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Randall L. Gray
USDA/NRCS

Sally J. Benjamin
USDA/FSA

Charles A. Rewa
USDA/NRCS

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Fish and Wildlife Benefits of the Wildlife Habitat Incentives Program

Randall L. Gray

USDA/NRCS, Ecological Sciences Division
P.O. Box 2890, Room 6158-S
Washington, D.C. 20250, USA
Randall.Gray@wdc.usda.gov

Sally L. Benjamin

USDA/FSA, Conservation Environmental Programs Division
1400 Independence Avenue SW
Washington, D.C. 20250, USA
Sally.Benjamin@wdc.usda.gov

Charles A. Rewa

USDA/NRCS, Resource Inventory and Assessment Division
5601 Sunnyside Avenue
Beltsville, MD 20705-5410, USA
Charles.Rewa@wdc.usda.gov

Abstract

The Wildlife Habitat Incentives Program (WHIP) is a voluntary program that encourages the establishment and enhancement of a wide variety of fish and wildlife habitats of national, state, tribal, or local significance. Through voluntary agreements, the Natural Resources Conservation Service (NRCS) provides financial and technical assistance to participants who installed habitat restoration and management practices. Since 1998, nearly \$150 million has been dedicated to the program and over 2.8 million acres involving over 18,000 contracts have been enrolled. A wide range of habitat-enhancement actions are cost-shared through the program, affecting hundreds of target and non-target species. While few quantitative data exist describing how fish and wildlife have responded to terrestrial and aquatic habitats enrolled in the program, the popularity of WHIP among participants and funding partners and anecdotal evidence imply that tangible benefits to target species are being realized. Additional studies are needed to better understand how WHIP projects affect local habitat use by and population response of target and non-target species.

Introduction

The Wildlife Habitat Incentives Program (WHIP) was established by the 1996 amendments to the 1985 Food Security Act and reauthorized by the Farm

Security and Rural Investment Act of 2002. Whereas other U.S. Department of Agriculture (USDA) conservation programs include wildlife conservation as a program purpose, WHIP is the only conservation program principally focused on addressing fish and wildlife habitat needs. Through WHIP, the Natural Resources Conservation Service (NRCS) provides technical and financial assistance to landowners and others to develop upland, wetland, riparian, and aquatic habitat areas on their property.

Through 5- to 10-year voluntary contracts, WHIP provides technical assistance and up to 75% of the cost of installing terrestrial and aquatic fish and wildlife habitat practices recommended in a wildlife habitat development plan. A provision in the 2002 Farm Bill enables cost-share to exceed 75% for contracts that are 15 years in duration.

Since implementation of WHIP began in 1998, over 2.8 million acres have been enrolled for a variety of fish and wildlife habitat objectives. While enrollment is substantial, little effort has been placed on quantifying benefits to the fish and wildlife resources targeted by WHIP projects. Hackett (2000) reviewed the literature that was available concerning the first 2 years of program operation. Few additional quantitative fish and wildlife studies to document response specifically related to WHIP have been conducted since. Therefore, this paper focuses on updating readers on WHIP implementation since 2000 and provides some examples of the types of projects the program is supporting to benefit fish and wildlife resources. Information presented on principle practices and program focus will help set the stage for the program-neutral, practice-based literature synthesis currently under development by The Wildlife Society and others.

Table 1. General enrollment information for the Wildlife Habitat Incentives Program (WHIP).

Heading	Fiscal year (FY)						
	1998	1999	2000 ^a	2001	2002	2003	2004
No. contracts enrolled	4,340	3,800	519	2,477	1,946	2,123	3,012
Cumulative no. contracts	4,340	8,140	8,659	11,136	13,082	15,205	18,217
Acres (× 1,000)	672	721	92	212	368	299	432
Cumulative acres (× 1,000)	672	1,393	1,485	1,697	2,065	2,364	2,876
Funding (× \$1,000)	30,000	20,000	0	12,500	15,000	30,000	42,000
Average contract size (acres)	146	187	176	92	189	141	140
Average cost-share (\$/acre)	44	28	110	59	34	55	63
Unfunded applications (number and total cost-share requested [× \$1,000])						3,660 40,393	3,033 10,704

^a Although no funds were allocated for WHIP in FY 2000, additional lands were enrolled using carry-over funds from previous years.

Program Funding and Enrollment

Although the program was authorized in 1996, it was first implemented through a \$30 million allocation in fiscal year (FY) 1998. An additional \$20 million was allocated in FY 1999; the program was not funded in FY 2000. While funding has varied over the years, a total of \$149.5 million had been appropriated to WHIP through FY 2004 (Table 1). By the end of FY 2004, over 2.8 million acres involving over 18,000 contracts had been enrolled (Table 1).

WHIP is a popular program, generating far more applications than it has been able to fund. In recent years, the number of contracts funded has been approximately half the number of applications received (Table 1). This tendency has remained through the life of the program, illustrated by signup activity during early enrollment periods. For example, while 428 applications were received in Oklahoma in 1999, only 74 were funded (Wildlife Management Institute 2002).

Management of the program is viewed positively by program participants. A recent customer satisfaction survey found that the American Customer Satisfaction Index (ASCI) score for WHIP of 77 to be rated significantly above the private sector services score of 74.7 and well above the aggregate federal government ASCI score of 70.9 (Federal Consulting Group 2004). Satisfaction with NRCS customer service (courtesy and professionalism) was the primary factor responsible for the high score, whereas the application process was seen less favorably.

Partnership with other organizations has remained a key aspect of WHIP implementation. The NRCS cooperates with other federal agencies, state and local partners, and the private sector to address local and national conservation issues. The NRCS State Technical Committees provide a forum to establish state wildlife priorities and for working with other fish and wildlife interests in the state to encourage the leveraging of other public and private funding. Links to state web pages with program descriptions and priorities can be viewed on the NRCS web site at <www.nrcs.usda.gov/programs/whip/WHIP_signup/WHIP_Stateprograms.html>.

Whereas WHIP participants contribute to the cost of habitat projects, conservation groups and other organizations also play a major role in many instances. In FY 2004, partners contributed over \$8 million in cost-share or in-kind services to help participants establish wildlife habitat practices on enrolled lands. Partners also bring technical expertise to the collaboration and may create wildlife habitat development plans, monitor progress, and assist in communication with stakeholders. In addition, partners bring other resources into the WHIP program through cost-

share, by supplying equipment, or providing staff or volunteers who install practices. Emphasis on partnership has strengthened WHIP and is an essential facet of the program's success.

Targeted Habitats and Practices

The WHIP Program Manual describes the emphasis of the program as follows:

- Wildlife and fisheries habitats of national and state significance.
- Habitats of fish and wildlife species experiencing declining or significantly reduced populations, including rare, threatened, and endangered species.
- Practices beneficial to fish and wildlife that may not otherwise be funded.

States generally select 2 to 6 priority habitat types, including 1 or more upland and riparian habitats. Wetlands, aquatic in-stream habitat and other unique wildlife habitat such as caves and salt marshes are also priorities in a number of states (Table 2).

Specific multi-state initiatives have also been established. For example, the WHIP Salmon Habitat Restoration Initiative helps landowners in Alaska, California, Idaho, Maine, Oregon, and Washington develop projects that restore habitat for Pacific and Atlantic salmon. Projects may include providing shade along streams, restoring gravel spawning beds, removing barriers to fish passages and reducing agricultural runoff. Funding for this initiative has been substantial—\$3.5 million was allocated in FY 2004, and \$2.8 million is being dedicated to this initiative in FY 2005.

Over 90% (388,454 acres) of the acres enrolled in WHIP in FY 2004 addressed upland wildlife habitats such as grasslands, shrub–scrub, and forests, whereas less than 5% (21,500 acres) of WHIP lands enrolled were wetland habitats. Riparian habitat made up less than 5% of the acres enrolled in FY 2004 as well. In FY 2004, 131 contracts involving \$2.9 million in cost-share funding and covering 21,000 acres were enrolled in 25 states to address habitat needs of threatened or endangered species.

A wide variety of lands and habitat types are eligible for enrollment in the program, enabling many clients to participate in USDA programs for the first time. Although many enrolled lands do involve agricultural production, this is not a requirement of the program. For example, 30 schools and environmental education centers have developed “WILD School Sites” with WHIP technical and financial assistance. Many types of practices are cost-shared to provide the planned habitat in WHIP

Table 2. Examples of habitat types, species targeted, and practices cost-shared under Wildlife Habitat Incentives Program (WHIP) to achieve fish and wildlife habitat objectives.

Habitat type	Examples of species or groups targeted	Practices and/or habitat-management actions
Upland Early successional/ grasslands Range lands Forest lands Shrub/scrub Cropland	Karner blue butterfly, gopher tortoise, Gunnison sage-grouse, short-eared owl and other grassland nesting birds, northern bobwhite, western harvest mouse, swift fox	Seeding and plantings Fencing Livestock management Prescribed burning Shrub thickets and shelterbelts Creation of forest openings Disking or mowing (meander disking through woodlands) Woody cover control Brush management Aspen stand regeneration Exclusion of feral animals Winter flooding of crop fields
Wetland Tidal flushing areas Salt marshes Wetland hardwood hammocks Mangrove forests Wild-rice beds Freshwater marshes Estuaries Vernal pools	Fairy shrimp, short-nosed sturgeon, amphibians, Santa Cruz long-toed salamander, black-crowned night heron, snowy egret, ibis, osprey, piping plover, California clapper rail, canvasback, Koloa duck, Nene goose	Installation of culverts or water-control structures Invasive plant control Fencing Creation of green-tree reservoirs Moist soil unit management Creation of shallow water area
Riparian and in-stream Riparian areas along streams, rivers, lakes, sloughs and coastal areas In-stream habitats	Higgin's eye pearly mussel, Ouachita rock pocketbook mussel, California freshwater shrimp, valley elderberry longhorn beetle, Puritan tiger beetle, short-nosed sturgeon, arctic grayling, American shad, Bonneville cutthroat trout, Oregon chub, bull trout, westslope cutthroat trout, brook trout, pallid shiner, leopard darter, Arkansas darter, hellbender, Pacific giant salamander, ornate box turtle, alligator snapping turtle, painted turtle, woodcock, Columbia sharp-tailed grouse, least tern, belted kingfisher, yellow-billed cuckoo, southwest willow flycatcher, Le Conte's sparrow, Preble's meadow jumping mouse, river otter	Tree plantings Fencing with livestock management and off-stream watering In-stream structures, including installation of large wood Seeding Streambank protection and stabilization Stream deflectors Creation of small pools Installation of buffers Removal of dams Fencing Creation of fish passage Gravel bed creation
Threatened and endangered, and other rare or declining species Various	American burying beetle, Neosho madtom, Topeka shiner, Snake River Chinook salmon, Umpqua River cutthroat trout, Lahontan cutthroat trout, coho salmon, steelhead, bulltrout, dusky gopher frog, bog turtle, gopher tortoise, southern hognose snake, eastern indigo snake, black pine snake, Florida sandhill crane, Mississippi sandhill crane, wood stork, Yuma clapper rail, snail kite, caracara, red-cockaded woodpecker, grasshopper sparrow, gray bat, lesser long-nosed bat, black-tailed prairie dog, Sonoran pronghorn, kit fox, Mexican wolf, Louisiana black bear, Florida panther	Species habitat requirement-specific actions

Table 3. Practices reported as planned and applied under the Wildlife Habitat Incentives Program WHIP during fiscal year (FY) 2004 that are generally recognized for providing benefits to fish and wildlife. (Data provided by the Natural Resources Conservation Service [NRCS] National Conservation Planning Database. Acres planned or installed do not directly correspond to acres enrolled in FY 2004 due to overlap in enrolling lands and planning and installing conservation practices.)

Conservation practice	NCRS code	Units	
		Planned ^a	Installed ^b
Wildlife-specific practices			
Early successional habitat development/management (acres)	647	16,600	3,878
Hedgerow planting (feet)	422	363,118	88,293
Restoration and management of declining habitats (acres)	643	4,174	1,517
Riparian herbaceous cover (acres)	390	3,226	41
Shallow water management for wildlife (acres)	646	4,922	934
Upland wildlife habitat management (acres)	645	659,735	177,667
Wetland wildlife habitat management (acres)	644	36,769	8,553
Wildlife watering facility (no.)	648	164	32
Buffer practices			
Field border (feet)	386	754,205	139,198
Riparian forest buffer (acres)	391	2,572	263
Windbreak/shelterbelt establishment (feet)	380	984,667	374,085
Windbreak/shelterbelt renovation (feet)	650	83,036	24,579
Grazing lands practices			
Brush management (acres)	314	57,974	11,639
Fence (feet)	382	1,579,539	421,812
Prescribed burning (acres)	338	137,017	33,382
Prescribed grazing (acres)	528a	239,888	113,698
Forestland practices			
Forest stand improvement (acres)	666	22,506	12,368
Tree/shrub establishment (acres)	612	9,606	1,994
Wetland and stream practices			
Dike (feet)	356	69,430	13,188
Fish passage (no.)	396	106	3
Pond (no.)	378	315	79
Stream habitat improvement and management (acres)	395	9,367	4,855
Streambank and shoreline protection (feet)	580	101,025	25,686
Structure for water control (no.)	587	110	45
Wetland enhancement (acres)	659	601	460
Wetland restoration (acres)	657	9,316	3,208

^aPractices planned during FY 2004 that were approved for cost-share under WHIP contracts.

^bPractices approved for cost-share under WHIP contracts established in FY 2004 or prior years and installed during FY 2004.

habitat plans. A number of these practices are widely recognized for their potential to improve fish and wildlife habitat quality. Table 3 provides a list of these practices planned and installed during FY 2004. Table 4 provides a list of other practices that, while not generally recognized as practices designed to address fish and wildlife habitat needs, were planned and installed for WHIP projects during FY 2004. This information provides a window into the relative amount of effort placed on each of the various NRCS conservation practices in WHIP implementation. The Upland Wildlife Habitat Management (645) practice stands out with nearly 660,000 acres planned during FY 2004 (Table 3). This practice is an umbrella practice for many activities undertaken for the purpose of creating, restoring, maintaining, or enhancing areas for food, cover, and water for upland wildlife and species that use upland habitat for a portion of their life cycle (NRCS 645 Practice Standard, Field Office Technical Guide). Many types of projects are carried out under this practice, making it difficult to determine specific habitat-manipulation actions performed without inspection of individual wildlife habitat plans. Specific habitat manipulation is easier to visualize for other practices.

Table 4. Practices reported planned and applied under Wildlife Habitat Incentives Program (WHIP) during fiscal year (FY) 2004 that are not generally recognized as wildlife practices. (Data provided by the Natural Resources Conservation Service [NRCS] National Conservation Planning Database.)

Conservation practice	NCRS code	Units	
		Planned ^a	Installed ^b
Access road (feet)	560	34,653	850
Agroforestry planting (acres)	704	12	12
Animal trails and walkways (feet)	575	1,084	
Channel bank vegetation (acres)	322	5	1
Channel stabilization (feet)	584	1,556	
Clearing and snagging (feet)	326	230	
Composting facility (no.)	317	1	
Conservation cover (acres)	327	6,352	2,771
Conservation crop rotation (acres)	328	5,177	1,867
Constructed wetland (no.)	656	3	3
Contour buffer strips (acres)	332	30	8
Contour farming (acres)	330	393	393
Controlled stream access for livestock watering (no.)	730	2	2
Cover crop (acres)	340	1,211	244
Critical area planting (acres)	342	885	63
Cross wind trap strips (acres)	589c	66	
Dam, diversion (no.)	348	1	
Diversion (feet)	362	6,690	1,599
Filter strip (acres)	393	134	22
Firebreak (feet)	394	4,442,070	1,727,153
Forage harvest management (acres)	511	2,348	1,832

Conservation practice	NCRS code	Units	
		Planned ^a	Installed ^b
Forest site preparation (acres)	490	4,414	1,261
Forest trails and landings (acres)	655	229	32
Grade stabilization structure (no.)	410	95	16
Grassed waterway (acres)	412	10	5
Grazing land mechanical treatment (acres)	548	60	
Heavy use area protection (acres)	561	1,178	53
Irrigation canal or lateral (feet)	320	1,200	1,200
Irrigation field ditch (feet)	388	769	
Irrigation or regulating reservoir (no.)	552	6	
Irrigation system, micro-irrigation (no.)	441	9,091	138
Irrigation system, sprinkler (no.)	442	33	
Irrigation system, surface and subsurface (no.)	443	1	
Irrigation water conveyance, ditch and canal lining, nonreinforced concrete (feet)	428a	125	
Irrigation water conveyance, pipeline, high-pressure, underground, plastic (feet)	430dd	31,389	1,300
Irrigation water conveyance, pipeline, low-pressure, underground, plastic (feet)	430ee	9,545	
Irrigation water conveyance, pipeline, rigid gated pipeline (feet)	430hh	2,845	3,500
Irrigation water management (acres)	449	401	86
Land clearing (acres)	460	550	199
Land grading (acres)	744	520	520
Land smoothing (acres)	466	4	5
Mine shaft and adit closing (no.)	457	1	1
Mulching (acres)	484	75	45
Nutrient management (acres)	590	11,060	4,797
Obstruction removal (acres)	500	40	
Pasture and hay planting (acres)	512	2,336	1,067
Pest management (acres)	595	20,959	14,352
Pipeline (feet)	516	371,511	73,560
Planned grazing system (acres)	762	783	813
Pond sealing or lining, bentonite sealant (no.)	521c	4	
Pond sealing or lining, flexible membrane (no.)	521a	5	
Pumping plant (no.)	533	24	2
Range planting (acres)	550	12,238	2,811
Recreation area improvement (acres)	562	15	11
Recreation land grading and shaping (acres)	566	1	1
Recreation trail and walkway (feet)	568	13,600	2,900
Residue management, mulch till (acres)	329b	524	399
Residue management, no-till/strip till (acres)	329a	815	335
Residue management, seasonal (acres)	344	3,938	1,165
Row arrangement (acres)	557	12	12
Snow fence (feet)	770	1,420	

Conservation practice	NCRS code	Units	
		Planned ^a	Installed ^b
Spoil spreading (feet)	572	4,000	
Spring development (no.)	574	39	6
Stream crossing (no.)	728	22	
Subsurface drain (feet)	606	1,839	89
Terrace (feet)	600	57,000	
Tree/shrub pruning (acres)	660	376	19
Underground outlet (feet)	620	345	435
Use exclusion (acres)	472	13,376	5,231
Waste storage facility (no.)	313	1	
Water and sediment control basin (no.)	638	2	
Water well (no.)	642	45	17
Watering facility (no.)	614	238	71
Well decommissioning (no.)	351	6	
Wetland creation (acres)	658	119	458
Woodland pruning (acres)	763	6	6

^a Practices planned during FY 2004 that were approved for cost-share under WHIP contracts.

^b Practices approved for cost-share under WHIP contracts established in FY 2004 or prior years and installed during FY 2004.

Fish and Wildlife Response to WHIP

Hackett (2000) reported that state-level WHIP priorities are intended to benefit a wide breadth of species and native habitats considered culturally and ecologically important. Few studies have been conducted to quantify the fish and wildlife benefits derived from WHIP implementation to date. However, many have recognized the potential importance of WHIP in meeting the needs of declining species and other important fish and wildlife resources. Casey et al. (2004) acknowledged the existence of indirect evidence of WHIP projects benefiting threatened and endangered or other at-risk species. Most states include at-risk species as a priority for the program.

Although WHIP does address problems believed to limit wildlife and their habitats, with few exceptions a direct cause-and-effect relationship between WHIP projects and improvements in wildlife populations has not been documented in the peer-reviewed literature. One reason is a lack of standardized monitoring protocols to establish such a relationship. However, a considerable amount of anecdotal information is available from states and others that demonstrates the value of WHIP projects for fish and wildlife. We list here just a few examples of the types of activities supported by WHIP.

Sage-grouse Habitat Improvement

The Western Governors Association (2004) credits WHIP as the means of securing funding to implement sage-grouse conservation actions on



Installation of fencing and adoption of grazing management allows for controlled, short-duration intensive grazing (far side of fence) followed by extended rest periods to improve habitat quality for sage-grouse and other wildlife species on Parker Mountain in Utah. Ron Francis, NRCS

WHIP is being used to restore riparian areas along streams used by salmon and other aquatic species. On this stream in northern California, WHIP provided support for bioengineered bank stabilization and tree planting in the riparian area. The site has been used to demonstrate salmon habitat-restoration techniques. Charlie Rewa, NRCS



private lands and to fund a private lands coordinator position. Specifically, \$350,000 of WHIP funds have recently been dedicated to improving privately owned sagebrush (*Artemisia* spp.) habitat on over 104,000 acres on Parker Mountain in Utah. This project is aimed at improving habitat quality for sage-grouse (*Centrocercus urophasianus*) and other species, such as pygmy rabbits (*Sylvilagus idahoensis*) and mule deer (*Odocoileus hemionus*). Funds will contribute to a partnership effort involving 15 federal and state agencies to restore the shrub-steppe ecosystem in the area. Habitat restoration work consists of planting forbs, excluding livestock with fencing, prescribed grazing, and installation of livestock water facilities. The effort is intended to help stem the decline in sage-grouse populations and to prevent it from becoming listed as an endangered species. An understanding of sage-grouse habitat requirements and how management practices can be installed to benefit this species is a key element of this effort (see Connelly et al. 2004). A total of \$2 million is being allocated in FY 2005 for projects designed to improve sage-grouse habitat in 5 western states.

Fish Passage on Streams

WHIP is supporting projects that remove impediments to fish passage on streams, ranging from removal of both large and small dams to replacing culverts to building fish ladders and other structures on obstructions that cannot be removed (106 fish passage projects were planned in FY 2004). These projects are opening hundreds of miles of streams to access by anadromous fish and other migratory aquatic organisms that have been blocked for many years by a variety of structures built during the 19th and 20th centuries. For example, removal of the Madison Electric Works Dam near Madison, Maine, is opening access of the Sandy River, a major tributary to the Kennebec River, to Atlantic salmon (*Salmo salar*) for the first time in over 160 years.

In 2004, \$74,000 in WHIP funds was contributed to a partnership effort among federal, state, and local governments, conservation groups, and James Madison University to remove the McGaheysville Dam on the South Fork of the Shenandoah River in Virginia. The work opened the South Fork to fish that had been previously precluded from access. Fish passage benefits of this type of project are usually quickly realized. In a similar project nearby, more than 5,000 juvenile eels were reported upstream of where a structure was removed just 1 week earlier (J. Hawkins, NRCS, personal communication).

Zebra Mussel Control

In August of 2002, the zebra mussel (*Dreissena polymorpha*), a nonnative species that can cause severe damage to ecological systems and local economies, was documented for the first time in Virginia. This single

population occurs in an abandoned quarry that is used for scuba training and recreational diving. This quarry lies just 300 feet from a natural stream. In an effort to prevent potential ecological damage to nearby native aquatic communities (an individual zebra mussel filters up to 1 gallon of water per day, removing microscopic organisms that serve as the food base of native fish and aquatic invertebrates), a multi-agency partnership was formed to eradicate this population of zebra mussels. In 2005, WHIP is contributing \$250,000 to this effort.

Eelgrass Restoration

NRCS has been using WHIP to support the efforts of an interagency partnership in Rhode Island to restore eelgrass (*Zostera marina*) beds in Narragansett Bay since 1998. Since 2001, tens of thousands of eelgrass plants have been transplanted, and hundreds of acres once again support eelgrass habitat. This submerged aquatic vegetation provides a vital habitat element for fish, shellfish (bay scallops [*Aequipecten irradians*], blue crabs [*Callinectes sapidus*], lobsters [*Homarus americanus*]), waterfowl such as Atlantic brant (*Branta bernicla*), and other wildlife.

Hawaiian Forest Restoration

The Honouliuli Preserve on Oahu, Hawaii, is 3,692 acres of globally rare lowland mesic forest. This preserve harbors a species of native land snail that is found nowhere else. The forest contains some of the last remaining habitat for native forest birds and the Hawaiian owl (*Asio flammeus sandwichensis*), revered as a guardian spirit by ancient Hawaiians. Also present is the O'ahu 'elepaio (*Chasiempis sandwichensis ibidis*), an endangered land bird. In partnership with The Nature Conservancy, NRCS has used WHIP funds to plant 3,900 plants listed as endangered and install catchment tanks and irrigation systems. WHIP funds were also used to install various kinds of traps for the purpose of controlling rodents to protect the rare snail, the plants, and the O'ahu 'elepaio during the nesting season.

Gating Abandoned Mines

Having lost many of their natural cave hibernation sites, bats now rely heavily on abandoned mines for shelter. Through partnerships with other agencies and organizations such as Bat Conservation International, NRCS is using WHIP to assist owners of these abandoned mines preserve important bat hibernation sites. Instead of sealing mine entrances to eliminate safety hazards, landowners are now working to install gates on inactive mines that preclude human access but allow bats to enter and exit. By protecting abandoned iron and copper mines in this way in Michigan's Upper Peninsula, these activities have preserved the hibernation habitat of an estimated 400,000 bats in Michigan, and as many as 1.5 million bats in the Upper Great Lakes region.



With the assistance of WHIP, removal of the McGaheysville Dam has reopened the South Fork of the Shenandoah River in Virginia to access by American eels (*Anguilla rostrata*) and other migratory fish. Mike Collins, City of Harrisonburg, Virginia



WHIP is assisting a multi-agency partnership restore eelgrass beds in Rhode Island's Narragansett Bay, reestablishing productive habitat for benthic infauna, fish, and other aquatic species.



In Texas, WHIP is being used to help ranchers install grazing-management systems that allow areas previously over-grazed by cattle, sheep, and goats to recover. Grazing management under the WHIP contract site featured here consists of grazing cattle only during the dormant season and complete rest during the growing season. Restoration of native habitat diversity is the goal on this ranch.
Steve Nelle, NRCS

Enhancing Habitat with Improved Grazing Systems

Nearly 300 miles of fencing and 240,000 acres of prescribed grazing practices were planned under WHIP in 2004 (Table 3). These practices are used in many instances to improve wildlife habitat quality while allowing producers to maintain productive livestock operations. For example, WHIP is assisting producers in Sheridan County, Montana, to adopt rest–rotation and other planned grazing systems that help support the area’s high-value waterfowl and shorebird habitat. Practices allow ranchers to minimize impacts to nesting piping plovers (*Charadrius melodus*) and waterfowl by restricting livestock access to the alkali wetlands that are scattered on the landscape.

Bog Turtle Habitat Enhancement

In eastern states from the Carolinas to New York, WHIP has provided funding to assist private landowners manage habitat for the federally threatened bog turtle (*Clemmys muhlenbergii*). Bog turtles inhabit limestone fens, sphagnum bogs, and wet, grassy pastures that are characterized by soft, muddy bottoms and perennial groundwater seepage. Bog turtle habitat projects have included brush management, fencing, prescribed grazing by goats and other livestock, and biological control of purple loosestrife (*Lythrum salicaria*) and other invasive exotic plants. Controlled grazing by livestock maintains an earlier successional stage and softens the ground, creating favorable conditions for bog turtles. However, overgrazing can result in habitat degradation. WHIP funds have been used for fencing to facilitate controlled grazing to maintain optimal habitat conditions for bog turtles.

Early Successional Habitat Development

Early successional habitats in forested and agricultural landscapes in the eastern U.S. have declined substantially in recent decades (Daley et al. 2004). Grassland birds and other wildlife species associated with these habitats have also experienced population declines (Sauer et al. 2004). WHIP is being used to help landowners restore and manage habitats in native herbaceous and scrub–shrub vegetation to benefit these declining species. Common species benefited include grassland nesting birds such as eastern meadowlark (*Sturnella magna*), bobolink (*Dolichonyx oryzivorus*), upland sandpiper (*Bartramia longicauda*), grasshopper sparrow (*Ammodramus savannarum*) vesper sparrow (*Pooecetes gramineus*), northern bobwhite (*Colinus virginianus*), small mammals, and other species.

Invasive Species Management

Habitat degradation by invasive species (plant, animal, and microbe) has become a major threat to many fish and wildlife species throughout North America and elsewhere (Pimentel et al. 2001). Many states are using

WHIP to reduce the impact of invasive species on target fish and wildlife. In states such as Nebraska and Texas, WHIP is being used to control invasive species such as mesquite (*Prosopis* sp.) and saltcedar (*Tamarix ramosissima*). The absence of fire within previous grassland systems has allowed woody species to dominate and change the wildlife species composition. WHIP projects are intended to remove these exotic woody plants and restore more natural grassland conditions that support native wildlife communities.

Knowledge Gaps

There is a general sense among program managers and participants that WHIP is supporting projects that greatly enhance fish and wildlife habitat quality and quantity. However, few objective studies have been published that quantify the response of fish and wildlife to these projects. We recognize several categories of knowledge gaps that need to be addressed to adequately assess how effective WHIP has been at meeting program objectives. These gaps, in the form of questions to be answered, are as follows:

- 1) Can the wide variety of habitat manipulation actions taken under umbrella practices such as the Upland Wildlife Habitat Management (645) practice be categorized to enable evaluation?
- 2) How does installation of WHIP practices influence local habitat use by target (and non-target) species?
- 3) How does installation of WHIP practices influence population dynamics of target (and non-target) species?
- 4) How do local and regional landscape characteristics affect fish and wildlife response to WHIP projects?
- 5) Once practices are planned and installed, how does habitat quality change over the life of the contract, with and without maintenance or active management?
- 6) The goal of WHIP is to improve habitat quality and quantity. Using standard habitat evaluation procedures, is it acceptable to assume WHIP has met this goal by increasing habitat units available for target species, whether or not the species actually responds to the habitat provided?
- 7) What is the success rate of projects that depend on active management (e.g., prescribed grazing) to produce the desired wildlife benefits?

The Conservation Effects Assessment Project (CEAP) is an interagency effort to document the environmental effects of Farm Bill conservation programs and practices (Mausbach and Dedrick 2004). As part of this effort, NRCS is working with state fish and wildlife agencies and others to develop an approach to assessing fish and wildlife benefits derived from



In the Loess Hills region of central Nebraska, WHIP has been used to improve range condition and habitat quality for greater prairie-chickens (*Tympanuchus cupido*) and other wildlife with prescribed fire. Herbaceous vegetation responds quickly shortly after the removal of saltcedar encroachment. Ritch Nelson, NRCS

conservation programs. Although we expect the CEAP effort to begin to address these questions identified for WHIP, it may be some time before the full impact of the wide range of WHIP activities on fish and wildlife resources throughout the country are understood.

Conclusions

The WHIP program has made great strides in organizing stakeholders, setting priorities for wildlife projects at the state and national level, and delivering services in collaboration with partners. A wide variety of projects are being implemented to address the habitat needs of hundreds of fish and wildlife species throughout the country, with an emphasis on species and habitats that are rare or declining. The WHIP program provides a means for NRCS and its partners to provide assistance to traditional USDA clients (e.g., farmers and ranchers enrolled in other conservation or commodity programs) as well as those that have not been involved with USDA programs. Whereas quantitative studies documenting fish and wildlife response to WHIP projects are lacking, benefits have been implied through anecdotal evidence and informal feedback from program participants and partners. Efforts to quantify fish and wildlife response to the program are needed. By attempting to assess the environmental benefits of conservation practices, including fish and wildlife benefits, CEAP is intended to begin to provide the information needed by program managers and partners to maximize fish and wildlife benefits achieved through WHIP and other conservation programs.

Literature Cited

- Casey, F., G. Boody, and C. Cox. 2004. Background paper: Session 1A—Farm Bill incentive programs. Habitat Conservation Incentives Workshop—background papers, 2–3 June 2004, Washington, D.C., USA. <http://www.biodiversitypartners.org/incentives/workshop/background_papers.pdf>. Accessed 2005 Jun 23.
- Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation assessment of greater sage-grouse and sagebrush habitats. Unpublished report. Western Association of Fish and Wildlife Agencies, Cheyenne, Wyoming, USA
- Daley, S. S., D. T. Cobb, P. T. Bromley, and C. E. Sorenson. 2004. Landowner attitudes regarding wildlife management on private lands in North Carolina. *Wildlife Society Bulletin* 32:209–219.
- Federal Consulting Group. 2004. American customer satisfaction index. Natural Resources Conservation Service Wildlife Habitat Incentives Program (WHIP), Final report. Washington, D.C., USA.

Hackett, E. 2000. The Wildlife Habitat Incentives Program: a summary of accomplishments 1998–1999. Pages 117–121 in W. L. Hohman and D. J. Halloum, editors. A comprehensive review of Farm Bill contributions to wildlife conservation, 1985–2000. U.S. Department of Agriculture, Natural Resources Conservation Service, Wildlife Habitat Management Institute, Technical Report USDA/NRCS/WHMI-2000.

Mausbach, M. J., and A. R. Dedrick. 2004. The length we go: measuring environmental benefits of conservation practices. *Journal of Soil and Water Conservation* 59:97A–103A.

Pimentel, D., S. McNair, J. Janecka, J. Wightman, C. Simmonds, C. O'Connell, E. Wong, L. Russel, J. Zern, T. Aquino, and T. Tsomondo. 2001. Economic and environmental threats of alien plant, animal, and microbe invasions. *Agriculture, Ecosystems and Environment* 84:1–20.

Sauer, J. R., J. E. Hines, and J. Fallon. 2004. The North American Breeding Bird Survey, results and analysis 1966–2003. Version 2004.1. U.S. Geological Survey Patuxent Wildlife Research Center, Laurel, Maryland, USA.

Western Governors Association. 2004. Conserving the greater sage grouse: a compilation of efforts underway on state, tribal, provincial, and private lands. Western Governors Association and U.S. Department of Agriculture, Natural Resources Conservation Service.

Wildlife Management Institute. 2002. Planting the seeds for conservation in America: the Farm Bill conservation programs' needs and successes. Washington, D.C., USA.