Final Report to

Natural Resources Conservation Service

for the Conservation Innovation Grant:

The Pacific Flyway Wildlife Program:

Development and Implementation of a Sustainably Funded Economic Framework to Enable Long-Term Waterbird Protection

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Project Summary

The Pacific Flyway is one of the primary migration routes for migratory birds in the western hemisphere. The Central Valley of California is a critically important rest stop and wintering area on the Pacific Flyway and supports over 7 million ducks, geese, shorebirds, and other migratory waterbirds every year, despite the staggering loss of over 90% of its natural wetlands. The Central Valley remains this important of a resource for waterbirds because hundreds of thousands of acres of agricultural land are flooded in the winter to provide habitat, in addition to the wetlands. In the northern portion of the Central Valley, rice agriculture provides over 50% of the calories for dabbling ducks each winter.

There are several different and complementary habitat incentive programs in this region that support producers' goals to support wildlife conservation on the lands they steward. There are the traditional practices available from NRCS (via EQIP or RCPP) that are the backbone of conservation on these private lands. Complementary dynamic conservation programs have also had much success (e.g. www.BirdReturns.org). These programs are attuned to farmer economic and conservation goals and are relatively straightforward to apply and enroll in. The dynamic nature of these programs also allows a relatively quick response to habitat needs as they arise.

This project was designed to meet the needs of farmers and wildlife by creating a dynamic and flexible program framework for farmers and a decision support tool to select the best locations and timeframes for enhancing wildlife habitat on ricelands. This project also sought to develop a fundraising plan and strategy to find private sector support through charitable contributions to supplement the long-term activities of our programs. All of which results in a lasting impact on conservation programs in California's agricultural system and a positive impact on migratory waterbirds by making significant contributions to the Central Valley Joint Venture's acreage objectives, especially for migratory shorebirds.

Project Goal and Objectives

The overall, long-term goal of this project was to increase the quality and quantity of waterbird habitat in California's ricelands. We accomplished this by creating a dynamic conservation program that is flexible and relatively easy for farmers to participate in, as well as develop a comprehensive modeling framework to select the best projects to fund each year. In addition, we sought to develop a model economic framework to provide long-term, sustained, private-sector funding. There are three stated objectives:

1. Create a flexible, dynamic, farmer-supported, and market-based wildlife habitat program within the California Ricelands Waterbird Foundation
2. Implement the new program with a goal to enroll 10,000 acres by 2022
3. Develop and implement a sustainable, long-term private-sector funding strategy to ensure program continuity indefinitely.

Project Background

With the significant loss of wetlands in the Central Valley, wildlife has become increasingly dependent on suitable agricultural lands for food and cover. Certain types of agriculture—especially rice cultivation—function in a way that is similar to native habitats and helps sustain many waterbird populations. These surrogate wetland habitats provided by ricelands serve as essential habitat for breeding, wintering, and rest-stops during migration for waterfowl, shorebirds, wading birds, and other wildlife. More than 200 species are known to use California ricelands. Ricelands provide a high-value food source in the form of 75,000 tons of waste grain remaining on the ground following the annual rice harvest in the Central Valley. This waste rice grain, as well as other valuable food resources, enables wintering waterfowl in the Sacramento Valley to gather over 50 percent of their nourishment from rice fields. Several special-status species have successfully adapted to using cultivated ricelands, including the Giant Garter Snake (*Thamnophis gigas*), Black Tern (*Chlidonias niger*), and Tule Goose (*Anser albifrons elgasi*).

As humans encroach on natural systems, the need for habitat becomes increasingly difficult to provide. While NRCS is one of the mainstays for wildlife conservation on private lands, there are situations when providing critical habitat is problematic for NRCS to incorporate into its programs, primarily due to the short timelines from when a field is known to be available for habitat and changing weather and habitat conditions (i.e., droughts and floods). In 2014, The Nature Conservancy (TNC) and the California Rice Commission (CRC) rolled out an innovative and dynamic conservation pilot program called BirdReturns to fill this need and secure critical waterbird habitat on California rice fields. This successful program used new technologies and a flexible "on-demand" approach to create shallow-water habitat on California rice fields for migratory shorebirds during times of the year when the need was greatest.

The CRC was an essential partner in making BirdReturns a success by bridging the gap between the producers and TNC. In 2015, the CRC further helped to scale-up BirdReturns by creating the California Ricelands Waterbird Foundation (hereafter, Foundation), a 501(c)(3) organization, whose mission is to "enhance the ecological value of California rice fields to help sustain the millions of waterbirds and other wildlife in the Pacific Flyway for future generations." With the Foundation in place and the critical help of this CIG, CRC created a new program in the Foundation and is developing a sustainable funding mechanism to ensure this type of habitat creation continues to benefit wildlife.

The nature of the activities conducted by the Foundation creates significant opportunity to engage the private sector as financial supporters. The Foundation is unique in that its connections with CRC mean that the Foundation has a connection with all California rice growers. Therefore, the Foundation is a grower-based wildlife conservation organization with a network of other wildlife organizations connected to it. This can make conservation program delivery smart and trusted by the grower community. Innovative conservation activities that facilitate practical solutions to short- and long-term conservation challenges are highly sought by private foundations, companies, and individuals who make charitable donations to environmental causes. By developing a fundraising strategy that targets these stakeholders, the Foundation can capitalize on this energy from the private sector to ensure long-term support for projects undertaken by the Foundation.

Project Methods

We implemented this project in three phases that closely aligned with project objectives. There was overlap in timing among the three phases.

Phase I – Program Development

Phase I commenced first, with the creation of the Project Management Team who built a detailed work plan for the development of our Bid4Birds program. This workplan covered various aspects of the program including bid selection modeling tools, monitoring, and evaluation.

Point Blue Conservation Science, FlowWest, and Ducks Unlimited (DU) developed geospatial data analytic tools required to prioritize migratory waterbird habitat projects that apply to Bid4Birds. This included acquisition of relevant geospatial data including aerial imagery, land use, crop mapping, vegetation coverage, and other similar data. They also used other relevant data such as hydrology, inundation, and waterbird presence to identify appropriate sites. Point Blue and DU provided migratory bird habitat expertise to interpret the results of modeling analyses. FlowWest and Point Blue developed a database and data management platform to store and manage the data used in the bid analytic processes. The platform is designed to maximize transparency through comprehensive documentation of methodology and source information, which facilitates translation of the workflow used in this program to other geographies and habitat types. All data products generated follow open data best practices and are freely available.

Phase II – Program Implementation

Implementation of the Pacific Flyway Wildlife Program we called Bid4Birds began in the second quarter of Federal FY 2020 with the overall goal to enroll 10,000 acres by 2022. The implementation of the program followed similar processes developed by the BirdReturns program. Phases I and II worked in concert with each other; lessons learned from each program implementation were fed into the next iteration of the data analytics which in turn improved our next program implementation.

Phase III – Development of funding strategy

This phase sought to develop a model fundraising strategy that would focus on sustainable, long-term private sector funding. The model would be replicable and available to other organizations across the country. Phase III had two key stages: A) Plan Development and B) Implementation Support.

Plan Development—CRC worked with Campbell & Company to build a framework for a comprehensive and strategic fundraising plan centered on foundations and major gifts. We built a three-year prospective donor engagement and solicitation plan focused on foundation funding. It ranked potential foundation funders in three tiers: 1) Ready to apply (to be engaged in the next 6 months); 2) In need of further cultivation (to be cultivated and engaged over the next 12-18 months); and 3) Currently unengaged/longshots (to be engaged and cultivated over the next 18-36 months). The plan included a

framework for tracking proposal processes, ensuring planning occurs 6-12 months in advance, managing approvals and reporting, and establishing stewardship plans after funding is secured.

Implementation Support—CRC and Campbell & Company supported the implementation of the development plan by executing fundraising priorities, supporting solicitation of key foundation prospects, creating systems and materials to support fundraising capacity, and implementing stewardship plans after funding is secured.

Project Results

Phase I – Program Development

Our objective was to create a wildlife habitat program within the California Ricelands Waterbird Foundation that was flexible (offering options that work for birds and people, easy to apply to, able to apply on short timelines once farming decisions have been made for the year), dynamic (able to address times and areas birds need habitat the most and react to habitat needs in real-time), farmer-supported (we have buy-in from the producer community on the program and practices -*and*- some farmers even support the Foundation), and market-based (we use a reverse auction; costs are variable and change based on the group of farmers that apply and the current market conditions for water).

To meet our objective above, we first used our recently created non-profit organization, the California Ricelands Waterbird Foundation, hereafter 'Foundation' as the major conduit to deploy the habitat projects funded by this program. The habitat program created within the Foundation was called Bid4Birds since we intended to use a reverse auction process where producers submitted 'bids' for habitat they were willing to provide for waterbirds. We created a project Management Team and subteams when needed, including one for program implementation and another subteam for modeling and analytics.

The main objective of the program implementation subteam was to support Bid4Bird's website (CalriceWaterbirds.org) and the framework of systems and processes required to implement programs regularly and successfully. We used BirdReturns as a model, so had a solid place to start, although we made many significant improvements in these processes over time. We created spreadsheets with all the steps needed to implement a program. These included prepping outreach materials (workshops, flyers, practice specifications, etc.) for a solicitation, creating forms on the website to collect all the information needed as input data for the analytics which differ among different programs, preparing all the bid data for the analytic and modeling systems (spatial and attribute data), coordinating and doing field verification to ensure the fields were in the condition we expected them to be, contracting with producers, doing compliance and biological monitoring while the fields were active, communicating with producers on compliance issues, finalizing/completing contracts, getting payments sent, and final reporting. We also included the estimated time and resources needed to accomplish each of these steps and identified those who are responsible for each step. These processes are continually being adaptively managed over time—some steps can be simplified whereas others we may need more documentation and attention over time. For example, we initially put a heavy focus on the front end of a solicitation with elements such as producer workshops, flyers, habitat criteria, practice specifications. Over time we

gained a lot of efficiency in these areas, and we shifted to putting more effort into the back end of data management and archiving processes.

The main objective of the modeling subteam was to bring new science and models by Erin Conlisk (Conlisk et al. 2022, 2023) into the Bid4Birds framework and figure out how best to apply them to our bid selection processes. We went through several iterations of creating bird scores from the modeling estimates, some of which included how much area was flooded while others didn't. Some focused on the specific time periods the areas were flooded, while others just focused on the start date. An important improvement was incorporating the assumption that an area is flooded when calculating the bird score, rather than only using the flooding history to use in the bird score. This improvement meant that producers doing a practice for the first time would not be at a disadvantage solely because it was their first time. In summary, the bird suitability scores use four different species of shorebirds and are based on machine learning suitability models developed with real-time covariate data, forecasted water, and imposed flooding in the field. These scores are calculated monthly and averaged across species in each month, then a weighted average is calculated across months, depending on how many days the bid is flooded in each month. Importantly, these suitability models use water forecasts to account for possible changes in water on the landscape due to water availability. These water forecasts use the 10-year average probability of flooding in each pixel, the water year index from the previous year, forecasted water year index for the current year, and the location.

After finalizing the bird scores, the team tackled moving the analytics, which would often take 2-5 days on dedicated computers, to the cloud where the analytics could just take an afternoon. This effort took several different iterations and was continually being refined over the course of the project. Finally, the team took on creating an online app, which we have titled 'Bid Runner'. This app will accept correctly formatted shapefiles with all the necessary information, along with the maximum funding cap and enable an advanced beginner at coding to run the analytics in the cloud with the results being a suggested bid selection based on the bird scoring models and the funding cap to give the user the best return on investment.

Phase II – Program Implementation

Our objective was to implement the new program with a goal to enroll 10,000 acres by 2022. For this CIG, we focused our efforts on Bid4Birds providing shoulder season habitat, similar to what BirdReturns had done in the past. This includes incentivizing shallow flooding on fields, later than "normal" in the spring and earlier than "normal" in the early fall. These are times known to have habitat deficits for some species of migratory waterbirds, especially shorebirds.

We began by offering programs in both spring and fall of varying lengths, depending on producer abilities. Because we were continuously monitoring waterbird response and site conditions, we discovered after a couple of years that fall programs needed to be shorter, even if producers had the ability to provide water longer, because the warm temperatures and ready weed seedbank resulted in a great deal of vegetation growth, lowering the habitat quality. We have shifted to only offering 3- and 4-week fall programs. Not surprisingly, some producers have expressed their appreciation for the flourishing weeds, as this means a cohort of weed seeds germinated and the producers follow up the

habitat program by disking in the cohort of weeds, hopefully lessening the pressure on the rice crop the following year.

Our project team and several other partners have also been discussing how the reverse auction is doing at keeping costs down and providing the best possible return on investment. Due to the influx of funding from the State of California during drought, funding was not the limiting factor for some programs/seasons. After much discussion, we decided it was important for Bid4Birds to not just accept every bid because we had sufficient funding but to continue to use our modeling efforts to select the best bids for the price. This meant leaving funding that could have gone to producers and their lands unobligated. This was difficult since the producers and birds stood to benefit. However, we felt that maintaining a process that delivers cost-effective habitat was important. We recommend that all other users of these bidding systems resist the temptation to "overpay" just because funding is not a limiting factor at times, as we believe strongly that this will lead to higher overall bidding over time.

From spring of 2020 to fall of 2022, CIG supported five habitat programs, with 7-10 producers participating each time, for a total of 8,973 acres (Table 1). This total is a bit shy of our goal of 10,000 acres. This is primarily due to severe drought. The acreage for each program is modest, but these are times of year most producers want to be working their land. We make the most of each program, and even this modest acreage makes a real difference for migratory waterbirds who are arriving to a parched and ploughed landscape.

Table 1. Summary of Bid4Birds programs included in this Conservation Innovation Grant.

Year	Season	Total Enrollees	Total Acres
2020	Spring	7	1,356
2020	Fall	7	1,072
2021	Spring	9	2,252
2021	Fall	10	2,158
2022	Spring	6	1,116
2022	Fall	7	1,019
		Overall	**8,973**

In the time period that we used this CIG to further develop, expand and communicate about our program capabilities, major drought gripped California and our program became a strong focus of the State of California to help Pacific Flyway wildlife survive the historic drought conditions. We found ourselves deploying over $15 million, over 131,701 acres in a variety of seasonal programs for both fish and wildlife, on ricelands and wetlands of the Sacramento Valley.

We monitored waterbirds using a sample of program fields and recorded a great response to the habitat created. We conducted over 350 surveys and counted over 75,000 waterbirds. In Fall programs, Long-billed Dowitcher (*Limnodromus scolopaceus*; a declining species) were by far the most abundant shorebirds, followed by Least Sandpiper (*Calidris minima*; smallest shorebird in the world) and Western Sandpiper (*Calidris mauri*). Northern Pintail (*Anas acuta*) and Northern Shoveler (*Spatula clypeata*) were the most abundant waterfowl. In Spring programs, Dunlin (*Calidris alpina*) were by far the most abundant shorebirds followed by Least Sandpiper, Long-billed Dowitcher and Greater

Yellowlegs (*Tringa melanoleuca*) while Northern Shoveler and Mallard (*Anas platyrhynchos*) were the most abundant waterfowl. While waterfowl continue to be a bright spot for conservation with many populations recovered and highly managed, shorebirds have declined dramatically over the last half century, with species like Long-billed Dowitcher potentially reaching a population-level tipping point in the near future. Programs like Bid4Birds that provide resting places and food along shorebird migration routes will be a key part of recovering these species.

Phase III – Development of funding strategy

Our objective was to develop and implement a sustainable, long-term private-sector funding strategy to ensure that Bid4Birds can continue to provide much-needed waterbird habitat, indefinitely. To accomplish this, we first undertook an assessment of the California Ricelands Waterbird Foundation internal structure and systems to support the execution of fundraising activities. This assessment was conducted by the fundraising firm, Campbell & Company, to understand what strengths and challenges existed in our current structure to leverage for fundraising activities. Next, we developed a tactical Fundraising Plan that focused on the key areas of successful fundraising, including leadership, donor engagement efforts, and staffing and systems. The Fundraising Plan guided all future fundraising activities.

As we began to implement the Fundraising Plan, we developed communication strategies to connect with potential private funders, we created a calendar of donor engagement activities including donor mailings and newsletters, we researched prospective foundations and corporate funders. We also developed grant proposals, reports, and other documents, including the creation of a boilerplate template with common language to improve efficiency of developing proposals and reports. Finally, we created a structure for events and sponsorships that could engage prospective funders by showcasing the work of the Foundation.

We conducted monthly meetings with the fundraising firm to develop and implement the Fundraising Plan. In these meetings, we developed tactical strategies tailored to each potential funding partner to implement, and then revisit, as new information about their interests became available. Some potential funding partners were interested in in-person site visits and tours, while others sought formal proposals to consider funding. The meetings with the fundraising firm helped our team implement these strategies immediately, while also preparing us to implement on our own for the future.

Some specific results include:

- Produced annual report and quarterly newsletters to inform funders of progress at the Foundation.
- Strengthened our relationships with industry partners, many of which provided ongoing donations to the Foundation as part of their relationship to the program.
- We participated in Big Day of Giving, held annually in early May, in partnership with the Sacramento Community Foundation, a key partner in the region to Foundations and nonprofits looking to gather support for their activities. In 2023, we raised $3,722, building on our success in 2022 where we raised over $5,713.

- Developed a long-term partnership with Mary's Gone Crackers that included a charitable contribution and publicity for the Foundation on their packaging in addition being a $10,000 annual donor. This relationship also helped us to make new connections with other corporations in the region, most notably Whole Foods.
- Secured new funding support from:
    - The Campbell Foundation: This funding was first awarded in 2022, and then renewed again for $5,000 in 2023.
    - Bass Pro Shops: This funding was first awarded in 2022; a proposal for renewed funding for 2023 is under consideration.
    - The Strong Foundation for Environmental Values: This funding at the $5,000 per year level was first awarded in 2022 and a proposal for renewed funding at the same level for 2023 was recently approved.
- Researched and pursued funding support from 23 prospective foundation and corporate partners. In many cases, this funding has not been secured for the Foundation, but we will continue to pursue these opportunities given the changing nature of priorities at private foundations. For example, we applied for a grant with the Rose Foundation for Communities and Environments – while we were not awarded the funding in the end, we did develop a relationship with the leadership of the Foundation that we can leverage in the future as our activities expand and we are in closer alignment with their funding priorities in the future.

Project Outputs

The main deliverables and products of this project are:

1. Creation of Pacific Flyway Wildlife Program which we call Bid4Birds.
    a. This website supports the sharing of information for Bid4Birds. https://calricewaterbirds.org/
    b. There are several pages. The Overview page (https://calricewaterbirds.org/bid4birds-overview/) describes the program itself, the background and inspiration, as well as how to Donate to the California Ricelands Waterbird Foundation to support the program. The Practice Requirements page (https://calricewaterbirds.org/practice-requirements/) describes the ranking and scoring process, the practice specifications, areas excluded due to proximity to airports, and a set of example photos that illustrate what kinds of field conditions we are looking for. There is a Frequently Asked Questions page (https://calricewaterbirds.org/bid4birds-faq/) that we keep updated. And finally, this website also hosts our online application form (https://calricewaterbirds.org/bid4birds-form/) which we revise and update for each program.
    c. Bid4Birds has been using this website since 2020 and there have been many updates and revisions since then.

2. A technical tool (Bid Runner) modeled after and updated from BirdReturns that allows the Foundation to select the habitat enhancement acres based on when and where the habitat is most needed using factors such as location, time, and proximity to other habitats.
    a. Source code for the tool in open source scripts: code for the Bid Runner app that runs the analytics can be found on GitHub at this address: https://github.com/california-rice-commission/bid-runner
    b. URLs for web-based databases used as inputs:
        i. Water Tracker: www.pointblue.org/watertracker; Reiter et al. 2015
        ii. USDA NASS Cropland Data Layer: https://nassgeodata.gmu.edu/CropScape/
        iii. Roads: https://www.openstreetmap.org/about
    c. Geospatial databases for non-web-based input layers: These are all found on GitHub (https://github.com/california-rice-commission/bid-runner) and described in the User Manual (Appendix A).
    d. Written documentation with instructions for using the Bid Runner application:
        i. Appendix A. Rapid Assessment of Habitat Value for Waterbirds: System Specifications and User Manual

3. Implement the Pacific Flyway Wildlife Program: Bid4Birds with a goal to enroll 10,000 acres by 2022.
    a. Brief annual project reports are on the Bid4Birds website at this address: https://calricewaterbirds.org/fieldwork/#reports
    b. With funding from this CIG, we implemented 8,973 acres of prime shoulder-season habitat for migratory waterbirds.

4. A long-term sustainable funding strategy to promote program continuity indefinitely.
    a. Plan developed, implemented and funding results reported to NRCS
        i. Annual Report sent to full email list: https://calricewaterbirds.org/wp-content/uploads/2019/12/AnnualReportFY20-21-Final.pdf
        ii. Bi-annual newsletters were developed and sent to full list of supporters (Appendix B.)
        iii. Corporate Sponsorship package: The Foundation creates customized programs to meet specific objectives of major donors. The sponsorship webpage is here: https://calricewaterbirds.org/sponsors/
    b. Plan provided to NRCS to serve as a replicable model in other parts of the nation (Appendix C.)

Project Impacts

Bid4Birds, and its web-based platform (https://www.calricewaterbirds.org) and analytic system are fully functional and run multiple programs each year. In fact, the readiness of the Foundation's Bid4Birds program and associated infrastructure and processes, was the primary rationale for the State

of California Department of Water Resources to award CRC over $15 million to deploy habitat programs to help offset the impacts of historic drought in California in 2021 and 2022, called the Drought Relief Waterbird Program. While these funds flowed through the CRC instead of the Foundation for state funding administrative reasons, this big award was a direct result of CIG investments into building out our Bid4Birds Program to be a shovel-ready tool for the State to consider in deploying millions of dollars in drought resiliency funding. CRC and Bid4Birds now host two additional new programs including California Department of Fish & Wildlife's California Winter Rice Habitat Incentive Program and CalTrout's Fish Food on Floodplains Program. These programs use the web-based platform for disseminating information about the programs such as practice requirements and application period as well as accepting applications, both for flat-rate programs and reverse auctions.

The development of a sustainable fundraising program at the Foundation is a unique opportunity in the context of our work; there is growing interest from private foundations, corporations, and individuals in funding conservation efforts. By doing the work these last several years to lay the groundwork for the fundraising program, we are now positioned to maintain and most likely grow private fundraising activities that supplement support we receive through contracts and public grants.

Bid4Birds, with the help of this CIG, has made a real impact on habitat availability for migratory waterbirds, especially shorebirds (many of which are declining), during this project period. And Bid4Birds will continue its good work into the future. The Central Valley Joint Venture, in their 2020 Implementation Plan set acreage objectives for non-breeding migratory shorebirds. Bid4Birds, since 2020, has provided 25-42% of the spring acreage objective and 9-19% of the fall acreage objective—for the whole Central Valley.

California NRCS, working with CRC and conservation partners, has created NRCS practice scenarios and specifications that can create similar kinds of habitat to those of the Foundation. And it is very important to continue to support these practices, especially for producers who know ahead of time they want to include these kinds of enhancements in their conservation plans. What makes a dynamic conservation program like Bid4Birds so important is that many producers don't know for sure they can include a conservation practice on their farm until up to two months in advance of doing the practice. The flexibility and nimbleness of Bid4Birds is essential to getting more, much needed annual habitat enhancements on the ground.

Appendices

Appendix A. A System for Rapid Assessment of Habitat Value for Waterbirds version 1.0

Appendix B. Bi-annual Fundraising Newsletters

Appendix C. Development Plan and Strategy

Due to the size of the file, these appendices have been removed.
Please email nrcscig@usda.gov to request a copy.