Lava Beds–Butte Valley Resource Conservation District
Conservation Innovation Grant
Upper Klamath Basin "Walking Wetlands" Demonstration Project

Final Report

Grant Agreement #: 68-3A75-6-115
Grantee Name: Lava Beds-Butte Valley Resource Conservation District
Project Title: Upper Klamath Basin "Walking Wetlands" Demonstration Project

Project Director: Theresa Wright
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Period covered by Report: 8/7/2006 – 12/31/2010
Project End Date: 12/31/2010

A summary of the work performed over the course of the project:

Our projects over the four year period created 2,287 acres of "Walking Wetlands" for our demonstration project. The three farms have completed their obligations of setting aside the lands for the wetlands and working with the US Fish & Wildlife Service to flood, drain and monitor the wetlands.

Project Area	Acres
Noonan Farms	1,391 acres
Staunton Farms	96 acres
Mc Gill Farms	800 acres
Total Acreage of	2,287

Project Planning :

The project represents the first attempt to extend the "walking wetland" concept onto private farm lands in the Upper Klamath Basin. The project sites were used to demonstrate the overall applicability of this technique to private farmland operations.

The Lava Beds-Butte Valley Resource Conservation District (LBBV RCD) followed project plans to create demonstration projects on Staunton Farms in Siskiyou County, California, and Noonan Farms and McGill Farms in Klamath County, Oregon. Planning for our Walking Wetlands projects were accomplished in coordination with the farm participants and US Fish & Wildlife Services (USFWS) Coordinator and biologists David Mauser and Loren Ruport. USFWS managed the coordination of water quality testing, bird inventories and construction of the wetlands.

Introduction

Upper Klamath Basin "Walking Wetlands" Demonstration Project

Our Conservation Innovation Grant, Upper Klamath Basin "Walking Wetlands" Demonstration project consisted of three landowners with a total of 2,287 acres developed into seasonal and year round wetlands. The interest by private landowners was due to demonstrated success on Refuge agricultural lands, several farmers adjacent to both Tule Lake and Lower Klamath National Wildlife Refuges expressed interest in incorporating wetlands into their farming operations. This is the first project that represents an attempt to incorporate the "walking wetlands" concept on private lands. Private lands; however, provided a unique challenge. On the Refuges, farm fields are converted to wetlands when farm leases or share-crop agreements expire. In contrast, a grower on private lands can seldom afford to take land out of production for even a single year.

This Walking Wetlands project is an innovative partnership effort initiated in 2006 between the U.S. Fish and Wildlife Service (USFWS), Natural Resource Conservation Service (NRCS) and the Lava Beds Butte Valley Resource Conservation District (LBBV RCD) and three participating landowners, to restore emergent wetland habitats for waterfowl and other wildlife in a way that is consistent with the private landowner's agricultural operations. Under the Walking Wetlands concept, farm fields from 100 to 200 acres in size are sloped and the excavated material used to construct perimeter levees. Water control structures are installed to allow flooding and draining of fields to create seasonal wetlands, similar to how the Refuge establishes waterfowl wetland management units. The projects involve the construction of standard exterior impoundment levees and installation of flashboard riser water control structures using techniques commonly employed by the US Fish and Wildlife Service Klamath Basin National Wildlife Refuge's wetland program and Natural Resource Conservation Service practices used in shallow water development and management standards.

The term "Walking Wetlands" was adopted to describe the moving of wetlands through the agricultural landscape on a one to four-year basis. Moving of the wetlands is done to take advantage of the fact that vegetation and invertebrate production of emergent wetlands in the Klamath Basin are found to be most productive during the first one to three years after construction, after which the productivity and quality of the wetlands for wildlife declines. When that occurs, the wetlands are drained and put back into agricultural production and a new Walking Wetland unit nearby is flooded to replace the drained acres. Many of the fields in this proposal will additionally be fall flooded to provide waterfowl habitat and hunting lease opportunities for the landowner. Fall flooding will not be a requirement of the private landowner but, encouraged through incentives ranging from being allowed to farm acres on refuge and an annual payment under the Conservation Innovation Grant program with NRCS for flooded agricultural land.

Waterfowl and shorebird diversity and annual use on Tulelake NWR has increased nearly ten fold since the introduction of seasonal and semi-permanent marsh provided by the "Walking Wetland". No seasonal marsh existed within the Tulelake Basin until this program was started eight years ago. The success of the Walking Wetlands program on both Refuge and now on private lands has caused increasing interest from farmers wanting to participate in the program. Today the demand by landowners wanting to participate in the program far exceeds the available fields to farm on the refuge as an incentive to take private ground out of production for a "Walking Wetland".

The Lava Beds-Butte Valley Resource Conservation District, its partners, and the local community continue to look for opportunities to expand and improve the "Walking Wetland" program. If the opportunity were to arise to continue these efforts with modifications to conservation programs in the existing Farm Bill or development of new programs that will allow for the inclusion in agricultural practices of rapid rotation of wetlands as a part of the agricultural crop rotation systems. This type of an initiative promises to both benefit wetland dependent wildlife species as well as adjacent rural communities. The Upper Klamath Basin provides a combination of private and public lands that presents the LBBV RCD and its partners a unique opportunity to take a lead in addressing these difficult issues and developing techniques which are applicable to other areas of North America, especially in areas such as the Mississippi Flyway or Central Flyway.

The "Walking Wetlands" cycle

The duration of flooding and the hydrology of the wetlands vary from one to four years and are managed as either seasonally flooded (fall through spring) or flooded on a year round basis Fields are typically first flooded as soon after harvest as possible and are utilized almost immediately by fall migrant waterfowl and sandhill cranes as well as wintering raptors including large numbers of bald eagles. Following the wetland cycling, fields are returned to agricultural production.

First winter flooding

First summer

Summer, year four

Return to farming

Our partners for the Upper Klamath Basin "Walking Wetlands" Demonstration Project:

Natural Resource Conservation Service

U.S. Fish and Wildlife Service

Klamath Water Users Association

Tule Lake Irrigation District

Ducks Unlimited

University of California

University of Washington

U.S. Geological Survey

Oregon Audubon

National Fish and Wildlife Foundation

Point Reyes Bird Observatory

U.S. Bureau of Reclamation

California Waterfowl Association

California Department of Fish and Game

Benefits to the Wildlife and Avian Populations

Benefits to Wildlife & Avian Populations

The wetlands of the Upper Klamath Basin cater to the hundreds of thousands of birds that migrate along the inland portion of the Pacific Flyway. Winter survival of migratory birds depends on available habitat and abundant food sources. Migrating birds use the Upper Klamath Basin in the fall to rest and replenish their energy and nutrient reserves before continuing on their migration south. While during the spring migration birds must meet their increased nutritional demands to reach the breeding areas in a healthy condition. There are several species that nest and raise their young in the Upper Klamath Basin with the available habitat. It has been noted that wading birds such as the Great Blue Heron and the Great Egrets were found to be abundant on the flooded fields in the spring.

The new techniques of moving of the wetlands is done to take advantage of the fact that vegetation and invertebrate production of emergent wetlands in the Klamath Basin are found to be most productive during the first one to three years after construction, after which the productivity and quality of the wetlands for wildlife declines. The development of walking wetlands on private ground has supplemented the refuge habitat, with feeding sites of wetland vegetation and the flooded areas will provide habitat for aquatic birds. The elevated dikes surrounding the private lands walking wetlands provide shelter from strong winds and the size of the flooded fields will reduce wave action.

Early surveys in 2006 and 2007 led us to believe there was increased usage while the bird surveys conducted in 2009 showed substantial increase of birds using the walking wetland sites. Unfortunately in 2010 the surveys were compromised greatly by the drought conditions and hence the few walking wetland sites that were flooded were heavily used by remaining birds. The data might be compelling in its review of showing how many more birds in general were using the walking wetland sites in 2009 when water was available.

Waterfowl and shorebird has increased since the introduction of seasonal and semi-permanent marsh provided by the walking wetland. The conversion of private cropland to create emergent wetlands has expanded the carrying capacity for the migratory bird population in the Upper Klamath Basin.

Ocular wildlife surveys were conducted on the Noonan and Staunton wetlands in 2006-07 by USFWS biologists. McGill wetlands were surveyed in 2009-10 by biologists from the Point Reyes Bird Observatory. A total of 91 avian species were observed during bird surveys. An additional 11 species are known to utilize the experimental wetlands but were not observed during actual survey dates. Bird diversity tended to be greater during the spring and early summer period when breeding waterfowl and a host of non-game water birds were present. Upland boarders surrounding the wetlands were attractive to several terrestrial species. Several species of raptors were attracted to the abundant prey species present on the wetland sites.

Lava Beds–Butte Valley Resource Conservation District
Conservation Innovation Grant
Upper Klamath Basin "Walking Wetlands" Demonstration Project

While 25% of the Klamath's historic wetlands exist today, the development of "Walking Wetlands", on the refuge and private lands has added nearly 4,000 acres of additional wetlands. That in turn has prompted a 50-75% increase in waterfowl. The photos below represents the stark contrasts, of a harvested spring red wheat crop and the following spring it was flooded to join the "Walking Wetland" program reflects the amazing contrast and was quickly utilized by the spring waterfowl and shorebirds migration.

Lava Beds–Butte Valley Resource Conservation District
Conservation Innovation Grant
Upper Klamath Basin "Walking Wetlands" Demonstration Project

Waterbird use of flooded fields has been represented by a diversity of species including many that are considered "sensitive" by the State of California. Sensitive species include those species listed as threatened or endangered under Federal and State law as well as focal or priority species identified by Federal or State governments and conservation organizations. These later species, while not listed as endangered or threatened, are generally facing one or more threats to their populations or habitats. Sensitive species are frequently priorities for landscape conservation planning efforts.

Species	Species	Species
Tule goose[1,2,11,]	Wrangel Island Snow goose[1,2]	American Wigeon[1,2]
Northern pintail[1,2]	Mallard[1,2]	Tundra swan[1]
Lesser Scaup[1,2,]	Pac. White-fronted goose[1,2]	American avocet[3,5,13,16]
American white pelican[3,6,7,10,11]	Black-necked stilt[3,5]	Long-billed curlew[3,5,16]
Marsh wren[3]	Northern harrier[3,10,11,16]	White-faced ibis[3,6,7,10,16]
Wilson's phalarope[3,5,13,16]	Yellow-headed blackbird[3,10,11]	Dunlin[5]
Greater yellowlegs[5]	Killdeer[5]	Least sandpiper[5]
Lesser yellowlegs[5]	Long-billed dowitcher[5]	Western sandpiper[5]
Willet[5]	Black tern[6,7,10,11]	Black-crowned night heron[6,7,10]
California gull[6,10,16]	Caspian tern[6,10,]	Eared grebe[6,7,16,]
Forster's tern[6,7,10,]	Franklin's gull[6,7,16]	Snowy egret[6,10,]
American peregrine falcon[8,9,10,13,16]	Bald eagle[8,12,17]	Great egret[10]
Great blue heron[10]	American bittern[10,11]	Bufflehead[11]
Sora rail[11]		

[1] North American Waterfowl Management Plan and the Intermountain West Joint Venture Strategic Plan (1995) Priority Waterfowl Species.
[2] North American Wetlands Conservation Act Priority Waterfowl Species, Bird Conservation Regions 9, 15, and 33.
[3] North American Wetlands Conservation Act Priority Bird Species - Non-waterfowl species, Bird Conservation Regions 9, 15, and 33.
[5] U.S. Shorebird Conservation Plan and Intermountain West Regional Shorebird Plan.
[6] North American Waterbird Conservation Plan
[7] Intermountain West Waterbird Conservation Plan - Bird Conservation Regions 9 and 15
[8] State of California Threatened and Endangered Birds List
[9] State of California Fully Protected Animals List
[10] California Department of Fish and Game Bird Species of Special Concern List (2003)
[11] California Bird Species List (PRBO)
[12] Federal Endangered Species List
[13] Birds of Conservation Concern - FWS Region One - Bird Conservation Regions 9, 15, and 33.
[16] Great Basin Ecoregional Conservation Blueprint (TNC)
[17] Klamath Mountains Ecoregional Plan (TNC)

Walking wetland bird surveys - Noonan wetlands 2006-07

Species	Noonan 4/25/2006 50% coverage	Noonan 6/13/2006 50% coverage	Noonan 10/26/2006 50% coverage	Noonan 5/22/2007 50% coverage	Noonan 6/12/2007
Canada goose			200		42
White-fronted goose				1	
Northern shovelor	395	9			10
Nothern pintail	37	1	200		79
American wigeon	4		50	4	
Gadwall	9	71	200	340	98
Mallard	15	50	2500	215	197
Green-wing teal	17		50		
Cinamnon teal	2	1		35	24
Blue-wing teal				2	
Lesser scaup	9				
Bufflehead	8			2	
Ringneck duck				2	
Ruddy duck				1	
American coot	154		200	100	
Great egret	1	2		2	6
Great blue heron			1		
Black-crowned night H.					2
Ringbill gull	3	2		145	6
Semi-palmated plover					16
Killdeer	1	2		8	
Willet		3		4	5
Black-neck stilt		49		80	237
Caspian tern					4
Forster's tern		17			16
Wilson's phalarope		1		95	15
American avocet		15		49	175
White-faced ibis				96	1
American white pelican					8
Eared grebe				2	
Northern harrier			4		
Bald eagle				1	
Sanhill crane				1	

Walking wetland bird surveys - Staunton wetlands 2006-07

Species	6/13/2006	8/16/2006	9/27/2006	10/26/2006	5/22/2007	6/12/2007	10/1/2007
Canada goose			408		11	1	529
White-fronted goose							1
Northern pintail			89		4	80	761
Northern shoveler			598	150	7	17	136
Gadwall	20			100	70	52	
Mallard	51	1		5	50	151	403
Cinammon teal	2				12	131	
Blue-wing teal						2	
Green-wing teal				200			
Ruddy duck				25			
American coot			46	400			52
Piedbilled grebe		1					
Eared grebe		3		25			
Ring-billed gull	1	29	52	13		5	396
Caspian tern		3			26	2	
Great egret			4			1	2
Great blue heron			1				
Killdeer	1		5	4	13	12	
Spotted sandpiper	3				14		
Wilson's phalarope		183			42	12	
Redneck phalarope		1					
Black-neck stilt		32	45		125	141	
American avocet					12		
Yellowlegs sp		4	4	2			
Long-billed dowitcher			386	5	72		
Least/western sand.			10			4	
Dunlin					4		
Semi-palmated plover						25	
Long-billed curlew				1			
Willet					10		
White-faced ibis			20		22	7	

Description	MGNO 3-May-09	MGNO 10-Jun-09	MGSO 2-May-09	MGSO 10-Jun-09	MGSO 18-Aug-09	MGSO 28-Apr-10	MGSO 14-Jun-10
Gr. White-fronted Goose			22			348	
Snow Goose							
Ross's Goose							
Cackling Goose							
Canada Goose	19		12		831	10	
Tundra Swan							
Wood Duck							
Gadwall	115	5	18	47	53	60	49
Eurasian Wigeon	1		1				
American Wigeon	22		71			9	
Mallard	64	25	177	118	1253	147	77
Blue-winged Teal						2	
Cinnamon Teal	23	3	3	10	92	40	21
Cinn x B-w Teal							
Northern Shoveler	916		2	14	96	293	
Northern Pintail	461		252	3	24	530	1
Green-winged Teal	441		1		2	170	
teal spp.							
dabbling duck spp.					250		
Canvasback							
Redhead	89		3				
Ring-necked Duck	2						
Greater Scaup							
Lesser Scaup			8	7		4	
Lesser Scaup or R-n. Duck							
Bufflehead	63		9			99	
Common Goldeneye							
Hooded Merganser							
Ruddy Duck							
California Quail				2	9	6	6
Ring-necked Pheasant							
Pied-billed Grebe	4				5		
Horned Grebe							
Eared Grebe				26			
Western Grebe				1			
Clark's Grebe				2		1	
Double-crested Cormorant							
American White Pelican			5		239	19	56
American Bittern							
Great Blue Heron	1	1					
Great Egret		1			30		
Snowy Egret							
Black-crowned Night-Heron					1		8
White-faced Ibis		80			407		
Turkey Vulture	1						
Bald Eagle	2		1	1		2	
Northern Harrier					1	6	
Red-shouldered Hawk							
Swainson's Hawk							
Red-tailed Hawk	2		1				
Golden Eagle							
American Kestrel							

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Lava Beds–Butte Valley Resource Conservation District
Upper Klamath Basin "Walking Wetlands" Demonstration Project

Bird Count Data

Description	MGNO 3-May-09	MGNO 10-Jun-09	MGSO 2-May-09	MGSO 10-Jun-09	MGSO 18-Aug-09	MGSO 28-Apr-10	MGSO 14-Jun-10
Merlin							
Peregrine Falcon							
Prairie Falcon							
Virginia Rail							
Sora							
American Coot	264				2	17	
Sandhill Crane					12		
Black-bellied Plover						1	
Snowy Plover							
Semipalmated Plover	1					22	
Killdeer	2	1	9	23	15	33	32
Black-necked Stilt	5	1		16	403	10	4
American Avocet	10	2		47	44	452	47
Spotted Sandpiper			1	6	1		1
Greater Yellowlegs	1				5	1	
Willet			2	2		8	10
Lesser Yellowlegs					3		
Whimbrel							
Long-billed Curlew							
Marbled Godwit						121	
Sanderling						2	
Western Sandpiper	90				1	261	
Least Sandpiper	203				33	643	
Western/Least Sandpiper	410					663	
Baird's Sandpiper					10		
Pectoral Sandpiper					1		
Dunlin	50					1326	
dowitcher spp.	5				49	810	
Wilson's Snipe					1	2	
Wilson's Phalarope		4		15	621	6	11
Red-necked Phalarope					73		
Bonaparte's Gull	1				2	4	40
Franklin's Gull	1				2	4	12
Ring-billed Gull	1	1	2		536	38	14
California Gull					9		2
Caspian Tern					14	1	
Black Tern	9	1			5		
Forster's Tern	36	3		6	29	3	14
Rock Pigeon							
Eurasian Collared-Dove							1
Mourning Dove				1	31	3	2
Common Nighthawk							
Vaux's Swift	3						
Western Wood-Pewee		1					
Western Kingbird		1					
Black-billed Magpie		3			2		
Common Raven							
Horned Lark			3	1		2	
Tree Swallow		20				14	
Violet-green Swallow						1	
N. Rough-winged Swallow				2		2	
Bank Swallow				13		3	4

MGSO - McGill South

MGNO - McGill North

Prepared by: Biologists from Point Reyes Bird Observatory

2009-2010

Description	MGNO 3-May-09	MGNO 10-Jun-09	MGSO 2-May-09	MGSO 10-Jun-09	MGSO 18-Aug-09	MGSO 28-Apr-10	MGSO 14-Jun-10
Cliff Swallow		120		1		1	2
Barn Swallow		10	9	2		28	
swallow spp.	500					75	
Marsh Wren						3	
American Robin				1		1	
European Starling	2	8		1			1
American Pipit			1				
Audubon's Warbler						6	
Common Yellowthroat							1
Savannah Sparrow			24	5	157	125	3
Song Sparrow			1		2	1	4
White-crowned Sparrow						5	
Golden-crowned Sparrow			2			3	
Red-winged Blackbird	62	40	218	19	185	57	56
Tricolored Blackbird							
Western Meadowlark							
Yellow-headed Blackbird	1	1		1	73	1	
Brewer's Blackbird	9	11	4	18	19	10	46
Brown-headed Cowbird			3		14	1	1
blackbird spp.	110	10		2	393		52
House Finch							2

Lava Beds–Butte Valley Resource Conservation District
Conservation Innovation Grant
Upper Klamath Basin "Walking Wetlands" Demonstration Project

Water Quality

In the

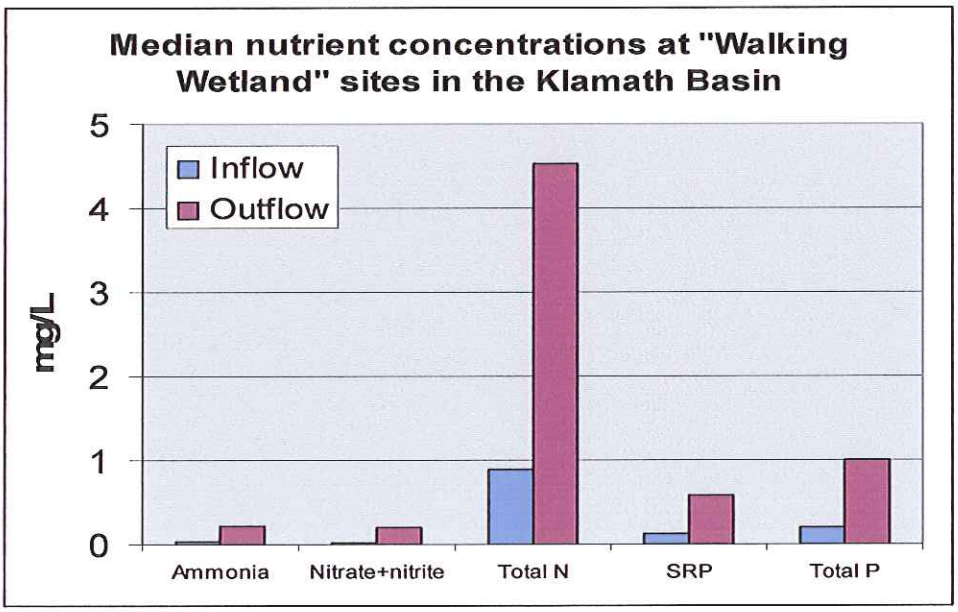
Walking Wetlands

Water Quality Benefits

Due to the complex nature of the system it has been difficult to quantify natural, background water quality. Natural background water quality is affected by low gradient streams, hot springs, channelization, phosphorus from eroding volcanic bedrock, wetland processes, high waterfowl populations, and other local phenomena. Insufficient data has been collected to determine geographic extent, magnitude, and source of water quality concerns. More extensive analysis of existing data and collection of new data to more precisely define agriculture's contribution to water quality in the basin.

USFWS staff collected water quality samples from all three "Walking Wetland" sites. Samples were analyzed for the nutrients nitrogen and phosphorus and their respective constituents. Samples were collected near the inflow and outflow locations in each wetland. Nearly all samples were collected during the spring months of May and June. Nutrient concentrations were much higher in the outflow samples compared to the inflow samples, for all nutrient forms except nitrate. For nitrogen forms, median ammonia concentrations were 0.028 mg/L in the inflows and 0.212 mg/L in the outflows (an order of magnitude higher). Median nitrate+nitrite concentrations were 0.025 mg/L in the inflows and 0.20 mg/L in the outflows (no difference really). Median total N concentrations were 0.90 mg/L in the inflows and 4.53 mg/L in the outflows (much higher). For phosphorus forms, median soluble reactive P (SRP) was 0.129 mg/L in the inflows and 0.576 mg/L in the outflows (higher). Median total phosphorus (P) concentrations were 0.203 mg/L in the inflows and 1.005 mg/L in the outflows (much higher).

These results are similar to those measured on nearby Lower Klamath National Wildlife Refuge (NWR) where nutrient concentrations were also higher in wetland outflows than inflows. Although concentrations were higher than inflows net nutrient loading to receiving waters was actually lower because of the large reduction in total water quantities between inflows and outflows. Thus, it is not necessarily the case that the increase in nutrient outflows is resulting in increased loading to the receiving water. To accurately measure loading companion measurements of inflow and outflow volumes would be necessary.



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Conservation Innovation Grant
Upper Klamath Basin "Walking Wetlands" Demonstration Project

Technical Suggestions

for

Walking Wetlands Construction

And

Development

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Upper Klamath Basin "Walking Wetlands" Demonstration Project

Walking Wetland Construction and Maintenance

Once a landowner has indentified a potential field they are willing to enroll in the program a site visit is made to ensure it is within a suitable location. On subsequent trip a full field survey is completed using engineering survey grade GPS equipment to establish field levels and assist in the design of the levee and grading of the field. This survey will also establish where the drain and delivery structures will be installed and lead to the final design submitted for approval by the landowner and associated local agencies.

Most projects involve the construction of a levee system around agricultural fields that will have a 12' top width with a 5:1 inside slope and a 2.5:1 outside slope and range from 2.5' through 4.5' in height. Equipment needs for this project are specific to minimize impact to farm fields. It is necessary to use land leveling scrapers with 8000 to 9000 series tractors that have eight wheels for limited soil compaction. These are large farm tractors with lower ground pressure and are required for this part of the project. The Scraper cans are attachments to the tractor and pull behind while self loading then hauling the soil over short distances. A double can set-up is needed to ensure efficient work at the lowest cost per cubic yard of soil moved. When the scraper picks up the soil it moves the material to the levee to be constructed and soil is handled only one time. Other forms of equipment result in excessive handling of material and typically will not result in our desired product of a compacted levee with little disturbance to the farm field. Other benefits of using a tractor scraper include a clean constructed levee and a field that is sloped and will flood efficiently for future farm irrigation and wetland management. Perimeter levee construction is the main component of the project but, interceptor drains are especially important around the entire project to ensure adjacent lands are not impacted from water seepage from these projects. Typical drains around the project are 4'- 6' deep to capture seepage and maintain the water table below adjacent fields. Many fields already have adequate field drains surrounding each field, but in some cases the project will need to enhance or create new drains along the levee edges and this is accomplished by use of excavators and backhoe.

On average the projects can be completed for $300-$380 per acre. This includes construction of levees and water control installation. The larger the field the better the value for construction on a dollar per acre basis so it is preferable to have fields at least 80-100 acres in size to keep the cost per acre within our average. Fields on private lands are selected on the ability to receive water throughout the year and projected bird use. The priority areas for construction are those directly adjacent the Refuge lands and those along the Lost River in California.

Management of wetlands is accomplished by flooding the fields in the fall using existing ditch systems within the Irrigation Districts and setting of boards on the drain structures at the low end of the field being flooded. These flash board structures allow the landowner to set the level of water by placing boards up to the management objective. The management level is set during construction so that water may flood over the highest point of the field at least six inches. Levees are constructed so that they are 2.5 feet over the highest point in the field allowing for two foot of levee free board above high water. This has been determined to be sufficient to hold water in this highly organic soil type without failure. Maintenance of the wetland area is very simple requiring only annual flooding and mowing levees. Cost to maintain the area are normal operating costs for landowners with or without wetlands and depend upon District water costs and diesel to manage field perimeters.

Partner Responsibilities

Tours as opportunity arises for local growers, interested public and congressional representatives.

2010

Summer

Complete required environmental compliance documents, survey field topography and finalize project design. Coordinate project with Resource Conservation District.

Fall

Begin construction activities including levees, water control structures. Construction to use scrapers, backhoes, and excavators using private contractors

Fall/Winter

Flood in October

2011

Fall/Winter/Spring

Flood field

Early summer

Remove water slowly to create shorebird habitats and promote germination of desired emergent and wetland plant species. Re-flood the Field for the entire year.

Summer/Fall

Monitoring and documentation of waterbird use on a twice a month basis during spring, summer, and fall with once per month monitoring in winter.

2012

Fall/Winter/Spring

Flood field

Early summer

Remove water slowly to create shorebird habitats and promote germination of desired emergent and wetland plant species. Reflood the Field for the entire year.

Summer/Fall

Monitoring and documentation of waterbird use on a twice a month basis during spring, summer, and fall with once per month monitoring in winter.

2013

Return the field to agricultural production and discuss cropping results following flood cycle with local growers.

2013 and beyond

Periodic flooding cycles, at landowner discretion, to create wildlife habitat, control soil diseases and pests, depress weed populations, and enhance soil fertility.

Responsibilities of Partners

XXXX Farms will:

1. Manage water on the property
2. Pay all water costs and pump charges associated with the wetland
3. Allow access to the property, with 24 hour prior notice, for all survey, construction, monitoring, and educational activities of the private lands biologist.

U.S. Fish and Wildlife Service will:

1. Conduct all wildlife monitoring activities and provide yearly reports to the landowner.
2. Provide yearly water management and habitat related technical assistance to the landowner.
3. Participate as needed in any field tours of the project and related educational events.
4. Provide technical assistance during construction activities.

Natural Resource Conservation Service will:

1. Provide technical assistance to the landowners as needed.
2. Participate as needed in field tours or other educational visits to the property.
3. Provide topographic surveys and assist in design of project.

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Conservation Innovation Grant
Upper Klamath Basin "Walking Wetlands" Demonstration Project

Agronomic Expectations and Opportunities of the Walking Wetlands

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Our Conservation Innovation Grant, Upper Klamath Basin "Walking Wetlands" Demonstration project was the pilot program here in the Klamath Basin for the development private agricultural lands into seasonal and year round wetlands.

The project was modeled after the program on the Refuges where farm fields are converted to wetlands the difference being on the Refuge this would occur when the lease or share-crop agreements would expire. What our project proposed to do was take productive agricultural ground out of production for two years the incentive offered for this project was to trade for refuge ground to farm in exchange and a payment from our CIG program to reduce the economic impact to the landowner. The basis for refuge ground to farm would be for 75 acres of private lands, the Refuge would provide 100 acres to farm with the agreement that 25 acres of un-harvested grains would remain, for wildlife. The payment from CIG program would be a per acre fee, with additional funds to cover water charges, ditch and levee maintenance and grass seed as needed.

The idea of the program met with initial resistance because of the potential loss of opportunity to keep the lands in production, as the details were ironed out the optimism began to grow. The incentive payments were based on per acre values as if the land was in production, taking into consideration taxes, water fees, maintenance of ditches and levees and grass seed for erosion control.

The awareness of the value of the program became more evident as organic production in the Klamath Basin has become more prevalent. The strict requirements for lands to reach organic status has been expedited by the use of the two year wetland cycle with the third growing season going back into agriculture. With the flooding of the lands the soil borne pests and weeds are reduced or eliminated, allowing for pesticide/herbicide reduced farming. The ability of the wetland process to increase available nitrogen in the soils creates the opportunity to see a substantial increase of production in the first year. Each year after the land has come out of the wetlands a noticeable decline of production and an increase in weed invasion occurs.

The landowners agreed that the primary purpose of the use of wetlands as part of their agricultural crop rotation system was to be able to be certified organic. The secondary reason was not as clear and the LBBV RCD found when talking to the program participants that it was between soil borne pests, fungus and the invasive weed, Quackgrass *(Elymus repens)*. Soil borne pests in potatoes and soil borne fungus in onions, create an environment that left unchecked would not allow for a marketable product.

If lands are converted to organic from conventional farming operations, the process begins with three years of transition and the fourth year the field will be organic. Prior to the use of the walking wetlands conventional transition, the fields can no longer be treated with any non-organic fertilizer or pesticide, this method creates idle conditions for soil borne pests and weeds to establish their existence in the field. Utilizing walking wetlands to treat pest and weed issues creates multiple opportunities for a landowner to gravitate into organic production without the soil borne pests and weeds becoming established during transition.

Initially a field coming into its first year of agricultural production after the wetland cycle shows an increase in yields of up to 40-50% this can be attributed to the increases in available soil nutrients after the decomposition of vegetative matter that grew in the wetland. Participants in the project have found that each year the field is in agricultural production after the walking wetlands the soil borne pests and weeds increase and the yields decrease. Discussions were held with the landowners in regards to utilizing the walking wetland concept as part of the standard crop rotation plan. It was agreed that the standard rotations of potatoes, grain and onions would benefit greatly from the inclusion of a wetland cycle and retain the status of organic. Even a seasonal wetland is beneficial while a year round wetland offers increased vegetative matter to be available for composting prior to placing the field back into agricultural production.

The initial costs of installing the drain and delivery structures and a levee system typically runs about $300-$380 per acre details maybe found in the Technical Suggestions for Walking Wetlands Construction & Development; while this seems expensive one landowner felt with proper maintenance these structures would remain viable for 40 years. This makes good use of the initial investment, by utilizing it every five to six years as a component of a crop rotation program of an agricultural operation. The value of the lands when they initially come out of the wetland cycle is nearly double that of conventional farm ground.

In conventional growing methods a rule of thumb many growers go by is the organic market, for grains and potatoes will yield 20% less and net 20% more in sales. With the walking wetlands program it has been consistently 15-40% percent higher in production and net sales tend to be about 20% higher than the conventional market. Organic fields not under the walking wetland programs tend to require more expensive and less available fertilizers/products to increase production and reduce pests.

One on the techniques that was utilized was the tile drain system to assist in maintaining proper levels during flooding and drawing down the water from the fields. This system has many benefits throughout the production cycle as well as in the wetland cycle; fields maybe fall irrigated to decrease the amount of water required to prepare the soil for planting in the spring. Due to the size and depth of drains in both the Noonan and McGill projects tile drains were not installed.

As landowners or operators our participants discussed the potential of the inclusion of the wetland cycle as part of the crop/land use rotation program it seemed that a logical step would be to have the wetland field near an irrigation district drain. This would allow for filling and maintaining the flood level on the field chosen for a wetland cycle from irrigation drains. This opportunity to recycle water (known as tail water), in a wetland setting brings the Upper Klamath Basin to the forefront of sustainable practices with the value placed on wetlands to filter pollutants and reduce erosion. This allows for the full utilization water supplies for the production of agricultural products and the benefit of fish and wildlife.

As our project progressed it has become evident that the outreach and education component for the project should have been increased to greater levels showing the benefits of incorporating a wetland cycle in agriculture crop rotations. We found several challenges in the educating many of the surrounding landowners and members of the irrigation

community. Many have misconceptions regarding the operation, maintenance, benefits and drawbacks to walking wetlands on the landscape.

Using the NRCS practice standard/cost share for Shallow Water Development and Management to install the water control structures, building of levees and the installation of necessary drain features will assist in encouraging landowners to implement these features necessary to the walking wetlands. Then, developing a crop rotation standard/cost share to include the walking wetlands would be beneficial to assisting the producers in improving water quality with benefits of additional habitat for wildlife.

The success of the Upper Klamath Basin "Walking Wetlands" Demonstration Project has created an opportunity in the community for future projects. The building of additional wetlands in our area as well as the opportunity to create them in other flyways across the country would be beneficial to the environment, production agriculture and wildlife populations.

Staunton Farms"
Walking Wetlands 96 Acres

McGill Farms Walking Wetland
1391 Acres in 3 Fields

Initial Survey to establish field levels and assist in the design of the levees

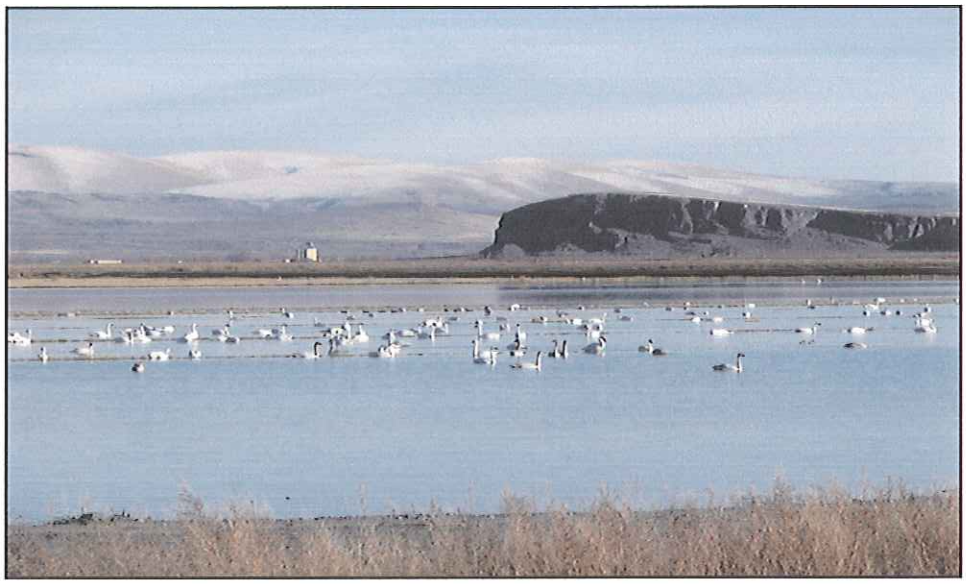
Leveling field to maintain proper flooding

Development of perimeter levees

Water Control Structures Installation
For Walking Wetlands

First Flooding with Water Control
Structures installed

Fall and Spring use by Wildlife



Drawing down of the Walking Wetlands in preparation for return to an agricultural field

Fertile Fields in production after Walking Wetlands