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Implementing the Conservation Reserve Program

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ABSTRACT

The Conservation Reserve Program (CRP) is a multi-year, multi-objective program of the 1985 Food Security Act scheduled to retire 40 million acres of highly erodible cropland by 1990. The Secretary of Agriculture has considerable discretion in implementing the program. This report analyzes the effects of various eligibility, pooling, and bid selection criteria on the performance of the Conservation Reserve. The program can be implemented to favor erosion reduction, supply control, or budget reduction to varying degrees. Furthermore, the operation and performance of the CRP are closely linked with other conservation and commodity program provisions of the 1985 Food Security Act.

Keywords: Conservation, Conservation Reserve Program.

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SUMMARY

The Conservation Reserve Program (CRP) is a multi-year, multi-objective program of the 1985 Food Security Act scheduled to retire 40 million acres by 1990. Current enrollment is 8.9 million acres with most coming from the Plains and Mountain States. Annual erosion is estimated to decline by 25 tons per acre on the enrolled land. Rental rates varied from $0 to $90 per acre for the accepted acreage with a national average of $46.

The legislation provides the Secretary of Agriculture with a great deal of latitude in implementing the CRP. The principal factors over which the Secretary has discretion are: (1) eligibility requirements for participation, including the definition of highly erodible cropland; (2) bid pool size including the delineation of the areas to receive allotments for acreages accepted; and (3) bid selection criteria, the weights given to each of the program objectives. Decisions regarding these discretionary factors have a direct effect on the program's performance in terms of erosion reduction, potential supply control, and direct program outlays.

Decisions on the definition of highly erodible acreage affect the quantity, the location, the erosiveness, and the productivity of the eligible acres. Three alternative definitions have been extensively discussed (3T, 2T, and EI$\geq$8). The eligible acreage varies from 69 million acres under the 3T to 118 million acres under the EI$\geq$8 definition. Simulation results indicate that the 2T definition would have the lowest direct program cost, but that the EI$\geq$8 definition would result in the greatest reduction in erosion. Productivity of the enrolled land is highly dependent upon the bid selection criteria. The 3T and 2T criteria refer to the actual level of erosion in proportion to that which is tolerable while the EI (erodibility index) criterion refers to the potential level of erosion in proportion to that which is tolerable.

Bid pool allocation decisions affect the degree of flexibility available for targeting acreage. A national pool maximizes the ability to target acreage with specific characteristics. As bid pool size is decreased, CRP acreage is more evenly distributed nationwide. Simulation results indicate that the cost of maintaining State pools ranges from $6-$10 billion. Similarly as bid pool size declines, the importance of the bid selection criteria declines.

In general, bid selection criteria can be used to obtain particular program performance objectives. Acreage can be targeted based on its cost, erodibility, or supply control potential. Simulation results suggest that this is the single most important variable affecting program performance.

Complementarity of the CRP and Conservation Compliance provisions of the 1985 Food Security Act could be limited if inconsistent definitions of highly erodible land are adopted. This potential problem raises equity considerations and affects farmer incentives for participating in the CRP.

The CRP, by retiring highly erodible land, has the potential to offset Commodity Credit Corporation (CCC) outlays made in the form of deficiency payments. Total estimated direct and indirect CCC savings range from $6-$8 billion. However, high deficiency payments decrease the incentive for participation in the CRP and the CRP may not attract a large quantity of base acreage.

Implementing the Conservation Reserve Program

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INTRODUCTION

The eventual success of the Conservation Reserve Program (CRP) in meeting multiple objectives depends heavily upon how the program is implemented over the next 4 years. As the legislation for the CRP provides only general guidelines for implementation, the Secretary of Agriculture may use a great deal of discretion in implementing it. This report summarizes the effects on performance of various discretionary factors in implementing the CRP.

SUMMARY OF 1986 CRP

CRP Objectives: The objectives of the Conservation Reserve Program, as established by Title XII of the 1985 Food Security Act, are to: (1) reduce water and wind erosion, (2) protect our long-term capability to produce food and fiber, (3) reduce sedimentation, (4) improve water quality, (5) create better habitat for fish and wildlife through improved food and cover, (6) curb production of surplus commodities, and (7) provide needed income support for farmers.

CRP Implementation: Owner/operators of any land defined for the Conservation Reserve Program as "highly erodible" may submit bids for enrollment of their eligible acreage. The appendix provides detail on the legislation which establishes a conservation reserve. At least two-thirds of the area of any field offered for bid must be considered highly erodible for eligibility. Farmers with eligible cropland interested in enrolling their cropland in the CRP are required to submit bids to the county Agricultural Stabilization and Conservation Service (ASCS) office. These bids are screened for eligibility based on cropping history, field characteristics, and farming practices. If the level of erosion is calculated to be significantly greater than the required minimum limit, eligibility is confirmed in the ASCS office. If the level of erosion is less than but close to the required minimum, an onsite inspection is required to confirm eligibility. If the annual rental rate bid is less than or equal to the rental rate cap set for the location, the bid is accepted. The rental rate caps are determined by ASCS based on land values and cash rents for average cropland in the specific areas. Upon acceptance of the bid, farmers are required to establish a permanent cover on the acres enrolled. Fifty percent of the cost of implementing this permanent cover is to be borne by the Department of Agriculture.

CRP Performance: Under the current implementation procedure, enrollment has reached approximately 8.9 million acres. The Northern and Southern Plains and Mountain States enrolled the most acreage with 15, 18, and 27 percent of the total enrollment, respectively (table 1). The rate of participation (acres

Table 1--Performance of the conservation reserve program through the first three sign-ups

Region/ State	Total cropland	Eligible acres	Eligible as % of State cropland	Acres accepted	Percent of U.S. total accepted	Percent of eligible accepted	Bids	Price /acre	Acres /bid	$/Acre limit
	1,000 acres		Percent	Acres	Percent		Number	Dollars	Percent	
Northeast	17,268	2,335.6	13.53	41,328	0.46	1.77	1,174	54.96	35	50-65
Connecticut	246	47.8	19.43	0	0	0	0	0	0	50
Delaware	520	13.9	2.67	4	0	0.03	1	60.00	4	65
Maine	953	82.1	8.61	7,141	.08	8.70	185	47.42	39	50
Maryland	1,788	241.8	13.52	1,345	.02	.56	37	57.04	36	60-65
Massachusetts	298	44.4	14.90	33	0	.07	6	86.97	6	50
New Hampshire	158	23.0	14.56	0	0	0	0	0	0	50
New Jersey	811	151.4	18.67	240	0	.16	10	54.59	24	60
New York	5,907	536.3	9.08	14,522	.16	2.71	378	55.18	38	60
Pennsylvania	5,913	1,142.9	19.33	17,885	.20	1.56	550	57.64	33	60-65
Rhode Island	23	2.5	10.87	0	0	0	0	0	0	50
Vermont	651	49.5	7.60	158	0	.32	7	48.37	23	50
Appalachian	22,555	4,973.0	22.05	313,277	3.51	6.30	6,603	52.13	47	45-60
Kentucky	5,863	1,431.4	24.41	124,897	1.40	8.73	2,086	57.47	60	50-60
North Carolina	6,661	1,142.0	17.14	32,338	.36	2.83	998	43.88	32	45-50
Tennessee	5,578	1,589.6	28.50	140,178	1.57	8.82	2,987	49.97	47	50-60
Virginia	3,394	606.3	17.86	15,731	.18	2.59	527	46.00	30	50
West Virginia	1,059	203.7	19.24	133	0	.07	5	43.77	27	50
Southeast	18,324	2,438.0	13.30	490,911	5.50	20.14	7,418	38.94	66	40-60
Alabama	4,492	842.2	18.75	165,310	1.85	19.63	2,011	38.75	82	45
Florida	3,440	388.8	11.30	44,573	.50	11.46	608	35.61	73	40-45
Georgia	6,535	766.2	11.72	190,056	2.13	24.81	3,221	39.51	59	45
Puerto Rico	282	226.5	80.32	2,296	.03	1.01	18	56.17	128	60
South Carolina	3,575	214.3	5.99	88,676	.99	41.38	1,560	39.27	57	45
Delta States	21,909	1,736.8	7.93	278,270	3.12	16.02	3,826	40.61	73	40-50
Arkansas	8,112	465.6	5.74	63,589	.71	13.66	755	47.39	84	50
Louisiana	6,403	178.3	2.78	21,506	.24	12.06	225	41.59	96	45
Mississippi	7,394	1,092.9	14.78	193,175	2.16	17.68	2,846	38.27	68	40
Corn Belt	92,421	16,170.5	17.50	885,736	9.92	5.48	13,101	65.91	68	40-90
Illinois	24,778	3,053.2	12.32	105,953	1.19	3.47	2,257	65.65	47	60-90
Indiana	13,796	1,529.4	11.09	34,606	.39	2.26	922	61.61	38	60-70
Iowa	26,454	6,624.2	25.04	358,553	4.02	5.41	5,248	74.70	68	70-90
Missouri	14,924	4,072.6	27.29	352,934	3.95	8.67	3,881	58.36	91	40-60
Ohio	2,469	891.1	7.15	33,690	.38	3.78	793	56.58	42	50-65
Lake States	43,961	4,413.8	10.04	774,007	8.67	17.54	9,999	53.67	77	20-85
Michigan	9,423	679.3	7.21	32,834	.37	4.83	751	54.48	44	40-65
Minnesota	23,063	1,904.2	8.26	661,785	7.41	34.75	7,314	52.38	90	20-85
Wisconsin	11,475	1,830.3	15.95	79,388	.89	4.34	1,934	64.10	41	30-80

Continued--

Table 1--Performance of the conservation reserve program through the first three sign-ups (cont.)

Region/ State	Total cropland	Eligible acres	Eligible as % of State cropland	Acres accepted	Percent of U.S. total accepted	Percent of eligible accepted	Bids	Price /acre	Acres /bid	$/Acre limit
	---1,000 acres---		Percent	Acres	---Percent---		Number	Dollars	--Percent--	
Northern Plains	93,633	9,377.0	10.01	1,369,093	15.34	14.60	11,202	46.16	122	28-70
Kansas	29,229	2,525.3	8.64	618,003	6.92	24.47	5,889	50.84	105	50-65
Nebraska	20,325	3,142.2	15.46	298,326	3.34	9.49	2,560	51.41	117	40-70
North Dakota	27,134	2,053.9	7.57	227,895	2.55	11.10	1,390	35.41	164	33-47
South Dakota	16,945	1,655.6	9.77	224,869	2.52	13.58	1,363	37.26	165	28-60
Southern Plains	44,819	12,925.0	28.84	1,578,569	17.69	12.21	6,837	39.48	231	35-55
Oklahoma	11,551	1,459.7	12.64	441,495	4.95	30.25	2,663	41.44	166	40-50
Texas	33,268	11,465.3	34.46	1,137,074	12.74	9.92	4,174	38.72	272	35-55
Mountain	43,219	11,840.0	27.40	2,445,258	27.40	20.65	6,579	38.92	372	33-50
Arizona	1,121	54.4	4.85	0	0	0	0	0	0	40
Colorado	10,624	3,677.6	34.62	1,131,807	12.68	30.78	2,724	39.39	415	40-50
Idaho	6,407	1,697.7	26.50	313,581	3.51	18.47	1,061	43.65	296	45-50
Montana	17,194	4,995.6	29.05	354,247	3.97	7.09	927	34.82	382	33-45
Nevada	861	192.1	22.31	137	0	.07	1	39.85	137	40
New Mexico	2,422	543.2	22.43	421,468	4.72	77.59	1,240	37.42	340	40
Utah	2,044	329.3	16.11	143,013	1.60	43.43	442	40.49	324	40-45
Wyoming	2,546	350.1	13.75	81,005	.91	23.14	184	37.00	440	40
Pacific	22,683	3,226.2	14.22	749,120	8.39	23.22	2,115	48.67	354	50-65
California	10,521	634.0	6.03	109,835	1.23	17.32	227	47.80	484	50
Oregon	4,347	1,009.8	23.23	321,760	3.60	31.86	899	48.95	358	50-65
Washington	7,815	1,582.4	20.25	317,525	3.56	20.07	989	48.69	321	50
U.S. total	420,792	69,435.9	16.50	8,925,569	100	12.85	68,854	45.50	130	20-90

accepted as a percentage of the acres eligible) was highest in the Southeast, Mountain, and Pacific regions.

Converting the acreage enrolled to permanent cover is estimated to reduce erosion by an average of 25 tons per acre per year (TAY), with the Southern Plains showing the greatest average reduction (46 TAY) and the Northeast showing the least reduction (17 TAY). Most notable was the 56 TAY reduction in erosion in New Mexico, the State with the most active participation.

Rental rates varied from less than $10 to $90 for the acreage accepted, with a national average of $46. The national average cost-share for the establishment of cover is roughly $50 per acre. To offset these expenditures, direct supply control cost savings occur on approximately 60 percent of the acres enrolled. That is, some 5.6 million of the 8.9 million acres enrolled were reductions to the program crop base acres. These acres have yields equal to about 70 percent of the national average. Because deficiency payments will not be made on these reserve base acres, this provides direct Commodity Credit Corporation (CCC) commodity program savings from CRP participation of nearly 40 percent of the rental payments. Analysis of sector-wide effects indicates that direct plus indirect CCC cost savings may remain sufficient to offset the costs of the CRP.

DISCRETIONARY FACTORS IN IMPLEMENTING THE CRP

The Secretary may modify, at any time prior to a sign-up period, any implementation factor deemed necessary to achieve the desired goals. Among the principal factors that may be manipulated to target or improve effectiveness of the CRP are:

1) Eligibility requirements for participation, including the definition of highly erodible cropland and predominance;
2) Bid pool size, including the delineation of the area(s) that receive allotments for total bid quantities by region or State; and
3) Bid selection criteria, or the weights given to each of the program objectives.

Decisions regarding CRP eligibility, bid pool size, and bid selection criteria have a direct effect on the program's performance in terms of:

- Erosion reduction;
- Program crop supply control (or supply control cost savings); and
- Program outlays.

The effects of eligibility, bid pool size, and bid selection criteria on CRP performance are interdependent. The interaction of the combined factors will affect the economic efficiency of the program. Several options for each discretionary factor have been evaluated. A summary of each is provided below.

Eligibility

Highly erodible cropland has been defined three ways in implementing Title XII (Conservation Title) of the 1985 Food Security Act. The first, which we will abbreviate as "3T," is the definition used in implementing the Conservation Reserve Program during 1986. The second, "2T," is the definition provided in the rules and regulations for the CRP. The third, EI$\geq$8, is the definition

currently used for implementing the Highly Erodible Land Conservation subtitle (sodbuster and conservation compliance).

The "3T" definition includes cropland in Land Capability Classes (LCC) 1/ II-V that is eroding at greater than three times the tolerance level (T) and all cropland in LCC's VI-VII (includes 69 million acres).

The "2T" definition includes cropland in LCC's II-V that is eroding at greater than twice the tolerance level (T) and all cropland in LCC's VI-VIII (includes 104 million acres).

The EI$\geq$8 definition includes all cropland with an erodibility index (EI) greater than or equal to 8 (includes 118 million acres). The EI is a physical measure of inherent erodibility of a soil relative to its natural rate of regeneration.

The first two definitions of highly erodible cropland use the universal soil loss equation in conjunction with the LCC scheme to identify acreage with actual, ongoing excessive erosion and fragile lands not capable of supporting continuous production of agricultural commodities. The 2T and 3T determinations are made using the Universal Soil Loss Equation (USLE) for measuring soil loss from sheet and rill (water) erosion or the wind erosion equation (WEQ) measuring the soil movement from wind erosion (in tons/acre/year). The average annual soil movement calculated with the USLE or WEQ is then divided by the soil loss tolerance level (T) to determine the magnitude of the soil erosion problem. The soil loss tolerance level is defined as the maximum rate of annual soil erosion that may occur and still permit a high level of crop productivity to be obtained economically and indefinitely. 2/ Simply, T may be thought of as a soil's natural rate of regeneration. By contrast, the erodibility index, or EI, is a measure of the inherent potential of a soil to erode. That is, land with an erodibility index of 8 or greater will have an excessive rate of erosion unless extensive conservation practices are applied. Whereas the "2T" and "3T" definitions use both physical (rainfall, slope, and soil characteristics) and management (conservation and tillage practices) variables, the EI uses only the physical characteristics of the USLE and WEQ. Thus, EI is a relative measure of potential erodibility relative to a specific soil loss tolerance level.

Alternative Criteria Yield Unique Acreage Distributions

The distribution of acreage under each of these eligibility criteria is shown in table 2. While 3T is a subset of 2T, EI$\geq$8 acreage includes land that is not currently eroding at or above 2T (fig. 1). Note that the EI$\geq$8 land includes 54 million acres that do not overlap with the 2T set and that 40 million acres of the 2T land do not overlap with the EI$\geq$8 land. The crop distribution of eligible acreage is also affected by eligibility criteria

1/ Land Capability Classes were developed by Wischmeier and Smith as a guide to determining the degree to which specific factors limit the productive capacity of a soil. W. Wischmeier and D. Smith (1978) Predicting Rainfall Erosion Losses--A Guide to Conservation Planning, U.S. Department of Agriculture, Agricultural Research Service, AH-537.

2/ D.E. McCormack, K.K. Young, and L.W. Kimberlin (1982) "Current Criteria for Determining Soil Loss Tolerance," Determinants of Soil Loss Tolerance, ASA special publication No. 45, pp. 95-111.

Table 2--Distribution of cropland acreage under different eligibility criteria

Region	Total cropland	(A) 1/ Eligible acres(3T)	(B) Eligible acres(2T)	(C) Eligible acres(EI>8)
		1,000 acres		
Northeast	17,268	2,336	3,387	7,491
Appalachian	22,555	4,973	6,537	9,694
Southeast	18,324	2,438	3,725	3,939
Delta States	21,909	1,737	2,863	2,760
Corn Belt	92,421	16,171	25,031	23,093
Lake States	43,961	4,414	8,887	6,034
N. Plains	93,633	9,377	15,981	25,017
S. Plains	44,819	12,925	16,741	14,822
Mountain	43,219	11,840	16,187	19,746
Pacific	22,683	3,280	4,629	5,281
U.S. total	420,792	69,490	103,968	117,876

A = Definition of highly erodible land as used for implementation of the Conservation Reserve Program for 1986 and 1987.
B = Definition of highly erodible land as provided by the rules and regulations for the Conservation Reserve Program.
C = Definition of highly erodible land provided by the rules and regulations for the HEL subtitle.

1/ (A) is a subset of (B). Sets (B) and (C) overlap by 64 million acres.

(table 3). A change to the EI≥8 definition includes slightly greater acreage of program crops (barley, corn, cotton, oats, sorghum, wheat) than the current actual erosion definition ("3T"). However, the acreage of program crops as a percentage of eligible cropland is reduced from 62 to 37 percent with the EI≥8 criterion. Table 3 shows the distribution of acreages devoted to program crops by region for different CRP eligibility criteria.

Moving from the current 3T definition to 2T would shift the distribution of acreage to favor the Lake States and Northern Plains at the expense of the Appalachian, Mountain, and Southern Plains regions. This shift in the distribution of acreage, may result in lower rental and establishment costs. Moving from 3T to the EI≥8 criterion will shift the distribution heavily in favor of the Appalachian, Northern Plains, and Northeast regions at the expense of the Corn Belt, Lake States, and Southern Plains regions. This shift will result in lower rental and establishment costs and reduced benefits from supply control cost savings. Thus, movement from either the 3T or 2T to the EI≥8 criterion will decrease the impact of the CRP on supply control cost savings, while moving from 3T to either 2T or EI≥8 may lower rental and establishment costs.

Expanding Eligibility Increases Selection Potential

In general, employment of a restrictive definition of "highly erodible" will limit the number of acres eligible and favor the erosion measure over all other objectives. Increasing the number of acres eligible for CRP allows greater flexibility in targeting highly eroding (having actual erosion), highly erodible (having the potential to erode), or highly productive acreage. The greater the number of eligible acres, the greater will be the likely number of bids received, and the range of characteristics of the land associated with those bids. With greater number and variety comes the opportunity for selection of bids most likely to achieve specific goals.

Eligibility criteria also have implications for the efficiency of the CRP bidding process and for the consistency of CRP with other provisions of the Conservation Title.

Consistency with Other Programs

If CRP eligibility is restricted to 3T cropland (69.5 million acres), and the Conservation Compliance provision applies to EI≥8 cropland (118 million acres), only 49 million acres will meet both definitions. The Conservation Compliance provision will deny access to specific commodity programs and benefits to owners or operators who do not implement an approved conservation plan on their highly erodible cropland. The implementation must begin by 1990 and be completed by 1995. Although there is some leniency in the level of erosion that must be achieved, in general the conservation plans were devised to approach the tolerance level (1T). Thus, under strict adherence to a 1T erosion limit for conservation plans, farmers on 34 million acres will be told that their land is not considered "highly erodible" to the extent necessary to receive the benefits available from the CRP. But, by 1990 these same farmers will be told their land is so "highly erodible" they must implement a conservation plan or forfeit eligibility to all future commodity program benefits. By the same token, owner/operators on 20 million acres who are eligible for CRP benefits under the 3T criterion would not be faced with compliance (fig. 1).

Table 3-- Distribution of 1982 program crop acres eligible for the conservation reserve program (CRP) using three eligibility criteria

Eligibility criteria	Barley	Corn	Cotton	Oats	Sorghum	Soybean	Wheat	(A) Total	Total eligible acres	(B) Percent of eligible
	1,000 acres									Percent
1/ 3T	858.9	12,822.1	6,709.4	813.1	3,408.5	9,013.4	9,548.2	43,173.6	69,489.6	62.13
2/ 2T	1,650.3	20,374.9	8,456.1	1,487.3	5,051.2	14,575.7	17,109.1	68,704.6	103,968.0	66.08
3/ EI>8	755.4	18,339.0	616.7	1,819.5	2,022.7	11,480.2	9,248.0	44,281.5	117,944.0	37.54

Source: 1982 National Resource Inventory.

A = Total national acreage of program crops (note: this is not total national base acreage).

B = The percent of eligible acres that are program crops (as listed).

1/ Current definition used for the CRP, all cropland in Land Capability Classes VI-VII and cropland in LCC's II-V eroding at least three times the soil loss tolerance level (T).

2/ Same as 1 above, except that the cropland must be eroding at least two times tolerance.

3/ Cropland with an erodibility index of at least 8.

Bid Pool Allocation

Although the State and regional distribution of acreage eligible for the CRP will change as the definition of highly erodible cropland changes, there may be no impact if a national pool is used. That is, 49 million acres are common to all three eligibility definitions. If all acreage is equally eligible for a 40-45 million acre CRP, it is possible that the acreage enrolled could be the same under each of the eligibility definitions. However, if regional, State, or substate pools are used to determine acreage allotments, a unique distribution of cropland will be enrolled under each of the eligibility definitions. The method used to define the acreage allotments for each pool will describe unique distributions of cropland. For instance, allotments could be defined by weighting the eligible acreage in each pool by the minimum 40-million-acre goal as a percentage of the total eligible acreage (40/69.5). Another method would be to weight eligible acreage in each pool by the share of erosion contributed from each pool to the national gross erosion. Regardless of the method employed, arguments exist for using national, regional, State, or substate pools.

Soil erodibility is a regional phenomenon, and therefore using the largest possible bid pool size (a national pool) also provides a high degree of flexibility in targeting acreage with specific characteristics. The most highly erodible (or productive) acres drawn from a national pool could be clustered in relatively few regions. However, as bid pool size is decreased (to State or substate levels), total CRP acres would be more evenly distributed nationwide.

The effect of using national versus State pools on the performance of the March 1986 CRP can be illustrated by comparing tables 4 and 5. The effect on specific performance measures of selecting bids to minimize rental costs with a national pool is illustrated in table 4. Similarly, the effect on performance under the current procedure of selecting bids subject to State and substate rental rate caps (Minimize rental costs) is provided in table 5. For comparison, both selection procedures were restricted to a maximum total expenditure of $35 million. More acreage is enrolled, rental costs per acre are lower, erosion reduction per acre is greater, and net program costs are less using the national pool. The use of the national pool would enroll more land from the Southern Plains region at the expense of land from the Corn Belt.

Bid Selection Criteria

There are many options for establishing bid selection criteria. Bids may be selected on the basis of their contribution to erosion reduction, the degree to which they reduce program crop base acreage or production, their rental cost, or any of numerous combinations of the erosion, supply, and rental cost values. Specific bid selection formulas can be used with or without eligibility criteria, bid pools, or rental rate caps.

For the March, May, and August 1986 signup periods, all bids at or below pool caps on rental cost were accepted. This is consistent with a bid selection strategy that minimizes rental cost of CRP enrollment.

Tables 5 and 6 compare the results of this bid selection strategy with the outcomes that would have been achieved, at identical cost, for bids received

Table 4--Analysis of alternative CRP bid selection criteria using a national pool

(Summary of the March 1986 bids)

Performance measures	Unit	Selection criteria 1/			
		Minimize rental cost	Maximize erosion reduction per dollar	Maximize supply control per dollar	Minimize 2/ net cost per ton of erosion
Acres accepted	1,000 acres	934	673	636	718
Rental costs:					
Total	Mil. dol.	35	35	35	35
Per acre	Dol.	37	52	55	48
Erosion reduction:					
Total	Mil. tons	27	48	17	44
Per acre	Ton	29	71	27	61
Cost/ton of erosion	Dol./ton	1.29	0.73	2.04	0.79
Supply control savings:					
Total	Mil. dol.	12	10	23	16
Per acre	Dol.	13	14	36	23
Erosion control cost savings:					
Total	Mil. dol.	14	19	9	18
Per acre	Dol.	15	29	14	25
Net program cost:					
Rental net of supply control benefits	Dol./acre	24	38	19	25
Rental net of supply control and erosion control savings	Dol./acre	9	9	5	0

1/ All criteria assume a total expenditure of $35 million.

2/ Net costs are defined as rental costs minus supply control benefits.

Table 5--Analysis of alternative CRP bid selection criteria using State and substate pools

(Summary of the March 1986 bids)

Performance measures	Unit	Selection criteria 1/			
		Minimize rental cost	Maximize erosion reduction per dollar	Maximize supply control per dollar	Minimize 2/ net cost per ton of erosion
Acres accepted	1,000 acres	828	712	659	730
Rental costs:					
Total	Mil. dol.	35	35	35	35
Per acre	Dol.	42	50	54	49
Erosion reduction:					
Total	Mil. tons	22	34	16	30
Per acre	Ton	26	47	25	41
Cost/ton of erosion	Dol./ton	1.61	1.07	2.16	1.20
Supply control savings:					
Total	Mil. dol.	13	12	21	18
Per acre	Dol.	16	17	32	25
Erosion control cost savings:					
Total	Mil. dol.	12	15	9	14
Per acre	Dol.	14	21	14	19
Net program cost:					
Rental net of supply control benefits	Dol./acre	26	33	22	24
Rental net of supply control and erosion control savings	Dol./acre	12	12	7	5

1/ All criteria assume a total expenditure of $35 million.

2/ Net costs are defined as rental costs minus supply control benefits.

Table 6--Analysis of alternative CRP bid selection criteria using State and substate pools and OBPA supply control costs

(Summary of the March, May, and August 1986 bids)

Performance measures	Unit	Selection criteria 1/			
		Minimize rental cost	Maximize erosion reduction per dollar	Maximize supply control per dollar	Minimize 2/ net cost per ton of erosion
Acres accepted	1,000 acres	8,913	8,471	8,367	8,513
Rental costs:					
Total	Mil. dol.	408	408	408	408
Per acre	Dol.	46	48	49	48
Erosion reduction:					
Total	Mil. tons	226	266	201	255
Per acre	Ton	25	31	24	30
Cost/ton of erosion	Dol./ton	1.80	1.53	2.03	1.60
Supply control savings:					
Total	Mil. dol.	157	151	192	177
Per acre	Dol.	18	18	23	21
Erosion control cost savings:					
Total	Mil. dol.	127	133	115	131
Per acre	Dol.	14	16	14	15
Net program cost:					
Rental net of supply control benefits	Dol./acre	28	30	26	27
Rental net of supply control and erosion control savings	Dol./acre	14	15	12	12

1/ All criteria assume a total expenditure of $408 million.

2/ Net costs are defined as rental costs minus supply control benefits.

in March and all bids received to date, respectively, if different selection criteria had been used. The alternative bid selection criteria examined include:

- o Minimize rental costs: Select all bids at or below the rental rate caps established for substate pools (the current strategy).

- o Maximize erosion reduction: Rank all bids from highest to lowest erosion rates per dollar bid. Select bids with highest erosion rates until the budget limit (actual expenditures for signup periods) is reached.

- o Maximize supply control: Rank bids from highest to lowest value of supply control cost savings per dollar bid. Select the bids with the highest supply control cost savings until the budget limit is reached. Supply control cost savings equal the value of program crop base reductions achieved through enrollment of commodity base acreage.

- o Minimize net cost per ton of erosion: Rank bids from the lowest to highest net dollar cost of preventing erosion. Net costs are equal to rental costs minus supply control cost savings. The net cost for each bid is divided by the tons of erosion per acre per year for the bid to determine the net cost per ton of erosion. Bids are selected from highest to lowest net cost per ton of erosion until the budget limit is reached.

These are only a few of the possibilities for alternative bid selection strategies. Their potential effect on CRP performance is significant. The following general observations may be made from tables 5 and 6.

1. Minimizing rental cost, the strategy followed thus far, enrolls the greatest number of acres for a given program outlay. However, the erosion control and supply control achieved with this strategy are less than what could be accomplished with alternative bid selection criteria.

2. Maximizing erosion reduction increases the erosion control benefits of a CRP, but these benefits are offset by a loss of supply control cost savings. Also, while not shown in table 2, the administrative costs of strategies relying on actual erosion measures for bid selection may be greater than for other strategies because of the need to obtain and confirm the actual erosion levels on parcels of cropland bid.

3. Maximizing the supply control benefits involves a tradeoff in erosion reduction.

4. Minimizing net cost per ton of erosion retains high benefits in the form of supply control and low per-acre net program costs, but also performs well in achieving high levels of erosion reduction.

Other Decisions Affect the Sensitivity of CRP Performance to Bid Selection Criteria

Two basic factors determine the extent to which formulas can be used to increase program effectiveness and efficiency:

1. Number of bids received: The greater the number of bids received, the greater the effectiveness of the formula in targeting desirable acreage for enrollment. The number of bids received is influenced by eligibility as well as by other program benefits and costs. Broadening eligibility, lowering commodity program benefits, or better advertising about the impending costs of conservation compliance should encourage more CRP bidding.

2. Number of bids that can be accepted: If every acre bid is needed to meet acreage constraints or allotments, formula use is a moot point. The smaller the percentage of bids that must be selected, the greater the effectiveness of formulas in targeting appropriate acreage. Comparing the use of selection criteria for the March signup to the sum of all signup periods illustrates this point. For the March signup only 17 percent of the bids were accepted and thus large variation in the performance factors occurred between the different bid selection criteria. However, for the sum of the signup periods more than 80 percent of the bids were accepted and consequently very little difference occurred in the performance factors between the bid selection criteria.

Further, the use of other discretionary factors that restrict the quantity of bids or acres will reduce the impact of the bid selection criteria. Thus, constraints imposed by bid pool acreage goals, the 25-percent per county maximum (see appendix) and rental rate caps are important in determining the effect of a formula.

The key point is that the interactions of eligibility criteria, pool allocation criteria, and use of a formula for bid selection must be taken into account. None of these controls operates in isolation of the others nor can the effects be analyzed in isolation.

INTERDEPENDENCE OF IMPLEMENTATION DECISIONS

No clear-cut "best" combination of criteria can be determined for several reasons. First, after eligibility requirements are set, the acres bid are a subset of the acres that would have been bid had no restrictions on eligibility existed. We can estimate the results that might have occurred under alternate eligibility criteria, but we are unable to do so with certainty. Thus, no deterministic comparison can be made for eligibility criteria. Second, farmers are quick to learn, and once the discretionary factors are known, farmers will react to them. Thus, changing the factors between signups will bias the results. However, policymakers need to be aware of likely consequences of administrative decisions on program effectiveness.

Thus, the performance of a 40-million-acre CRP was simulated to illustrate the interdependence of the discretionary factors. Using the distributions of cropland under each eligibility criterion from the 1982 National Resource Inventory (NRI), associated yields for these cropland distributions from the Erosion Productivity Impact Calculator model (EPIC), and cash rent for this cropland from the 1986 Agricultural Land Survey, the erosion, yield, and rental rates were estimated.

Eligibility and Bid Pool Allocation

The simulation of a 40-million-acre reserve, presented in table 7, illustrates the differences in performance among various eligibility criteria and State versus national bid pool sizes, when bids are selected on the basis of low rental cost. Note that under the low-cost bid selection criteria:

- o There is greater variability in performance measures between bid pool sizes than within bid pool sizes between eligibility criteria. The EI$\geq$8 definition provides the greatest erosion control, but this eligibility option also requires higher program outlays.

- o Using the national pool, the 3T eligibility criterion is the most expensive but may provide the largest supply control benefits. With a State pool, it is the least expensive and offers no supply control advantages. The 2T definition has the lowest program costs when bids are selected from a national pool, but this advantage is diminished by the selection of bids from State allotments.

- o The cost of assuring that CRP program benefits are equitably distributed among States is between $6 and 10 billion.

- o State bid pooling enhances supply control aspects of the CRP without sacrificing erosion control benefits.

Bid Pool Allocation and Bid Selection

The effect of using different combinations of bid pool size and bid selection criteria is demonstrated for the March 1986 signup period (tables 4 and 5). The results indicate:

- o Net program costs are lower under every bid selection criteria when a national bid pool is used.

- o The single-objective bid selection criteria (minimize rental costs, maximize erosion reduction, maximize supply control) best achieve their objectives under a national pool.

- o The double-objective bid selection criteria of maximizing supply control and erosion reduction (minimize net cost per ton of erosion) enrolls the most acreage and provides the greatest supply control under a State pool but provides the greatest erosion reduction and lowest net cost under the national pool.

Eligibility and Bid Selection

The effects of using alternative combinations of eligibility and bid selection criteria are shown in table 8. For a nationally pooled Conservation Reserve the most notable implications are:

- o There is much greater diversity in performance measures between bid selection criteria for any eligibility criteria than between eligibility criteria for any bid selection criteria.

- o Selecting bids to maximize either erosion control or supply control potential significantly raises program cost over the current strategy

Table 7--Simulated performance of a 40-million-acre reserve for three eligibility criteria 1/

Performance measure	Unit	National pool			State pools		
		>3T	>2T	EI>8	>3T	>2T	EI>8
Average rental rate	Dol./acre	41.28	33.77	34.10	61.96	63.42	63.72
Average cover cost	Dol./acre	4.79	3.91	4.17	6.14	6.17	6.46
Total, discounted program outlay 2/	Billion dol.	13.00	10.60	10.70	19.4	19.9	20.0
Average erosion reduction	TAY	26	21.50	28	26	21.5	28
Average base yield on program crops enrolled 3/	Index	.74	.64	.66	.84	.84	.84

1/ Bids were selected from a national pool based on minimum rental rates.
2/ Discounted rate is 4 percent.
3/ Indexed to weighted average national yields of barley, oats, corn, sorghum, wheat, and cotton.

Table 8--Simulated performance of a 40-million-acre CRP for selected eligibility and bid selection criteria

Bid selection, eligibility criteria	Performance measures: Average rental costs	Average erosion reduction	Average base yield on program crops
	Dol./acre	TAY	Index
Minimize rental costs:			
3T	41.28	26	0.74
2T	33.77	21.5	.64
EI≥8	34.10	28	.66
Maximize erosion reduction:			
3T	64.42	31	.86
2T	62.92	29	.85
EI≥8	56.05	37	.80
Maximize supply control potential:			
3T	82.94	24	1.04
2T	98.25	19	1.13
EI>8	99.48	25	1.13
Maximize erosion reduction per dollar:			
2T	38.15	26	.68
Maximize supply control potential per dollar:			
2T	35.86	23	.72

of minimizing rental payment. Maximizing supply control potential is most expensive.

- o If bids were selected to maximize supply control potential, the acreage set aside in the CRP would be highly productive, with average yields 13 percent higher than the national average.

- o Selecting bids to maximize erosion control would improve program performance by increasing annual soil savings per acre over other bid selection alternatives. Note that bid selection to maximize erosion reduction for a 2T eligibility criterion performs better (in controlling erosion) than using either "3T" or EI$\geq$8 eligibility definitions when erosion is not targeted.

- o If budget is considered jointly with either erosion or supply control, the simulated net cost is much lower than for the unconstrained erosion control or supply control criteria. The per acre erosion control and supply control is also significantly lower although total erosion control and supply control is greater.

INTERRELATIONSHIP WITH COMMODITY PROGRAMS

The Conservation Reserve, by retiring highly erodible land, has the potential to offset CCC outlays made in the form of deficiency payments. This potential arises both from:

1. Direct cost savings in the form of base acreage reduction required by CRP enrollment; and

2. Indirect cost savings which may result from commodity market price increases, spurred by reduced production, and consequent reduction in deficiency payment levels.

The CRP costs for FY 1986-91 are estimated to be $8-10 billion. The direct savings from reduced deficiency payments to CRP participants range from $2.5-3.5 billion. Indirect savings, due to market price effects, storage costs and net loan outlays associated with reduced production, range from $3.5-4.6 billion. Consequently, CRP costs could range up to $4 billion above the CCC cost savings if the reserve is not successful in obtaining high proportions of commodity program base acreages. On the other hand, high enrollment of base acreage could save up to $8-10 billion in CCC outlays for a CRP net program cost of $1-2 billion.

A complicating factor arises, however, when commodity program benefits are high. There is then a disincentive to participate in the CRP at current levels of accepted bids. Greater than average cash rent values will be required to compensate many commodity program participants for the loss of base and program benefits they incur as a result of CRP enrollment. As long as CRP benefits are low relative to commodity program benefits, commodity programs will pose strong competition with the CRP and the CRP may not enroll a large quantity of base acreage.

CONCLUSIONS

The CRP can be designed to favor erosion reduction, supply control, or budget reduction to various degrees above one another. However, the use of discretionary factors to weight the program's multiple objectives is neither simple nor straightforward. Decisions regarding eligibility, bid solicitation, and bid selection are interdependent. Each of various strategies for CRP implementation has unique advantages and disadvantages. Furthermore, the operation and success of the CRP are closely linked with other provisions of the Conservation Title as well as with the commodity programs it complements.

APPENDIX--CONSERVATION RESERVE PROGRAM LEGISLATION

The conservation reserve provision proposes to assist, through contract, owners and operators of highly erodible cropland in conserving and improving the soil and water resources of their farms and ranches. This purpose will be met by establishing a conservation reserve of 40-45 million acres by 1990. Highly erodible cropland will be placed into the reserve at the rates shown in appendix table 1. The Secretary may also include lands not highly erodible, but which pose a serious environmental threat or suffer continued degradation of productivity due to salinity. No more than 25 percent of the cropland in any one county may be placed in the reserve except where it is determined that to do so would have no adverse effect on the local economy. Where practicable, at least one-eighth of the total conservation reserve acreage should be devoted to trees.

Landowners or operators desiring to participate in the conservation reserve must agree to implement a plan approved by the local conservation district to place highly erodible cropland into grasses, trees, and other acceptable vegetative covers for 10-15 years. They must further agree not to harvest, graze, or make other commercial use of the forage for the duration of the contract, except where the Secretary permits, as in a drought or similar emergency. The conservation plan must describe the measures and practices required; the commercial use, if any, to be permitted; and the amount of cropland base and allotment history, if any, to be permanently retired. The amount of the reduction in cropland base acreage and allotment history, during the life of the contract, will be based on the ratio between acreage placed in the reserve and total cropland acreage on the farm for those crops which have production adjustment programs in place. The Secretary, however, may preserve the cropland base and allotment history on the acreage placed in the reserve for the purpose of any Federal program unless the owner and operator agree under the contract to retire that cropland base and allotment history permanently.

The Secretary must pay an annual fee sufficient to compensate for the conversion of highly erodible land to grass and trees and the retirement of any cropland base and allotment history. The compensation, in the form of annual rental payments, may be determined through the submission of bids. The acceptability of each bid may be based on the extent of erosion and the productivity of the acreage diverted. Different criteria may be established in various States and regions to determine the extent to which erosion may be abated. Priority may be given to owners and operators with the highest level of economic stress, and where appropriate, for the establishment of shelterbelts, windbreaks, stream borders, filter strips of permanent grass, or trees that significantly reduce erosion.

The annual rental payments may be made in cash or in kind and may be made prior to the implementation of the contract by owners or operators. The total payment may not exceed $50,000 per year, and will not affect the total amount of payments available under other programs. USDA must make the payments as soon as possible after October 1 of each year. The Secretary must also provide technical assistance and 50 percent of the cost of establishing conservation practices. These payments must be made as soon after the expenses occur as is feasible.

Land on which ownership has changed in the 3-year period preceding the first year of the contract will be ineligible for the conservation reserve unless

the land was acquired by will or succession as a result of death, or prior to January 1, 1985, or where the Secretary determines that the land was acquired under circumstances that provide adequate assurance that it was not purchased for the purpose of being placed in the reserve. Ownership is not a requirement for eligibility, provided the person has operated the land for the 3-year period preceding the first year of the contract and will continue to control the land for the duration of the contract.

The Secretary may modify or terminate an individual contract if the owner or operator agrees to the change and if the action is in the public interest. If the contract is violated, the owner or operator forfeits all rights to past, present, and future rental and cost-share payments or must accept adjustments to payments that the Secretary determines appropriate. On transfer of ownership or lease, the new owner or operator has the option to continue the current contract, enter into a new contract, or refuse to participate.

Title XII authorizes the Secretary to carry out the conservation reserve program through the CCC in fiscal years 1986-87. In fiscal year 1988 and subsequent years, the Secretary may use CCC facilities, services, and funds only if the CCC has received funds targeted for the conservation reserve.

Appendix table 1--Conservation reserve acreage, crop years 1986-90

Range	1986	1987	1988	1989	1990
	Million acres				
Minimum 1/	5	15	25	35	40
Maximum	45	45	45	45	45

1/ The Secretary may reduce the number of acres placed in the reserve by up to 25 percent if rental payments are likely to be significantly lower in the following year.

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