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Audubon CALIFORNIA

The Nature Conservancy
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Point Blue Conservation Science

WATERBIRD HABITAT ENHANCEMENT PROGRAM

BIRD-FRIENDLY FARMING IN CALIFORNIA RICE FIELDS

A Model of Collaboration Benefitting Birds and People

PREPARED FOR

California Rice

California Rice Commission
www.calrice.org
September 2014

About the Authors

The Migratory Bird Conservation Partnership (Partnership)[23] is a collaboration of Audubon California, The Nature Conservancy, and Point Blue Conservation Science. The Partnership was established in 2008 with the goal to protect and enhance the wetlands and agricultural lands that support migratory bird populations in California and along the Pacific Flyway. Combining the experience and expertise of these three leaders in bird conservation, the Partnership is using the best available science to enhance the value of agricultural lands as migratory bird habitat, securing reliable water for wetlands, and promoting policy solutions that will help bolster migratory bird populations.

This publication was prepared to highlight the success of the immense investment made by NRCS, the key federal agency that provided the expertise, funding, and technical assistance to make the significant achievements of this program a reality.

Greater Yellowlegs

IN BRIEF

Successful NRCS Program in California Supports Farms and Birds

The United States Department of Agriculture's Natural Resources Conservation Service (NRCS) created the Waterbird Habitat Enhancement Program (WHEP), which provided $10 million of federal Farm Bill funds to enhance habitat on 100,000 acres of California ricelands. This program helps to sustain production agriculture in the Central Valley while simultaneously providing wildlife with surrogate wetland habitat to help offset substantial loss of wetland habitat over the past 150 years.

WHEP has proven to be a high-impact investment of Farm Bill funding and has become a model for enhancing waterbird habitat in California's agricultural landscape. This program emerged from a cooperative effort between the NRCS, California Rice Commission, rice growers, Audubon California, Point Blue Conservation Science and The Nature Conservancy to find ways to both grow rice and improve the habitat for birds. Collaborative research that documented the benefits of on-farm management for birds led to the adoption of on-farm conservation management practices included in WHEP.

Investment by the NRCS in WHEP, which leverages individual farmer investments and privately-funded scientific expertise, has already resulted in great benefits to California's rice industry and increased habitat to support migratory birds in California's Central Valley. By investing in short-term habitat enhancements rather than permanent protection and restoration, WHEP is an example of a relatively low-cost program with the ability to adapt with new information and changing conditions. To permanently purchase, protect and enhance this same amount of habitat it would cost up to $1 billion, plus up to $15 million in annual management costs.[1] The great program enrollment response to WHEP by rice farmers has affirmed that they can be an integral part of large-scale conservation of migratory birds.

Innovative and collaborative efforts, such as WHEP, to meet pressing financial and conservation challenges need continued investment for long-term benefit to farmers, birds and our environment. This report assesses WHEP's outcomes and provides an overview of the management practices developed and installed as part of this unique program.

Sacramento Valley Ricelands are Home to Farms and Wildlife

HOME TO MILLIONS

To millions of migratory birds, the Central Valley of California is a lynchpin of the Pacific Flyway, a crucial place to rest and refuel during annual journeys from, for example, Alaska to South America. To farmers, it is among the most fertile land in the nation, the home of their families for generations, and the origin of billions of dollars in agricultural products each year. To millions of Californians, it is a source of water, food, and recreation.

The migratory ducks, geese, shorebirds and other species that depend on California's rich wetlands have lost more than 90 percent of their habitat in the Central Valley. What remains is highly degraded and fragmented.[2] The result has been significant population declines for many waterbirds.[3] Birds are sentinels of nature's health and they reveal how some environmental changes can threaten us all – wildlife and humans alike.

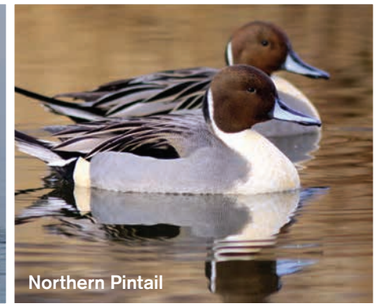
CRUCIAL CONNECTION

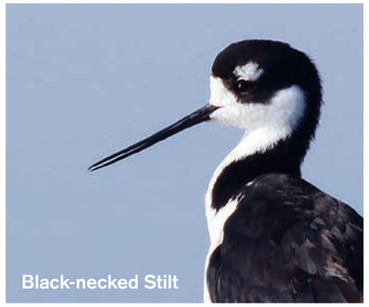
Today, the connection between agricultural and wetland habitats in the Central Valley is crucial to helping waterbirds survive. Ricelands can be an integral part of the solution to supplement lost wetlands, especially when managed with birds in mind. In California, the current annual cultivation of some 550,000 acres of rice supports nearly 230 wildlife species including 50 species of waterbirds.[4,5,6] In fact, the ricelands and wetlands of the Sacramento Valley have been designated as internationally important for shorebirds by the Western Hemisphere Shorebird Reserve Network[7] and the National Audubon Society.[8]

Despite the significant habitat contribution provided by ricelands and other farmland, there are more opportunities to manage agricultural fields in ways that can enhance their ability to support a greater diversity of wildlife. Working together, the rice industry, conservation scientists and the NRCS developed a program that aligns this shared goal for the future. WHEP is an excellent example of the success that can be achieved through strong partnerships and collaboration.


Snow Geese


American Avocet


Northern Pintail


Black-necked Stilt


Long-billed Curlew


Greater Sandhill Cranes

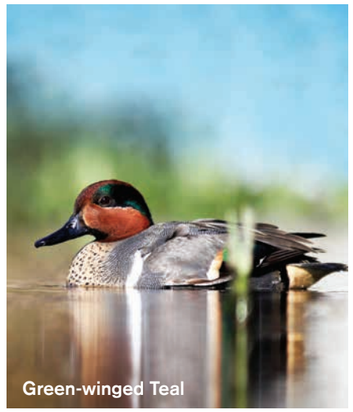
The Central Valley is one of the most important inland regions in North America for migratory and wintering shorebirds.[12]

California ricelands provide habitat *for nine species of dabbling ducks, eight species of long-legged waders and thirteen species of shorebirds[5,6,9], including five species of special concern in the state of California: Black Tern, Burrowing Owl, Lesser Sandhill Crane, Least Bittern, and Northern Harrier; one California threatened species: the Greater Sandhill Crane; and two species of federal conservation concern: the Long-billed Curlew and the Whimbrel.[6,10,11]*

Waterbirds live on or around water and include ducks, shorebirds, herons, egrets, cranes, terns, rails and ibis.

WATERFOWL

Waterfowl include ducks, geese and swans, many of which are important game species. Waterfowl have flat bills and webbed feet, making them strong swimmers. They require wetland habitats such as rivers, lakes, wetlands, or the ocean to survive. As many as seven million wintering waterfowl rely on the Central Valley, and rice fields provide nearly 60 percent of all of their food resources in the Central Valley.


Green-winged Teal

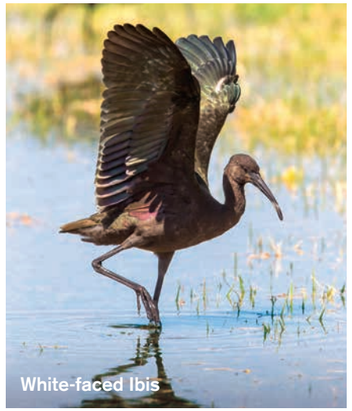

Tundra Swans


Wood Ducks


Killdeer


Snowy Egret


Least Sandpiper


White-faced Ibis

SHOREBIRDS

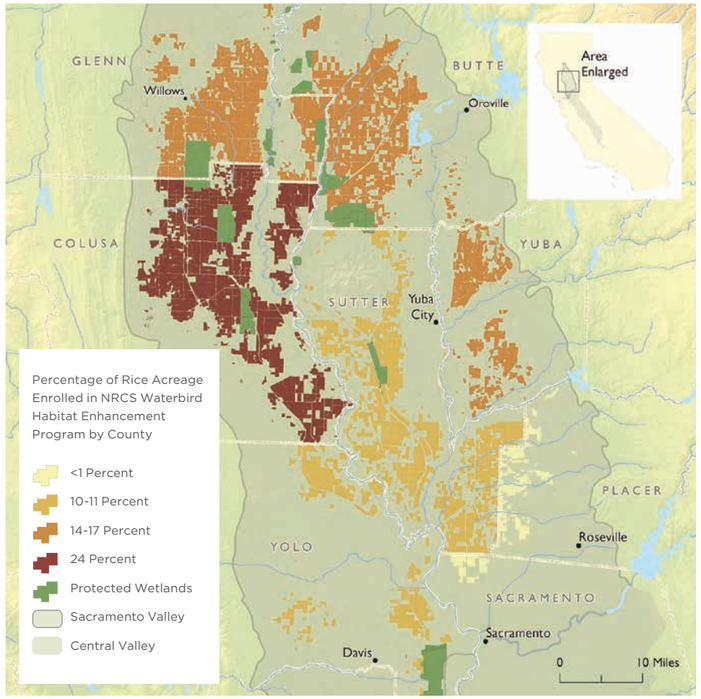
Shorebirds live in other areas besides the shore. They generally inhabit open areas of beaches, mudflats, grasslands, and wetlands. They often have long, thin bills, and long legs and range from sparrow to chicken size. Central Valley ricelands and wetlands have been recognized as being internationally important to this group.

LONG-LEGGED WADERS

This group includes a wide range of species, most with very long legs and long bills such as herons, egrets, ibis and cranes. They find their food in a variety of habitats.

Located at the heart of the Pacific Flyway, California ricelands are filled with birds year-round.

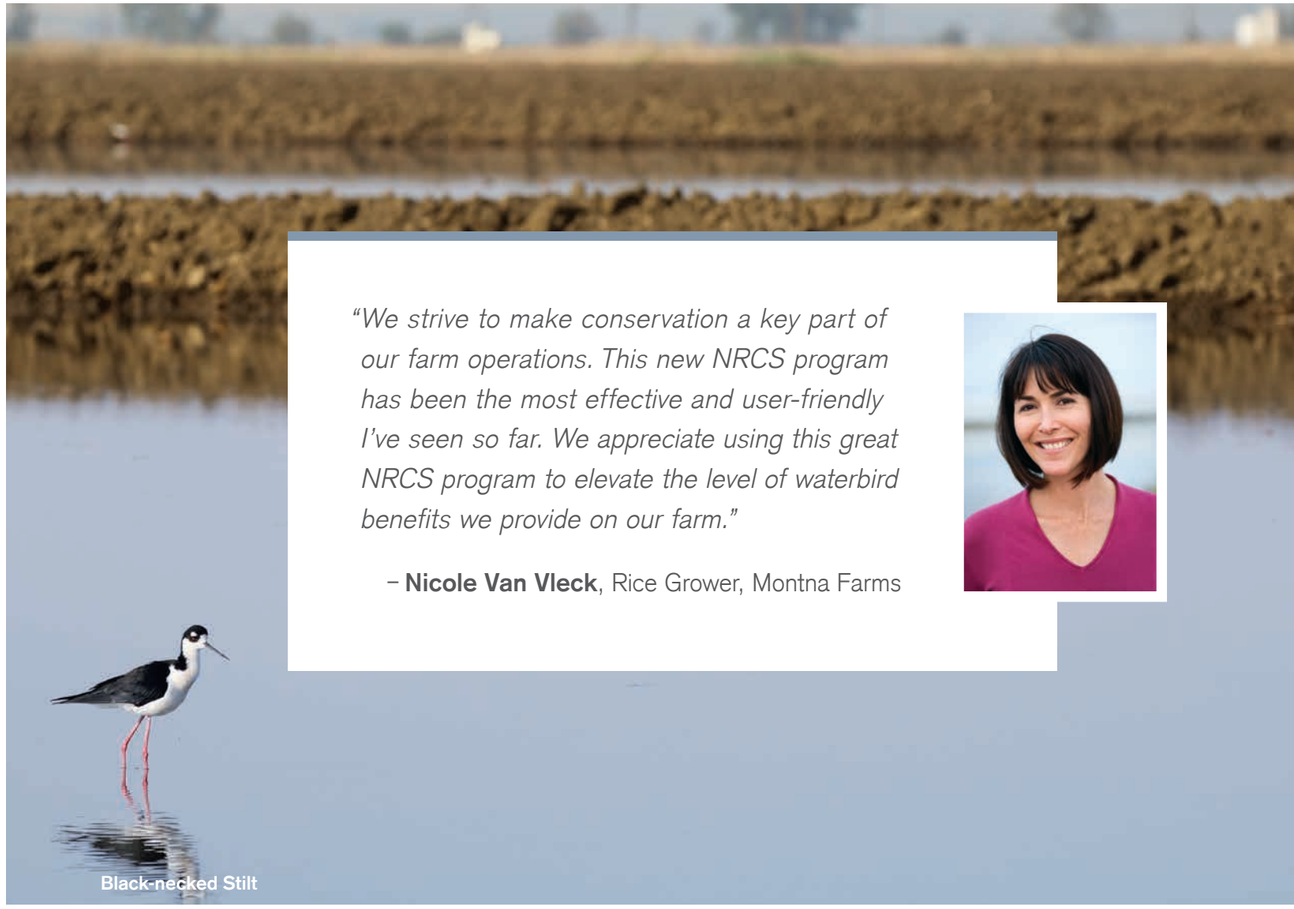
Enhancement *is the physical manipulation of an area to repair, improve, or mimic natural and historic functions for the benefit of wildlife. Through the NRCS Waterbird Habitat Enhancement Program, rice farmers in California are enhancing their farm fields to support greater numbers of migratory birds.*



Source: USDA, NASS, 2012 CA Cropland Data Layer

PERCENTAGE OF RICE ACREAGE ENROLLED

FIGURE 2. The Waterbird Habitat Enhancement Program has increased the footprint of high-quality waterbird habitat in the central valley where more than 90 percent of native wetlands have been converted to agriculture and other human uses. The program was available in eight Sacramento Valley counties and successfully enrolled nearly 20 percent of California's rice acreage in bird-friendly farming practices.



"We strive to make conservation a key part of our farm operations. This new NRCS program has been the most effective and user-friendly I've seen so far. We appreciate using this great NRCS program to elevate the level of waterbird benefits we provide on our farm."

– **Nicole Van Vleck**, Rice Grower, Montna Farms

Black-necked Stilt

TIMELINE OF EVENTS

FIGURE 1. Timeline of events leading to the implementation of the NRCS Waterbird Habitat Enhancement Program in California's Sacramento Valley.

2008

Natural Resources Conservation Service, Audubon California, Point Blue Conservation Science, The Nature Conservancy, California Rice Commission and the rice growing community begin dialogue and host informational workshops.

2009

Testing of three alternative management practices begins on rice farms in the Sacramento Valley.

2010

Rice and Waterbirds Workshops held to identify additional alternative management practices in rice.

2011

NRCS launches a two-county pilot program that successfully enrolls 27,000 acres of riceland enrolled in bird-friendly practices.

2012

NRCS expands program availability to eight counties in the Sacramento Valley and Sacramento–San Joaquin Delta.

2013

Program continues and cumulatively, more than 100,00 acres enrolled.

2014

Program applications have been submitted, awaiting contracted acreage.

Future of WHEP...

WHEP Program can only be achieved through Strong Partnerships and Collaboration


Black-necked Stilts and American Avocets

LONG-TERM SUSTAINABILITY

WHEP's long-term sustainability appears to be limited. WHEP supports a number of annual management practices and is currently funded primarily through the Environmental Quality Incentives Program (EQIP) which limits the duration of contracts and re-enrollment of the same acres in the same practice is restricted.

BASELINE HABITAT

WHEP successfully increased the baseline habitat provided by ricelands but the short-term contracts begin to expire in 2014, creating a downward trajectory of acres enrolled in these waterbird-friendly practices. In 2015, approximately 28,000 acres will cycle out of the program, followed by about another 59,000 acres phasing out in 2016 (Figure 3).

ESSENTIAL PARTNERSHIPS

Because these practices are not essential to maintain agricultural productivity, they are unlikely to continue being implemented without the continuation of the program. To address this issue, the California Rice Commission, Audubon California, Point Blue Conservation Science and The Nature Conservancy would welcome the opportunity to work closely with NRCS in a joint effort to develop alternate conservation program mechanisms that would continue to incentivize the types of bird-friendly farming practices that have been supported by WHEP thus far.

DECLINING ACRES IN WHEP

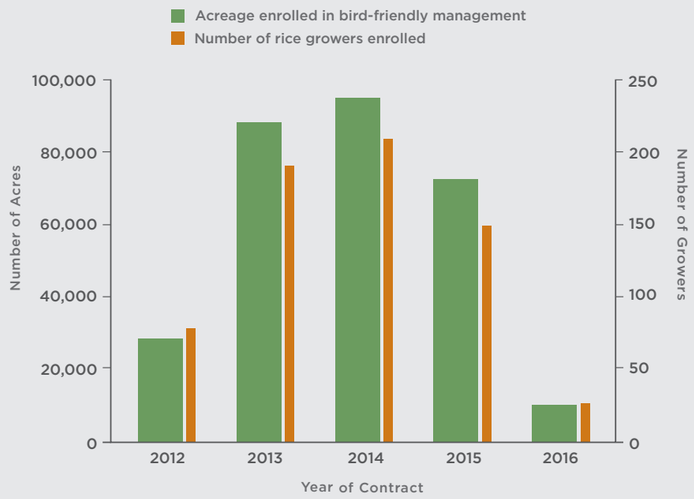


FIGURE 3. Current acres of riceland contracted in bird-friendly management of winter rice fields in the NRCS Waterbird Habitat Enhancement Program during each year until 2016. Enrolled acreage decreases each year as contracted acres phase out of the program and are unable to re-enroll. This figure does not account for the additional acres that may enroll in the program in future years, although for rice, this is thought to be minimal given the high number of acres already enrolled and limitations to re-enrollment.

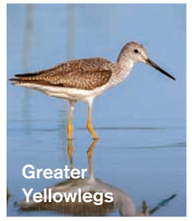
WHEP: COST-EFFECTIVE BIRD CONSERVATION

The USDA's roughly $10 million investment in WHEP thus far has resulted in great enhancements to on-farm habitats that benefit migratory birds in California and across the Pacific Flyway. The estimated cost to acquire 100,000 acres of similar habitat in the Sacramento Valley ranges from around $650 million to $1 billion.[1]

Estimates suggest that, at current costs, an annual payment program similar to WHEP could conceivably be run for hundreds of years and still cost less than permanently acquiring and restoring the same amount of land. Such a permanent restoration strategy requires that the capital be invested at the onset, whereas WHEP requires a relatively small amount of funding each year.[1]


Killdeer


American White Pelicans


Greater Yellowlegs

Implemented through WHEP

SYNCING RICE MANAGEMENT & ANNUAL WATERBIRD CYCLES

There is a great opportunity to sync rice management practices with the annual life cycle needs of waterbirds. The Waterbird Habitat Enhancement Program offers a suite of management practices that provides habitat for waterbirds and other wildlife. In figure 4 we present details for a selection of those practices, spanning the calendar year.

Wilson's Phalarope

"The Waterbird Habitat Enhancement Program provides me the opportunity to invest further in habitat on my farm without incurring all the expenses on my own. I appreciate NRCS helping me to cover some of these costs while we work together to do more for waterbirds and other wildlife."

– **Charley Mathews Jr.**, Rice Grower

TIMING RICE PRACTICES WITH THE NEEDS OF WATERBIRDS

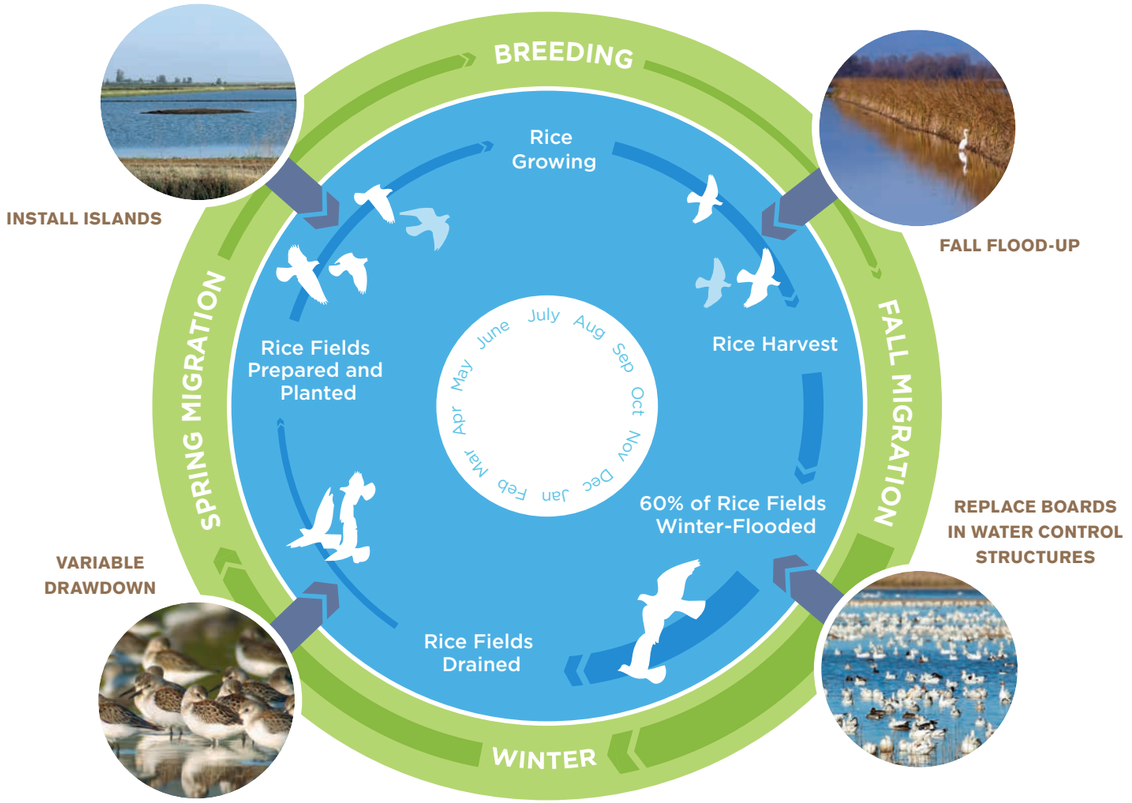


FIGURE 4. The annual cycle of Sacramento Valley rice production (blue) and migratory waterbirds (green) can be aligned by implementing alternative management practices on rice fields that provide enhanced habitat for waterbirds throughout the year (purple). Width of the arrows represents the relative amount of flooded habitat available for waterbirds (blue) and abundance of waterbirds in the Sacramento Valley (green).

Winter Season

Replace boards in water-control structures and perform light tillage

MANAGEMENT OBJECTIVE

- **Create preparedness to increase flooded winter conditions by collecting rainwater on fields through passive capture; most effective at providing habitat when heavy tillage is reduced.**
- **Cumulative acres enrolled: Approximately 55,000 acres over 5 years**


Great Blue Heron

DURING THE WINTER, rice fields and managed wetlands in the Central Valley host nearly half of the region's shorebirds and two-thirds of the entire waterfowl population of the Pacific Flyway (including nearly 20 percent of North America's ducks). One reason waterbirds use this area is because approximately 60 percent of California's ricelands are intentionally flooded in winter to promote decomposition of plant material left after harvest.

APPROXIMATELY 40 PERCENT OF RICE FIELDS ARE NOT FLOODED each winter and most of these fields remain dry or periodically become saturated by rainfall. To increase the habitat value of rice fields that are not intentionally flooded in the winter, growers enrolled in this practice refrain from heavy-machine work after harvest. This prevents important food sources from being buried and creates field conditions that are more hospitable for birds. Growers then use their water-control structures to passively capture rain-water, thereby increasing the likelihood of providing shallowly flooded habitat that waterbirds can use.

Late Winter / Spring Season

Stagger field drainage using variable drawdown

MANAGEMENT OBJECTIVE

- **Delay the drainage of flooded fields to provide a range of water depths later into winter**
- **Cumulative acres enrolled: 229,100 acres over 5 years**
- **Annual maximum acres implementing practice (2014): Approximately 92,000**


Whimbrel

RICE FIELDS ARE TYPICALLY DRAINED AT THE END OF JANUARY. This means that the available flooded habitat rapidly diminishes just as shorebird abundance in the Sacramento Valley is reaching its peak in the spring (Figure 4). Many birds do not depart for their Arctic breeding areas until May, and arrive in the Central Valley to find a lack of habitat. In addition, waterbirds that have spent the winter further south rely on the Central Valley to rest and re-fuel as they pass through on their journey back to their northern breeding grounds.

The rice growers who enrolled staggered the draining of their winter-flooded rice fields. This practice retains water during the month of February by draining only 25 percent of a farm's fields each week. This practice attracted three times the numbers of shorebirds (Figure 5), ducks and long-legged waders than the typical drawdown timing,[15] thereby increasing the capacity of the landscape to support a greater abundance and diversity of waterbirds.


Variable Drawdown

Shorebirds need enough food to increase their body weight by 20-60 percent to help them make their migratory journey to their nesting area.[13,14]

SHOREBIRD RESPONSE TO THE VARIABLE DRAWDOWN PRACTICE

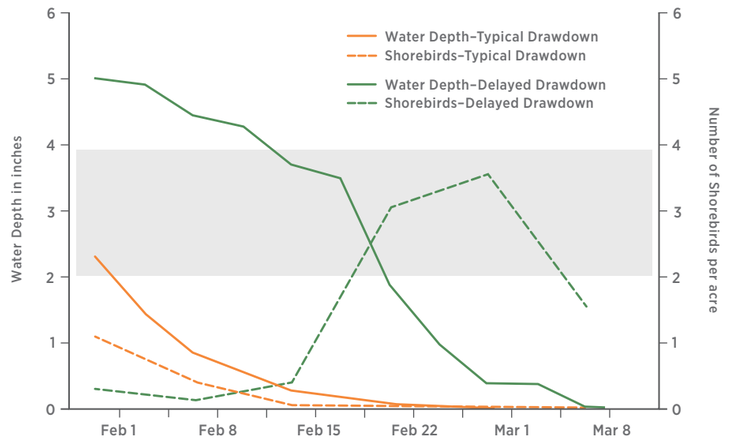


FIGURE 5. On left, average water depth in fields where water drawdown was delayed by three weeks (solid green line) and provided flooded habitat for shorebirds later in the winter when habitat is limited compared to fields with typical drawdown timing (solid orange line). On right, average number of shorebirds per acre in fields where drawdown was delayed by three weeks (dashed green line) compared to fields with typical water drawdown timing (dashed orange line) in the Sacramento Valley, California. The shaded area represents optimal water depths for shorebirds.

These results are from a study conducted by the Partnership from 2012-2013 on 12 farms enrolled in the WHEP program. Data were collected on 12 visits over 6 weeks and averages incorporate all densities recorded during that time, including when no birds were observed.

Spring and Summer Season

Install islands and widen berms

Nesting Islands

MANAGEMENT OBJECTIVE

- **Increase nesting habitat sites by installing islands and widening berms**
- **Cumulative amount of installed practices: 147 islands and 760 miles of modified berms over 5 years**

The Sacramento Valley's rice fields provide wetland-like habitat for nesting Mallards, Cinnamon Teal, Black Tern, Black-necked Stilt, American Avocet, Killdeer and more.[16,17,18] The berms that subdivide rice fields and the roads through rice farms can be important habitat for American Avocet and Killdeer, species that nest on relatively bare ground close to shallow water.[17,19,20]

Rice farmers that enrolled in nesting season enhancement practices installed small islands into rice fields and widened the tops of the earthen berms that separate rice paddies. More than four times as many shorebirds have been found to nest on widened berms than on those that had not been altered.[17]

"I am really happy with this new habitat program. The nesting islands I've created are among my favorite. They create a nice protected area for the birds. Overall, I've seen increased numbers and variety of species using my fields. I love driving around and seeing all these birds."

– **Keith Davis**, Rice Grower

Black Tern *(above)* – a species of conservation concern in California – nests in the Central Valley almost exclusively in rice fields.[10,16]

Black-necked Stilt nest

Fall Season

Flood-up early in fall

MANAGEMENT OBJECTIVE

- **Flood available fields to create habitat for fall migrant birds**
- **Estimated cumulative acres enrolled: 822 acres over four years**

Canada Geese

AFTER BREEDING FURTHER NORTH, SHOREBIRDS ARE THE FIRST TO ARRIVE IN THE SACRAMENTO VALLEY IN JULY, followed by ducks and geese in August. At this time, habitat is scarce. The migrant birds find a limited amount of shallow flooded habitat in the wetlands and dense stands of mature rice carpets much of the valley. The dense rice can be good habitat for young ducks to hide and for herons and egrets to look for food, but do not provide significant amounts of habitat for shorebirds. In fact, it can be months after the first migratory waterbirds arrive before rice fields can help support them in large numbers.

RICE FARMERS ENROLLED IN A PRACTICE CALLED EARLY FALL FLOOD-UP on fields that were either harvested early or were not in production. This shallow flooding from July through September provided high-value habitat. With the limited amount of this habitat available, shorebirds literally flocked to these fields. In fact, it is estimated that just 200 acres of this habitat provided 8 to 50 percent of regional habitat objectives depending on the month.[12,21,22]

MANAGEMENT PRACTICE	UNIT	2012	2013	2014	2015	2016	TOTAL
REPLACE BOARDS AND LIGHT TILLAGE	ACRES	16,878	21,925	11,391	4,756	54	55,004
VARIABLE DRAWDOWN	ACRES	10,541	63,171	80,241	65,116	10,029	229,099
INSTALL ISLANDS	NUMBER	12	117	18	0	0	147
WIDEN BERMS	MILES	87	669	4	1	0	760
FLOOD EARLY IN SPRING OR FALL	ACRES	175	258	340	48	0	822
WETLAND RESTORATION	ACRES	0	49	9	3	0	61
TOTAL	ACRES	27,643	85,648	92,182	70,316	10,113	285,902

TABLE 1. The annual and cumulative enrolled acreage, number of islands, and miles of bird-friendly management practices in California's ricelands in the NRCS Waterbird Habitat Enhancement Program.

"The WHEP practices I have applied during the past three years have proven to show positive outcomes for the bird species in the working lands environment."

– **Jim LaGrande**,
Rice Grower

Greater Sandhill Cranes

PARTNERSHIPS MAKE CONSERVATION POSSIBLE

THE WATERBIRD HABITAT ENHANCEMENT PROGRAM was developed through a collaboration of the NRCS, California Rice Commission, rice growers, Audubon California, Point Blue Conservation Science, and The Nature Conservancy. Together, the partners developed and tested field management practices to enhance the habitat value of ricelands for migratory birds. Leveraging the expertise and capacity of the rice growing community and the nongovernmental organizations, the NRCS invested significant federal Farm Bill funding to incentivize the adoption of bird-friendly farming practices. Efforts included NRCS personnel at all levels within California, from the local field offices to state-level staff. The California Rice Commission hosted a series of educational workshops for growers, while the conservation organizations helped reach out to growers, monitored the response from the birds, and shared the science validating the program. Working across the public, private and nonprofit sectors, this partnership harnessed significant resources and expertise to make WHEP successful.

"Improving agricultural landscapes to benefit wildlife is one of the goals of the NRCS. Rice fields are already equipped to provide precise water level management, so proposing alterations to the typical management is a cost-effective way to gain habitat while leaving the land in production. It is a very satisfying challenge to help private land owners find the balance between agricultural production and environmental conservation."

– **Jennifer Cavanaugh**, State Wetlands Biologist,
USDA Natural Resources Conservation Service

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Special Acknowledgement

Large-scale projects like WHEP require significant financial support and administrative commitment to become a reality. This success story could not have been possible without significant investment from each of the partners, especially the federal conservation funding and sustained commitment from the NRCS and the United States Department of Agriculture. Accordingly, WHEP should be recognized as one of their great contributions to waterbird habitat in the Central Valley – one of the most important waterbird habitat areas in North America and a critical stopping point along the Pacific Flyway. The California rice industry and the bird conservation community are deeply appreciative of this valuable contribution.

Great Egret

PHOTOGRAPHY

Cover JMorris_tundra swans
1 LMorris_greater yellowlegs
2 LMorris_snow geese
3a Iglecia_american avocet
3b Winnu_northern pintail
3c Iglecia_black necked stilt
3d Winnu_long-billed curlew
3e The Nature Conservancy_ greater sandhill cranes
4a Winnu_green-winged teal
4b LMorris_tundra swans
4c LMorris_wood ducks
5a LMorris_killdeer
5b LMorris_snowy egret
5c LMorris_least sandpiper
5d LMorris_white faced ibis
6 Iglecia_ridger with ring roller
7a Iglecia_black-necked stilt
7b Baer_nicole van ≠≠
7c Audubon_widened levee
7d Audubon_jim lagrande
8 JMorris_black-necked stilts and american avocets
9a Audubon_rice coast range
9b LMorris_killdeer
9c LMorris_american white pelicans
9d LMorris_lesser yellowlegs
10a LMorris_wilson's phalarope
10b Baer_charley mathews
11a Iglecia_rice islands
11b LMorris_great egret
11c MacKay_western sandpipers
11d Baer_many birds in flooded field
12a LMorris_great blue heron
12b Baer_dog and man on the levee
13a LMorris_whimbrel
13b Iglecia_variable drawdown
14 Audubon_widened levee & ibis
15a Iglecia_nesting islands
15b Audubon_black tern
15c Audubon_black-necked stilt nest
15d JMorris_keith davis
16a LMorris_canada geese
16b Baer_many birds in flooded field
17 Baer_aerial sutter buttes & rice fields
18a Audubon_jim lagrande
18b The Nature Conservancy_ greater sandhill cranes
19 Natural Resources Conservation Service_jennifer cavanaugh
21 LMorris_great egret

(listed by page number)