Point Blue Conservation Science

Expanding NRCS Conservation Programs Through Partner Biologist Technical Assistance

Final Report

April 2024

Partner Biologists, Fall Training 2023
Photo Credit: Alicia Herrera

Expanding NRCS Conservation Programs through Partner Biologist Technical Assistance

NRCS Contribution Agreement NR209104XXXXC004 Final Report

April 2024

Prepared by

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INTRODUCTION

In May 2020, Point Blue Conservation Science (Point Blue) executed a Contribution Agreement with the USDA Natural Resource Conservation Service (NRCS) to assist NRCS in delivery of conservation programs through technical assistance, with the common goal to institute sustainable use of soil, water and related natural resources. Through the contribution agreement, Point Blue focused efforts on conservation planning, Farm Bill contract implementation and outreach throughout California. California NRCS separated the need for technical biological support into two distinct categories and tasks: Task1 - Working Lands Conservation and Task 2 - Farm Bill Easement Activities. This agreement was achieved through Point Blue's Working Lands Partner Biologist program.

Partner Biologists work in partnership with NRCS field office staff to integrate a wildlife perspective into the conservation planning process as well as into Farm Bill program design and implementation. With their knowledge of wildlife and habitat requirements and ability to monitor responses in bird use, vegetation communities, and soil properties to conservation practice implementation, Partner Biologists bring a value-added skill set to their respective field offices that enhances the services they can provide to all NRCS clientele.

Point Blue wishes to convey our deepest gratitude to NRCS for the agency's commitment to our 12-year partnership to provide value-added services in the application of conservation programs and practices through the Farm Bill. This report is intended as a final report for NRCS Agreement No: NR209104XXXXC004, spanning the time period of May 7, 2020 to February 29, 2024.

TASK 1: WORKING LANDS CONSERVATION

Over the agreement time period, Point Blue Partner Biologists filled positions in thirteen NRCS field offices across California. Field offices included: Alturas, Eureka, Grass Valley, Mariposa, Merced, Oroville, Petaluma, Redding, Susanville, Vacaville, Victorville, Visalia, and Woodland. The number of Partner Biologists supported by the contribution agreement varied from 10-12 over the course of the agreement. See Appendix A for Partner Biologist and field office location as of end of the conclusion of the agreement in February 2024.

Point Blue Partner Biologists, in partnership with NRCS staff, worked with 554 landowners influencing the protection and conservation of natural resources on 173, 288 acres of working lands in 22 California counties during the course of the agreement. Partner Biologists provided biological support in their primary field office locations and filled NRCS staffing gaps in adjacent counties where there were biological vacancies.

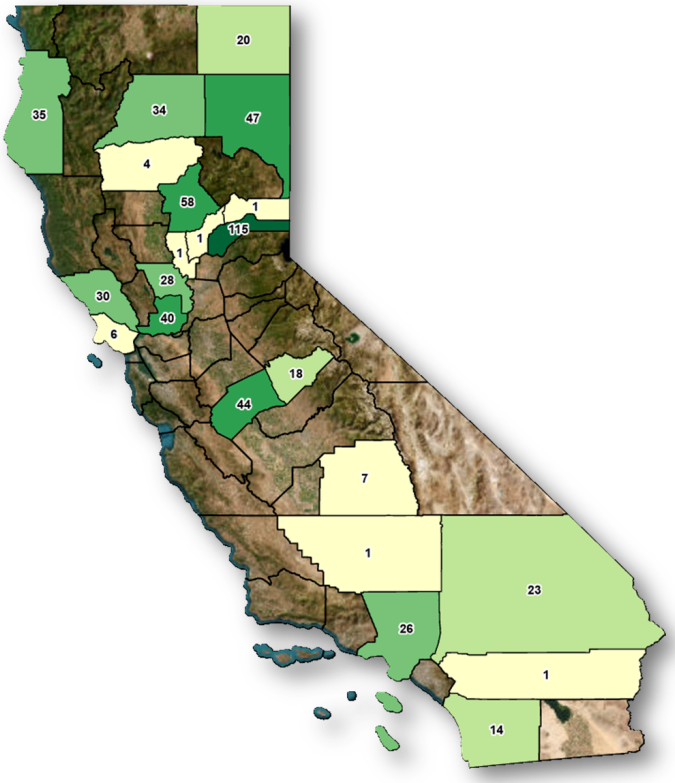


Figure 1. Landowners Engaged by County. The map shows the location and number of landowners Partner Biologists engaged with across 22 counties. Partner Biologists provided support in their primary field office location and surrounding counties. Counties represented include: Nevada (11), Butte (58), Lassen (47), Merced (44), Solano (40), Humboldt (35), Shasta (34), Sonoma (30), Yolo (28), Los Angeles (26), San Bernardino (23), Modoc (20), Mariposa (18), San Diego (14), Tulare (7), Marin (6), Tehama (4), Kern (1), Riverside (1), Sierra (1), Sutter (1), and Yuba (1).

Figure 2. Acres Influenced by County. The map shows the location and number of acres Partner Biologists influenced across 22 counties. Counties represented include: Butte (33,243 ac.), Tehama (26,520 ac.), Shasta (20,020 ac.), Lassen (18,513 ac.), Merced (13,974 ac.), Yolo (11,258 ac.), Nevada (7,964 ac.), Sonoma (7,057 ac.), Tulare (6,000 ac.), Yuba (6,000 ac.), Modoc (5,319 ac.), Sutter (4,500 ac.) Mariposa (3,197 ac.), Solano (3,124 ac.), Marin (2,838 ac.), Humboldt (1,905 ac.), San Bernardino (1,170 ac.), Sierra (270 ac.), San Diego (236 ac.), Los Angeles (103 ac.), Kern (16 ac.), and Riverside (1 ac.).

Partner Biologists provided technical assistance, outreach and NRCS planning, contracting, and certification for EQIP, CSP, CIC, and regional RCPP programs. Over the course of the agreement, Partner Biologists conducted conservation planning and inventory for 432 conservation plans. All Partner Biologists received training and ongoing guidance on the use of NRCS inventory methods. Inventory methods used for conservation planning included Wildlife Habitat Evaluation Guides (WHEGs), Stream Visual Assessment Protocol (SVAP), Pollinator Habitat Assessment (PHA), Environmental Evaluations (EE or CPA-52 form), Irrigation Improvement Benefits Tool, Interpreting Indicators of Rangeland Health, Pasture Condition Score Sheet, Soil Health Field Assessment, and forest inventory techniques.

Partner Biologists planned and assisted on wildlife, rangeland, forestry, cropland, and pastureland conservation plans. Over the course of the agreement, Partner Biologists assisted landowners with 307 EQIP applications, 42 CIC applications, and 29 CSP applications. Of those applications, 162 were chosen for NRCS funding and were obligated as contracts. The majority of these projects focused on improving wildlife habitat and watershed conditions in rangeland, forested, and pasture systems. Partner Biologists utilized the full range of NRCS fund pools when submitting conservation plans for funding. Projects focused entirely on wildlife habitat were submitted to Declining Species Wildlife Habitat fundpools and/or RCPP waterbird fundpool. Those conservation plans which included other natural resource concern improvements were often submitted to NRCS regional fund pools, tribal fund pools, Catastrophic Fire Recovery, Water Conservation, and organic fund pools.

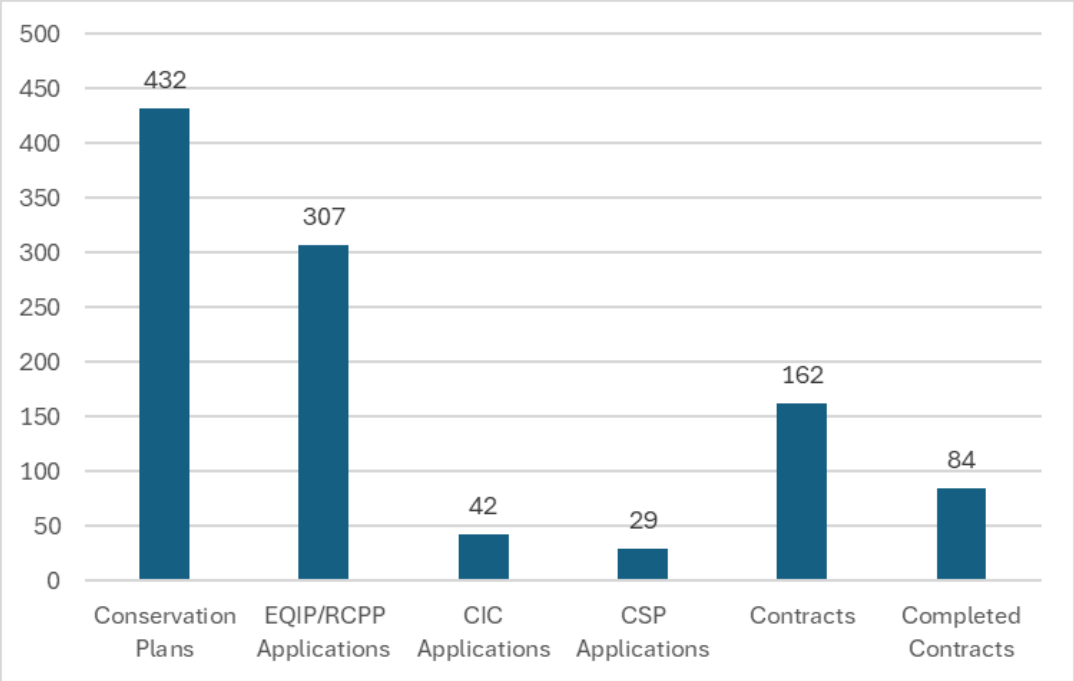


Figure 3. Partner Biologist NRCS Conservation Planning Impacts. Point Blue Partner Biologist planning, application, contracting, and contract completion efforts during the reporting period.

Obtaining certified conservation planner credentials, and appropriate job-approval-authorities (JAA) for practices was coordinated between individual Partner Biologists and field office District Conservationists. Depending on field office workload and District Conservationist prioritization, there was more or less emphasis for individual Partner Biologists to obtain these credentials. Over the course of the agreement, 9 Partner Biologists completed the NRCS Conservation Planner in-person and AgLearn courses, 6 Partner Biologists had at least 2 finalized conservation plans reviewed, and 3 Partner Biologists obtained certified conservation planner credentials. See Appendix B for the complete status of Partner Biologists credential progression.

Obtaining job-approval-authorities was tailored for each Partner Biologist to complement the workload of the field office they were servicing, and emphasize those NRCS key practices involving biological support. Of the eleven Partner Biologists in place at the end of the agreement, 9 had obtained JAA in at least one frequently used practice. Of the practices in which Partner Biologists obtained JAA, 70% are identified as key NRCS practices involving biological support, as identified by NRCS in the original executed contribution agreement.

Practice Number	Practice Name
*314	Brush Management
*315	Herbaceous Weed Treatment
340	Cover Crop
*382	Fence
*390	Riparian Herbaceous Cover
420	Wildlife Habitat Planting
*422	Hedgerow Planting
*516	Livestock Pipeline
528	Prescribed Grazing
533	Pumping Plant
*574	Spring Development
*614	Watering Facility
642	Water Well
*644	Wetland Wildlife Habitat Mng
*645	Upland Wildlife Habitat Mng
*649	Structures for Wildlife
*666	Forest Stand Improvement

Table 1. Partner Biologist JAA. Point Blue Partner Biologists tailored JAA to complement the workload of the office(s) they were serving and those practices best planned with biological support. Practices marked with an asterisk (*) are key NRCS practices identified best planned with biological input and support.

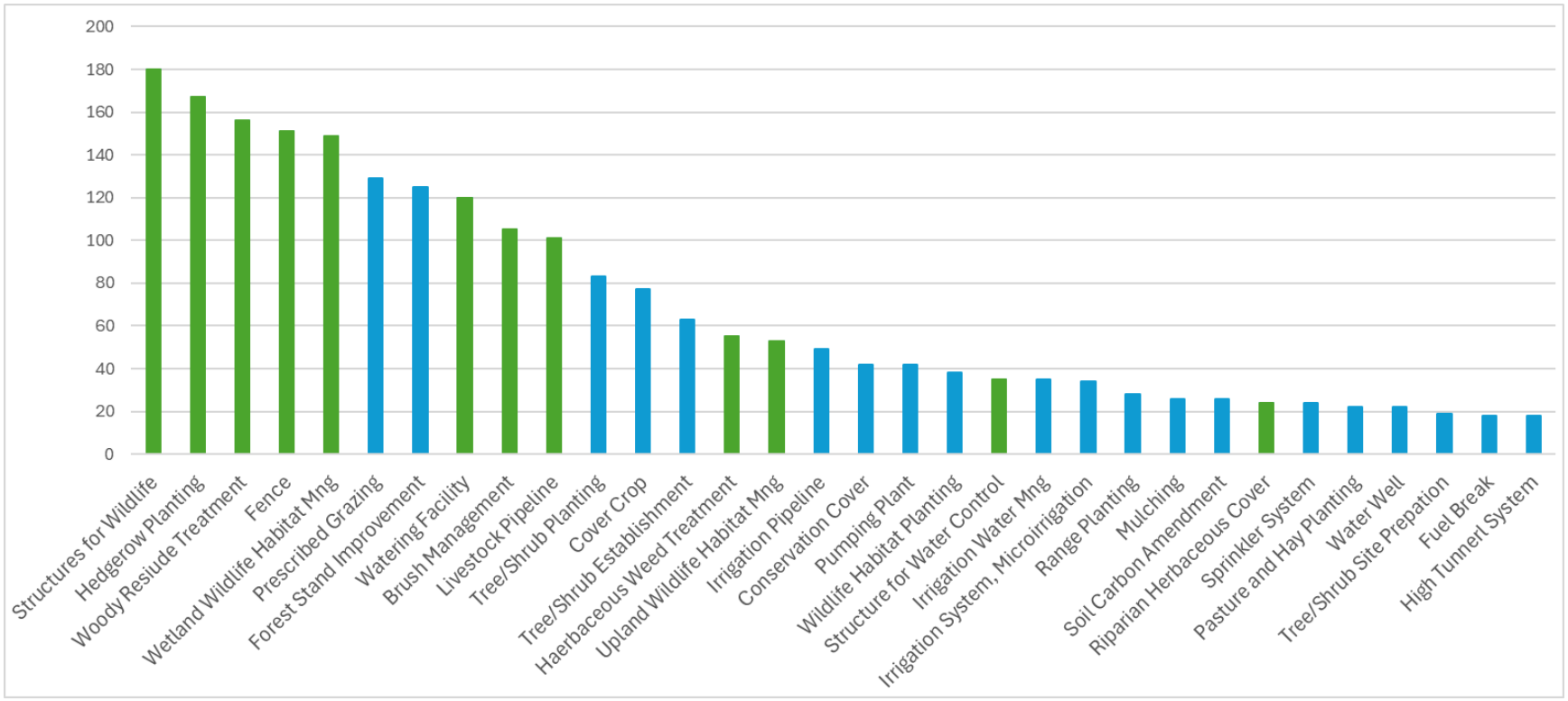


Figure 4. Partner Biologist NRCS Practices Instances. Point Blue Partner Biologists planned, contracted, and certified 2,394 practices during the course of the agreement. The figure above shows those practices with >15 instances of Partner Biologist engagement. The key NRCS practices identified as benefiting from biological support are in green. Notably 80% of the practices most frequently interacted with are key practices for biological support.

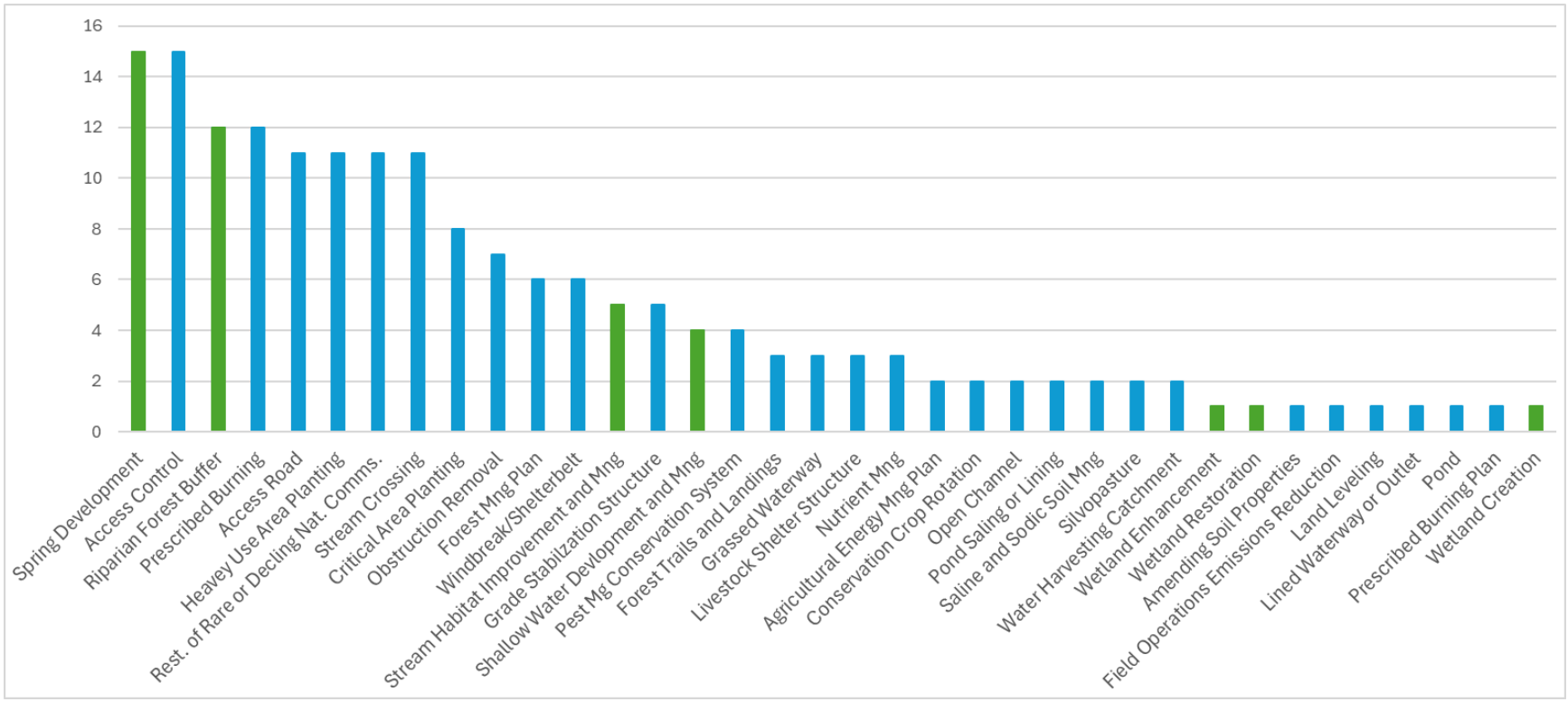


Figure 5. Partner Biologist NRCS Practices Instances. Point Blue Partner Biologists planned, contracted, and certified 2,394 practices during the course of the agreement. The figure above shows those practices with <=15 instances of Partner Biologist engagement. The key NRCS practices identified as benefiting from biological support are in green. Notably 80% of the practices most frequently interacted with are key practices for biological support.

Partner Biologists served as lead planners and often provided a multi-disciplinary approach to conservation planning activities. They also assisted other NRCS field office staff with inspecting, measuring, and certifying NRCS project work in accordance with NRCS Practice Standards, Specifications and Implementation Requirements. Over the course of the agreement, Partner Biologists planned, contracted or certified 2,394 NRCS practices. The practices Partner Biologists most frequently interacted with included (649) Structures for Wildlife, (422) Hedgerow Planting, (384) Woody Residue Treatment, (382) Fence, and (644) Wetland Wildlife Habitat Management - all key NRCS practices identified as benefiting from biological support. When certifying a practice, Partner Biologists followed JAA guidance infield review, measurement and certification and reviewed documentation for accuracy, compliance with regulations, and justification of requests for payment.

Partner Biologists received training and support through approved NRCS training, AgLearn courses, and NRCS biology teleconferences and meetings on the 9-steps of NRCS Conservation Planning, NRCS inventory tools, NRCS program administration, and NRCS wildlife practices. Point Blue support staff provided additional training on ecological principles, standardized data collection, reading the landscape to identify opportunities for natural resource enhancement, and building trusting relationships with landowners in order to foster a landowner ethic.

The emphasis on continued training, support and mentorship for the Partner Biologist team has proven successful in employee retention for the program and often lead to Partner Biologists being the most veteran NRCS field office member. Partner Biologists regularly provided guidance and training to new NRCS Biologists and other field office staff. Areas of training included wildlife and plant identification, ecology of California ecosystems, building trust and maintaining relationships with private landowners, the conservation planning process, resource assessment tools (WHEG, SVAP2, Pollinator Habitat), planning and implementation requirements of biological practices (e.g., curating species lists, seed mixes, site prep, etc.), knowledge of agricultural systems and their associated resource concerns, building connections with local resources and partners, and easement monitoring requirements. NRCS Biologists placed in the Eureka, Oroville, Redding, Susanville, and Woodland field offices were paired with Point Blue Partner Biologists for job-shadowing and mentorship.

Additionally, Partner Biologists were well-adept at conducting biological inventory and monitoring activities related to National Environmental Protection Act (NEPA) compliance and provided guidance for potential impacts of planned conservation practices on Threatened and Endangered (T&E) species. Area 2 Partner Biologists, in particular, frequently assisted with appending projects to Biological Opinions (BO),

focusing on protection and benefit of distinct populations of California Tiger Salamander and Red-legged Frogs in grasslands and savannas.

Monitoring NRCS Conservation Practices

The ninth step of NRCS Conservation Planning is to evaluate the conservation plan as to its effectiveness and work with the NRCS customers to make adjustments as needed. A value-added skill Point Blue brought to the contribution agreement was a framework, methodology and support team to complete ecological monitoring on participating NRCS customer properties in order to inform adaptive management.

Rangeland Monitoring Network

Point Blue's Rangeland Monitoring Network seeks to understand and measure ecological function of rangelands and increase communication and collaboration among managers across California. We assess ecological function by collecting information on birds, vegetation, and soil dynamic properties in a standardized way at each monitoring location, which allows us to measure the ecosystem response to NRCS conservation practice implementation. To date, 105 rangeland properties are in the Rangeland Monitoring Network, of which 81% have participated in NRCS conservation programs.

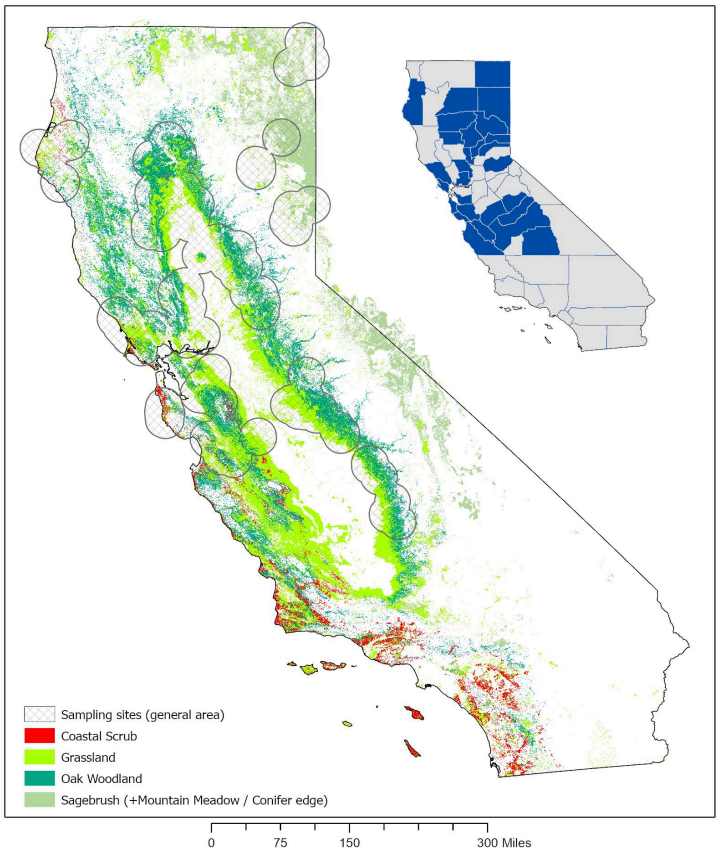


Figure 6. Rangeland Monitoring Network. As of 2022, 105 rangeland properties across 28 counties have participated in the Rangeland Monitoring Network. During 2020 - 2023 Partner Biologists collected bird, vegetation, and soil data on 60 properties and created landowner letters tailored for each property to interpret the data and recommend management practices to improve ecological function. Data is collected and stored securely and aggregated and analyzed anonymously across the network to measure the variation in ecological function across rangelands and to make larger inferences about rangeland management practices and ecological function.

During the reporting period, Partner Biologists collected ecological data, analyzed and interpreted, and discussed results and management actions and changes with 60 rangeland owners with NRCS conservation plans. Partner Biologists create ranch-specific landowner letters for each property to share results and discuss management implications and provide suggestions for practices or management actions that can improve ecological function. Landowner letters provide evaluation of active NRCS contracts, document history and resource inventory to support new NRCS applications See Appendix C for an example landowner letter.

TASK 2: FARM BILL EASEMENT ACTIVITIES

In addition to Task 1. Working Lands Conservation, applicable field office locations were identified for Partner Biologist Farm Bill Easement activities support. A total of 58 properties with easements totaling over 27,000 acres were monitored by Partner Biologists across 8 counties. While Partner Biologists provided program and applicant support primarily for the Wetland Reserve Easement (WRE), there was one instance of monitoring support for the Emergency Watershed Protection Program - Floodplain Easement Option (EWPP-FPE) and Grassland Reserve Easement (GRE) programs.

County	Easement Properties	Easement Acres
Butte	3	1,265.4
Del Norte	1	147.6
Humboldt	18	2,344.0
Lassen	11	5,577.4
Mendocino	1	83.1
Merced	7	2,759.0
Modoc	13	13,537.2
Plumas	1	65.6
Tehama	5	3,549.3
Total	**60**	**29,328.6**

Table 2. Counties with Partner Biologist Monitored Easements. Point Blue Partner Biologists monitored 60 different properties and over 29,000 acres with NRCS easements.

Partner Biologists completed site visits, biological assessments and due diligence work for 37 WRE applications and ushered 12 of these applications to completed contracts. Partner Biologists provided restoration planning assistance for 48 active and new easements . A Wetland Reserve Plan of Operations (WRPO) was completed for 6 easements, and 70 grazing plans and/or Compatible Use Agreements (CUAs) were developed. Partner Biologists completed Environmental Evaluations for WRE

management, enhancement, and restoration activities and assisted with permitting activities for 4 easements where it was required to implement restoration activities. Partner Biologists played a very active role in annual monitoring compliance for WREs in Area 1 and 2, completing 208 annual monitoring sheets over the course of the agreement and completed Practice Requirements and certified practices upon completion..

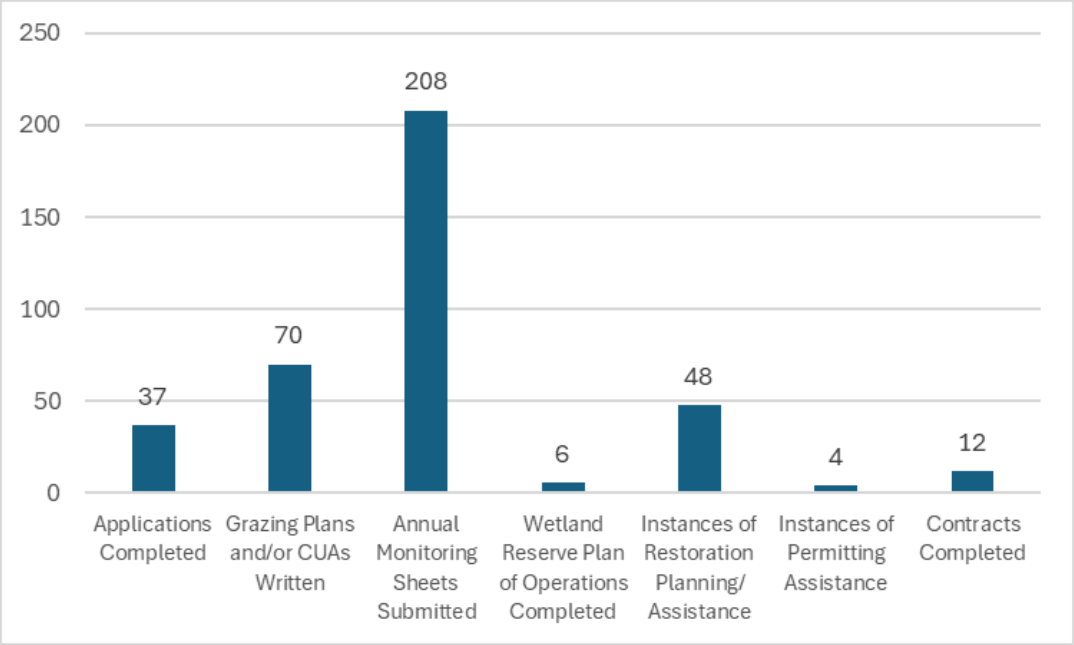


Figure 6. Partner Biologist NRCS Farm Bill Easement Impact. Point Blue Partner Biologist application, grazing plan, CUA, annual monitoring, WRPO, restoration planning, permitting assistance and contract completion efforts during the reporting period.

Partner Biologists participated in NRCS Easement Program training when offered and prioritized attendance and facilitation of outreach meetings in conjunction with NRCS field office, RCDs, and other local partners.

GROWING CONSERVATION IMPACT

Point Blue contributed 41.8% ($1,645,738) of the total funding to support the Partner Biologist program through the match funding sources over the life span of the contribution agreement. Long-term sustainability of the Point Blue/NRCS partnership required a focused funding strategy to provide the non-federal match through a blend of private and state sources. When we look to other states in the U.S. that have long-term partnership programs focused on private land conservation like ours, the most successful are supported by state and federal sources, with an NGO serving as the connection point. Across our partnership, our match funding sources include:

- CDFA Healthy Soils Demonstration projects
- CDFA Technical Assistance grant
- RCD subcontracts
- Private philanthropy
- Research grants
- Land Trust grants

Contract deliverables associated with these match funding sources overlapped with NRCS-stated objectives for the Partner Biologist positions and increased outreach and/or participation in NRCS conservation programs. Through these match funding sources, Partner Biologists planned and facilitated community building events and field days for agricultural producers to discuss soil health, building wildlife habitat, and implementing NRCS practices. Partner Biologists gave presentations at conferences such as CARCD, Society for Range Management, The Wildlife Society, CDFA Healthy Soils field days, and local invited presentations where we shared scientific outcomes from the Rangeland Monitoring Network as well as about our partnership with NRCS.

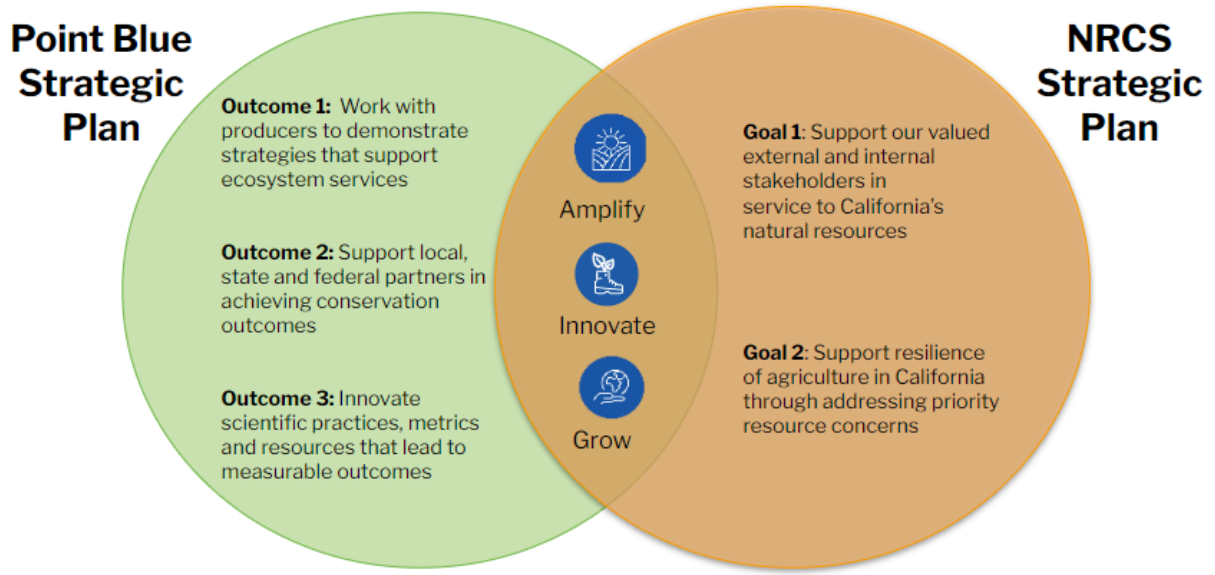


Figure 7. Point Blue and NRCS Complementing Objectives and Goals. Point Blue and NRCS shared goals help each organization accelerate conservation on the ground.

Partner Biologists acted as "community connectors" within each of their geographies, leveraging match-funding activities as opportunities to outreach for NRCS technical and funding assistance and expand conservation impact. These activities included:

- Building trust with tribes and partnering to bring science to their natural resource management or support food sovereignty

- Integrating Diversity, Equity, Inclusion (DEI) values and principles into their approach to conservation
- Valuing all forms of conservation, including Traditional Ecological Knowledge (TEK) and developing our understanding and use of cultural and prescribed fire.
- Participating in locally-led conservation and natural resource protection groups including:
    - Prescribed Burn Associations (PBAs)
    - Land Trust committees and boards
    - Fire Safe Councils
    - Local working groups
    - Master Gardener program
- Developing and participating in community action groups to support urban agriculture
- Partnering with local organizations and ranches to develop, monitor, and share results from CDFA Healthy Soils Demonstration projects
- Partnering with UCCE and UCANR to host and lead workshops for producers focused on land stewardship and management practices to improve water quality and quantity, forage quality and quantity, animal welfare, and soil health
- Mentoring community youth through programs such as Center for Land Based Learning's SLEWS program, which engages students in on-farm restoration projects

We are proud of the Partner Biologists' value-added activities and believe they will have lasting impact in their communities.

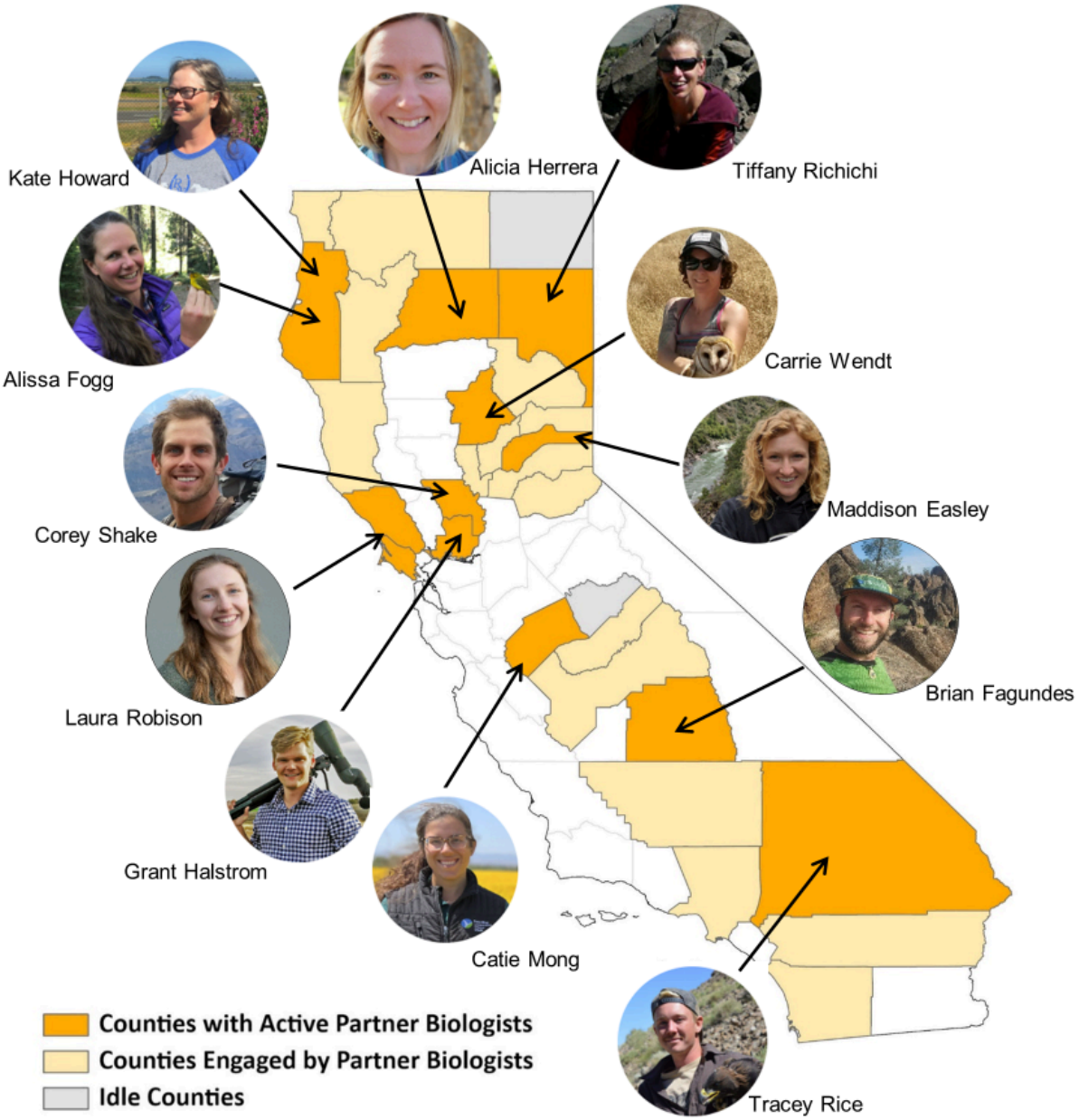
CONCLUSION

Point Blue is grateful to the NRCS, producers and other partners for allowing us to collaborate on implementing conservation across much of California's working lands. Point Blue is proud to support efforts to benefit soil, water, air, plant, animal, energy, and human resources. Point Blue and NRCS have built a strong partnership over our twelve-year history and we look forward to continuing to grow our collaborative efforts and complementary programs. Working together we have had a greater impact on the health, diversity, and productivity of California's natural resource protection and have accelerated conservation on the ground.

We welcome feedback regarding the content and/or formatting of this report. If you have any questions about this Final Report, please contact Point Blue Working Lands Group Director, Bonnie Eyestone, beyestone@pointblue.org or Point Blue

Working Lands Programs Coordinator and Sr Partner Biologist Alicia Herrera, aherrera@pointblue.org. Thank you!

APPENDIX A: Partner Biologist personnel and field office locations, February 2024



APPENDIX B: Point Blue Partner Biologist certified planner credentials

Partner Biologist	Field Office	Hire Date	CP Course Completed	Plans Completed	Plans Reviewed	Certified Planner
Alicia Herrera	Redding	2011	Yes	3	3	Yes
Tiffany Russell	Susanville	2012	Yes	3	3	Yes
Corey Shake	Woodland	2013	Yes	3	3	Yes
Kate Howard	Eureka	2015	Yes	2	2	No
Carrie Wendt	Oroville	2016	Yes	2	2	No
Cathryn Mong	Merced	2020	Yes	0	0	No
Maddison Easley	Grass Valley	2020	Yes	1	0	No
Grant Halstrom	Vacaville	2021	Yes	2	0	No
Tracey Rice	Victorville	2021	No	1	0	No
Brian Fagundes	Visalia	2023	No	0	0	No
Laura Robison	Petaluma	2023	No	0	0	No
Bree Peterson (Schnelle)	*Alturas*	*No longer w/Point Blue*	*Yes*	*2*	*2*	*No*
Elaina Cromer	*Mariposa*	*No longer w/Point Blue*	*Yes*	*0*	*0*	*No*
Qaim Naqvi	*Petaluma*	*No longer w/Point Blue*	*No*	*0*	*0*	*No*
Taj Hittenberger	*Petaluma*	*No longer w/Point Blue*	*No*	*0*	*0*	*No*

APPENDIX C: Example RMN landowner letter

The attached landowner letter is being shared with landowner permission The landowner letter appendices have been excluded to reduce the number of pages.. The landowner had an active NRCS contract and initial implemented practices were included in RMN data evaluation. Similar to all RMN participating ranches, the Partner Biologist will revisit the ranch in 3 years to collect another round of standardized RMN ecological data and use that data to further evaluate NRCS installed practice, analyze trends in soil health metrics, vegetation communities, and local bird populations, and recommend additional actions or management practices that could benefit the overall health and productivity of the property..

FLEENER CREEK
2022 Ecological Report

Rangeland Monitoring Network

Point Blue Conservation Science

Howard, Kate
khoward@pointblue.org

Dear Pedrotti Family:

Firstly, we would like to thank you for the opportunity to work with you on your amazing family ranch in Centerville. The purpose of this letter is to provide you with an overview of what we learned from our initial year of ecological monitoring at Fleener Creek, and based on our findings, provide you with a list of potential management recommendations for your consideration. Over time, resampling efforts can help reveal successes and opportunities associated with past and future restoration efforts and general land health. This initial letter is quite long and contains a large amount of information. Future versions will be short and focused on comparisons of this baseline data to future data we collect.

During the 2022 sampling season, we collected data from 7 sites (Fig 1). We performed point counts twice during the breeding season for all sites, as well as vegetation and soil samples at two of the sites. Sampling was conducted as part of Point Blue Conservation Science's Rangeland Monitoring Network (RMN). RMN measures ecological function on rangelands across California to:

- Establish baselines for monitoring change
- Evaluate the ecological effects of grazing and other management practices
- Provide information to landowners to help guide decision-making
- Understand the relationships among ecological metrics

As you know, your ranch consists primarily of coastal mixed conifer with open coastal prairie, shrubland, and a riparian area along Fleener Creek. Our sampling points are distributed throughout the grazed acreage and will serve as baseline monitoring for any management that may occur to address specific goals.

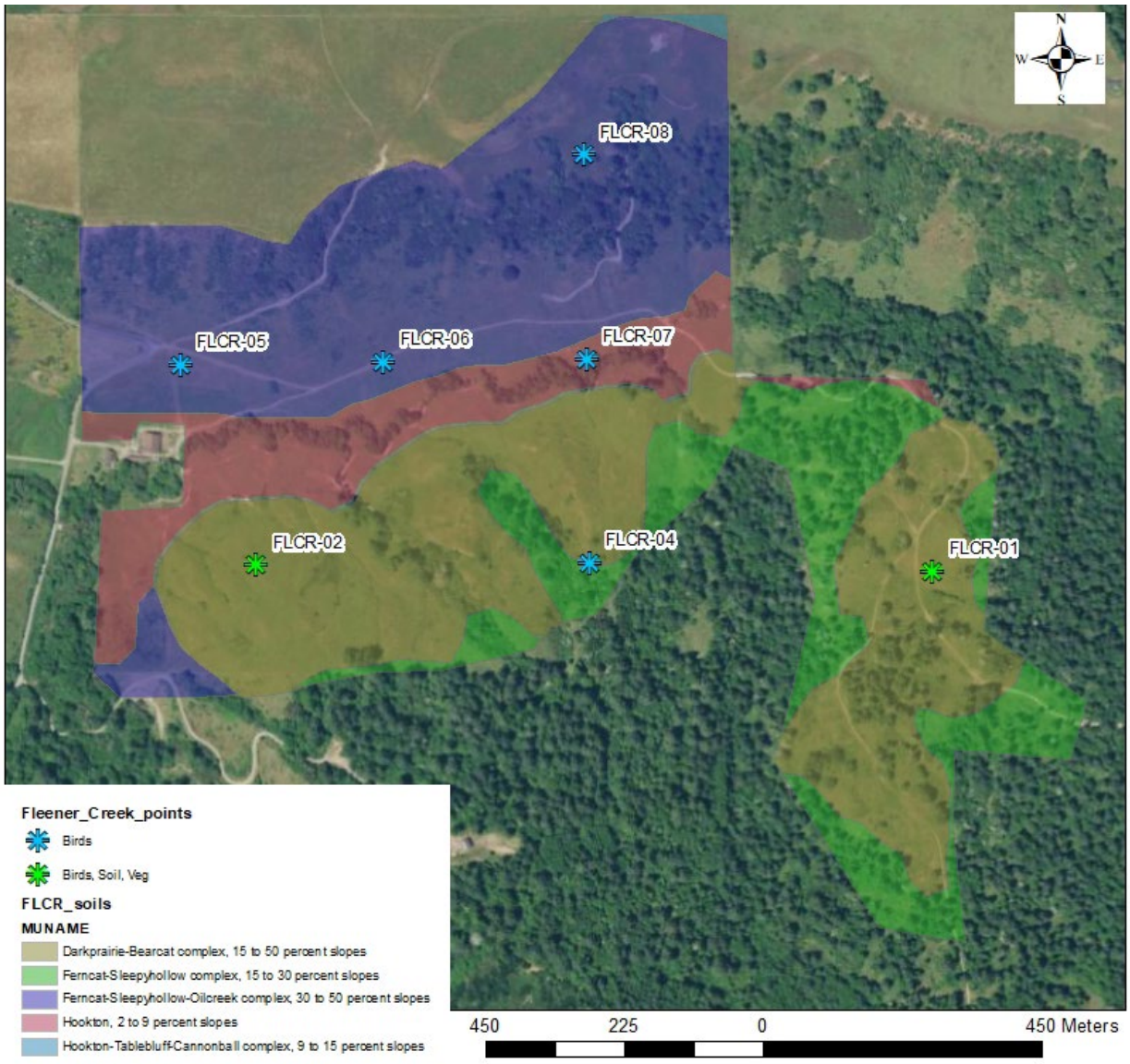


Figure 1: Map of Fleener Creek with soil type and Sampling Points from 2022.

Birds are commonly found in most habitat types and can serve as excellent indicators of habitat health. Since different birds use different habitat features and canopy layers for nesting, cover, and foraging, they are a useful tool for guiding management decisions. Bird "**focal species**" are common birds that represent a specific association with each of the habitat features and layers in a highly functional habitat (Fig. 2). By recording species richness (number of different species) and abundance (number of birds at a given location) of the focal species on your property and tracking changes in these numbers over time, we can identify areas of higher and lower bird use on your ranch and suggest management alternatives to improve habitat value for wildlife.

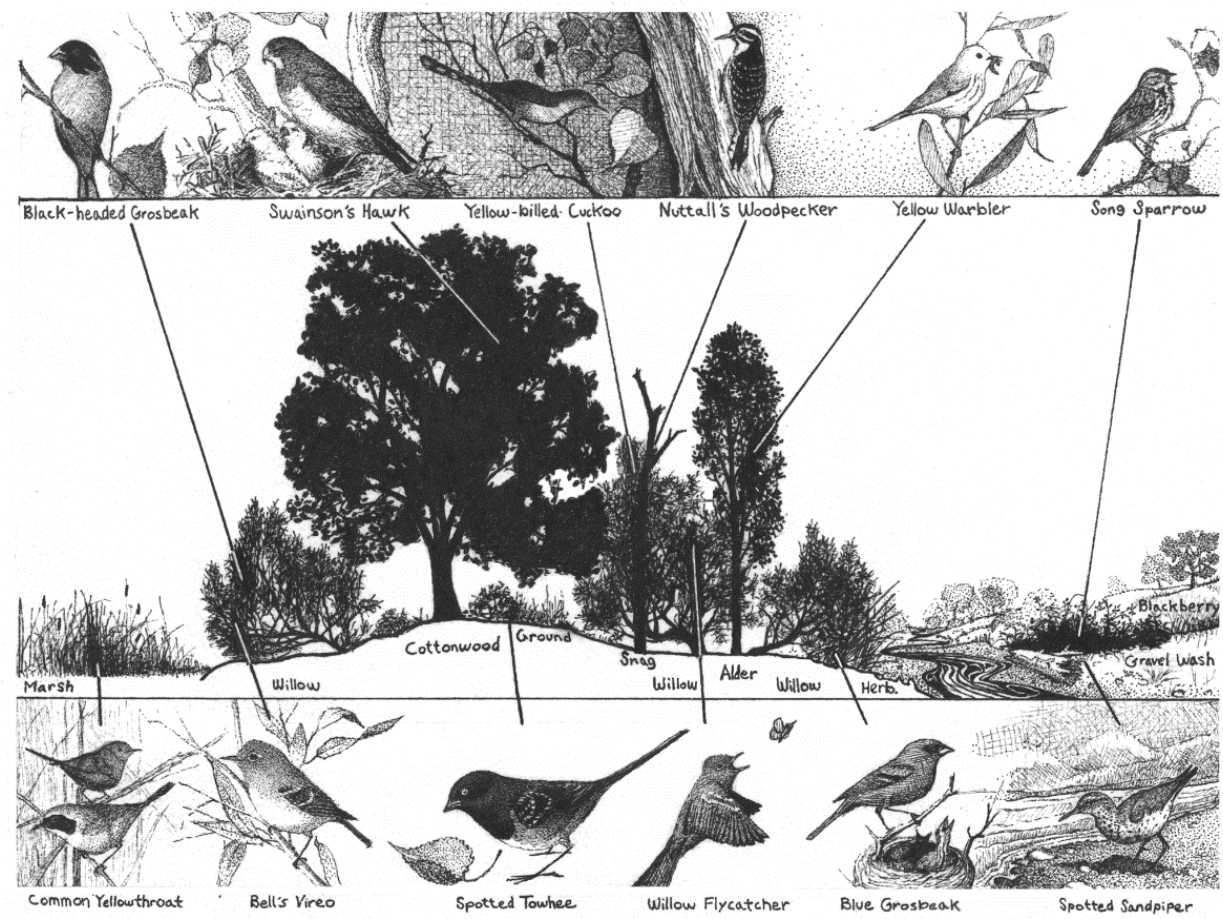


Figure 2: Different focal species use different layers in riparian habitats. A healthy system needs diverse vegetative structure to best support wildlife.

The focal species concept has been developed for many CA habitat types, but of course the North Coast is fairly unique. Appendix A contains lists of Bird Focal Species for Grassland, Riparian and Conifer habitats with notes for Humboldt County. The focal bird species we surveyed for represent a rich diversity of natural life cycles: many of the birds are cavity-nesting species, either as primary cavity-nesters (able to excavate cavities themselves i.e. woodpeckers) or secondary cavity-nesters (these do not excavate, they rely on natural and woodpecker-created cavities instead); some are migratory, others are not; some are primarily seed eaters, others are primarily insectivores.

Riparian habitat (vegetation in and directly adjacent to streams and other bodies of water) hosts an exceptional diversity of life, and also serves a valuable role of performing biological and physical functions at a disproportionately high rate compared to its footprint on the landscape. In

addition to providing a source of water, shade, and late season forage for livestock, healthy riparian areas offer migration stopover sites or breeding and wintering grounds for over 225 species of wildlife in California and are an integral part of the transportation and filtration of water and storage of carbon. By stabilizing stream and riverbanks, riparian vegetation regulates water flow and velocity, which in turn minimizes soil erosion, regulates water temperature, and physically and biologically processes pollutants and sediment to maintain water quality.

Bird Point Count Summary:

We surveyed the breeding bird community using a point count method that is standardized (Rangeland Monitoring Network Handbook, Appendix B). This method is intended to most accurately capture information about breeding songbirds which have smaller territories, rather than species such as raptors and waterbirds. While doing our surveys, we observed a total of 44 species; see Appendix C for full species list. Our point count data for 2022 is summarized into total species richness by point in Figure 3. Figure 4 depicts the abundance of riparian focal species. FLCR-04 and FLCR-08 tied for the highest species richness.

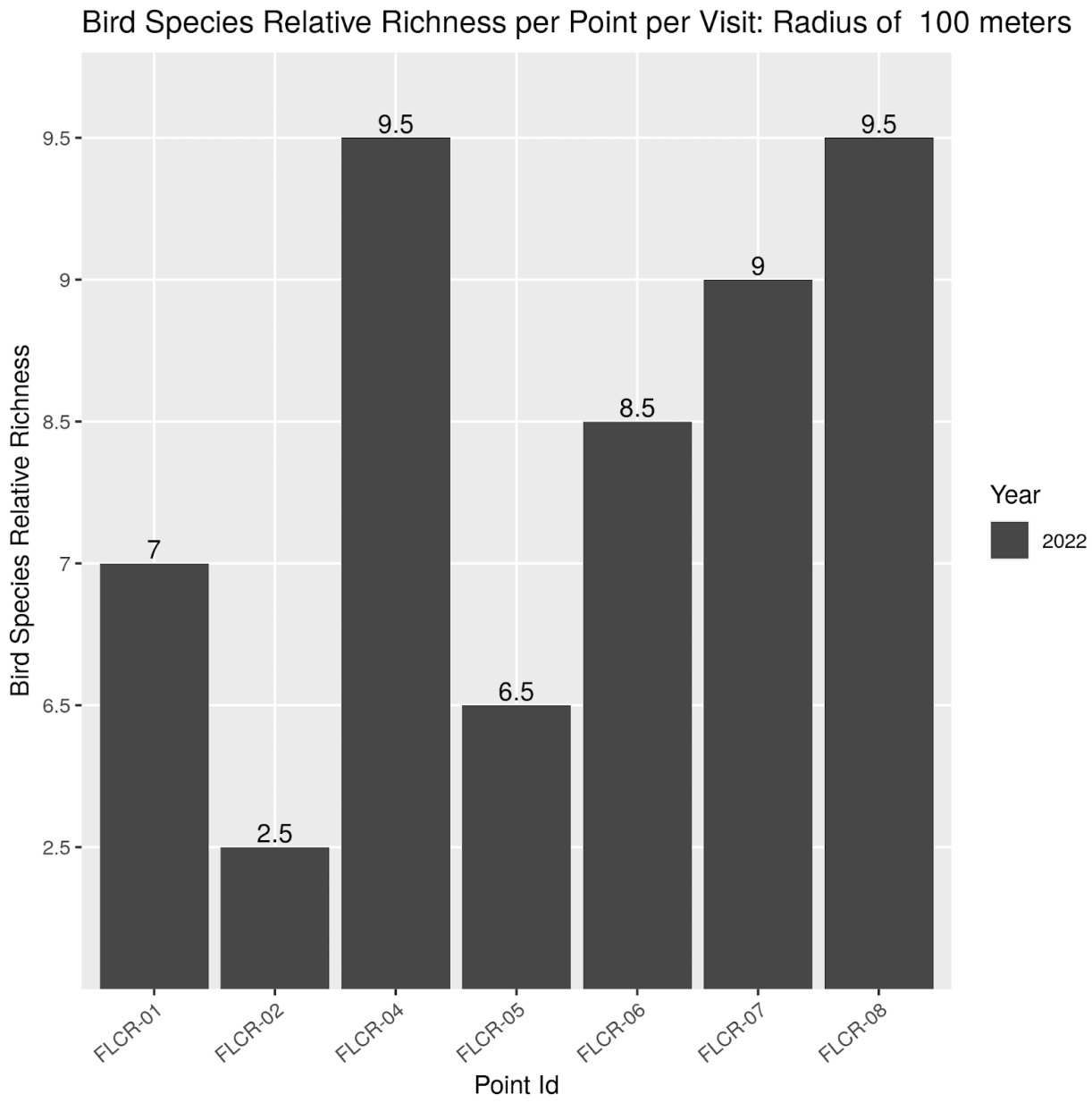


Figure 3: Relative bird species richness detected on point counts in 2022. This measures the number of species at each point.

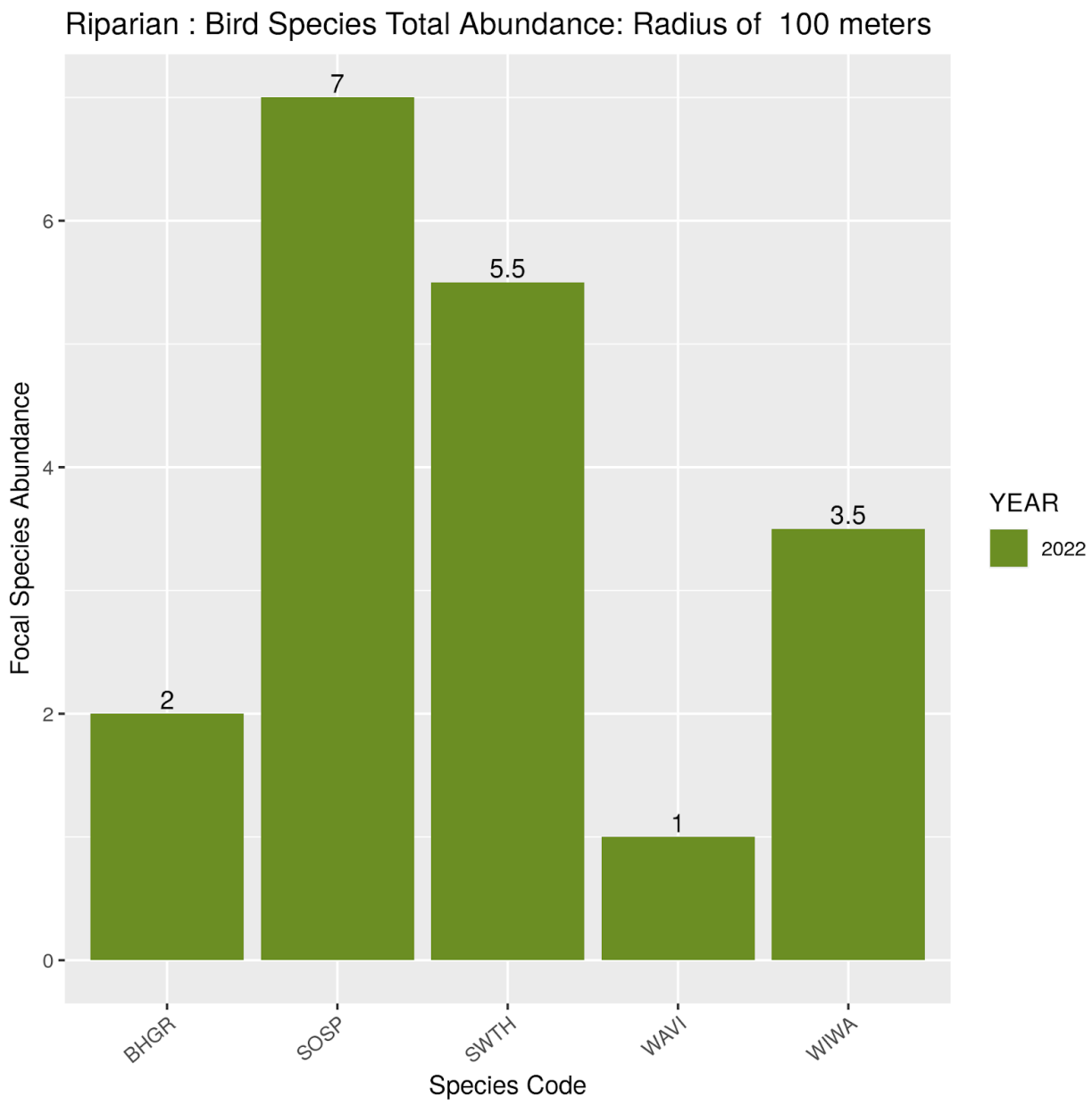


Figure 4: Riparian Focal Species abundance across the ranch. BHGR=Black-headed Grosbeak; SOSP=Song Sparrow; SWTH=Swainson's Thrush; WAVI=Warbling Vireo; WIWA=Wilson's Warbler. This looks at the number of focal species across points on the ranch.

These results indicate that by and large, birds love your ranch! This is a really wonderful thing. Birds aren't just good indicator species of overall habitat health, but they often provide services such as pest control. Swallows primarily eat flying insects, particularly mosquitoes, and you have loads of these guys. American Kestrels, North America's smallest falcon and a secondary cavity-nester, are excellent grasshopper eaters; despite not picking them up on surveys they have been

detected on the ranch. Same for Red-tailed Hawks; we did see a few and know they are around and they can help with gopher problems. The presence of certain focal species birds gives us information about what habitat elements are in abundance on your property while their absence can indicate what might be in need. In some cases, focal species for a given habitat type are simply out of range in our county, like Blue Grosbeak, so we wouldn't expect to find them regardless of habitat availability. Some species only winter here or aren't detected well by our point count methods since they aren't breeding songbirds. This information is helpful over time to recognize trends which can help to highlight any concerns that may need to be addressed.

Vegetation Summary:

We sampled herbaceous vegetation at two of the sites. We did a standardized Line-Point-Intercept (Rangeland Monitoring Network Handbook, Appendix B) which gives us a measure of soil cover and plant species composition. We detected 68 plant species, though some were only identifiable to genus; see Appendix C for full species list. We detected more non-native plants species (52) than native plant species (16), but that's quite typical of our RMN ranches.

Native violet, Viola adunca, growing on a steep cutback.

In addition to assessing the species composition of the vegetation community, it can also be helpful to assess the vegetation from a functional group standpoint. **Functional groups** are groupings of plants based on the role they play in their ecosystem (such as perennial grasses with deep root systems that stabilize soil and stay green into the summer, or clovers that fix nitrogen, etc). Your property has a very decent proportion of perennial grasses (Fig. 8), which is highly desirable. Maintaining or even increasing perennials is one of our main goals in managing for healthy ecosystems. Over time we

can compare across years and see changes in these ratios in response to background climate variations and to active management decisions.

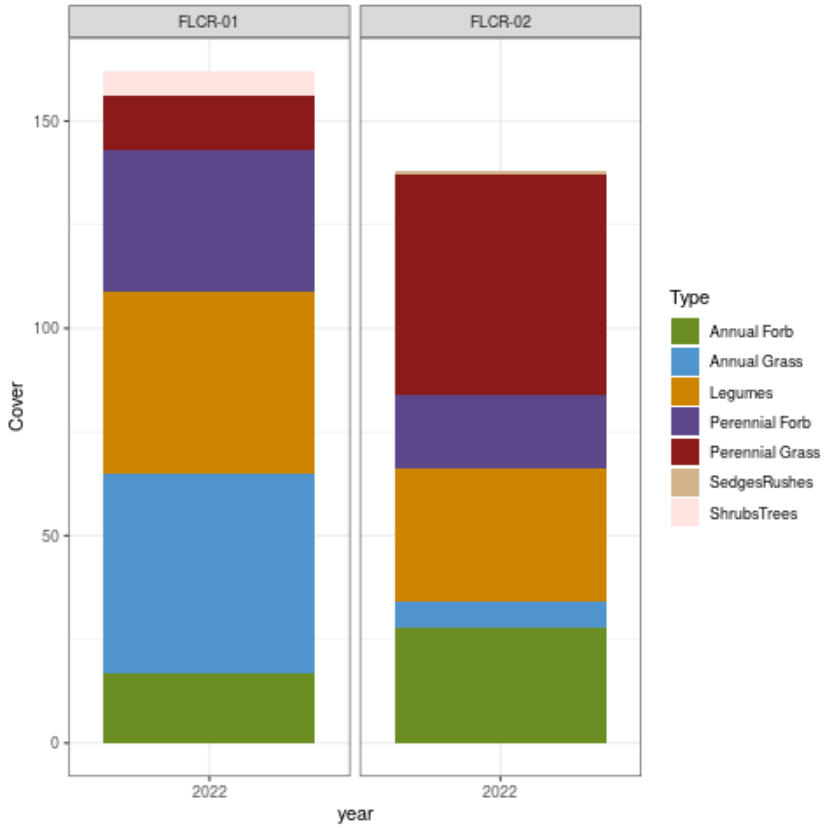


Figure 8: Plant Community Composition as Functional Groups

Figure 9 depicts a cover summary and your species richness. From a diversity point of view, your herbaceous species richness is highest at FLCR-01. In general, keeping diversity as high as possible is a good management goal for healthy systems. Plant diversity is good for your livestock because it allows them to have options for feed that meet differing nutritional requirements, and it's also fantastic for wildlife.

We detected little to no bare ground at the locations which we sampled on your ranch; however there may still be locations on your ranch with bare ground, and bare ground may also be more or less prevalent depending on the time of the year. Keeping an eye on bare areas that do show up and working to keep the soil covered at all times is likely one of the most important things we can do to maintain and improve soil health. The best cover for the soil is provided by living

plants with root systems that stabilize the ground, but in cases where bare ground shows up despite best efforts or following specific management actions like brush removal, covering the soil with a little mulch like chipped debris or straw can go a long way.

Litter is defined as the previous year's dead plant material that's in contact with the soil and going through the slow process of breaking down and being incorporated into the soil. Generally speaking, more is better; litter ultimately contributes to soil organic matter (SOM). This is one of the reasons trampling at higher stock densities is a big help to us, because the hoof action helps bring plant material into contact with the soil. Litter at FLCR-01 was below 20% and FLCR-02 was below 10. This is an area where installation of the infrastructure with your NRCS contract that will help facilitate better rotations and will hopefully yield some improvements over time.

Thatch is defined as the previous year's dead plant material that's still standing, not in contact with the soil. Thatch from desirable annual grasses is your Residual Dry Matter (RDM), which is critically important in helping cover and protect the soils. Generally, we would like to see RDM levels higher on steeper slopes, but thatch buildup from invasive species is undesirable because many of these species operate by choking out their competition, like medusahead. You don't have any significant thatch at either of the points we sampled, nor did we detect any of the highly undesirable invasive species. Again, the increased ability to rotate will help facilitate being able to leave higher amounts of RDM in future seasons.

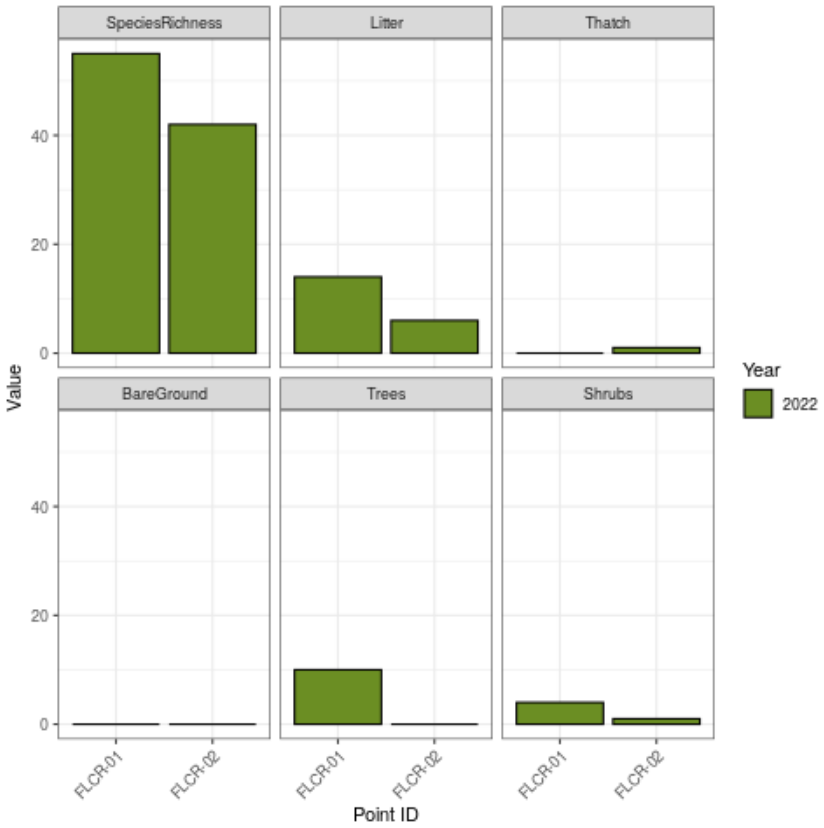


Figure 9: Percent cover summary for species richness, litter, thatch, bare ground, trees, and shrubs.

Soil Summary:

We sampled soil dynamic properties at the same two points where we sampled vegetation. Soil dynamic properties are those that are sensitive to management and can change in relatively short amounts of time (e.g., years instead of decades or centuries). We measured water infiltration, soil organic carbon, bulk density, as well as soil texture. Soil texture is not a dynamic property, but it is still important to consider when making management decisions and knowing your soil texture allows us to compare like soil textural attributes. Appendix D is a Natural Resources Conservation Service (NRCS) soil report for your ranch.

Soil texture (or the % sand, silt and clay of the mineral soil) is one in the *inherent* properties of soils. It is not sensitive to management, however it can influence the amount of water the soil can hold, the rate of water movement through the soil (infiltration/drainage), how responsive that soil is to management, and soil fertility, so it provides context for management decisions based on soil dynamic property expectations and targets. For example, soils higher in clay are often higher

in organic carbon. Results from your property (Fig. 10) show your soils are predominantly loams which exhibit the properties of sand, silt, and clay fairly evenly.

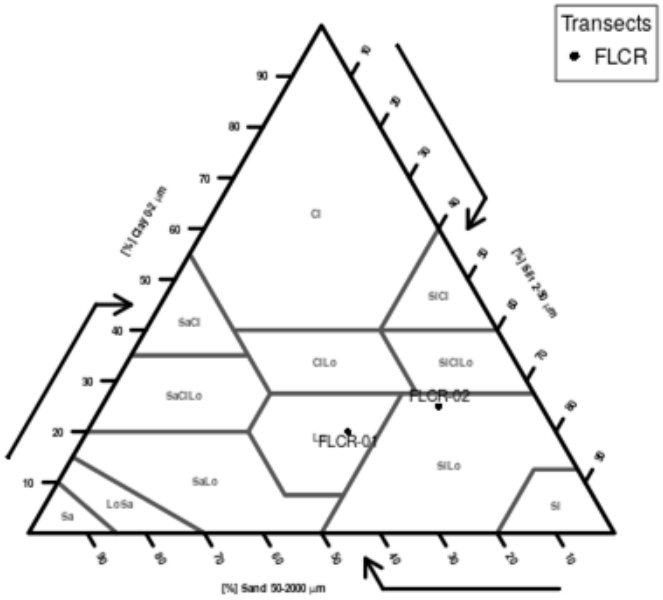


Figure 10: Soil Texture.

Soil organic carbon (SOC) is the main building block (~58%) of soil organic matter (SOM). Organic carbon in the soil provides multiple ecological benefits; it stores water, provides structure to store nutrients and microorganisms, etc. An advantage to measuring carbon is that SOM is arguably the cornerstone of ecological function on rangelands, thus what better than to measure it directly? While we don't (yet) have targets for SOM/SOC for California rangelands, our RMN data in non-peat soils ranges from 0.9 to 8.3 % in the top 10 cm and 0.3 to 3.3% in the 10 to 40 cm depth. Results from your ranch (Fig. 11) show SOM ranging from 3.5 to 5.5 in the top 10 cm and 1.6 to 2.7 in the 10 to 40 cm depth, which is quite high for CA, and fairly typical for the north coast. This is an active area of study. SOM/SOC appear to be strongly associated with temperature and precipitation, so it is not surprising that the North Coast RMN points tend to have higher SOM than those from Sacramento and San Joaquin Valley.

One percent soil organic matter (SOM) holds around 16,500 gal/acre of water. For every 19 acres that boost SOM by 1%, you are storing an acre foot of additional water in the soil profile. If you can grow one more ounce of forage per square foot, that's over 2700 lbs of forage per acre @ let's just say $12/bale for 100lb bales = $240 /ton, therefore *100 acres could produce $32400 in additional forage*. More importantly, since you don't feed much hay in most cases already, you are increasing your carbon storage in the soil. When it's economically AND ecologically beneficial, that's a real win-win! In reality, one of the trends we've observed in the data collected across the Network so far is that soil carbon on average is declining in many parts of CA, likely in response to sustained drought. This indicates that just maintaining your soil carbon through ever increasing drought periods will be critical, particularly since yours is quite high.

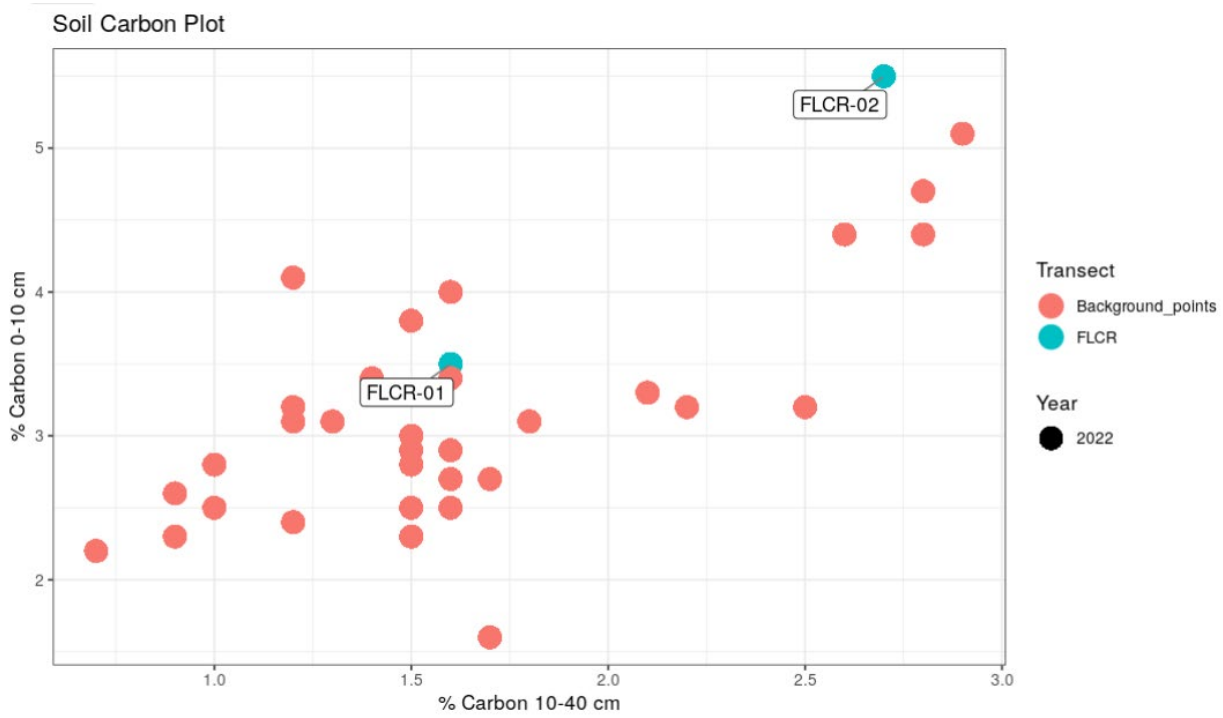


Figure 11: Soils rich in organic carbon have aggregates and structure that provide pore space for plant germination and growth and water capture and retention; thus building and retaining SOC is desirable. Background points are from other ranches in the Network in the North and Central Coast.

Water infiltration is the process of water entering the soil. The single ring infiltrometer is the preferred way to measure water infiltration which is commonly recommended as a soil metric. While it is easy, intuitive, and there's no lab work involved, it's highly variable and influenced

by many factors (compaction, vegetation, texture, etc.), making it “noisy.” As far as what is “good”, the NRCS Soil Quality Test Kit Guide provides very general reference values for infiltration, however it is not specific to soil texture. In general, ten minutes or less for 1 inch of water to enter the soil is considered fast. The faster water infiltrates, the less opportunity for run-off and erosion and the greater the opportunity for water capture in the soil profile, therefore fast infiltration times are desirable.

Bulk density is a commonly used measure of soil compaction. It is the dry weight per volume of soil. We take a small core sample, dry it, sift out the rocks and weigh it. This gives us grams of soil per milliliter (mL). It does vary with soil texture, so must be interpreted with texture data. Generally, the lower values mean less compaction. The NRCS Soil Quality Test Kit guide gives reference values for bulk density by soil type. A bulk density of 1.1 or below is good for clay soils; a bulk density of 1.4 or below is good for sandy soils. A bulk density less than 1 is typical of peat soils.

Water infiltration and bulk density are both measures of soil compaction. FlLCR-02 is below the line of the target infiltration time and to the far left indicating it has low to no compaction issues; FLCR-01 may have some compaction issues (Fig. 12). The history of the land use helps us interpret this, as well as repeated monitoring over time.

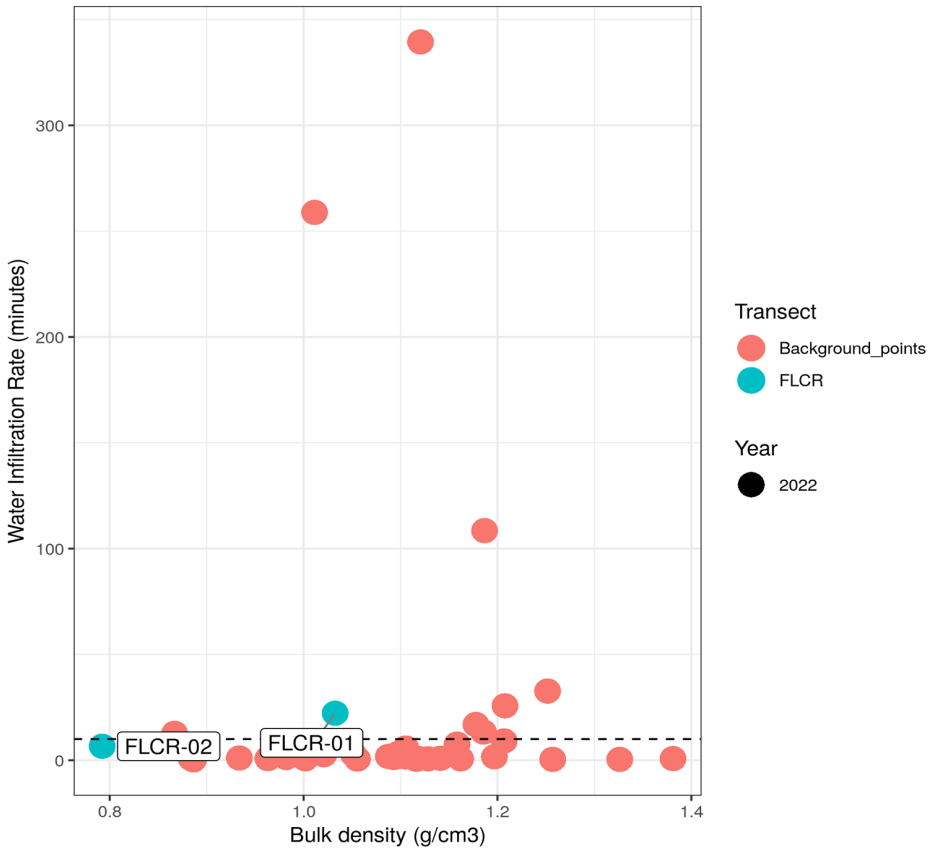


Figure 12: Soil compaction is a measure of how tightly soil particles are packed together. Bulk density is the weight per volume of soil and water infiltration is the time it takes a standard amount of water to enter the soil. These two measurements together give us a profile of the soil's compaction.

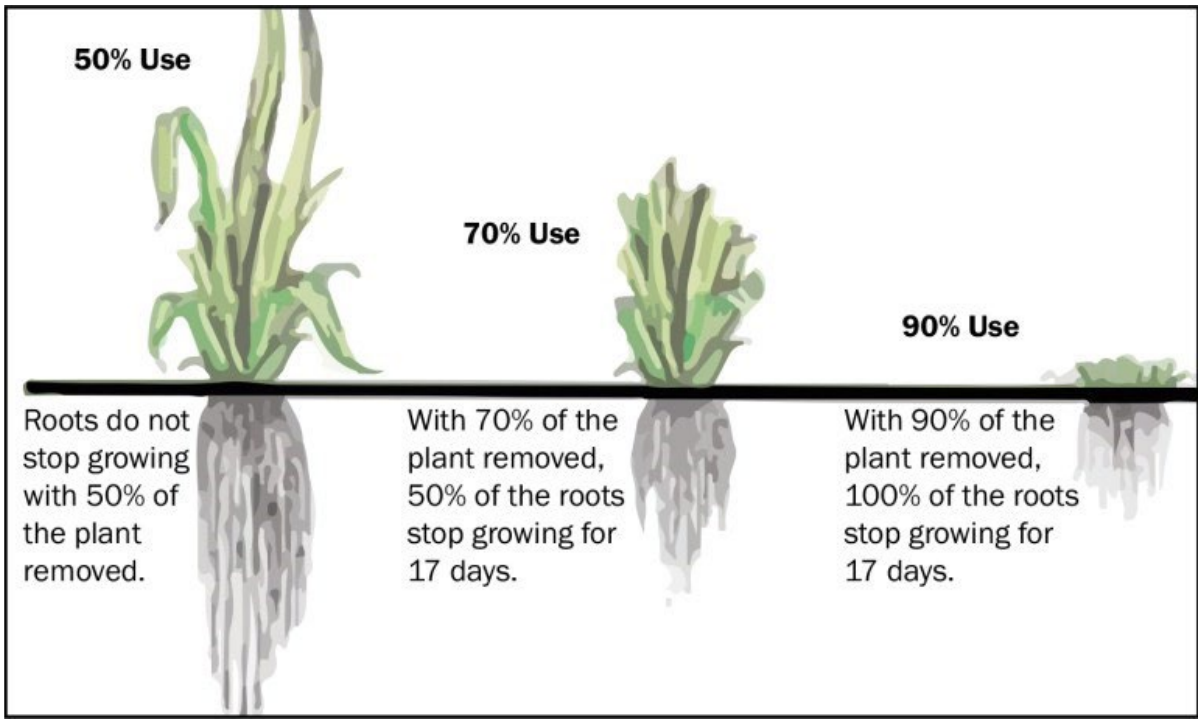
Management Recommendations:

While the data presented here is baseline data collected during a small snapshot in time, there are a handful of management recommendations that generally apply. More specific recommendations can be made over time as we collect more data and begin to identify trends.

These **five principles of grazing management** can help maintain healthy vegetation communities and soils for a sustainable ranching operation. Principles are taken directly from Roger Ingram's UCCE Grazing Academy materials:

- The first is rest period; we do this for the plants. When plants have their leaves removed from grazing, they need time to recover and if they get grazed again too soon, they can suffer and even die as a result. Recovery rates for your pastures will change with the seasons and vary from year to year, but if you make sure to never turn animals back onto

a pasture prior to full recovery, you will maintain a better species composition and have more forage production.



- The second is the graze period; this we do for the animal. If we use the shortest graze period possible (while still maintaining adequate rest), you can leave behind enough forage that it can recover more. Ideally animals take a single bite off each plant and move on. This can also help with breaking parasite lifecycles.
- The third principle is stock density; this we do for the paddock. By bunching up the herd and moving them often, you increase the amount of trampling that occurs, which can help manage invasive annual grasses and speed up incorporation of organic matter into the soil. It also helps with grazing selectivity; animals that are crowded spend less time picking out the “ice cream” plants and hurry to get mouthfuls of everything they can, thus taking the pressure off highly favored plants and putting more pressure on less desirable ones. This is key to shifting the community composition of pastures.
- The fourth principle is directly related to the third, and that’s herd effect; this is for the land. Maintaining the largest herd size possible helps with stock density. Having a few separate herds for management purposes is often required but keeping them to as few as possible is helpful in achieving higher stock density and minimizing labor.

- The fifth and final principle is stocking rate and carrying capacity; this is for the whole ranch. Attempt to match your stocking rate to changes in carrying capacity on both an annual and a seasonal basis. This is where folks often like to erect exclosures and do clippings to measure biomass; that is certainly a robust option for measuring forage production, but it can often be just as effective if not more so to learn how to eyeball standing forage for seasonal planning. This is a bit of a process in the beginning, but it leaves one with the ability to simply ride/drive about at any given time of year and have a very good idea of how much forage you have left in a given pasture.

Birds:

Managing for birds and other wildlife can be something you invest a lot into, or a little, depending on your goals and objectives. There is already a legacy of active conservation on your land that is commendable. Typically, lands managed for livestock grazing and timber can provide very high-quality habitat for wildlife. Certain targeted practices may help further benefit wildlife, for instance providing wildlife friendly access to water with wildlife ramps in troughs or guzzlers built into the overflow. Outside of these cases, habitat needs are often met simply due to good management; it's one of the many co-benefits!

Birds in particular benefit from diversity in the plant community for food throughout the year, so maintaining native shrubs and trees as well as healthy herbaceous plants is helpful. Pollinators benefit from this as well. Dead and dying trees (snags) are also of particular importance so that woodpeckers can make cavities for nests and other birds can subsequently use them. In your timber operations, leaving snags as much as possible is a great way to ensure nesting opportunities for native birds. If you desire, nest boxes can be added in strategic places to help species like Western Bluebirds and Violet-green Swallows.

Vegetation:

Grazing can change plant community structure and composition by removing and trampling aboveground biomass and changing photosynthetic capacity, growth rates, and competitive dynamics of plants. Grazing that is meant to benefit vegetation communities in California is often focused on reducing thatch, reducing amounts of bare soil, slowing or reversing plant

successional trajectories, and increasing species and functional diversity, such as perennial plants. Managers typically control the timing, duration, intensity, and frequency of grazing to achieve these goals.

Increasing your perennial plants is a goal that can help you on several fronts. Why are perennial grasses so important? Typically speaking, they have much more robust root systems, which help with soil health (Fig. 13). One unpublished study showed that under 4”/hour rainfall, annual grasses received 9” of infiltration and 3.2” of runoff while perennial grasses received 24” of penetration and experienced 0.2” runoff. That’s a lot more water in your soil for plants!

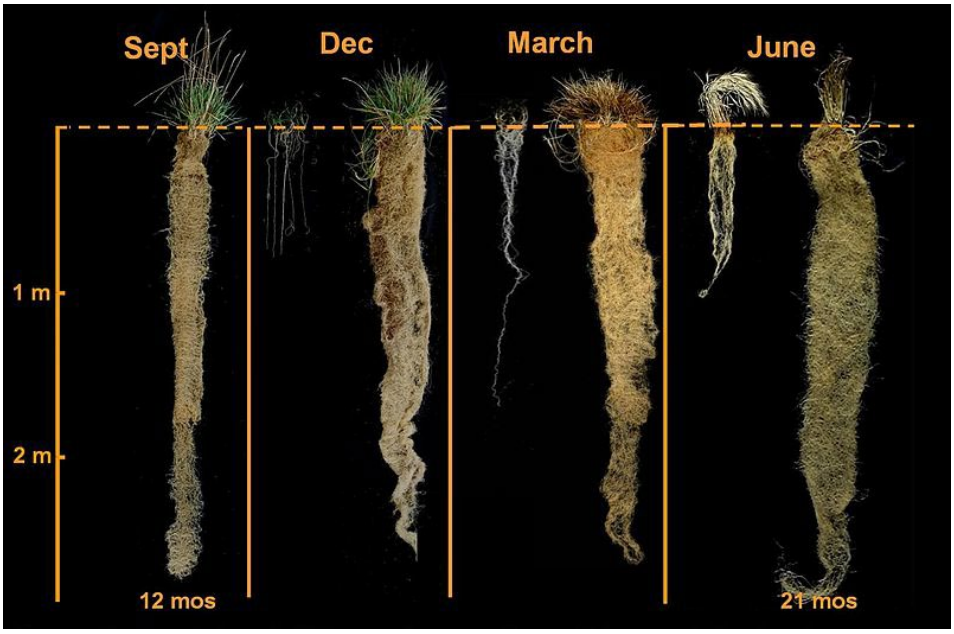


Figure 13. Annual wheat on left in each panel compared to perennial wheatgrass on right.

What does it mean to manage for perennials? Perennial grasses are often the only significant source of protein for livestock in the late summer/early fall. Ruminants require certain protein levels to keep the microbes in their gut alive and able to process forage with high levels of lignin, or the dried out tough annuals at the end of their lifecycle. Animals instinctively seek out protein and will selectively overgraze perennial grasses by taking multiple bites off the same plant, thus taking away the plant’s “solar panel” and forcing it to use its energy stored in the root system, which eventually dies. Providing pastures with rest and allowing perennial grasses to fully recover before being grazed again ensures these critical plants can thrive and propagate. If pastures are dominated by annuals that are old and “rank” (have a high lignin content), providing

a protein supplement can help those animals utilize that older feed. The protein content of typical alfalfa hay (23-26%) is usually more than enough to feed gut microbes, and only small quantities are generally needed.

One element to managing for more perennials is changing up the timing of grazing in different areas. By grazing and resting various pastures at different times of year over time, you allow the different species of plants to express themselves. This is achieved during grazing planning, and while some areas may need to be used at the same time every year for logistical reasons, the more you can shuffle it up the better for the plant communities. For instance, if you typically graze pastures in a certain order each year, simply reversing the order every other year can break up the timing and benefit the vegetation.

Seeding can be a tricky practice. In most cases, rangeland plantings fail. The time and effort coupled with high seed prices make it a dubious investment at best. There are cases when it can be worthwhile, however. Spreading seed and covering it with straw and then hay over the top is a great way to "spot" treat problematic areas; add livestock and they do the work for you! This can really help shift the species composition and create a seed base to propagate more desirable species. It cannot be stressed enough however that if you are seeding and spending any real amount of money or labor to put it out, it needs to have animals locked off it until plants gets established. Annuals rapidly germinate and are excellent for immediate coverage of erodible soils, and once they seed out, they can be grazed. Perennials are typically more expensive and more difficult to get established, and really need a full year before being grazed. Typically native species are far more expensive and in many cases non-natives that fill the same functional role are still valuable. Appendix E includes some tips for range plantings if that practice is of interest.

Invasive species control is always an ongoing management issue. We didn't sample right along Fleener Creek for plants or soils but the thistle there are problematic at best. Treatments like those in your NRCS Conservation Plan are good ways to treat the immediate need, but long-term shift in that plant community will require changes in management. Some of the most common ways to deal with undesirable species include prescribed fire, using electric fence to target areas at specific times of year to help trample thatch into litter, herding animals, feeding hay or

supplement on top of thatch areas to help use hoof action to break it up, etc. A good way to think about it is to manage *for* what you *want*, rather than against what you don't. Eradicating most of these invasives is likely beyond our means but managing for diversity and overall health of the system are our best insurance against economic loss to invasives. On your ranch, you are dealing more with shrub encroachment and invasives like thistles (more than annual grass invasions), which usually require fire or mechanical treatment.

Soils:

Grazing can impact soil dynamic properties such as bulk density, water infiltration and the proportion of soil organic matter through trampling, influencing rates of plant growth, influencing amount and decomposition rate of dead plant material, and playing a role in nutrient cycling. Grazing management meant to improve soil health will typically minimize soil compaction and maximize soil water storage and soil organic matter retention or accumulation. Common ways of doing this include the same suite of practices we've covered previously; balancing stocking rates on a seasonal and annual basis and controlling grazing timing, intensity, duration, and frequency. Appendix F contains materials on how to estimate carrying capacity and develop a grazing chart.

The same principles that increase vegetative diversity and promote perennial root systems also benefit soils. Namely, the micro-organisms in the soils; there are more of them in a spoonful of healthy soil than there are humans on the planet. In addition to the microbes, fungi play a fundamentally important role in soil health via vast networks of mycorrhizae, long filaments that connect fungi to root systems of other plants and help exchange nutrients the microbes mine from the soils for sugars the plants produce. Rangeland soils aren't typically subject to heavy disturbance like intense tillage but it's important to recognize the importance of maintaining cover. The surface of bare soil or soils without adequate cover are subject to direct exposure of sun which can elevate soil temperatures to levels that kill most beneficial organisms. Appendix G is a guide to these various beneficial critters living underground. Bare soils are also subject to excess erosion. When rain falls, raindrops hit the soil surface at approximately 14 mph, and erode the soil if it is bare. The loss of just a dimes' width of topsoil over one acre equals 5 tons

of soil! This is particularly disturbing because the bulk of your organic carbon (which contains most of the nutrients your plants need to grow) is in the top 10 cm of the soil.

What we have in this part of CA are annual grasslands, dominated by non-native grasses. We make efforts to manage the land in a way that maximizes perennials, but we're really managing annual rangelands. One of the key measures often used in annual rangelands is Residual Dry Matter (RDM). It refers to the leftover standing biomass from annual grasses that remain after grazing to keep the soil covered until the next growing season. There are recommendations for proper quantities of RDM for different regions, slopes, and levels of canopy cover, measured in pounds per acre. This standing biomass provides cover for the soil to help reduce surface temperatures, slow water on the landscape down and help with infiltration, provide nursery habitat for newly germinating grasses, and eventually break down and become incorporated into the soil, feeding the microbes and adding to carbon stocks. Leaving behind good feed can sometimes be hard to do, but covering the soil is critical and it can be thought of as feed for the soil. Appendix H are some guidelines for monitoring RDM.

Looking at the points we sampled, FLCR-02 has the lowest plant diversity and the highest compaction. We can start to combat that compaction by getting more perennials established with deep root systems. The cross fencing in your NRCS Conservation Plan will help facilitate more rotation and provide this area with more rest during the growing seasons. Once that occurs, some treatments may be warranted to help jump-start it. Straw mulch, seeding, adding compost; anything to increase cover and help it break down into the soil. The highest stocking densities you can achieve with the shortest graze time late in the season before the fall rains may help as well.

Summary:

After completing a single season of ecological monitoring, we are happy to provide you with some baseline data on your bird and vegetation communities and soil health. This data will hopefully help inform your management and conservation actions on your ranch. It is important to view this data and report within context, recognizing that baseline data provided here was collected at a single point in time. The good news is that all the same practices that increase

living roots in the soil and keep that soil covered to maximize production and land health are also the best buffers we have against droughts and other extreme weather. As you continue to make management decisions and implement them, we are happy to return and resample to help you determine if the suggested management strategies are accomplishing your goals. Resampling efforts typically occur every three years. We can also expand our efforts to address additional specific questions you may have. This monitoring effort is designed to inform you so please don't hesitate to let us know how we can improve. We thank you for the opportunity to work in such an amazing and unique place!