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**CRP Targeting for Wildlife Habitat:  
A New Indicator Using the 1992  
National Resources Inventory**

P.G. Lakshminarayan, Bruce A. Babcock, and Robert Kellogg

*Working Paper 96-WP 150*  
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## **CRP TARGETING FOR WILDLIFE HABITAT: A NEW INDICATOR USING THE 1992 NATIONAL RESOURCES INVENTORY**

A critical issue facing Congress is which lands should be enrolled in a renewal of the Conservation Reserve Program (CRP). Beginning in 1985, CRP paid land owners to retire their land from production for 10 years. Initially, soil erosion was the only criterion used to judge whether land qualified for CRP payments. Later sign-ups considered other environmental criteria, including riparian potential and water quality. Wildlife habitat enhancement was not considered as a criteria by itself until very late in the program. Nevertheless, Cihacek (1993) points out that benefits to wildlife from the CRP are substantial. He also points out that wildlife benefits can be further enhanced by targeting high-value wildlife areas. To maximize wildlife habitat benefits, more CRP tracts should be enrolled adjacent to riparian zones, shelterbelts, wooded watercourses, wetlands, irrigated cropland, and areas with landscape diversity.

There is widespread consensus that the current CRP needs to be streamlined by changing enrollment criteria so that environmental benefits can be maximized. Babcock, Lakshminarayan, and Wu (1995) estimate that 75% of the overall environmental benefits from the current CRP can be maintained by better targeting even if total acreage is reduced by 50%. If the CRP is to be streamlined in this manner, it is important that priority wildlife areas be targeted directly to ensure enrollment of the most valuable wildlife habitat. For example, the prairie pothole region in the Northern Great Plains is considered a high value wildlife habitat because of its ability to sustain diverse plant and animal species.

This paper evaluates the amount of land that may qualify for CRP enrollment in order to provide high-value wildlife habitat, and to present the potential enrollment costs. The evaluation is based on a wildlife habitat indicator developed from the 1992 National Resources Inventory (NRI) conducted by the Natural Resources Conservation Service. Per acre CRP enrollment costs were previously estimated by Babcock, Lakshminarayan, and Wu.

### **Targeting A High-Value Wildlife Indicator**

One way to ensure enrollment of highly valuable wildlife habitat is to identify these areas and to target them directly. The prairie pothole region is considered one of the highest valued wildlife habitat areas in the United States because of its proximity to cultivated cropland and its ability to sustain diverse plant and animal species. The problem for CRP becomes one of selecting a feasible targeting criterion so land that is in the prairie pothole region can be enrolled.

“Prairie potholes” are small water-filled ponds characteristic of the glaciated portion of grassland prairie regions of the north central United States. Prairie pothole wetlands are a productive resource that can support both agricultural and nonagricultural land use including crop production, wildlife habitat, haying and grazing. They also provide intangible benefits such as protection of groundwater and surface water quality, entrapment of sediment from erosion of the surrounding catchment, and flood abatement.

Because traditional agricultural use of these wetlands compete and conflict with nonagricultural uses (Leitch 1989) a mechanism to protect and maintain these wetlands in a manner that gives benefits to both landowners and the public is desirable. The temporary and seasonally-flooded prairie pothole wetlands contain the most fertile soils in the region. Farmer will not voluntarily give up use of this land without adequate compensation. Enrolling this type of land into CRP would provide this compensation while providing enhanced nonagricultural use of these. The value of the resulting environmental benefits might easily outweigh the costs of enrollment.

Consultations with wildlife biologists suggested that palustrine wetland areas are usually associated with high-value wildlife habitat in agricultural regions. All pothole-type wetlands in the north central prairies would be classified into the palustrine system (Richardson, Arndt, and Freeland 1994). Palustrine wetland is a subclass of the Cowardin System of wetland classification developed by biologists in the U.S. Department of Interior, Fish and Wildlife Service (1979). Palustrine wetlands are the most

upland portion of wetlands, and they are often used as cropland. They may go several years without being covered by water, but are eventually inundated for significant periods of time. The soil characteristics of palustrine wetlands reflect these intermittent floods.

The 1992 NRI estimates the extent of the nations' wetlands using the Cowardin System, and also reports the use of the land. According to the NRI, there are about 100 million acres of palustrine wetlands in the continental United States, about 8% of which are cropped. Figure 1 shows the distribution of palustrine wetlands within the continental United States in 1992. Land presently enrolled in the CRP was included in these statistics because the existing contracts will eventually expire, after which time most of the land will revert back to cropland if the contracts are not renewed. In addition, non-cultivated land and acres in rice were excluded.

Figure 2 shows the distribution of cropped palustrine wetlands. Large areas of cropped palustrine wetlands occur in North Dakota, Minnesota, South Dakota, and Louisiana. Most of the cropped palustrine wetlands in 1992 were planted to soybeans, corn, or wheat (Table 1). About one million acres were

Table 1. Distribution of Crops in Cropped Palustrine Wetlands

| Crop                 | Acres     | % of total |
|----------------------|-----------|------------|
| Soybeans             | 2,141,900 | 26         |
| Corn                 | 1,613,200 | 20         |
| Wheat                | 1,136,400 | 14         |
| Cropland not planted | 932,200   | 11         |
| Land enrolled in CRP | 666,600   | 8          |
| Cotton               | 419,000   | 5          |
| Other crops          | 310,200   | 4          |
| Sorghum              | 235,800   | 3          |
| Barley               | 232,800   | 3          |
| Summer fallow        | 220,700   | 3          |
| Vegetables           | 105,100   | 1          |
| Oats                 | 95,200    | 1          |
| Hayland              | 31,900    | 0          |
| Peanuts              | 22,300    | 0          |
| Total                | 8,163,300 | 100        |

cropland that was not planted in 1992, which includes the USDA set-a-side acres. In addition, 8% of the cropped palustrine wetlands (666,600 acres) were enrolled in the CRP.

The concentration of cropped palustrine wetlands is shown in Figure 3. Areas of the country with the highest concentration of cropped palustrine wetlands have the greatest potential for improvement of wildlife habitat. Many wildlife species are dependent on large, contiguous tracts of suitable habitat. Conversely, counties with more sparse cropped palustrine wetlands would benefit less from retirement of the cropped palustrine wetland area. The most concentrated areas—where cropped palustrine wetlands are 10% or more of the cultivated land (including CRP) in the county—are shown in red. About half of all the cropped palustrine wetlands (4,553,500 acres) are in these counties. States with the most acres of concentrated cropped palustrine wetlands (10% or more of cultivated cropland) are Louisiana, Minnesota, North Dakota, Mississippi, Texas, and Kansas. Figure 3 further shows that if cropped palustrine wetlands are targeted by the CRP, the prairie pothole region in the Northern Great Plains would be well represented.

Areas of high concentrations of cropped palustrine wetlands correspond favorably with priority wildlife areas. Figure 4 shows the priority waterfowl areas that were developed as part of the Environmental Benefits Index (EBI) for use in selecting cropland for enrollment in the 13th sign-up of the CRP (in fiscal year 1995). Areas where cropped palustrine wetlands comprise one percent or more of the available cultivated cropland are nearly all within the priority areas for waterfowl. Priority areas for grassland ecosystems (also used in the EBI) extend throughout the Great Plains, and are also well represented by cropped palustrine wetlands, particularly in Kansas.

### **Cost Estimates**

There are two approaches to estimating the potential program costs of enrolling cropped palustrine wetlands in the CRP, developed by Babcock, Lakshminarayan, and Wu. The first cost method is to estimate costs based on county average per acre rental rates paid for acres enrolled in the CRP (accepted

Figure 1: Palustrine Wetlands, 1992

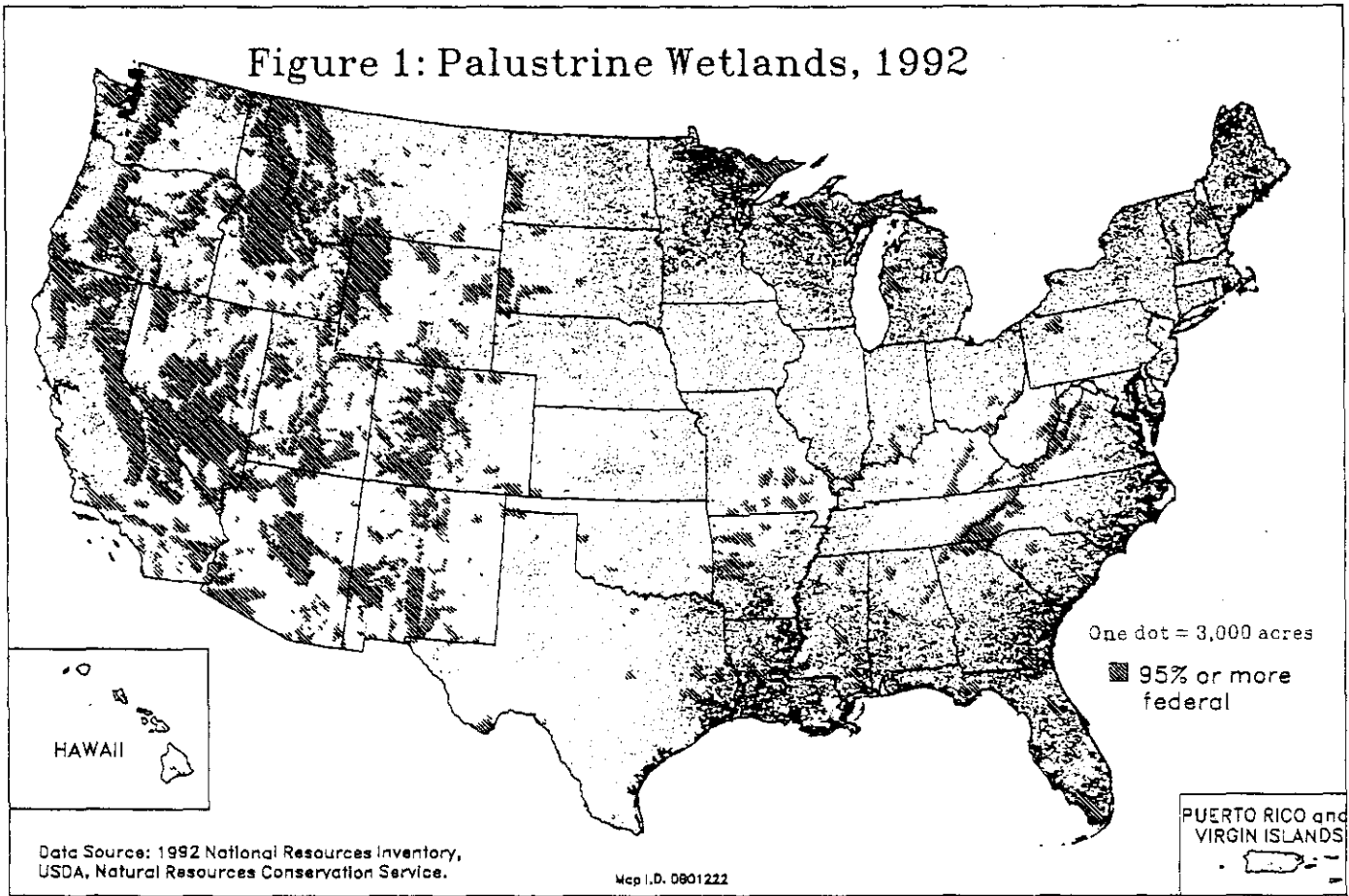


Figure 2: Palustrine Wetlands on Cultivated Cropland, 1992

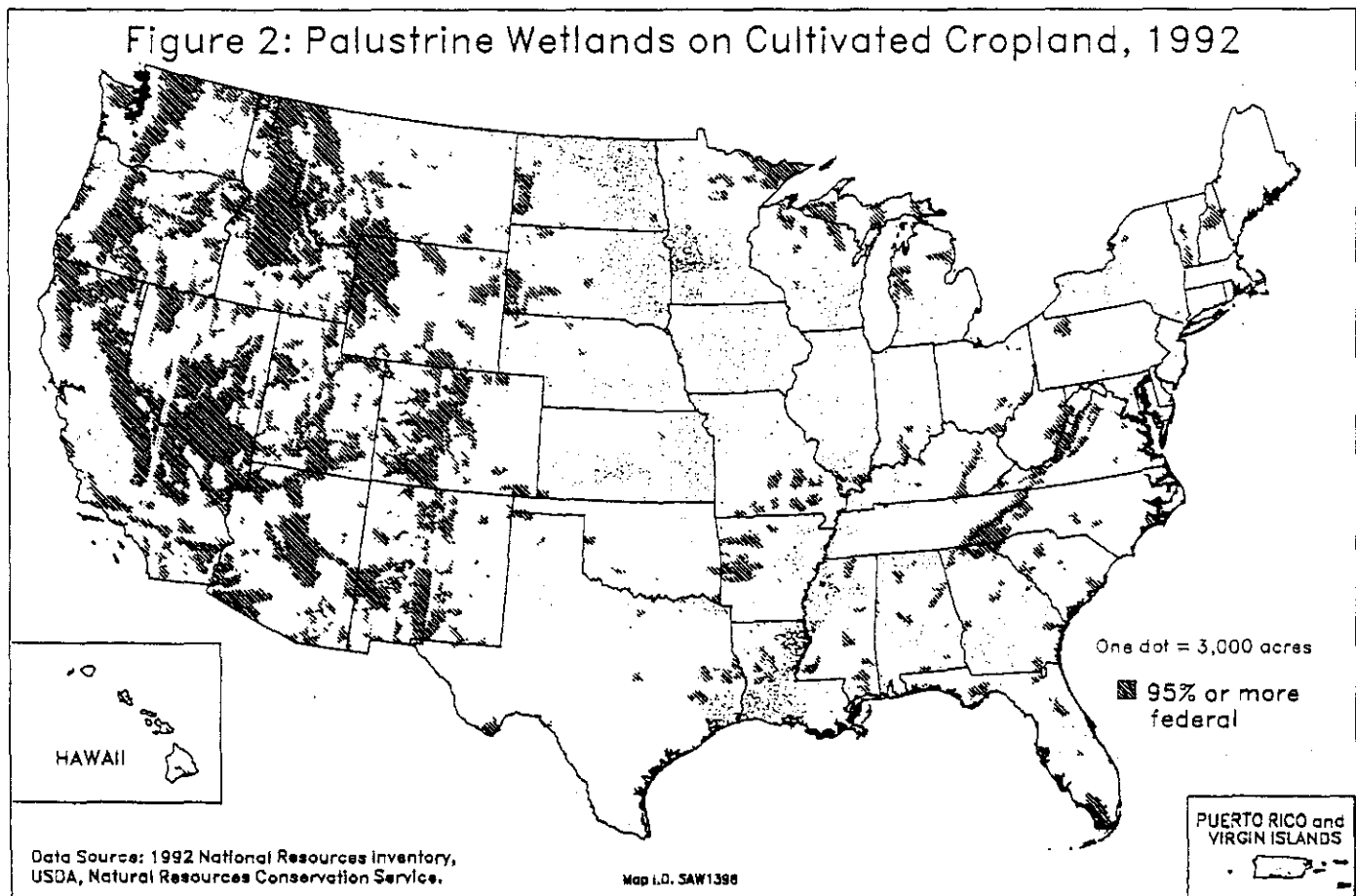




Figure 3: Acres of Cultivated Cropland and CRP Land which are Palustrine Wetlands as a Percentage of Cultivated Cropland and CRP Land

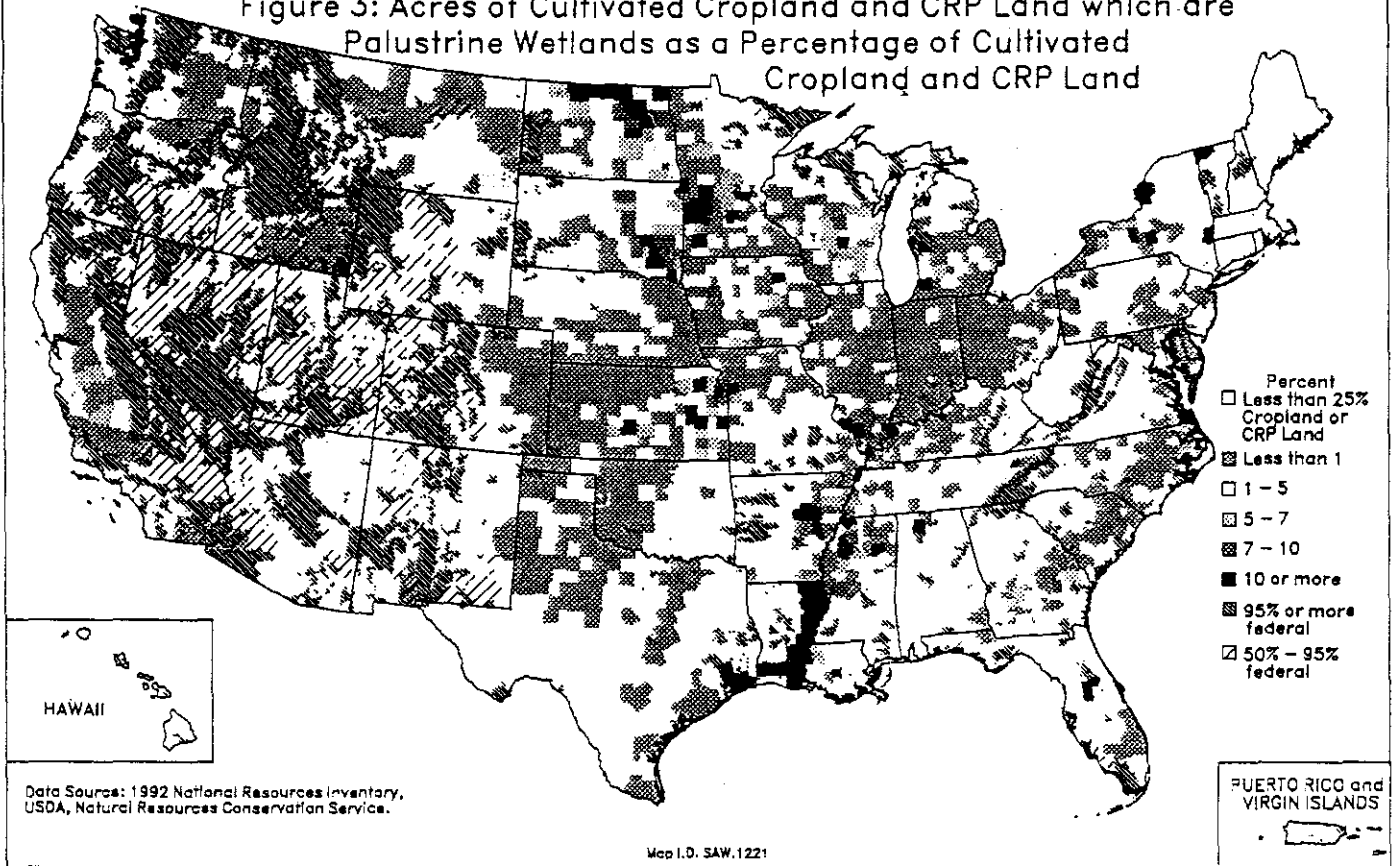
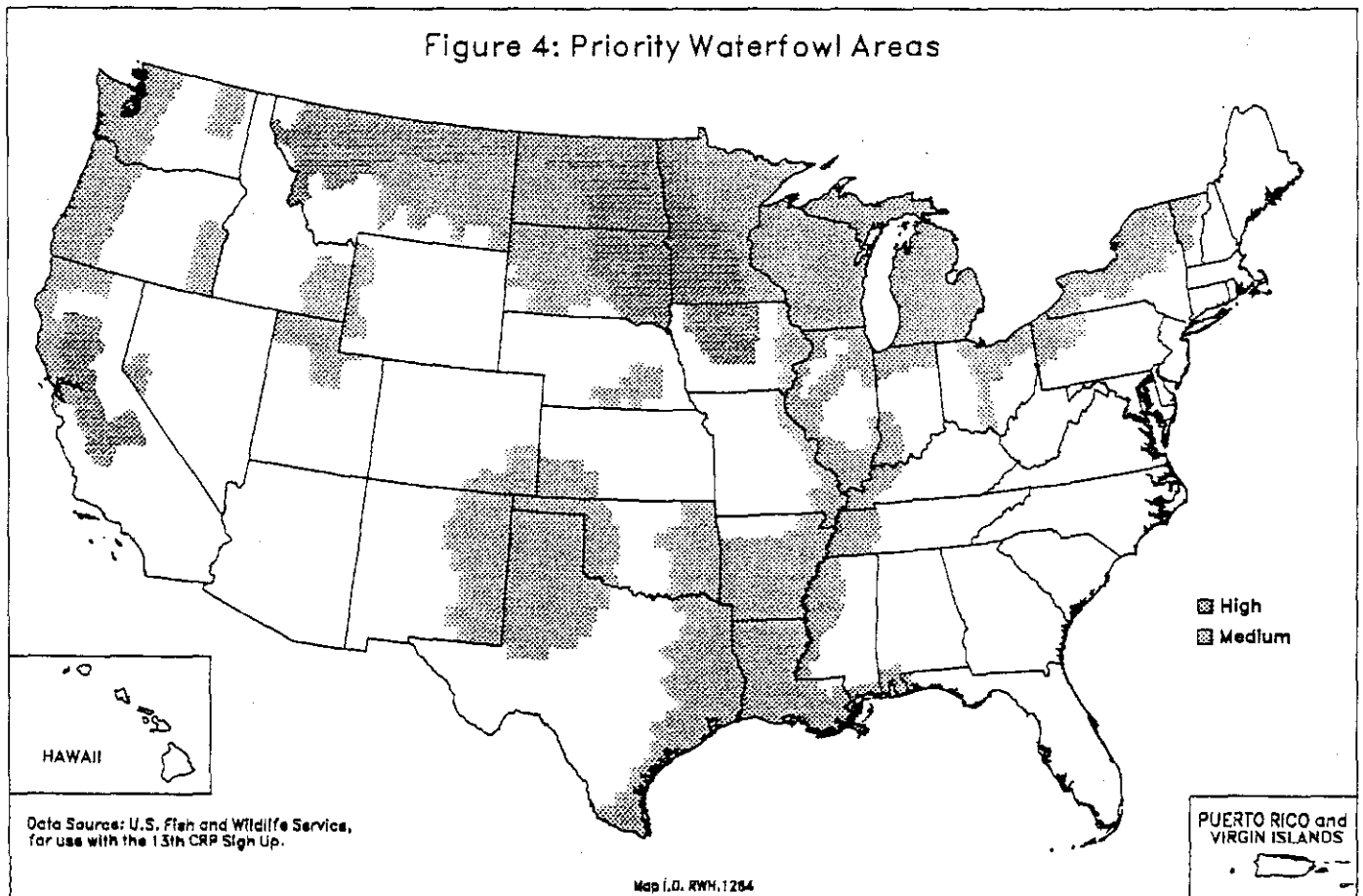


Figure 4: Priority Waterfowl Areas



bid rates). The second method is to estimate costs with prevailing county average rental rates (cropland cash rents) in 1994. These two estimates are believed to bracket the rental rates that will be paid for CRP enrollments in the near future. We applied these two methods to (1) all cropped palustrine wetlands and to (2) the most concentrated cropped palustrine wetlands, to provide rough estimates of the maximum costs that would occur if the CRP were to aggressively target these areas. Costs are shown by state in Table 2. If all 8 million acres of cropped palustrine wetlands were enrolled, which represents an upper bound on program costs since it is impossible to enroll all these acres, total program costs would be about \$400 million. If all of the cropped palustrine wetlands were enrolled in only those counties where they were the most dense—counties where cropped palustrine wetlands comprise 10% or more of the cultivated land (including CRP)—program costs would be a maximum of about \$210 million. These costs would be reduced another 10% if counties were excluded with less than 25% of the landscape in cropland. Counties with a small proportion of cropland already have a diverse landscape, and would probably benefit the least in terms of enhanced wildlife habitat from additional retirements of cropland. The above cost estimates assume full participation. Because farmers voluntarily participate in CRP, actual program costs would be substantially less.

### **Overlap with Other CRP Enrollment Criteria**

Further analysis shows that most of the cropped palustrine wetlands would not be enrolled in the CRP if criteria for erosion and riparian areas were the only criteria used (Table 3). Of the eight million acres of cropped palustrine wetlands, only 6% have an erodibility index greater than 8, indicating they are highly erodible. Many of these acres are already enrolled in the CRP. If the criteria for highly erodible land is adjusted to acres with an erodibility index greater than 15, which was suggested during the Farm Bill debate as a method of reducing the costs of the program, the overlap falls to 1%.

Table 2. CRP Wildlife Targeting: Cropped Palustrine Wetland Acres and Cost of Enrollment

| State          | All cropped palustrine wetlands |                    |                    | Cropped palustrine wetlands accounting for at least 10% of total cropland |                    |                    |
|----------------|---------------------------------|--------------------|--------------------|---|--------------------|--------------------|
|                | Acres                           | Cost1              | Cost2              | Acres   | Cost1              | Cost2              |
| Alabama        | 160,700                         | 7,003,844          | 6,297,910          | 97,300  | 4,207,148          | 3,642,380          |
| Arizona        | 0                               |                    |                    | 0   |                    |                    |
| Arkansas       | 197,700                         | 9,716,377          | 10,926,990         | 107,600   | 5,254,926          | 6,050,530          |
| California     | 53,600                          | 2,664,145          | 3,451,840          | 0   |                    |                    |
| Colorado       | 20,800                          | 900,083            | 446,830            | 0   |                    |                    |
| Connecticut    | 1,000                           | 49,000             | 49,000             | 0   |                    |                    |
| Delaware       | 700                             | 50,234             | 40,250             | 0   |                    |                    |
| Florida        | 31,800                          | 431,200            | 1,161,910          | 24,600  | 344,400            | 919,800            |
| Georgia        | 113,600                         | 4,921,263          | 3,856,080          | 18,700  | 791,702            | 578,250            |
| Idaho          | 27,900                          | 1,326,191          | 1,299,180          | 12,200  | 540,464            | 513,580            |
| Illinois       | 290,200                         | 21,413,548         | 24,519,520         | 97,400  | 6,289,894          | 5,940,810          |
| Indiana        | 19,100                          | 1,398,286          | 1,675,570          | 3,400   | 203,802            | 268,940            |
| Iowa           | 306,600                         | 25,948,967         | 32,323,940         | 27,700  | 2,348,730          | 3,074,700          |
| Kansas         | 516,400                         | 29,432,139         | 19,330,280         | 178,400   | 10,202,412         | 6,846,950          |
| Kentucky       | 94,900                          | 5,628,151          | 6,278,640          | 54,400  | 3,221,720          | 3,522,740          |
| Louisiana      | 1,591,800                       | 67,831,421         | 77,405,880         | 1,567,100   | 66,899,096         | 76,347,160         |
| Maine          | 10,600                          | 509,872            | 539,700            | 5,400   | 252,450            | 265,140            |
| Maryland       | 3,900                           | 265,985            | 252,470            | 0   |                    |                    |
| Massachusetts  | 0                               |                    |                    | 0   |                    |                    |
| Michigan       | 78,700                          | 3,790,723          | 3,289,980          | 47,500  | 1,976,255          | 1,628,580          |
| Minnesota      | 1,132,000                       | 70,086,768         | 64,572,830         | 915,300   | 57,089,637         | 51,851,950         |
| Mississippi    | 443,100                         | 19,846,305         | 20,690,650         | 311,400   | 13,995,433         | 13,596,730         |
| Missouri       | 126,500                         | 7,868,025          | 8,313,680          | 16,600  | 1,038,051          | 1,121,730          |
| Montana        | 88,900                          | 3,143,546          | 2,148,140          | 2,400   | 84,865             | 60,000             |
| Nebraska       | 150,600                         | 8,844,436          | 8,356,630          | 0   |                    |                    |
| Nevada         | 100                             | 4,900              | 4,900              | 0   |                    |                    |
| New Hampshire  | 500                             | 24,500             | 21,450             | 500   | 24,500             | 21,450             |
| New Jersey     | 5,000                           | 279,146            | 578,230            | 0   |                    |                    |
| New Mexico     | 1,100                           | 41,055             | 14,080             | 0   |                    |                    |
| New York       | 91,400                          | 4,899,600          | 3,242,000          | 30,700  | 1,659,027          | 1,053,360          |
| North Carolina | 3,700                           | 185,206            | 124,690            | 0   |                    |                    |
| North Dakota   | 1,194,100                       | 47,977,220         | 41,031,650         | 588,600   | 23,633,822         | 21,044,460         |
| Ohio           | 23,500                          | 1,349,040          | 1,178,050          | 4,800   | 271,075            | 244,080            |
| Oklahoma       | 31,100                          | 1,366,539          | 685,890            | 9,700   | 423,586            | 242,500            |
| Oregon         | 25,900                          | 1,370,725          | 1,530,800          | 900   |                    |                    |
| Pennsylvania   | 17,700                          | 1,152,562          | 747,610            | 0   |                    |                    |
| Rhode Island   | 0                               |                    |                    | 0   |                    |                    |
| South Carolina | 4,100                           | 172,078            | 88,680             | 0   |                    |                    |
| South Dakota   | 616,000                         | 28,866,816         | 23,418,660         | 106,700   | 5,489,597          | 5,273,880          |
| Tennessee      | 89,000                          | 4,786,226          | 5,672,610          | 10,600  | 502,704            | 802,570            |
| Texas          | 294,300                         | 4,029,282          | 7,515,910          | 245,900   | 2,110,248          | 6,369,920          |
| Utah           | 7,100                           | 195,237            | 176,040            | 2,000   | 54,996             | 40,000             |
| Vermont        | 15,000                          | 105,000            | 607,500            | 11,800  | 60,000             | 477,900            |
| Virginia       | 55,300                          | 3,171,197          | 2,329,170          | 39,600  | 2,309,087          | 1,693,440          |
| Washington     | 34,700                          | 1,920,934          | 1,758,590          | 1,400   | 77,501             | 70,000             |
| West Virginia  | 1,800                           | 88,200             | 68,040             | 1,800   | 88,200             | 68,040             |
| Wisconsin      | 186,600                         | 11,920,354         | 10,046,880         | 11,100  | 493,555            | 458,510            |
| Wyoming        | 4,200                           | 164,252            | 62,720             | 0   |                    |                    |
| <b>U.S.</b>    | <b>8,163,300</b>                | <b>407,140,579</b> | <b>398,132,050</b> | <b>4,553,500</b>  | <b>211,938,885</b> | <b>214,090,080</b> |

Note: Cost1 is based on county average CRP bid rate and Cost2 is based on 1994 cropland cash rent.

Table 3. Overlap of Potential Acres Targeted Using Wildlife Habitat Indicator with Acres Targeted Using Other CRP Enrollment Criteria

|                                     | Acres     | % of CPW |
|-------------------------------------|-----------|----------|
| Acres with Erodibility Index > 8    | 529,700   | 6%       |
| Acres with Erodibility Index > 15   | 52,800    | 1%       |
| Acres within 100 feet of water body | 233,600   | 3%       |
| Cropped Palustrine Wetlands (CPW)   | 8,163,300 | 100%     |

Similarly, few cropped palustrine wetlands overlap with riparian areas; only 3% of the eight million acres of cropped palustrine wetlands are within 100 feet of a perennial water body.

### **Enrollment in the Wetlands Reserve Program Versus the CRP**

A small amount of the country's 8 million acres of cropped palustrine wetlands are already being enrolled in the Wetlands Reserve Program (WRP). The WRP focuses on the permanent restoration of wetlands, which is less attractive to many landowners than the shorter 10-year agreements in the CRP. At present, the WRP has about 300,000 total acres enrolled, the majority of which are palustrine wetlands. The WRP is designed to peak at about 1 million acres, and is presently increasing at a slow rate of about 100,000 acres per year. Because the WRP is a small program, the WRP cannot produce the magnitude of wildlife benefits that is possible by targeting cropped palustrine wetlands in the CRP.

### **Concluding Remarks**

It is expected that the next Farm Bill will reduce the number of acres enrolled in the CRP in an effort to reduce program costs. At the same time, selection criteria for CRP enrollment is expected to broaden beyond soil erosion to also include the protection of water quality and enhancement of wildlife habitat. This analysis shows that targeting cropped palustrine wetlands will bring into the CRP acres with

high-value wildlife habitat, the vast majority of which would not be selected using soil erosion or riparian area criteria. The acreage selected for enrollment can be further targeted to areas with a high concentration of wetlands, thereby increasing the benefit to cost ratio of the targeting scheme. Farmers would be expected to participate because average yields on palustrine wetlands are lower than on land not subject to seasonal flooding and occasional crop failure. Not only would wildlife habitat increase, but taking cropped palustrine wetlands out of production may also help protect water quality by allowing wetland vegetation to utilize nutrients that runoff from upland areas.

Here we also show that it is possible to target critical wildlife habitat in the prairie pothole region by enrolling palustrine wetlands in the Dakotas and Minnesota. There are approximately 1.6 million acres of cropped palustrine wetlands, accounting for at least 10% of total cropland, in Minnesota and North and South Dakota. If the pre-1990 CRP rule were reinstated that allowed two acres of non-wetland to be enrolled in CRP for each acre of qualifying wetland, then up to 4.8 million acres would be eligible for enrollment in this area.

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