survey estimated. Our survey may be overestimating harvest as a result of the type of hunters more likely to report. For example, avid hunters who are more successful on average may also be more likely to report, lending disproportionate influence during extrapolation. The federal survey stratifies potential survey participants by effort, using a required screening survey conducted upon procurement of a hunting license.

Past surveys used a random sampling design to increase the response rate and reach a target sample size of respondents based on a desired level of sampling error (<2%). Our response rate (7.6%) was relatively low compared to that of historical small game harvest surveys, including the 2020–2021 Upland Game Bird Harvest Survey (12%). However, the total sample of respondents was much larger, which achieved the desired sampling error and allowed for more complete county-level representation by species. In future years, opening a survey closer to the end of each season would likely benefit the ability of respondents to report harvest accurately. More than one survey sent out to a random sample of individuals in a given hunting season may be appropriate in the context of this strategy.

Acknowledgements

This survey would not have been possible without the help of the License and Revenue Branch (LRB), the Database and Technology Division (DTD), and the Office of Communications, Education, and Outreach (OCEO). Tony Straw and Damien Sivak (LRB) provided upland game bird validation lists necessary for our random sample and sent the email out to the hunters. Angie Barlow, Amita Patel, and Roger Harness (DTD) worked with Upland Game Program staff to design the survey on the California Fish and Wildlife website. Robert Karam and OCEO staff assisted with developing the email that was sent to the hunters.

Literature Cited

Dillman, D. A. 2000. Mail and Internet Surveys. John Wiley and Sons, New York, USA.

Species Figures

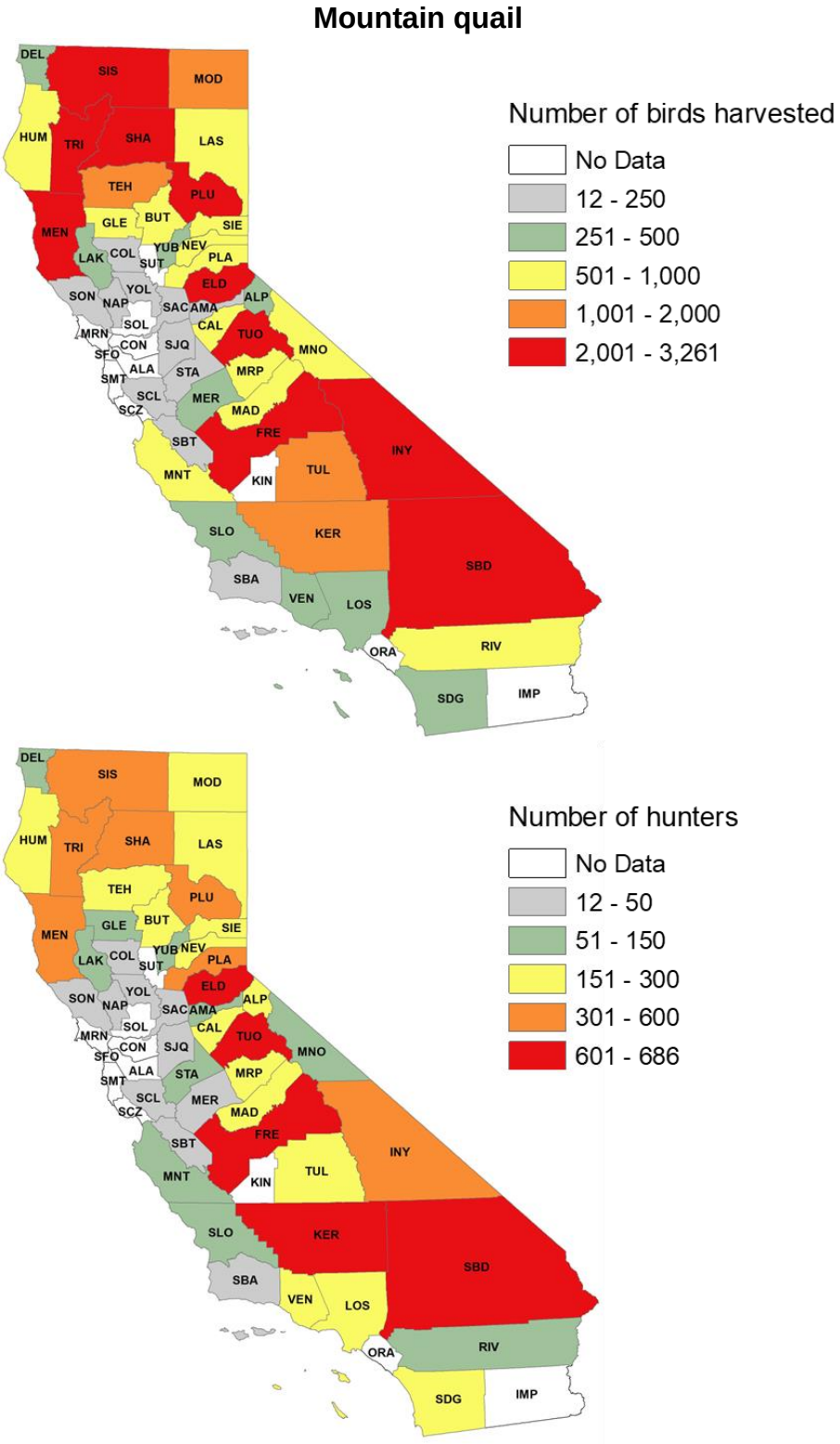


Figure 4. Estimated number of hunters and harvest by county for mountain quail during the 2022–2023 hunting season (*Oreortyx pictus*).

California Quail

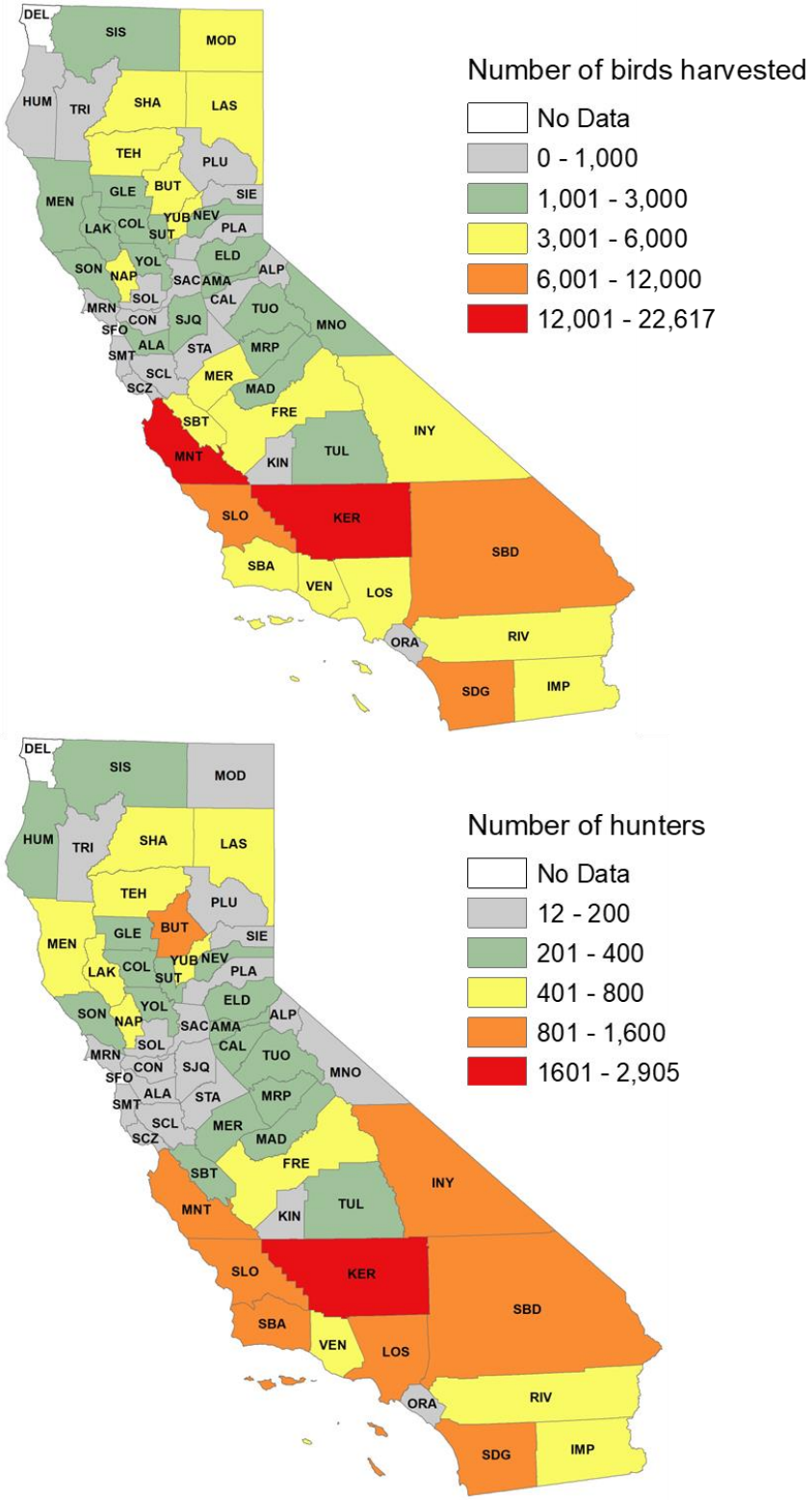


Figure 5. Estimated number of hunters and harvest by county for California quail during the 2022–2023 hunting season (*Callipepla californica).*

Gambel's quail

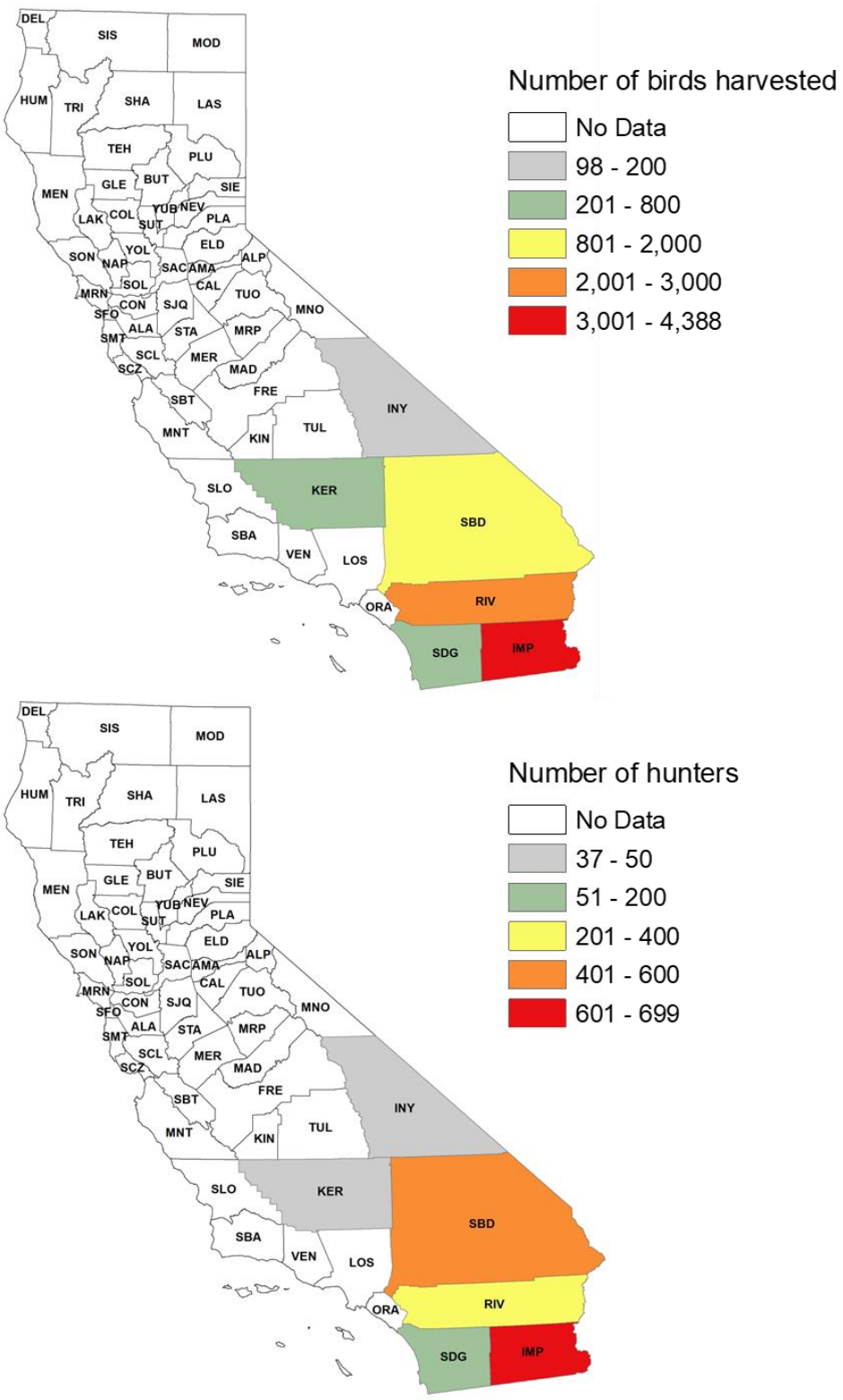


Figure 6. Estimated number of hunters and harvest by county for Gambel's quail during the 2022–2023 hunting season (*Callipepla gambelii).*

Wild turkey Fall 2022

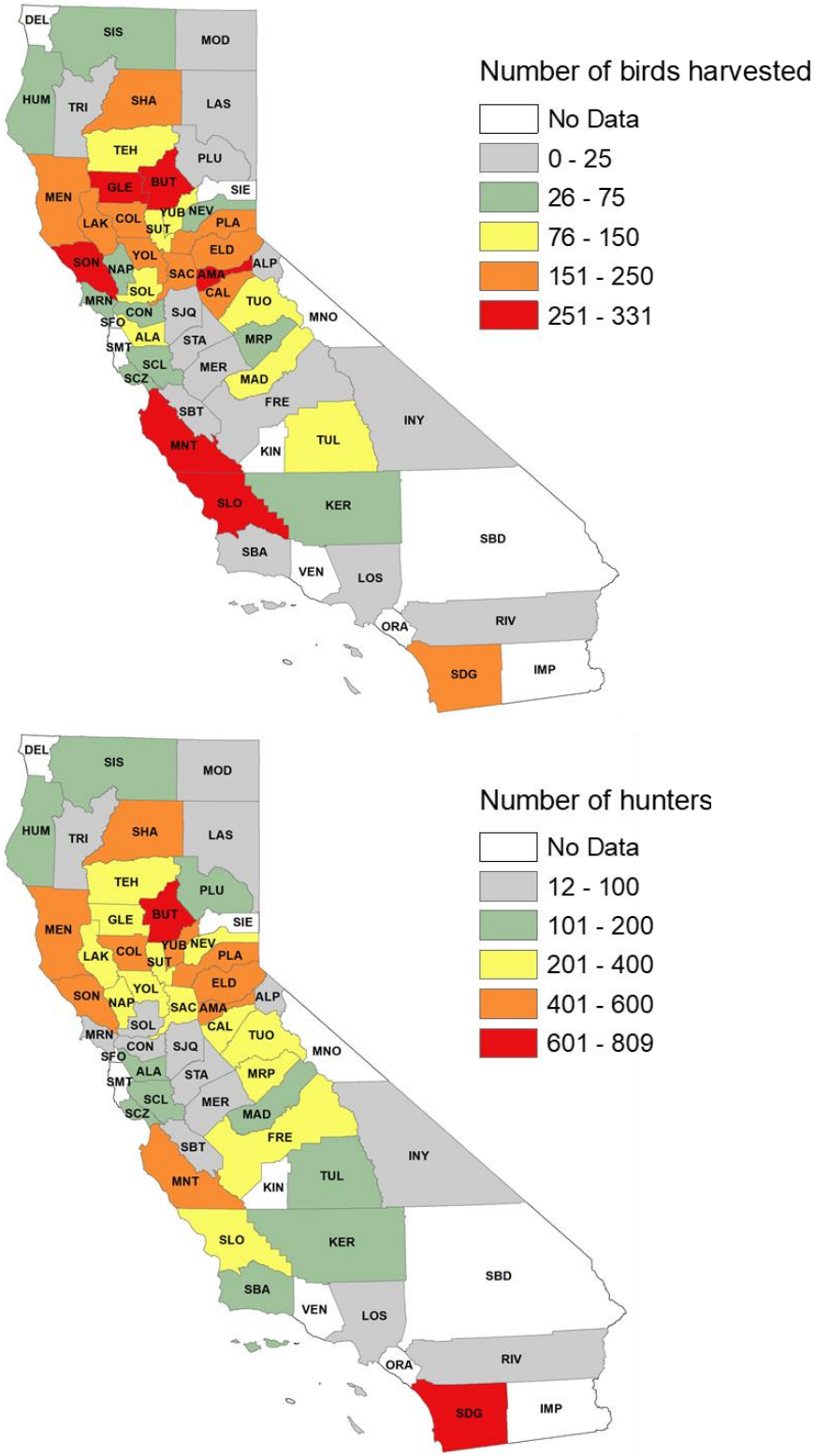


Figure 7: Estimated number of hunters and harvest by county for wild turkey (*Meleagris gallopavo*) during Fall 2022.

Wild turkey Spring 2023

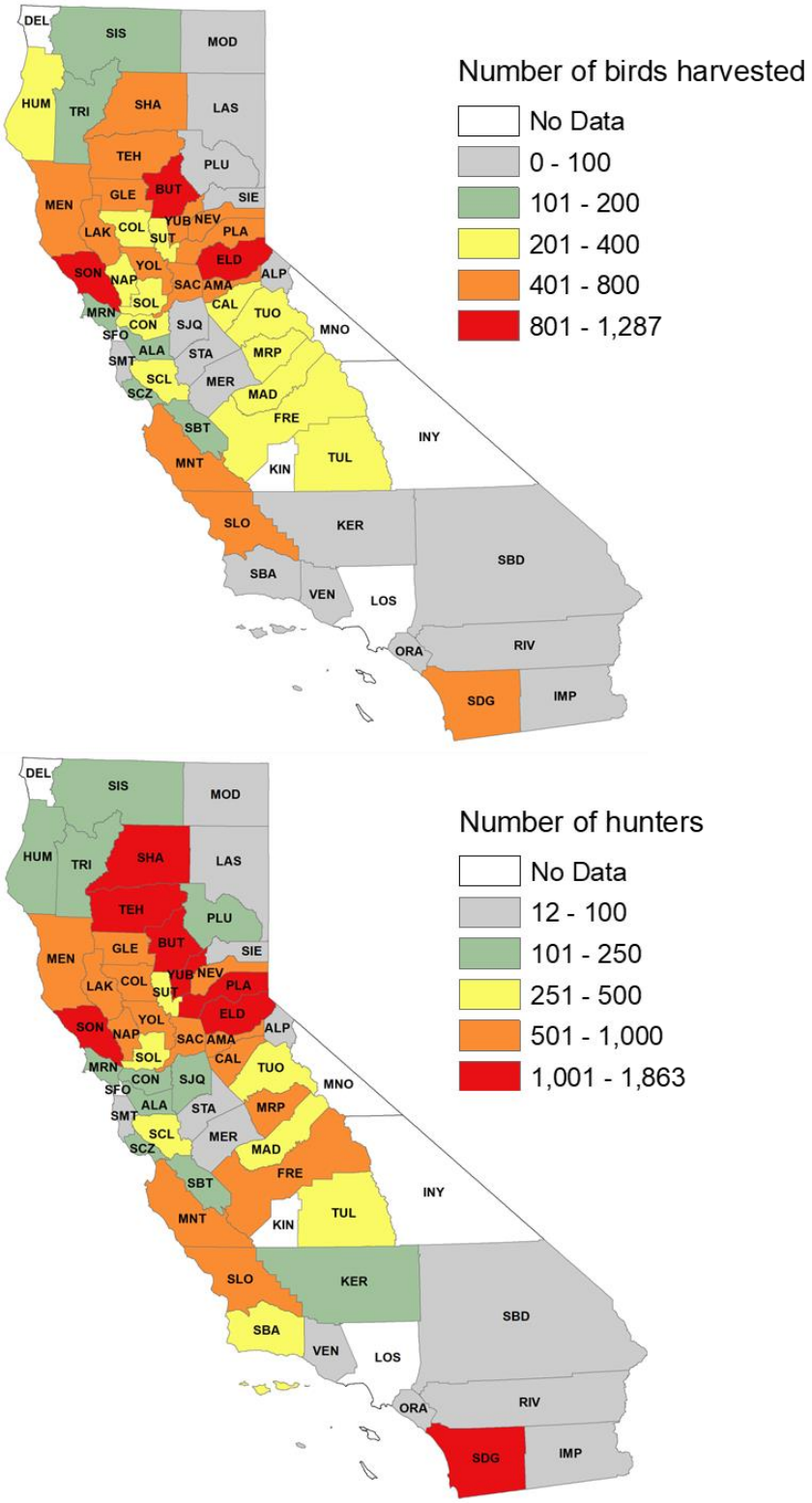


Figure 8. Estimated number of hunters and harvest by county for wild turkey (*Meleagris gallopavo*) during Spring 2023.

Ruffed grouse

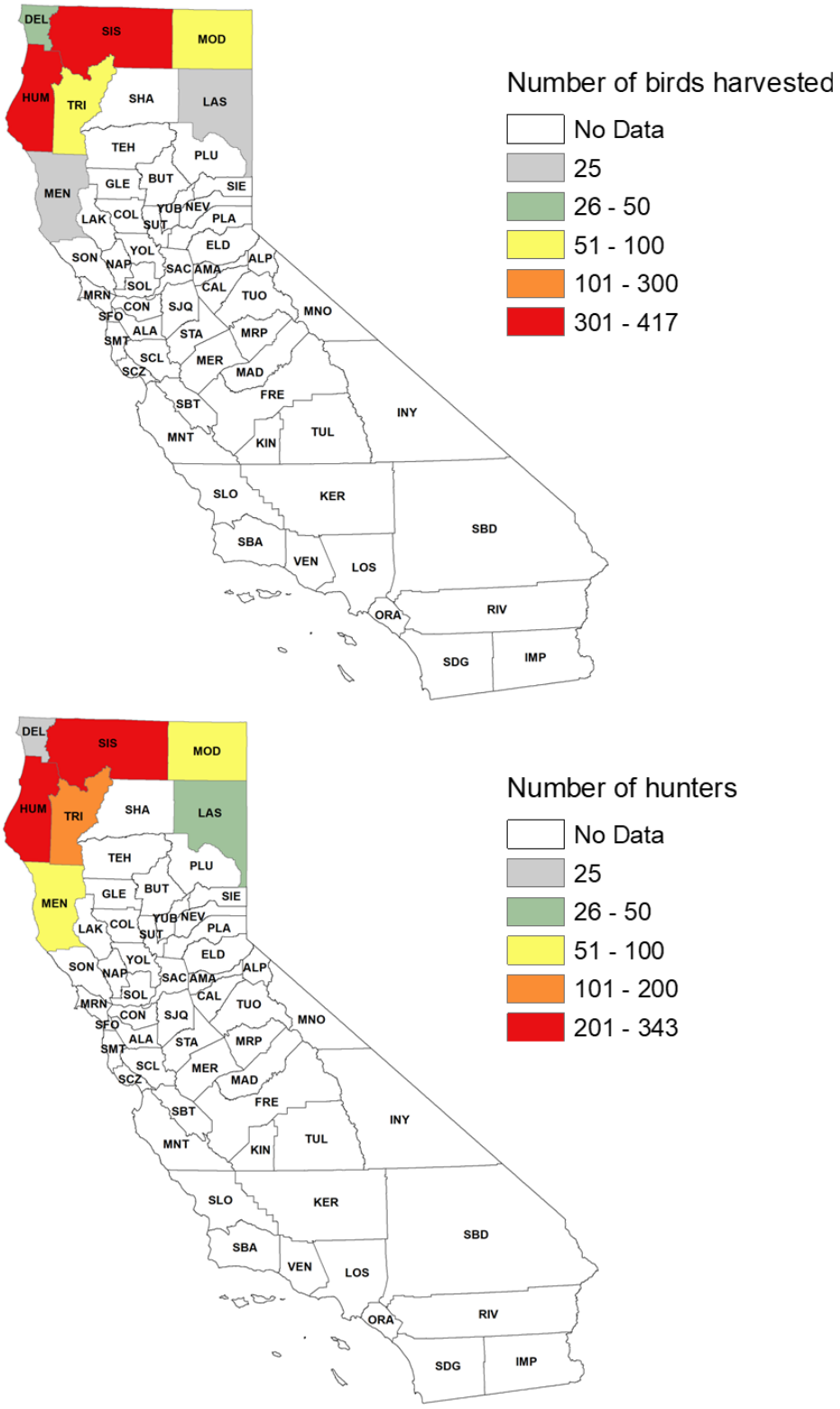


Figure 9. Estimated number of hunters and harvest by county for ruffed grouse during the 2022–2023 hunting season (*Bonasus umbellus*).

Sooty grouse

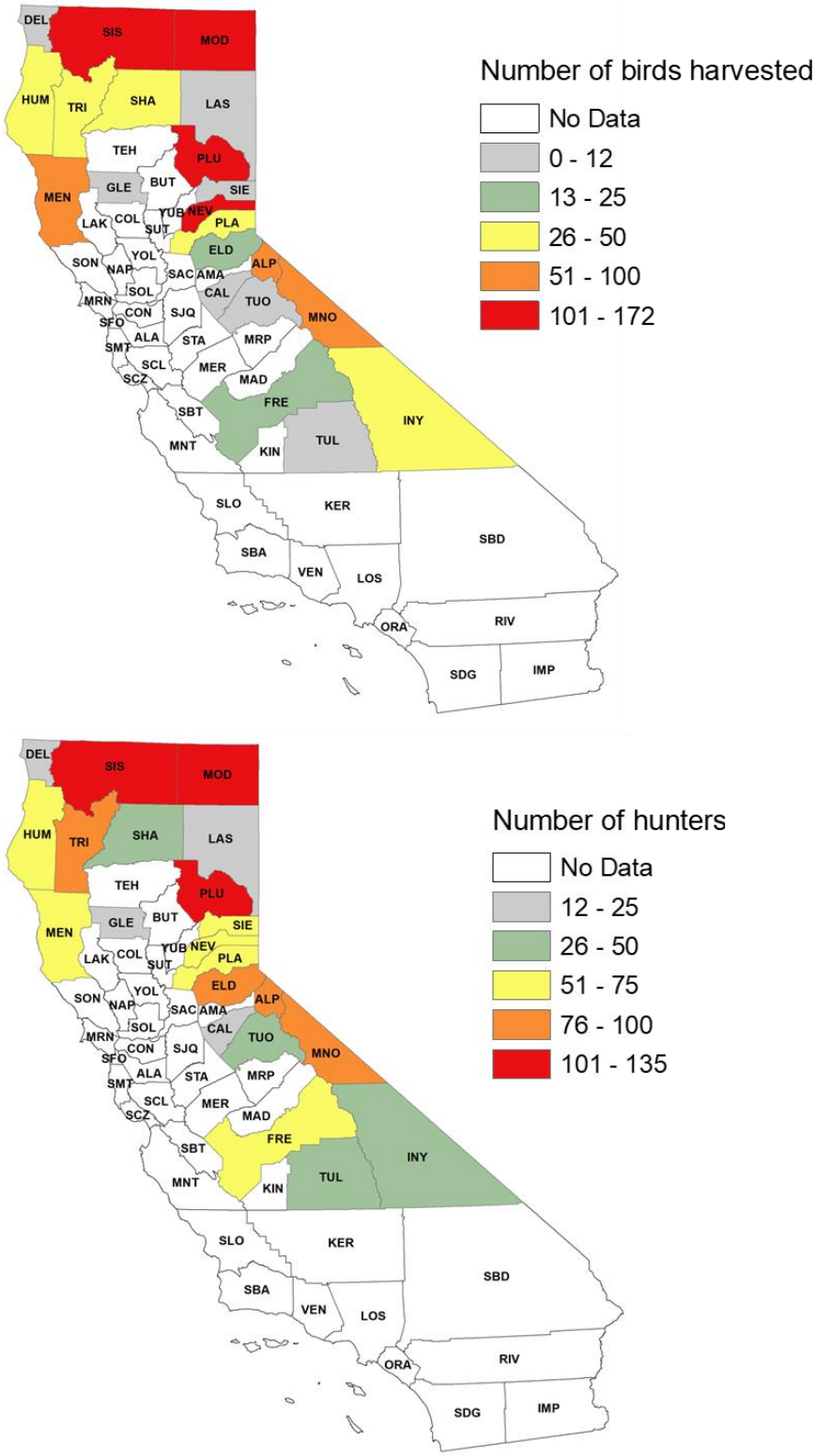


Figure 10. Estimated number of hunters and harvest by county for sooty grouse during the 2022–2023 hunting season (*Dendragapus fuliginosus*).

Ring-necked pheasant

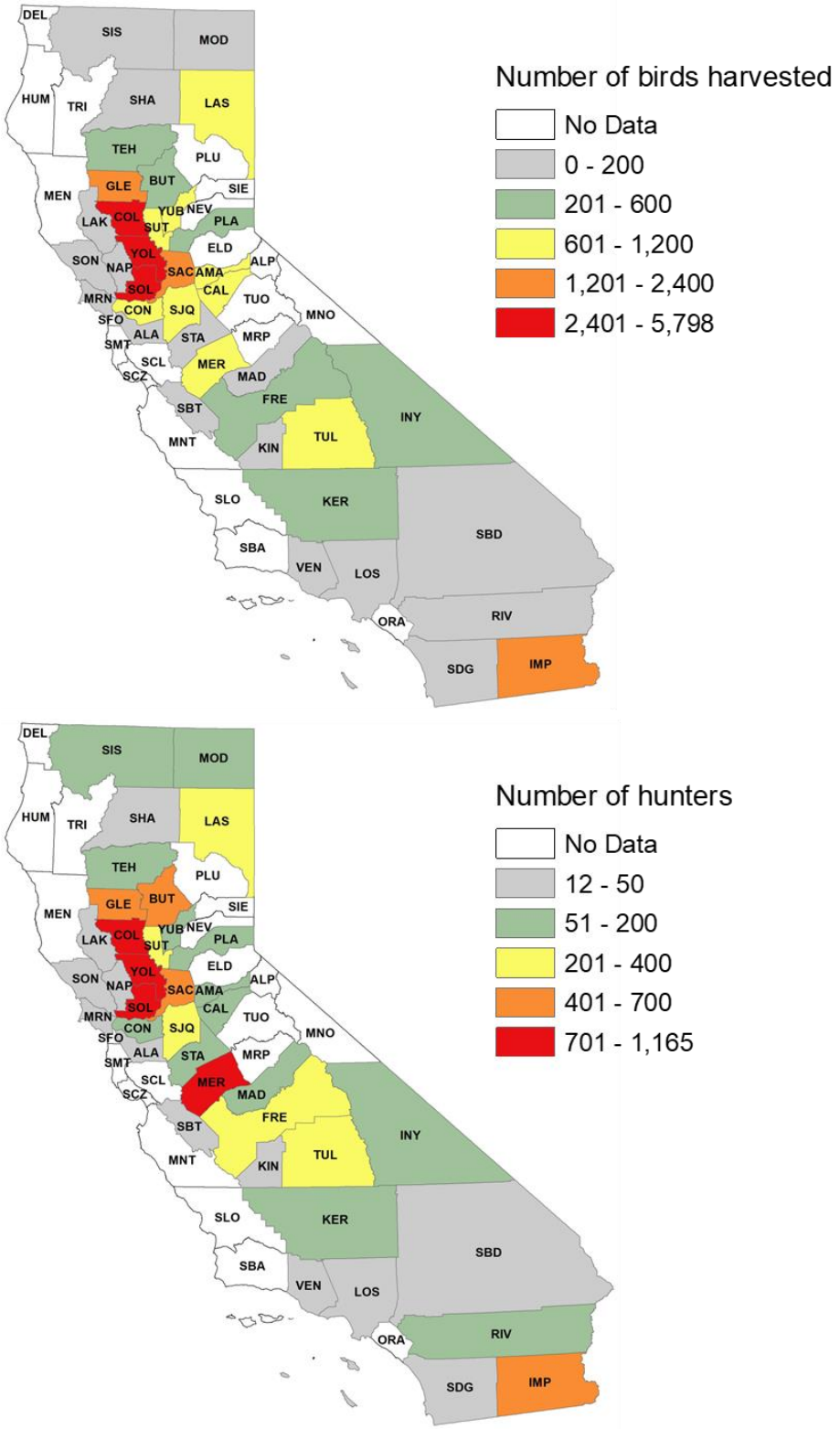


Figure 11. Estimated number of hunters and harvest by county for ring-necked pheasant during the 2022–2023 hunting season (*Phasianus colchicus*).

Chukar

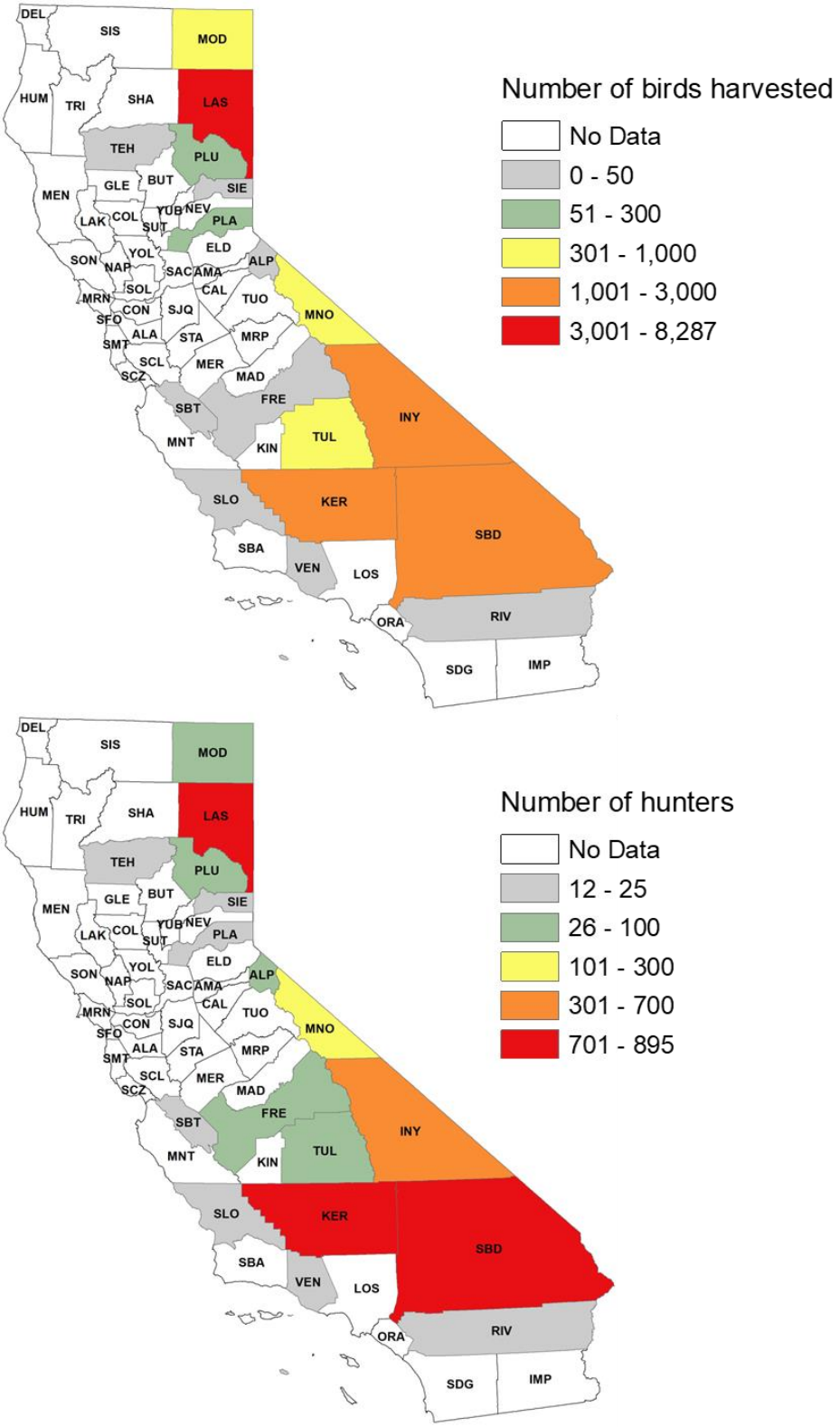


Figure 12. Estimated number of hunters and harvest by county for chukar during the 2022–2023 hunting season (*Alectoris chukar*).

Band-tailed pigeon

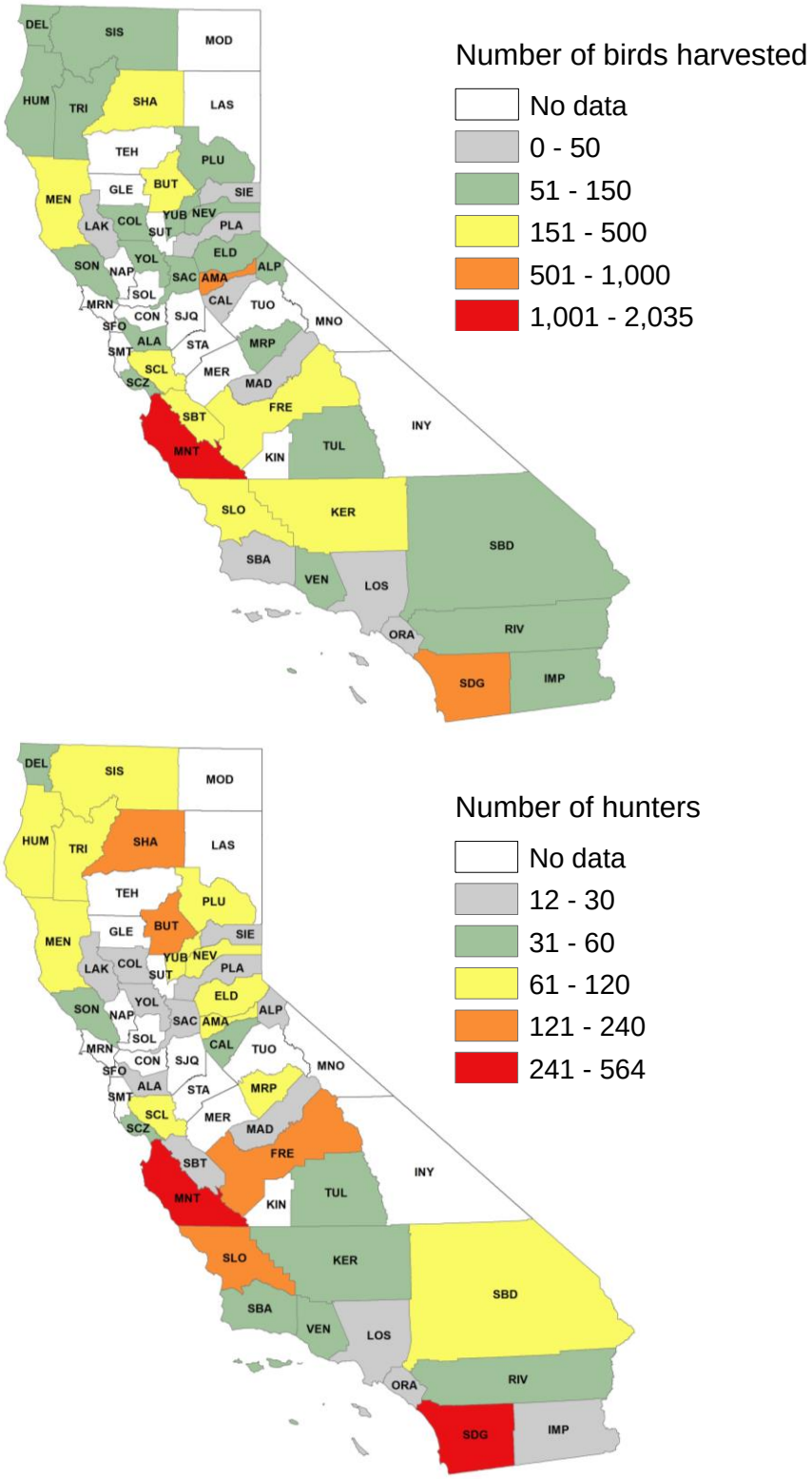


Figure 13. Estimated number of hunters and harvest by county for band-tailed pigeon during the 2022–2023 hunting season (*Patagioenas fasciata monilis*).

Eurasian collared dove

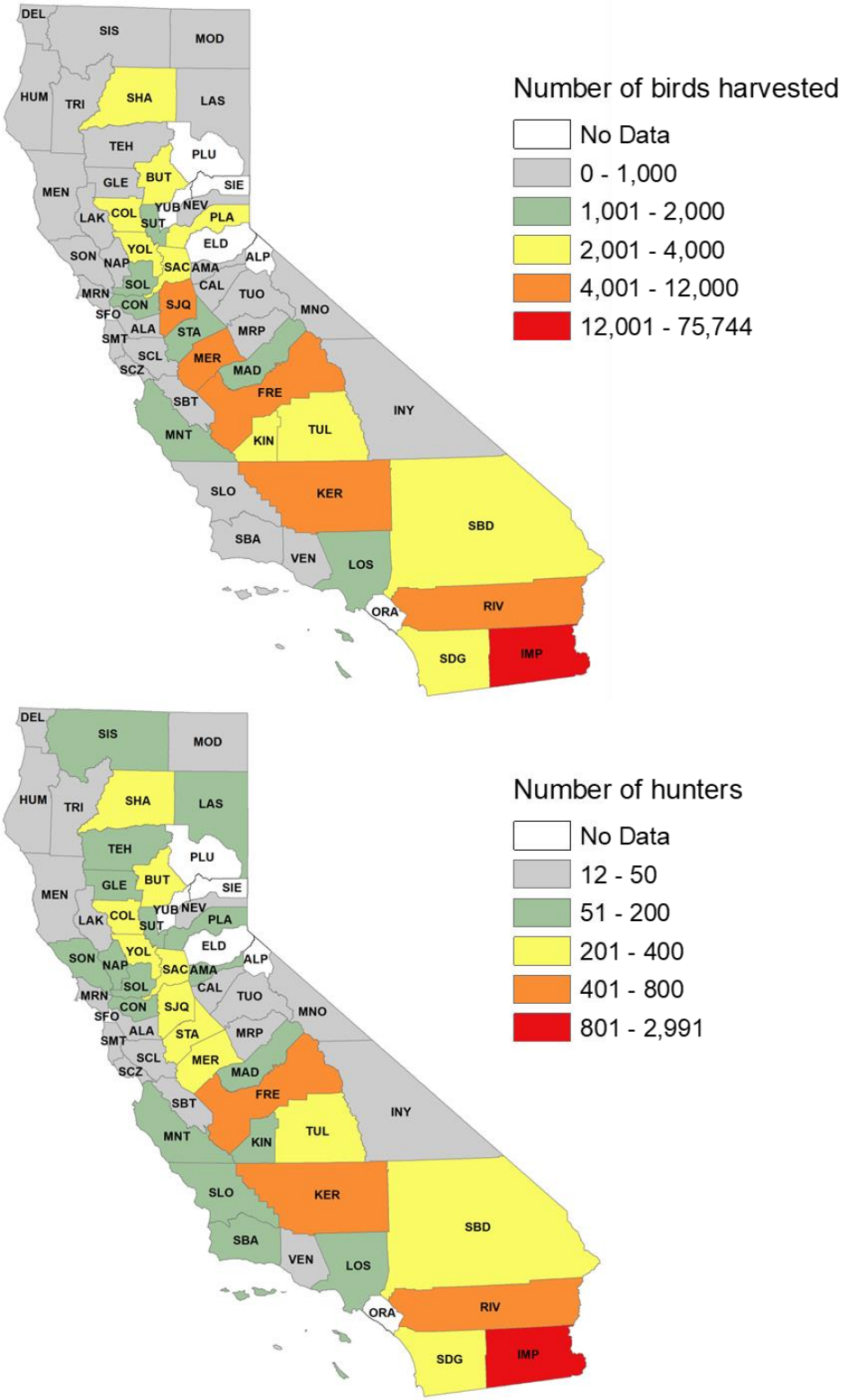


Figure 14. Estimated number of hunters and harvest by county for Eurasian collared-dove during the 2022–2023 hunting season (*Streptopelia decaocto)*.

White-winged dove

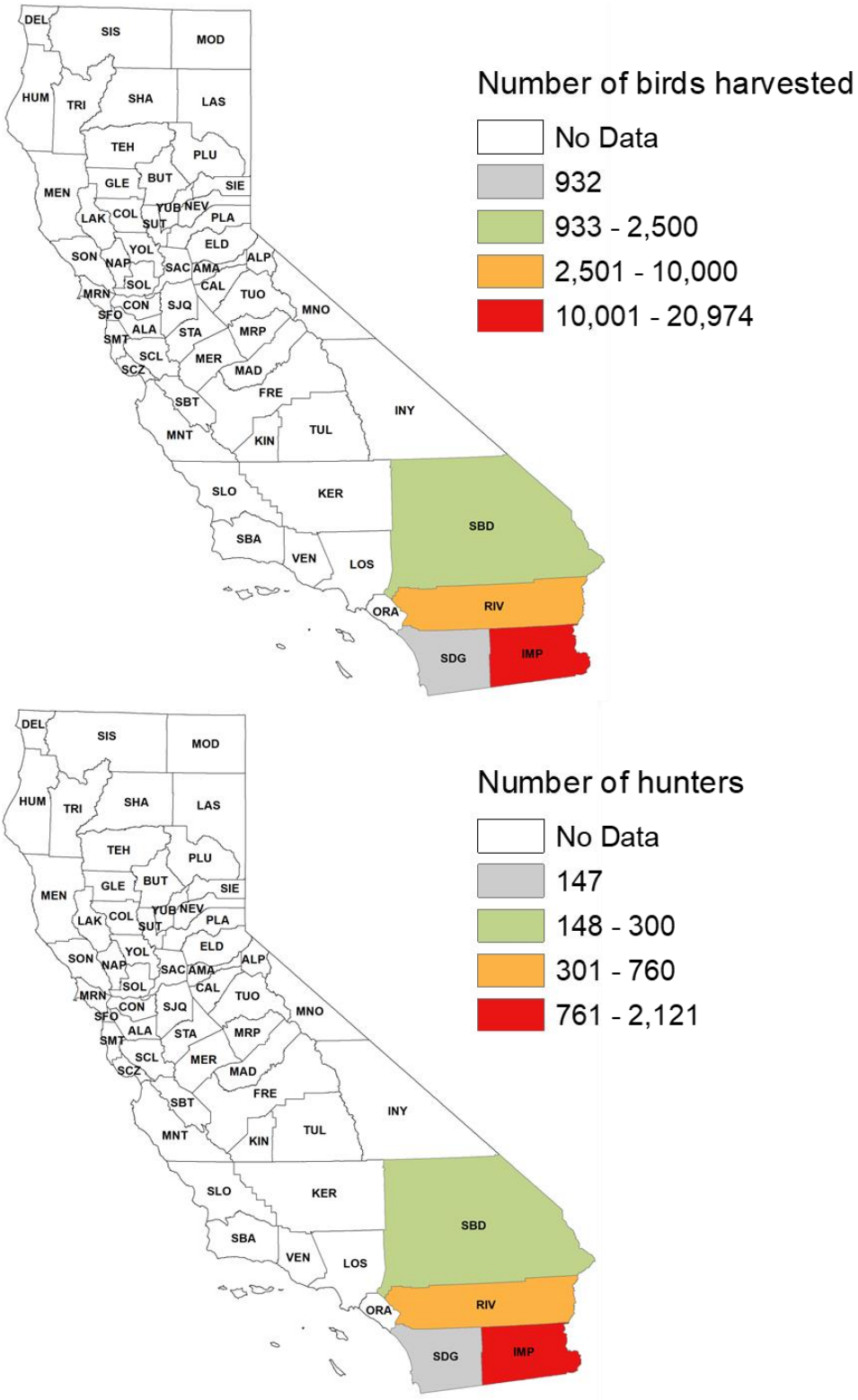


Figure 15. Estimated number of hunters and harvest by county for white-winged dove during the 2022–2023 hunting season (*Zenaida asiatica*).

Mourning dove

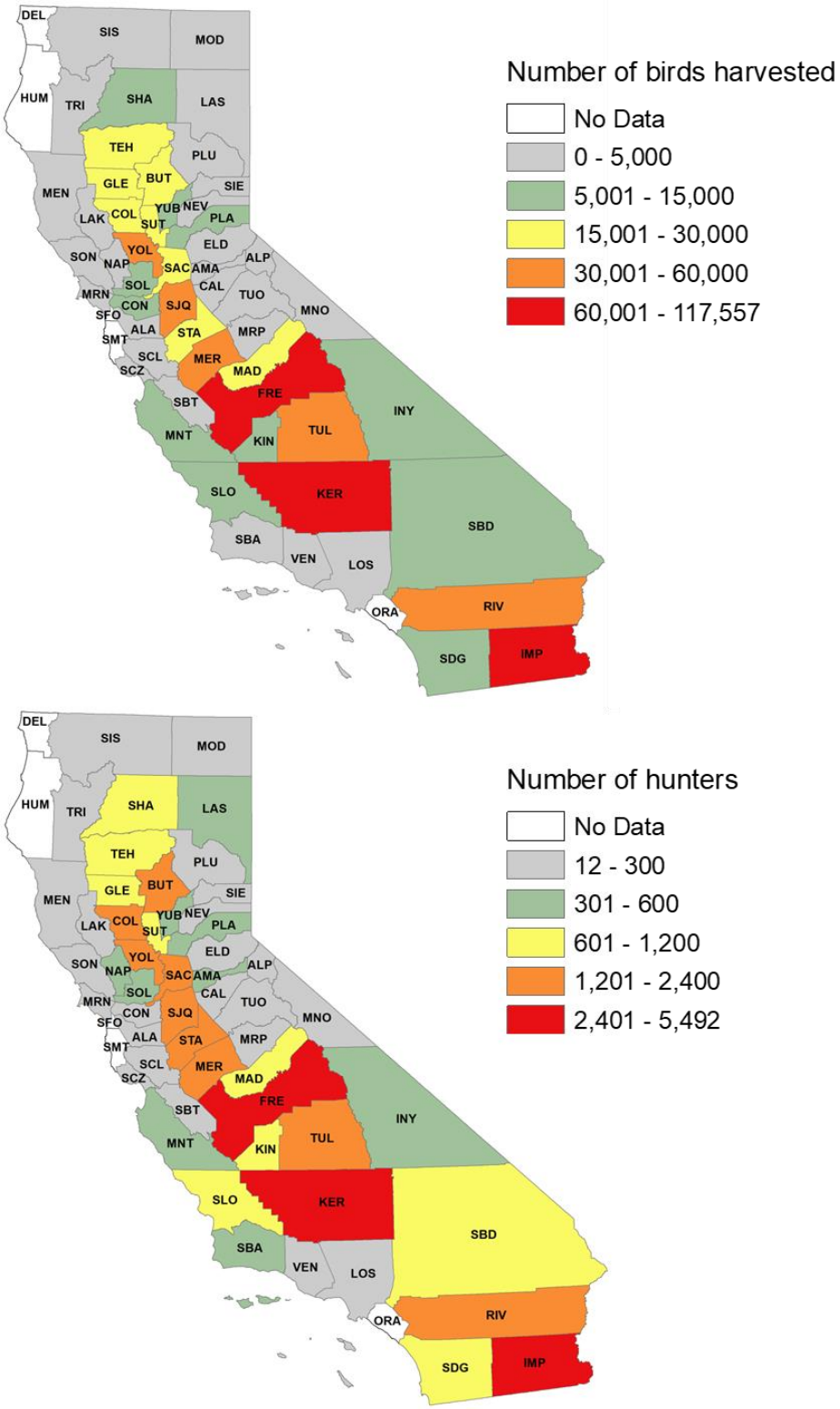


Figure 16. Estimated number of hunters and harvest by county for mourning dove during the 2022–2023 hunting season (*Zenaida macroura*).

Wilson's snipe

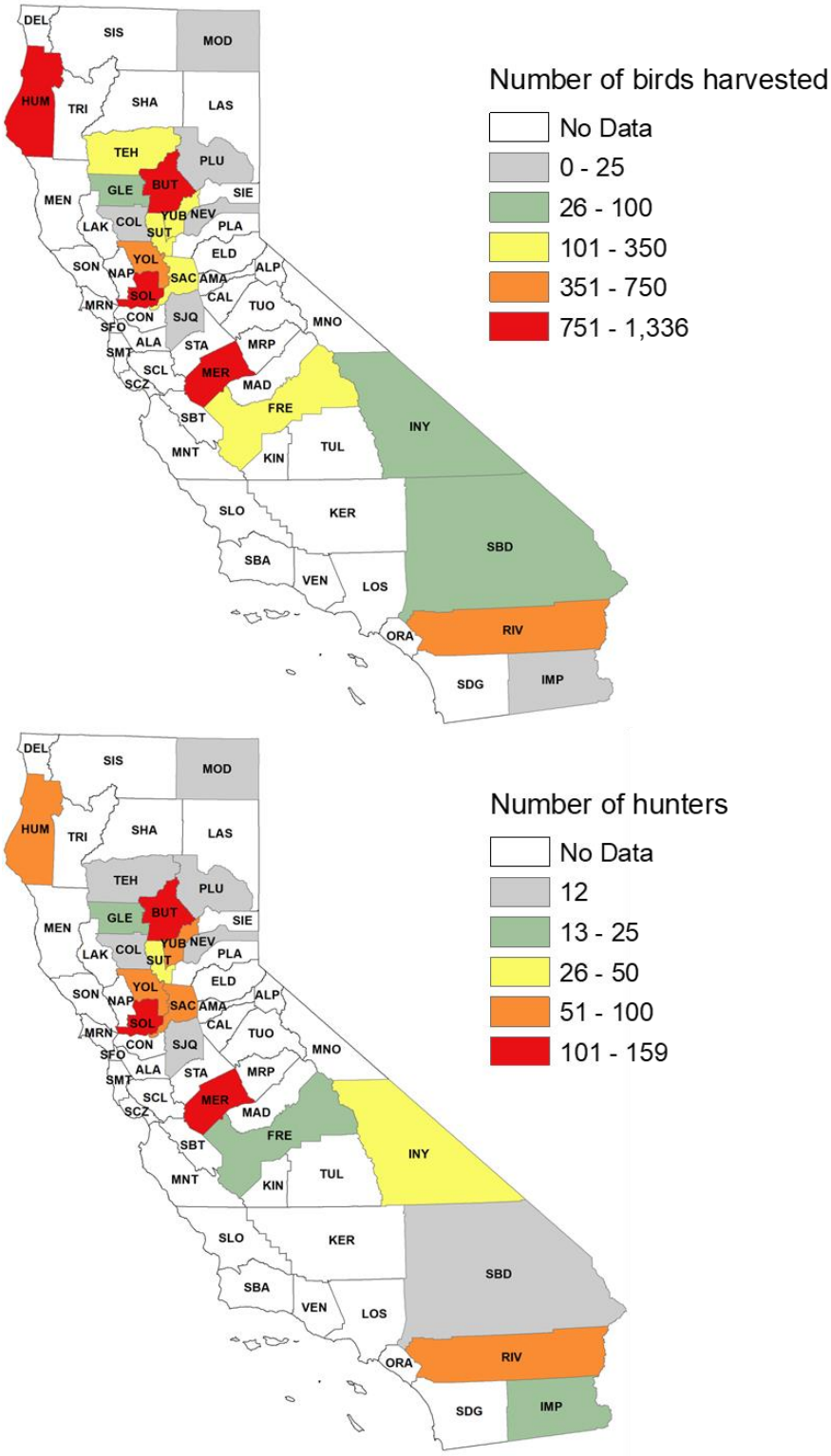


Figure 17. Estimated number of hunters and harvest by county for Wilson's snipe during the 2022–2023 hunting season (*Gallinago delicata*).

Fox squirrel

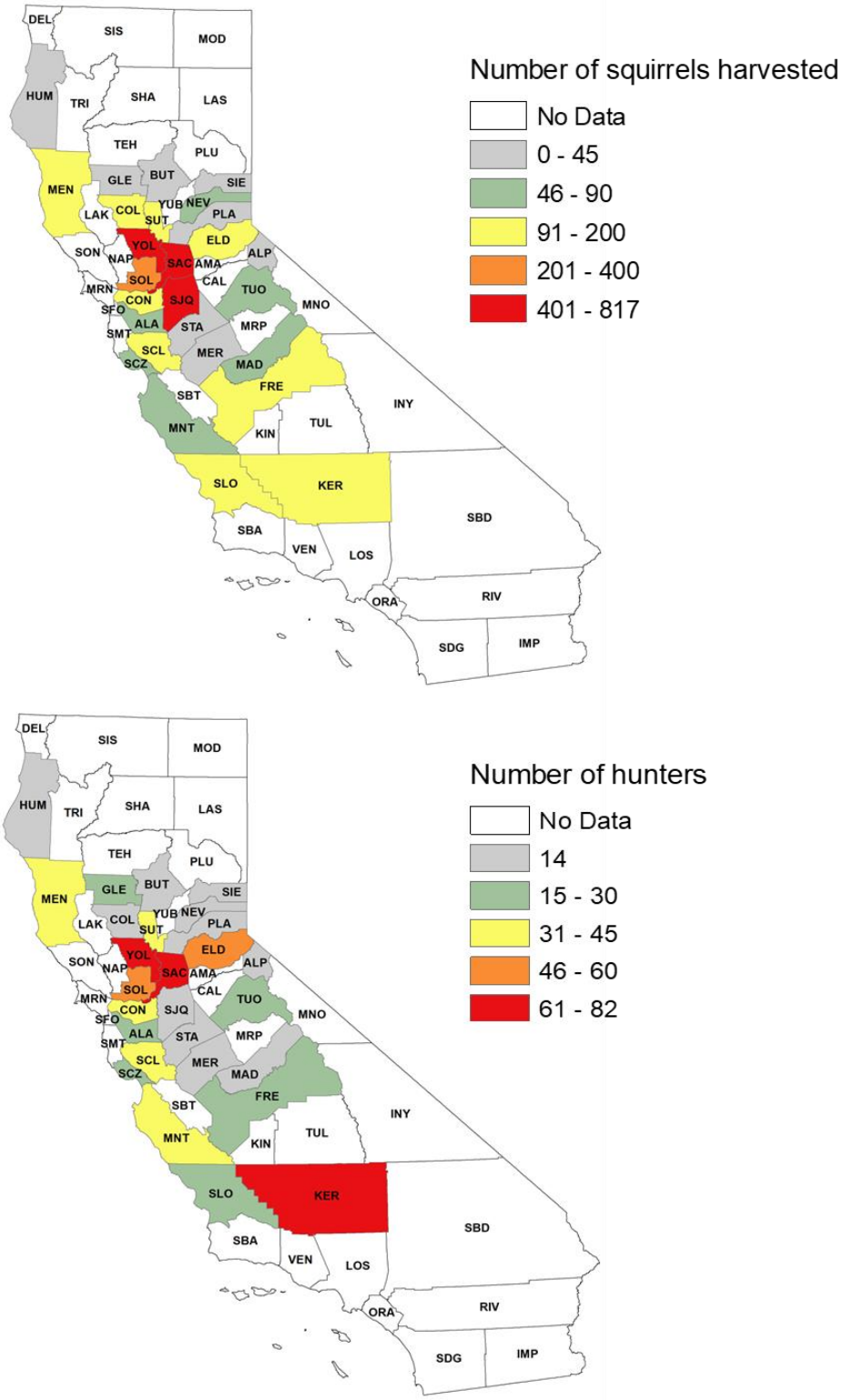


Figure 18: Estimated number of hunters and harvest by county for fox squirrel during the 2022–2023 hunting season (*Sciurus niger*).

Gray squirrel

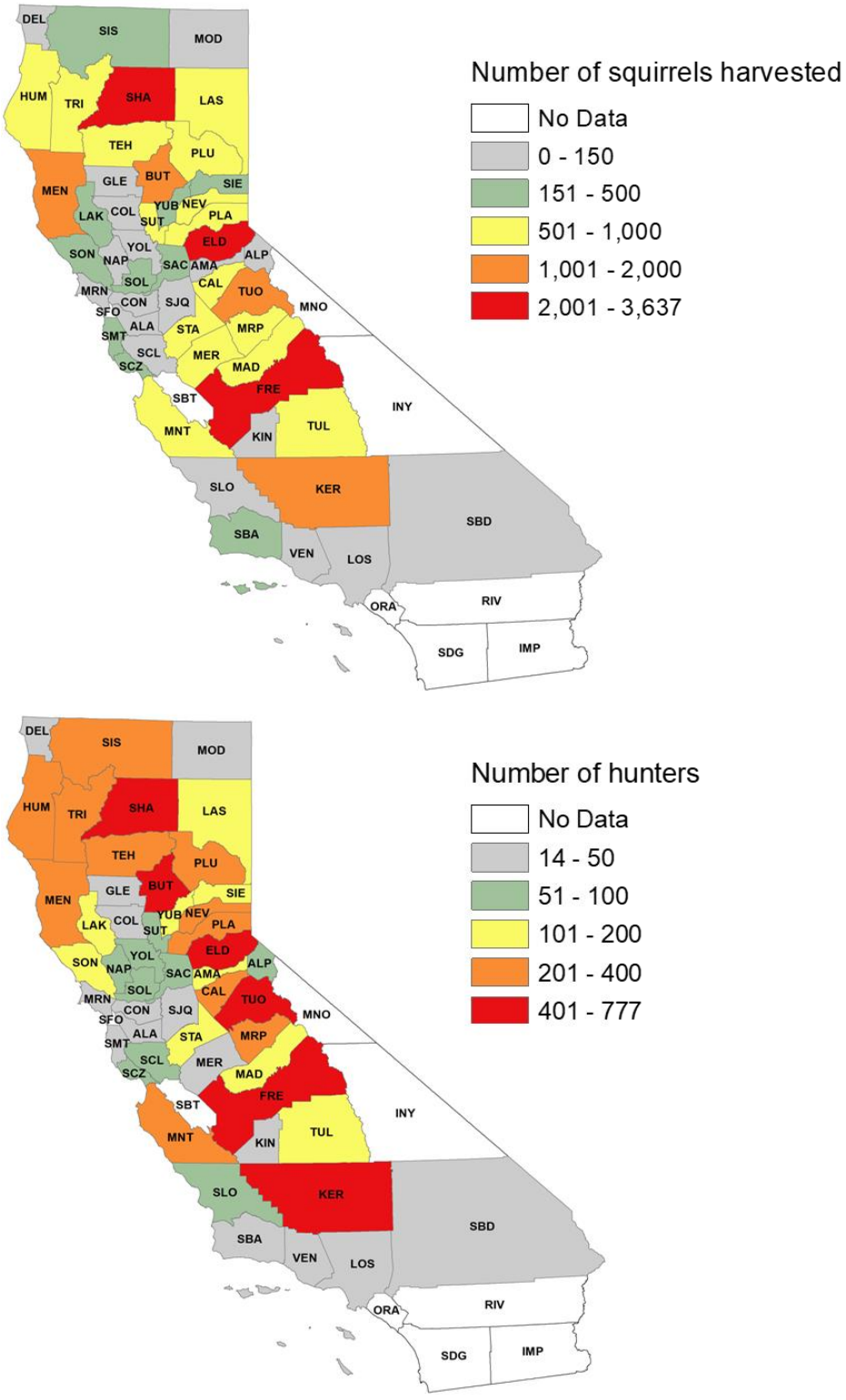


Figure 19. Estimated number of hunters and harvest by county for gray squirrel during the 2022–2023 hunting season (*Sciurus griseus*).

Jackrabbit

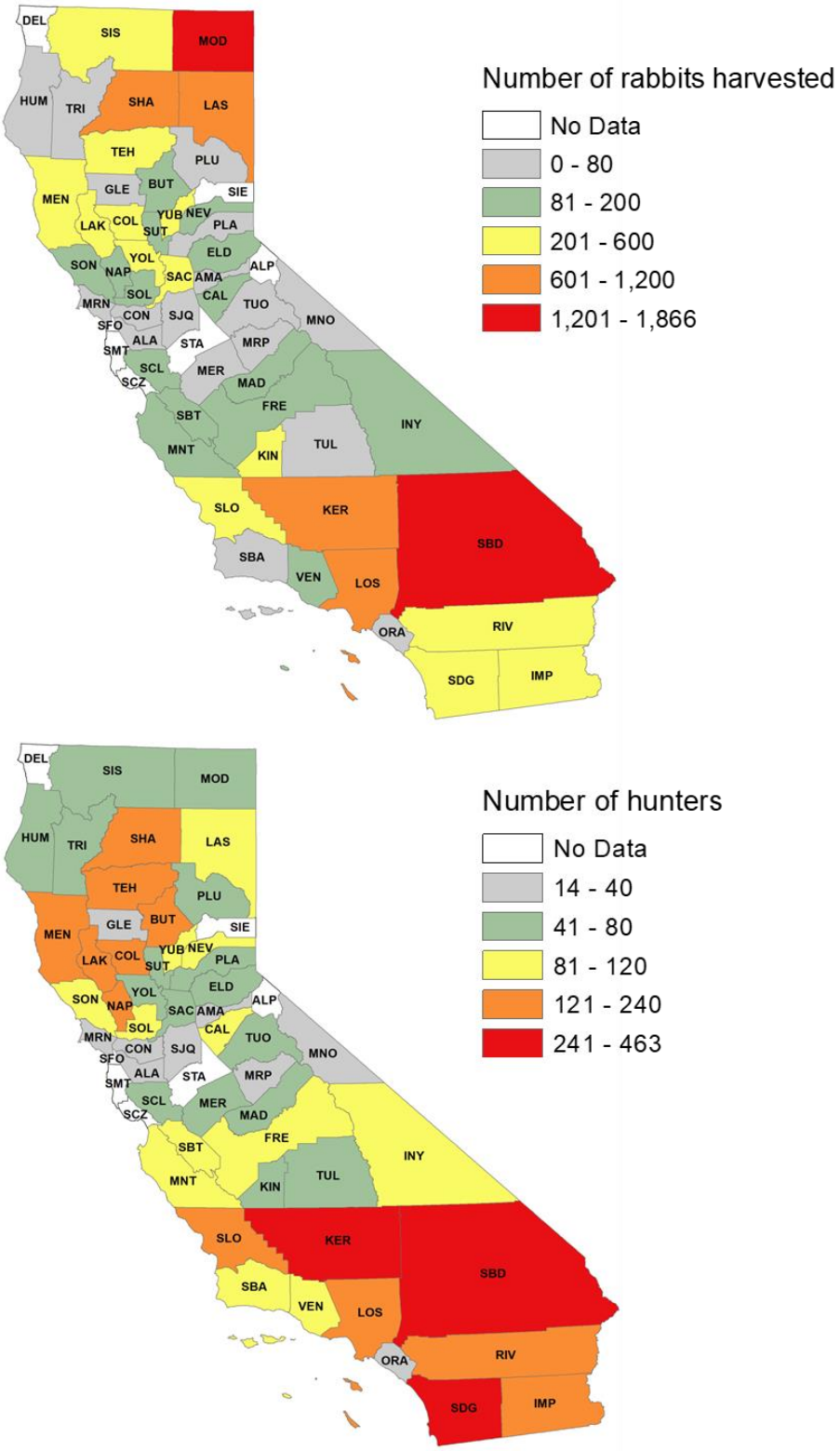
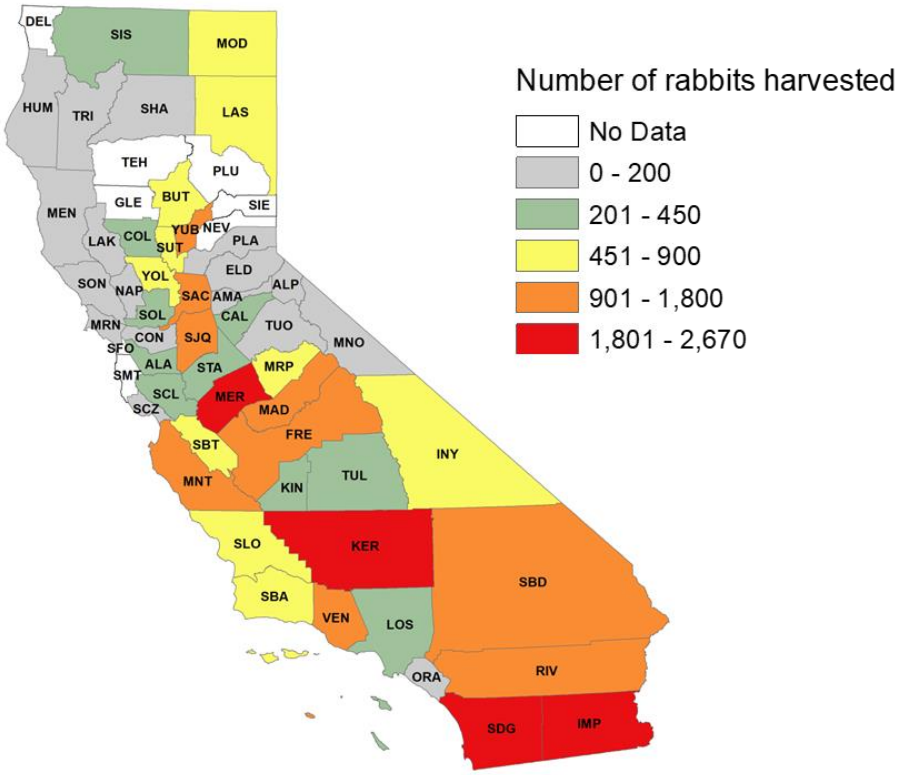


Figure 20. Estimated number of hunters and harvest by county for Jackrabbit during the 2022–2023 hunting season (*Lepus californicus*).

Cottontail rabbit



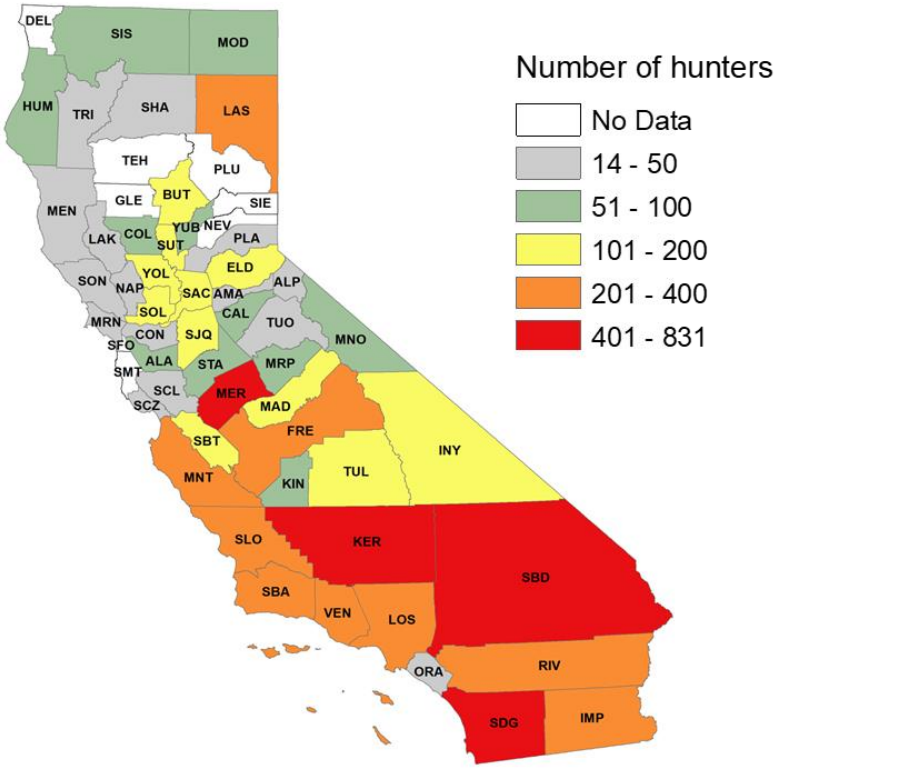


Figure 21. Estimated number of hunters and harvest by county for cottontail rabbit (*Sylvilagus audubonii*).

Tables

Table 1. Statewide estimated harvest and hunter effort for 18 species reported from the 2022–2023 Upland Game Bird and Small Game Mammal Harvest Survey.

Species	Harvest	Hunters	Avg. bag per hunter	Days hunted	Avg. days hunted
Mountain quail	45,723	10,272	4.45	48,114	4.68
California quail	175,624	22,862	7.68	113,193	4.95
Gambel's quail	9,414	1,692	5.57	7,784	4.60
Wild turkey Fall 2022	5,492	11,719	0.47	38,172	3.26
Wild turkey Spring 2023	17,014	25,509	0.67	106,782	4.19
Ruffed grouse	968	883	1.08	4,425	4.95
White-tailed ptarmigan*	NA	16	NA	NA	NA
Sooty grouse	1,140	1,312	0.87	4,830	3.68
Ring-necked pheasant	28,255	8,912	3.17	33,894	3.80
Chukar	15,433	3,469	4.18	17,529	4.75
Band-tailed pigeon	7,759	2,967	2.64	7,343	2.49
Eurasian collared-dove	158,990	10,542	15.08	43,676	4.14
White-winged dove	33,404	3,285	10.17	10,420	3.17
Mourning dove	791,492	41,176	19.22	138,629	3.37
Wilson's snipe	6,509	993	6.56	5,565	5.60
Fox squirrel	3,870	816	4.74	3,988	4.89
Gray squirrel	31,656	7,871	4.02	45,556	5.79
Jackrabbit	14,203	4,515	3.15	29,774	6.59
Cottontail rabbit	31,314	7,200	4.35	37,830	5.25

* Reporting raw results from survey responses.

Table 2. Estimated harvest, hunters, and hunter effort for mountain quail and California quail across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available.

County	Mountain quail harvest	Mountain quail hunters	Mountain quail days	California quail harvest	California quail hunters	California quail days
Alameda				1,226	135	478
Alpine	257	208	552	306	159	429
Amador	172	110	319	2,194	282	1,287
Butte	735	184	637	4,597	846	3,285
Calaveras	870	196	956	527	257	735
Colusa	172	37	86	2,059	368	1,017
Contra Costa				98	25	61
Del Norte	429	74	343			
El Dorado	2,341	662	2,795	1,397	208	1,103
Fresno	2,868	625	2,439	5,259	748	2,623
Glenn	711	61	294	1,017	208	588
Humboldt	503	221	846	932	257	895
Imperial				4,057	674	2,390
Inyo	2,305	368	2,893	4,952	846	5,651
Kern	1,802	686	2,697	22,617	2,905	13,165
Kings				981	49	294
Lake	490	74	208	2,243	405	1,716
Lassen	944	270	944	4,413	478	2,378
Los Angeles	306	172	564	5,933	907	4,952
Madera	785	208	932	2,905	355	1,961
Marin				454	37	98
Mariposa	699	159	1,152	1,974	306	1,324
Mendocino	2,096	417	2,243	2,783	466	1,581
Merced	392	37	564	3,310	319	1,876
Modoc	1,643	196	625	3,212	184	1,287
Mono	883	110	503	1,275	98	601
Monterey	772	86	503	16,904	1,116	6,718
Napa	37	37	110	3,543	454	1,826
Nevada	883	196	772	1,741	368	1,753
Orange				172	61	123
Placer	723	343	1,005	650	172	650
Plumas	2,525	588	2,856	883	98	674
Riverside	772	98	417	5,087	662	3,163

Sacramento	25	12	86	368	123	674
San Benito	12	12	12	3,175	392	1,238
San Bernardino	2,157	650	2,243	7,085	1,361	7,527
San Diego	331	294	1,165	7,845	1,410	5,737
San Francisco						
San Joaquin	184	12	74	1,373	123	441
San Luis Obispo	306	86	159	8,642	1,091	4,388
San Mateo				61	12	12
Santa Barbara	135	49	135	4,401	870	3,653
Santa Clara	245	12	61	588	123	294
Santa Cruz				0	12	25
Shasta	2,182	490	2,562	5,124	723	4,266
Sierra	760	270	981	392	86	588
Siskiyou	2,881	539	3,028	2,280	306	1,496
Solano				846	135	637
Sonoma	233	37	49	1,397	233	785
Stanislaus	110	98	478	368	98	392
Sutter				1,299	233	650
Tehama	1,299	282	1,054	4,536	650	2,182
Trinity	2,243	515	2,341	429	110	772
Tulare	1,287	257	846	2,856	392	1,054
Tuolumne	3,261	613	3,518	2,108	208	1,397
Ventura	466	184	723	3,003	613	3,616
Yolo	25	25	25	2,623	331	1,238
Yuba	466	74	319	4,425	539	2,562

Table 3. Estimated harvest, hunters, and hunter-effort for Gambel's quail across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available.

County	Gambel's quail harvest	Gambel's quail hunters	Gambel's quail days
Alameda			
Alpine			
Amador			
Butte			
Calaveras			
Colusa			
Contra Costa			
Del Norte			
El Dorado			
Fresno			
Glenn			
Humboldt			
Imperial	4,388	699	3,028
Inyo	98	49	147
Kern	306	37	233
Kings			
Lake			
Lassen			
Los Angeles			
Madera			
Marin			
Mariposa			
Mendocino			
Merced			
Modoc			
Mono			
Monterey			
Napa			
Nevada			
Orange			
Placer			
Plumas			
Riverside	2,329	392	1,679
Sacramento			
San Benito			

San Bernardino	1,814	466	2,390
San Diego	478	110	306
San Francisco			
San Joaquin			
San Luis Obispo			
San Mateo			
Santa Barbara			
Santa Clara			
Santa Cruz			
Shasta			
Sierra			
Siskiyou			
Solano			
Sonoma			
Stanislaus			
Sutter			
Tehama			
Trinity			
Tulare			
Tuolumne			
Ventura			
Yolo			
Yuba			

Table 4. Estimated harvest, hunters, and hunter-effort for wild turkey across all California counties during the 2022-2023 hunting season. F and S refer to Fall 2022 and Spring 2023, respectively. Blank cells indicate no data available.

County	Wild turkey F harvest	Wild turkey F hunters	Wild turkey F days	Wild turkey S harvest	Wild turkey S hunters	Wild turkey S days
Alameda	98	147	466	172	196	809
Alpine	0	12	25	12	12	12
Amador	257	466	1,214	429	895	2,783
Butte	331	748	1,826	981	1,790	6,926
Calaveras	172	368	1,226	343	809	3,432
Colusa	172	429	956	343	686	2,243
Contra Costa	74	86	454	245	221	1,103
Del Norte						
El Dorado	208	576	1,618	1,287	1,545	5,774
Fresno	25	233	711	245	601	2,930
Glenn	294	294	674	429	711	2,390
Humboldt	74	184	588	208	196	515
Imperial				0	12	49
Inyo	12	12	12			
Kern	74	123	441	98	196	588
Kings						
Lake	184	270	858	552	809	3,126
Lassen	25	49	110	12	74	245
Los Angeles	0	25	86			
Madera	110	147	368	282	368	1,520
Marin	74	61	135	172	159	650
Mariposa	74	306	1,336	319	503	2,366
Mendocino	196	429	1,410	527	760	2,746
Merced	0	49	147	0	25	98
Modoc	12	25	49	25	61	172
Mono						
Monterey	294	515	2,035	650	919	3,567
Napa	74	208	674	319	686	2,366
Nevada	61	270	699	588	674	3,175
Orange				0	25	74
Placer	221	490	1,753	772	1,079	4,462
Plumas	25	110	306	74	184	1,189
Riverside	0	12	25	0	25	74
Sacramento	208	343	870	441	760	2,709
San Benito	25	86	221	135	221	870

San Bernardino				0	12	12
San Diego	184	809	3,261	625	1,863	8,274
San Francisco						
San Joaquin	25	61	110	49	184	515
San Luis Obispo	270	380	1,066	588	785	2,390
San Mateo				25	25	86
Santa Barbara	12	159	417	86	380	1,214
Santa Clara	74	135	331	319	343	1,189
Santa Cruz	61	110	527	172	184	772
Shasta	233	527	2,047	735	1,373	6,669
Sierra				37	37	380
Siskiyou	49	123	711	184	245	1,397
Solano	86	98	466	343	343	1,545
Sonoma	294	466	1,728	1,091	1,177	4,217
Stanislaus	0	49	74	74	86	405
Sutter	123	208	772	343	429	2,072
Tehama	110	270	760	539	1,201	4,793
Trinity	0	49	147	123	172	576
Tulare	98	123	355	257	429	1,226
Tuolumne	98	355	1,030	221	441	1,446
Ventura				0	12	12
Yolo	245	392	1,116	637	858	2,758
Yuba	123	405	1,508	662	1,250	4,511

Table 5. Estimated harvest, hunters, and hunter-effort for ruffed grouse and sooty grouse across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available.

County	Ruffed grouse harvest	Ruffed grouse hunters	Ruffed grouse days	Sooty grouse harvest	Sooty grouse hunters	Sooty grouse days
Alameda						
Alpine				61	86	172
Amador						
Butte						
Calaveras				0	12	25
Colusa						
Contra Costa						
Del Norte	49	25	37	0	12	49
El Dorado				25	98	306
Fresno				25	61	123
Glenn				12	12	37
Humboldt	331	221	1,299	37	74	454
Imperial						
Inyo				37	37	319
Kern						
Kings						
Lake						
Lassen	25	49	98	0	25	37
Los Angeles						
Madera						
Marin						
Mariposa						
Mendocino	25	61	343	74	61	221
Merced						
Modoc	61	86	306	172	123	466
Mono				86	98	208
Monterey						
Napa						
Nevada				159	74	245
Orange						
Placer				49	61	208
Plumas				147	135	331
Riverside						
Sacramento						
San Benito						

San Bernardino						
San Diego						
San Francisco						
San Joaquin						
San Luis Obispo						
San Mateo						
Santa Barbara						
Santa Clara						
Santa Cruz						
Shasta				49	49	123
Sierra				12	61	441
Siskiyou	417	343	1,974	135	135	674
Solano						
Sonoma						
Stanislaus						
Sutter						
Tehama						
Trinity	61	110	368	49	86	294
Tulare				0	37	61
Tuolumne				12	37	37
Ventura						
Yolo						
Yuba						

Table 6. Estimated harvest, hunters, and hunter-effort for ring-necked pheasant and chukar across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available.

County	Ring-necked pheasant harvest	Ring-necked pheasant hunters	Ring-necked pheasant days	Chukar harvest	Chukar hunters	Chukar days
Alameda	0	37	74			
Alpine				0	37	37
Amador	1,017	159	772			
Butte	588	478	1,459			
Calaveras	662	74	392			
Colusa	2,648	1,165	3,469			
Contra Costa	895	123	993			
Del Norte						
El Dorado						
Fresno	552	233	637	49	61	147
Glenn	1,545	576	2,170			
Humboldt						
Imperial	1,324	539	1,974			
Inyo	306	74	86	2,586	650	4,278
Kern	429	196	392	1,397	895	3,138
Kings	0	12	25			
Lake	0	12	25			
Lassen	1,079	245	1,373	8,287	834	4,854
Los Angeles	110	25	61			
Madera	98	98	147			
Marin	37	12	12			
Mariposa						
Mendocino						
Merced	1,005	723	2,305			
Modoc	123	74	98	441	74	257
Mono				797	123	588
Monterey						
Napa	61	37	74			
Nevada						
Orange						
Placer	233	110	282	98	25	49
Plumas				86	61	110
Riverside	49	61	98	37	25	37
Sacramento	1,618	405	1,483			
San Benito	0	12	12	12	25	74

San Bernardino	25	12	12	1,214	748	3,322
San Diego	12	12	25			
San Francisco						
San Joaquin	1,079	355	1,508			
San Luis Obispo				12	25	135
San Mateo						
Santa Barbara						
Santa Clara						
Santa Cruz						
Shasta	0	12	12			
Sierra				0	25	270
Siskiyou	49	184	355			
Solano	5,798	993	4,646			
Sonoma	0	12	12			
Stanislaus	110	123	184			
Sutter	858	282	858			
Tehama	319	110	539	0	12	12
Trinity						
Tulare	1,005	270	870	417	61	184
Tuolumne						
Ventura	123	12	196	0	12	37
Yolo	2,979	1,079	5,161			
Yuba	944	110	478			

Table 7. Estimated harvest, number of hunters, and number of days hunted for band-tailed pigeon and Eurasian collared-dove across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available.

County	Band-tailed pigeon harvest	Band-tailed pigeon hunters	Band-tailed pigeon days	Eur. collared-dove harvest	Eur. collared-dove hunters	Eur. collared-dove days
Alameda	86	25	49	184	37	123
Alpine	37	25	61			
Amador	588	61	184	184	86	331
Butte	355	147	392	2,881	282	1,459
Calaveras	25	49	98	12	12	37
Colusa	49	12	25	2,648	294	1,042
Contra Costa				1,532	74	319
Del Norte	37	37	86	147	12	61
El Dorado	49	74	147			
Fresno	331	159	392	5,222	515	1,851
Glenn				650	135	355
Humboldt	86	61	147	123	25	184
Imperial	98	25	49	75,744	2,991	12,307
Inyo				123	49	61
Kern	270	49	221	5,394	601	2,145
Kings				2,341	196	1,066
Lake	12	12	12	86	25	37
Lassen				907	86	294
Los Angeles	0	12	12	1,839	147	883
Madera	12	25	49	1,974	123	331
Marin				123	12	74
Mariposa	98	61	147	37	37	98
Mendocino	221	61	196	12	12	49
Merced				5,908	392	1,618
Modoc				25	12	12
Mono				49	12	12
Monterey	2,035	564	1,557	1,361	159	515
Napa				25	61	86
Nevada	184	74	172	123	49	135
Orange	0	12	12			
Placer	0	12	12	2,525	86	490
Plumas	172	110	294			
Riverside	49	37	74	10,763	625	3,065
Sacramento	86	25	86	2,697	257	1,116

San Benito	368	12	123	343	49	110
San Bernardino	110	74	147	3,101	233	723
San Diego	613	343	552	3,236	208	785
San Francisco						
San Joaquin				4,695	392	1,888
San Luis Obispo	466	172	380	319	61	159
San Mateo				0	12	49
Santa Barbara	0	37	86	270	61	147
Santa Clara	245	61	172	748	37	221
Santa Cruz	98	49	98	74	12	25
Shasta	208	159	429	2,354	245	993
Sierra	25	25	25			
Siskiyou	147	74	270	834	86	355
Solano				1,348	159	490
Sonoma	61	37	98	454	74	208
Stanislaus				1,679	319	1,066
Sutter				1,312	172	466
Tehama				601	172	319
Trinity	159	61	147	588	25	233
Tulare	61	37	49	2,476	208	625
Tuolumne				331	37	306
Ventura	98	49	147	172	25	37
Yolo	74	12	25	3,359	368	1,974
Yuba	147	98	123			

Table 8. Estimated harvest, hunters, and hunter-effort for white-winged dove and mourning dove across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available.

County	White-winged dove harvest	White-winged dove hunters	White-winged dove days	Mourning dove harvest	Mourning dove hunters	Mourning dove days
Alameda				1,054	123	282
Alpine				0	12	12
Amador				4,940	405	907
Butte				23,438	1,728	4,891
Calaveras				2,783	245	748
Colusa				23,401	1,263	3,310
Contra Costa				5,014	245	821
Del Norte						
El Dorado				1,692	196	466
Fresno				77,963	3,163	10,836
Glenn				18,657	981	3,003
Humboldt						
Imperial	20,974	2,121	6,865	117,557	5,492	17,897
Inyo				5,357	380	1,765
Kern				81,444	3,383	12,454
Kings				12,099	662	1,937
Lake				1,336	135	294
Lassen				4,818	429	1,030
Los Angeles				3,114	257	1,226
Madera				21,207	981	3,445
Marin				1,091	98	270
Mariposa				1,140	110	405
Mendocino				478	86	135
Merced				45,270	2,341	6,362
Modoc				2,096	123	319
Mono				25	25	25
Monterey				7,661	503	1,373
Napa				3,040	368	772
Nevada				1,275	135	637
Orange						
Placer				5,761	454	1,483
Plumas				466	37	221
Riverside	8,618	760	2,219	33,919	2,023	6,644
Sacramento				27,691	1,287	4,793

San Benito				2,059	245	552
San Bernardino	2,219	159	441	14,109	932	3,837
San Diego	932	147	441	8,593	723	2,366
San Francisco						
San Joaquin				34,262	1,594	6,019
San Luis Obispo				8,973	723	2,317
San Mateo						
Santa Barbara				3,935	454	1,103
Santa Clara				981	159	270
Santa Cruz				1,042	61	184
Shasta				11,069	662	1,986
Sierra				49	12	49
Siskiyou				1,925	221	552
Solano				5,896	527	1,373
Sonoma				294	74	196
Stanislaus				22,335	1,214	4,487
Sutter				15,053	772	2,341
Tehama				18,669	1,079	2,942
Trinity				12	37	147
Tulare				31,712	1,373	4,634
Tuolumne				588	86	123
Ventura				1,912	172	368
Yolo				35,623	1,863	7,049
Yuba				9,721	576	1,863

Table 9. Estimated harvest, hunters, and hunter-effort for Wilson's snipe across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available.

County	Wilson's snipe harvest	Wilson's snipe hunters	Wilson's snipe days
Alameda			
Alpine			
Amador			
Butte	907	159	674
Calaveras			
Colusa	0	12	25
Contra Costa			
Del Norte			
El Dorado			
Fresno	110	25	61
Glenn	49	25	25
Humboldt	1,336	74	1,446
Imperial	25	25	245
Inyo	49	37	25
Kern			
Kings			
Lake			
Lassen			
Los Angeles			
Madera			
Marin			
Mariposa			
Mendocino			
Merced	1,005	135	405
Modoc	0	12	12
Mono			
Monterey			
Napa			
Nevada	0	12	12
Orange			
Placer			
Plumas	0	12	25
Riverside	515	86	454
Sacramento	208	61	159
San Benito			

San Bernardino	74	12	12
San Diego			
San Francisco			
San Joaquin	12	12	37
San Luis Obispo			
San Mateo			
Santa Barbara			
Santa Clara			
Santa Cruz			
Shasta			
Sierra			
Siskiyou			
Solano	870	123	1,066
Sonoma			
Stanislaus			
Sutter	233	37	123
Tehama	245	12	49
Trinity			
Tulare			
Tuolumne			
Ventura			
Yolo	576	86	221
Yuba	233	61	184

Table 10. Estimated harvest, hunters, and hunter-effort for fox squirrels and gray squirrels across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available.

County	Fox squirrel harvest	Fox squirrel hunters	Fox squirrel days	Gray squirrel harvest	Gray squirrel hunters	Gray squirrel days
Alameda	82	27	41	41	14	14
Alpine	27	14	14	0	54	136
Amador				82	136	313
Butte	41	14	27	1,934	477	2,302
Calaveras				913	259	1,744
Colusa	136	14	14	82	41	109
Contra Costa	123	41	191	41	41	68
Del Norte				150	41	218
El Dorado	136	54	272	3,637	777	4,223
Fresno	177	27	163	3,161	545	3,774
Glenn	0	27	68	54	41	123
Humboldt	0	14	41	722	272	1,199
Imperial						
Inyo						
Kern	191	68	341	1,894	436	1,744
Kings				14	14	27
Lake				259	123	313
Lassen				763	123	668
Los Angeles				0	27	68
Madera	68	14	27	613	109	817
Marin				54	27	41
Mariposa				994	286	1,894
Mendocino	95	41	259	1,948	354	1,934
Merced	0	14	14	504	41	736
Modoc				95	27	95
Mono						
Monterey	68	41	232	763	218	1,499
Napa				109	68	409
Nevada	82	14	163	763	313	1,049
Orange						
Placer	14	14	14	586	259	913
Plumas				899	327	1,989
Riverside						
Sacramento	572	82	422	422	82	313
San Benito						

San Bernardino				27	14	41
San Diego						
San Francisco						
San Joaquin	409	14	0	14	14	14
San Luis Obispo	136	27	68	150	54	82
San Mateo				245	14	341
Santa Barbara				313	27	1,567
Santa Clara	191	41	272	68	54	463
Santa Cruz	82	27	82	245	95	341
Shasta				2,902	708	4,155
Sierra	0	14	14	436	109	531
Siskiyou				436	204	858
Solano	300	54	313	300	68	272
Sonoma				327	136	640
Stanislaus	27	14	14	804	177	1,485
Sutter	177	41	177	681	82	518
Tehama				695	259	1,131
Trinity				749	245	1,458
Tulare				640	163	845
Tuolumne	54	27	163	1,648	531	2,738
Ventura				27	14	68
Yolo	817	68	722	27	68	123
Yuba				368	109	627

Table 11. Estimated harvest, hunters, and hunter effort for jackrabbit and cottontail rabbit across all California counties during the 2022-2023 hunting season. Blank cells indicate no data available.

County	Jackrabbit harvest	Jackrabbit hunters	Jackrabbit days	Cottontail harvest	Cottontail hunters	Cottontail days
Alameda	14	14	27	354	54	259
Alpine				68	27	150
Amador	14	14	14	27	27	68
Butte	163	123	450	681	150	627
Calaveras	136	95	1,117	218	82	123
Colusa	232	136	599	272	95	327
Contra Costa	14	14	14	191	27	191
Del Norte						
El Dorado	123	54	327	177	123	409
Fresno	163	82	150	1,267	368	1,199
Glenn	27	14	27			
Humboldt	41	68	327	68	54	218
Imperial	313	136	477	2,152	341	1,975
Inyo	82	109	436	477	136	1,144
Kern	1,049	436	1,567	2,302	708	2,616
Kings	504	41	463	354	68	232
Lake	450	177	518	0	27	136
Lassen	1,117	109	545	531	259	1,103
Los Angeles	777	136	2,479	436	218	736
Madera	95	54	95	1,090	191	1,294
Marin	0	27	27	54	14	27
Mariposa	41	27	218	599	68	477
Mendocino	354	191	749	0	27	27
Merced	68	54	109	2,493	409	1,703
Modoc	1,866	54	845	572	68	381
Mono	41	27	82	95	54	177
Monterey	123	95	409	1,376	341	2,043
Napa	95	123	518	14	27	191
Nevada	150	82	218			
Orange	0	14	41	41	27	54
Placer	27	41	82	68	27	41
Plumas	14	41	123			
Riverside	559	218	940	1,648	341	1,785
Sacramento	381	54	1,267	913	163	1,185
San Benito	150	82	354	599	150	477

San Bernardino	1,499	463	4,305	1,444	586	4,904
San Diego	395	272	1,526	2,670	831	3,719
San Francisco						
San Joaquin	27	27	136	1,212	109	681
San Luis Obispo	286	136	409	681	327	1,144
San Mateo						
Santa Barbara	54	82	586	858	204	1,212
Santa Clara	163	41	177	422	41	368
Santa Cruz				109	41	95
Shasta	777	123	1,376	14	14	68
Sierra						
Siskiyou	463	54	2,915	232	82	368
Solano	150	82	368	259	123	368
Sonoma	82	95	259	68	14	82
Stanislaus				450	54	722
Sutter	123	41	95	463	123	627
Tehama	259	123	994			
Trinity	27	41	109	0	14	41
Tulare	54	54	95	422	136	150
Tuolumne	27	54	82	0	41	82
Ventura	109	95	163	1,553	259	1,485
Yolo	463	68	136	627	136	477
Yuba	341	95	790	1,444	82	790

Table 12. Long-term average, 3-year average, in season results and change among years of hunter harvest, hunters and effort (days afield) for statewide resident upland game birds.

Level	Quail (All)	MOQU	CAQU	GAQU	Forest Grouse	RUGR	SOGR	CHUK	RIPH	WITU (All)	WITU Fall	WITU Spring	EUCD
Years of Data	45	23	23	23	45	14	14	25	25	45	23	23	6
LTA Harv.	1,079,175	130,304	522,876	47,944	8,209	3,830	4,116	46,652	140,176	14,022	7,075	15,944	71,967
LTA Hunters	114,329	22,603	47,454	5,199	5,637	2,179	2,840	9,905	42,302	24,124	12,036	22,772	6,648
LTA Effort**	563,302	133,097	275,567	28,540	23,131	13,861	12,783	48,226	191,909	97,534	41,206	99,474	28,919
LTA Avg. Harv.***	9.4	5.8	11.0	9.2	1.5	1.8	1.4	4.7	3.3	0.6	0.6	0.7	10.8
LTA Avg. Effort****	4.9	5.9	5.8	5.5	4.1	6.4	4.5	4.9	4.5	4.0	3.4	4.4	4.4
3-year Avg. Harv.	297,797	41,201	235,386	13,219	3,007	1,724	1,283	13,108	32,613	26,240	6,244	19,996	118,055
3-year Avg. Hunters	42,881	9,577	27,856	2,018	2,890	1,107	1,783	4,040	13,186	42,012	12,936	29,076	9,503
3-year Avg. Effort	199,638	43,755	132,843	8,734	12,119	5,969	6,150	17,236	49,629	156,073	42,674	113,399	38,349
3-year Avg. Harv	6.9	4.3	8.4	6.6	1.0	1.6	0.7	3.2	2.5	0.6	0.5	0.7	12.4
3-year Avg. Effort	4.7	4.6	4.8	4.3	4.2	5.4	3.4	4.3	3.8	3.7	3.3	3.9	4.0
2022 Harvest	230,761	45,723	175,624	9,414	2,108	968	1,140	15,433	28,255	22,506	5,492	17,014	158,990
2022 Hunters	34,826	10,272	22,862	1,692	2,195	883	1,312	3,469	8,912	37,228	11,719	25,509	10,542
2022 Effort	169,091	48,114	113,193	7,784	9,255	4,425	4,830	17,529	33,894	144,954	38,172	106,782	43,676
2022 Avg. Harv.	6.6	4.5	7.7	5.6	1.0	1.1	0.9	4.4	3.2	0.6	0.5	0.7	15.1
2022 Avg. Effort	4.9	4.7	5.0	4.6	4.2	5.0	3.7	5.1	3.8	3.9	3.3	4.2	4.1
2022 vs LTA Harv.	-79%	-65%	-66%	-80%	-74%	-75%	-72%	-67%	-80%	61%	-22%	7%	121%
2022 vs LTA Hunters	-70%	-55%	-52%	-67%	-61%	-59%	-54%	-65%	-79%	54%	-3%	12%	59%
2022 vs LTA Effort	-70%	-64%	-59%	-73%	-60%	-68%	-62%	-64%	-82%	49%	-7%	7%	51%
2022 vs LTA Avg. Harv.	-30%	-23%	-30%	-40%	-34%	-38%	-40%	-6%	-4%	4%	-20%	-5%	39%
2022 vs LTA Avg. Effort	-1%	-21%	-15%	-16%	3%	-21%	-18%	4%	-16%	-4%	-5%	-4%	-5%
2022 vs 3-year Avg. Harv.	-23%	11%	-25%	-29%	-30%	-44%	-11%	18%	-13%	-14%	-12%	-15%	35%
2022 vs 3-year Avg. Hunters	-19%	7%	-18%	-16%	-24%	-20%	-26%	-14%	-32%	-11%	-9%	-12%	11%
2022 vs 3-year Avg. Effort	-15%	10%	-15%	-11%	-24%	-26%	-21%	2%	-32%	-7%	-11%	-6%	14%
2022 vs 3-year Avg. Harv.	-5%	3%	-9%	-15%	-8%	-30%	21%	37%	28%	-3%	-3%	-3%	21%
2022 vs 3-year Avg. Effort	4%	2%	4%	6%	1%	-7%	7%	18%	1%	5%	-1%	7%	3%

MOQU = Mountain quail, CAQU = California quail, GAQU = Gambel's quail, RUGR = Ruffed grouse, SOGR = Sooty grouse, CHUK = Chukar, RIPH = Ring-necked pheasant, WITU = Wild turkey, EUCD = Eurasian collard-dove.

*2- Year avg for EUCD

**Effort in days afield

***Avg. Harv = Average harvest: Total Harvest/Hunters

**** Avg. effort = Average Effort: Total Days/Hunters

Table 13. Long-term average, 3-year average, in season results and change among years of hunter harvest, hunters and effort (days afield) for statewide tree squirrel (fox squirrel and gray squirrel), cottontail, and jackrabbit.

Level	Fox Squirrel	Gray Squirrel	Tree Squirrel	Cottontail	Jackrabbit
Years of Data	2	2	63	65	65
LTA Harv.	NA	NA	119,346	395,033	760,123
LTA Hunters	NA	NA	33,077	53,290	625,65
LTA Effort**	NA	NA	171,788	280,374	434,738
LTA Avg. Harv.***	NA	NA	4.3	6.6	9.7
LTA Avg. Effort****	NA	NA	4	5.3	7.5
2022 Harvest	3,870	31,656	35,526	31,314	14,203
2022 Hunters	816	7,871	8,687	7,200	4,515
2022 Effort	3,988	45,556	49,544	37,830	29,774
2022 Avg. Harv.	4.7	4.0	4.4	4.3	3.1
2022 Avg. Effort	4.9	5.8	5.3	5.3	6.6
2022 vs LTA Harv.	NA	NA	-70%	-92%	-98%
2022 vs LTA Hunters	NA	NA	-74%	-86%	-93%
2022 vs LTA Effort	NA	NA	-71%	-87%	-93%
2022 vs LTA Avg. Harv.	NA	NA	2%	-34%	-68%
2022 vs LTA Avg. Effort	NA	NA	34%	-1%	-12%
2022 vs 2018 Harv.	2	2	49%	-33%	-41%
2022 vs 2018 Hunters	NA	NA	23%	-6%	-37%
2022 vs 2018 Effort	NA	NA	35%	3%	-20%
2022 vs 2018 Avg. Harv.	NA	NA	30%	-29%	-5%
2022 vs 2018 Avg. Effort	NA	NA	3%	9%	28%

*Tree Squirrel 2022 harvest, hunters, and effort are the sum of fox and gray squirrel data
**Effort in days afield
***Avg. Harv = Average harvest: Total Harvest/Hunters
**** Avg. effort = Average Effort: Total Days/Hunters