ON-FARM RECHARGE OF ANNUAL CROPS
WATERBIRD HABITAT QUICK REFERENCE

Bird Group	Habitat Characteristics in Annual Croplands	Vegetation Maintenance	Habitat Size & Location	Water Depth	Timing
SHOREBIRDS 	Open mudflats or shallowly flooded areas. Some short, sparse vegetation or crop stubble is okay; less than 40% is recommended.	Remove, smash, or lightly incorporate crop stubble or vegetation (e.g., chop, harrow, disc) without leaving deep ruts on the surface. Rolling after incorporation is ideal.	Areas >100 ac are ideal for creating shorebird habitat. Prioritize flooding areas within 6 miles of managed wetlands.	Saturated mudflat to 4 inches.	Critical periods for habitat include spring (March – May) and fall (July – September). winter (October – February) is also an important period. Shorebirds are present in the Central Valley July – May.
LONG-LEGGED WADING BIRDS 	Flooded or dry fields and areas with a mix of standing water and dry land (e.g., unflooded post -harvest cropland.)	Complete vegetation removal is not necessary. Standing vegetation and crop stubble should not be over 12 inches tall.	Larger areas of flooding are ideal. Prioritize flooding areas within 6 miles of managed wetlands and floodplain forests.	Saturated mudflat to 9 inches.	Important times for providing habitat include spring (March – May) and fall (September).
WATERFOWL 	Uses areas of open water and upland habitat (e.g., post-harvest grain fields.) for resting and feeding. Some vegetation and stubble okay.	Complete vegetation removal is not necessary, however some removal of crop stubble is. Standing vegetation and crop stubble should not be over 12 inches tall.	Larger areas of flooding are ideal. Prioritize flooding areas within 3 miles of managed wetlands.	Greater than 6 inches.	Winter (October – February) is an important time to provide habitat.

To learn more about the Migratory Bird Conservation Partnership, visit our website at:
www.camigratorybirds.org

Migratory Bird Conservation Partnership

VISION: *California's Central Valley has thriving bird populations, sustainable water for wildlife and people and is climate resilient.*


Long-billed Curlew

ON-FARM RECHARGE OF ANNUAL CROPS

Groundwater Recharge to Benefit People and Wildlife

With the Sustainable Groundwater Management Act (SGMA) requiring basins to balance water budgets and manage groundwater sustainably, there is an opportunity to demonstrate groundwater recharge with benefits to birds and people.

A multiple-benefit approach brings together water managers, farmers, agencies and conservation groups to stabilize groundwater in a manner that provides greater water reliability for farms and communities while protecting ecosystems, including migratory bird habitat.

What Are We Doing?

The Migratory Bird Conservation Partnership is developing resources to help landowners incorporate multiple benefits into groundwater recharge projects. This includes working with farmers, water management agencies, and other partners to identify how recharge on annual crop fields can also provide bird habitat. Our goal is to develop the resources that will help landowners implement multiple-benefit recharge projects where it matters most.

How Can You Help?

Talk to your community, other farmers and local agency staff about a multiple-benefit approach to replenishing groundwater.

Collaborate with us to evaluate the benefits and tradeoffs of managing annual cropland for birds and groundwater recharge. If you are interested in collaborating, please reach out by calling or emailing Samantha Arthur, sarthur@audubon.org, (916) 737-5707.

GROUNDWATER, BIRDS AND CALIFORNIA'S CENTRAL VALLEY

Millions of waterbirds visit the Central Valley each year to feed and rest in managed wetlands and post-harvest croplands. Rice, corn, and alfalfa provide over a million and a half acres of potential habitat and may be suitable for groundwater recharge, providing a win-win for birds and people.


Lesser Yellowlegs

Black-necked Stilt

AN INTRODUCTION TO WATERBIRDS

Waterbirds depend on water during some or all parts of the year for feeding, resting, or nesting and are often lumped into three categories:

Shorebirds: Most shorebirds have relatively long, thin legs. Some, like curlews and sandpipers have long, thin bills used to probe soft substrates for insect larvae and small worms. Others, like plovers, have short bills to peck bugs off the ground or the surface of the water. Most shorebirds prefer areas of open muddy areas or shallow water. They will tolerate short, sparse vegetation or crop stubble and avoid areas with thick or tall vegetation. Shorebird numbers peak in April as many species move through in the Central Valley to northern nesting areas. Numbers rise again during fall migration (July – September) and many spend the winter (October – March) in the region. Two areas of the Central Valley are formally recognized as internationally important to shorebirds: wetlands and ricelands of the Sacramento Valley and the Grasslands Ecological Area in Merced County.

Long-legged Wading Birds: This group includes herons, egrets, ibis, and cranes, united by having very long legs, necks, and bills. Herons and egrets use stealth to stalk their prey from above and lightning-fast reflexes to snatch crayfish, fish, and small mammals from the water or ground. Sandhill Cranes and White-faced Ibis probe muddy substrates for insect larvae and earthworms and also feed from the surface of the water and ground. Wading birds use a diverse range of habitats, including open water, vegetated wetlands, and upland areas.

Waterfowl: Waterfowl include ducks, geese, and swans, many of which are important game species. Most have webbed feet, making them strong swimmers. They use wetlands and other flooded areas and upland habitats. Waterfowl feed on waste grain, aquatic vegetation, and invertebrates. Most prefer to forage in open water and rest in either open water or upland habitats. Generally, waterfowl prefer water greater than six inches in depth. As many as seven million waterfowl rely on the Central Valley annually, mainly in winter (October – February).

RECOMMENDATIONS FOR CREATING WATERBIRD HABITAT ON ANNUAL CROPLAND

Agriculture contributes over 50% of all waterbird habitat in California. Crops like rice, corn, and alfalfa provide over a million and a half acres of potential habitat when managed appropriately. Waterbird use of flooded habitats depends primarily on the depth and timing of flooding, and the extent and height of vegetation. Our work with farmers around the Central Valley helped us develop these guidelines for managing annual crop fields to support waterbirds.

Provide Multiple Water Depths When Possible: Each of the three groups of birds prefers a different range of water depths and flooding at variable depths can provide habitat for more than one group. Fields with varying topography, such as beds or furrows or fields with one end that is lower than the other, will be able to provide a variety of water depths at the same time.

Manage Vegetation and Crop Residue: There are many ways to manage vegetation and crop stubble which vary in their effectiveness in creating suitable habitat for waterbirds. In general, vegetation and crop residue should not cover more than 40% of the field surface. The height of the vegetation and crop stubble should be 12 inches or less. Grain fields (e.g., corn and rice) can provide calorie-rich waste grain if the crop stubble and remaining grain is not buried after harvest such as removing or smashing crop residue (chopping, harrowing, shallow discing, etc.) in combination with a technique that creates a mostly uniform surface (rolling, etc.) before flooding. Chiseling, ripping and deep discing reduce habitat quality. Fallow fields can be managed similarly by breaking down vegetation growth prior to flooding with disking and/or mowing.

Consider Seasonal Timing When Flooding: Waterbirds use the Central Valley during most of the calendar year for feeding resting, and nesting. The most critical times of year for shorebirds is fall (July – September) and spring (March – April) migration when many crops fields are in production and habitat is scarce. Even small patches of land flooded and managed appropriately during these times can have a big impact. Mosquitoes can be especially active in late summer so contact your local vector control agency if you are considering flooding for five or more consecutive days from July through September.

Additional Considerations: Various combinations of field management practices may achieve the desired habitat results. For example, at the end of flooding, stagger the drawdown of fields to create a mosaic of water depths. We encourage you to try new combinations of practices to determine the best practices at your farm for attracting waterbirds.

PARTNERING FOR WATER AND WILDLIFE

The Migratory Bird Conservation Partnership is a collaboration among Audubon California, The Nature Conservancy, and Point Blue Conservation Science. Our goal is to protect and enhance agricultural, wetland, and riparian habitats in California's Central Valley to sustain healthy migratory bird populations in the face of changes in land use and weather patterns.

The Sustainable Groundwater Management Act (SGMA) provides an opportunity to manage our water resources more sustainably and avoid the negative consequences of groundwater overdraft. Meeting the goal of sustainability will present challenges for nearly every water-user in the Central Valley. Rice, corn, and alfalfa provide up to 300,000 acres of potential groundwater recharge, presenting an opportunity to manage for the multiple benefits of groundwater recharge and bird habitat.

We are interested in designing groundwater recharge projects on annual cropland that also meet the needs of waterbirds. We created this document to provide guidance on incorporating elements of waterbird habitat into groundwater recharge projects on annual cropland. We'd like to partner with you to evaluate the benefits and tradeoffs of managing annual cropland to simultaneously provide wildlife habitat and generate potentially significant water supply benefits.