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for the
Environmental Quality Incentives Program
(EQIP)

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Regulatory Impact Analysis for the Environmental Quality Incentives Program (EQIP)

Executive Summary

The Agriculture Improvement Act of 2018 (the 2018 Farm Bill) makes several changes to EQIP. These changes include making a State, irrigation district, groundwater management district, acequia, land grant-mercedes, or similar entity eligible for EQIP payments, requiring targeting of at least 10 percent of EQIP funds to wildlife conservation practices, reducing EQIP funds targeted for livestock to 50 percent, and creating various incentives to address resource concerns in identified watersheds and other high priority areas.

Most of this rule's impacts consist of transfer payments to producers for completed conservation practices under EQIP contracts. The 2018 Farm Bill increases EQIP funding over 2014 Farm Bill funding by 22 percent on an annualized basis to \$1.84 billion per year. From FY2014-2018, EQIP was authorized at \$8.0 billion, but annual funding restrictions resulted in actual authority being \$7.51 billion, for an annualized amount of \$1.50 billion. In contrast, the authorized level for EQIP for FY2019-2023 is \$9.18¹ billion (assuming future funding caps are set at authorized amounts). Additionally, EQIP funds remain available until expended, meaning that any unobligated balance at the end of a fiscal year is available for obligation in the subsequent year.

Conservation practices funded through EQIP will continue to: contribute to improvements in soil health and reductions in water and wind erosion on cropland, pasture and rangeland; reduce nutrient losses to streams, rivers, lakes and estuaries; increase wildlife habitat; and provide other environmental benefits. Further, continued implementation of practices which treat and manage animal waste through EQIP will directly contribute to improvements in water quality and associated improvements in air quality (such as from reduction in methane emissions or reduced risk of algal blooms). NRCS estimates that the cost,² from both public and private sources, of implementing EQIP conservation practices will be \$13,640.2 million dollars (FY2019–23), assuming a historical average participant cost of 40 percent and a technical assistance share of 27 percent.

Changes in funding levels for EQIP livestock and wildlife practices will alter to a minor extent the types of conservation practices that are funded. From FY 2014-18, wildlife practices accounted for 7.6 percent of EQIP funds through wildlife and landscape initiatives and 16 designated wildlife conservation practices. The remaining 2.4 percent increase in funding to wildlife needed to meet the new 10 percent level will likely occur through greater support for existing wildlife initiatives and potentially target additional wildlife habitat development efforts through new initiatives. With respect to livestock, over 60 percent of EQIP funds went to livestock-related practices during FY 2014-2018, but the 2018 Farm Bill reduced this target to 50

¹ Includes the \$1.75 billion authorized level in the new Farm Bill for FY 2019 even though this amount was reduced by the sequester and other transfers to \$1.61 billion.

² Public costs include total technical assistance (TA) and financial assistance (FA) funds. Private costs are out-of-pocket costs paid voluntarily by participants.

percent for each of fiscal years 2019 through 2023. With greater EQIP funding overall, the amount of funding being provided for the implementation of livestock conservation practices should not change significantly.

To address increasing demands on the nation's water supply, the 2018 Farm Bill expands EQIP eligibility to water management entities like irrigation districts, ground water management districts, and acequias, along with providing the Secretary with the authority to waive adjusted gross income, contract, and payment limits to encourage continued efforts in agricultural water conservation. In some states, particularly in the West, these water management entities may increase competition for funding and enhance conservation benefits per dollar spent. The impacts, however, on the allocation of EQIP funding will be limited. The 2018 Farm Bill directs NRCS to maintain current funding allocations to states, limiting the impact nationally. Also, NRCS proposes in its interim rule establishing a payment limit of \$900,000 on all contracts with water management entities.

The 2018 Farm Bill establishes incentive contracts to address up to three priority resource concerns for a given watershed, or other region, or area. Contracts will range from a minimum of five up to ten years in length and provide an annual payment and an incentive practice payment. The impact of these new incentive contracts is uncertain, particularly regarding benefits per dollar. Overall, given the current demand for regular enrollment in EQIP, and the currently uncertain impacts that incentive contracts will have, the aggregate benefits from these new incentive contracts may be limited.

Increasing the payment limit for participants in the organic initiative to \$140,000 over the period FY 2019-2023, will likely have little impact on EQIP program performance. This is because existing organic initiative contracts are usually well below the multi-year payment limit of \$80,000 set by 2014 Farm Bill. Currently, organic participants who exceed the organic initiative payment limit use other EQIP funding mechanisms. With the increase in the organic initiative limit to \$140,000, more organic applicants will be able to make use of the organic initiative and consequently need only compete with other organic operations for funding.

Regulatory Impact Analysis for the Environmental Quality Incentives Program (EQIP)

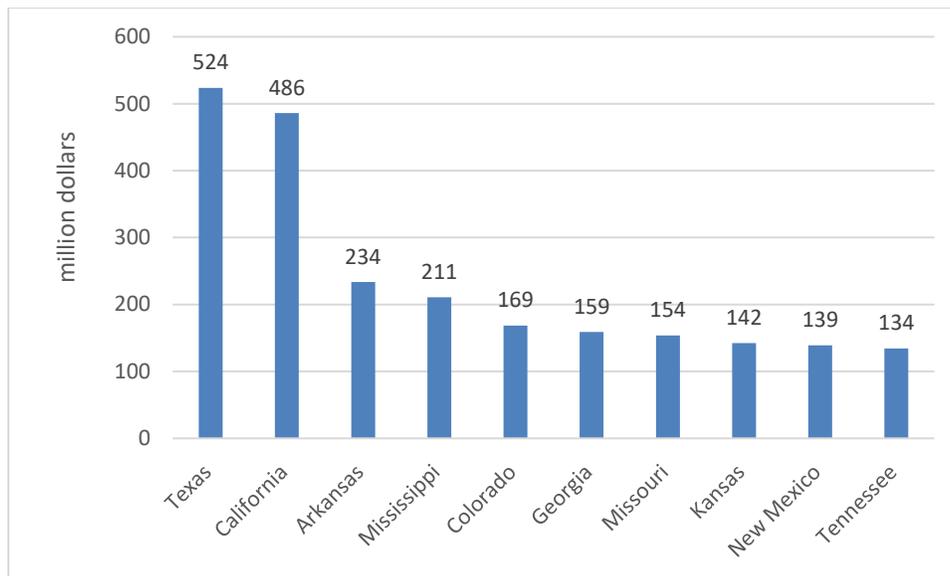
Background

EQIP is a voluntary “working lands” program providing agricultural producers with financial resources and one-on-one assistance to plan and implement conservation improvements (or “practices”). These conservation practices¹—such as nutrient management plans and conservation buffers—lead to cleaner water and air, healthier soil, and improved wildlife habitat. EQIP is available to agricultural producers across the U.S. and its territories.

All eligible applicants must control or own eligible land, comply with adjusted gross income limitation (AGI) provisions, comply with highly erodible land and wetland conservation requirements, and develop an EQIP plan of operations. Eligible land includes cropland, rangeland, pastureland, non-industrial private forestland and other associated farm or ranch lands.

EQIP contracts are usually for 1-3 years, although they may be up to 10 years. The new EQIP incentive contracts will be from 5 to 10 years in length. EQIP applications are accepted throughout the year, although cutoff dates are scheduled by NRCS State Conservationists to allow for current year ranking and selection of applications for funding. National, State and local ranking criteria are used to evaluate applications (see later discussion).

Figure 1. Top 10 States in Obligated Financial Assistance (FA) Funds, 2014-2018



¹ For the full list of EQIP practices, see:

https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849

Historically, Texas, California, and Arkansas are the states with the largest EQIP financial assistance obligations (see Figure 1). This reflects the size of the agriculture sectors in each state and the types of conservation practices funded. California's largest expenditures are for air quality practices, and Texas' largest expenditures are for brush management. All three states have significant irrigation improvement expenditures addressing water conservation needs due to declining aquifers and competing non-agriculture uses.

Many working lands currently have resource limitations that impair their productive use and reduce agricultural efficiency. The following cases illustrate the natural resource concerns that EQIP is designed to address:

- The 2015 Annual National Resources Inventory (USDA, 2018) indicated that a total of 64.2 million acres or 13 percent of total cultivated cropland, pastureland, and CRP land had annual rates of soil erosion that exceeded "T," the soil loss tolerance rate at which the productivity of a soil can be maintained indefinitely.
- In its ATTAINS water quality reporting database (U.S. EPA, 2019), EPA documented one or more water quality impairments in 53 percent of assessed river and stream miles, 70 percent of assessed lake areas, and 79 percent of assessed estuaries. Agriculture was identified as a source of impairment.
- State assessments of contaminant threats to public water systems identify agriculture as a potential contaminating activity in many states. In a survey summarized in "The State of the Industry 2018," member utilities of the American Water Works Association identified source water quality and quantity among the top ten issues facing the water industry.
- A recent NRCS report indicates that consolidation of animal production into larger and more geographically concentrated operations continues to be a potential source of water quality degradation (Golleson et al., 2016).

EQIP provides funding for a wide range of conservation practices to address these and other natural resource concerns. Benefits provided by EQIP include reduced sheet and rill erosion, improved wildlife habitat, and greater carbon sequestration; there are other benefits discussed later in the "Conservation Effects" section. Further, NRCS has estimated at the national level changes in several environmental indicators resulting from practices that address soil erosion, soil carbon retention, and soil quality (Table 1). As shown below, EQIP conservation activity over the 2014 -2018 period has increased sediment and carbon retained in fields, as well as increased the number of acres that utilize conservation practices to improve soil quality.

Table 1. EQIP Performance – Benefits to the Environment

Key Performance Indicator	2014	2015	2016	2017	2018
Tons of sediment prevented from leaving cropland (Million tons)	3.4	3.4	3.2	4.8	4.4
Soil carbon retained on cropland (Thousand tons)	56.5	59.9	50.3	64.9	77.3
Cropland with conservation to improve soil quality (Million acres)	3.1	3.0	2.7	3.0	4.8
Source: Internal NRCS analysis, 2018					

Participation

EQIP participation depends to a very large extent on available funding. As shown in Table 2, the \$9.175 billion in authorized funding under the 2018 Farm Bill is higher than the \$8.0 billion authorized under the 2014 Farm Bill.

Table 2. EQIP Authorized Funding FY 2014 – FY 2018 and FY 2019 – FY 2023

FY 2014 Farm Bill		FY 2018 Farm Bill	
Fiscal Year	EQIP	Fiscal Year	Total
FY 2014	1,750,000,000	FY 2019	1,750,000,000
FY 2015	1,600,000,000	FY 2020	1,750,000,000
FY 2016	1,650,000,000	FY 2021	1,800,000,000
FY 2017	1,650,000,000	FY 2022	1,850,000,000
FY 2018	1,750,000,000	FY 2023	2,025,000,000
Totals:	8,000,000,000		9,175,000,000
Average Annualized:	1,600,000,000		1,835,000,000

Further, as shown in Table 3, EQIP has historically received enough applications to obligate all available funds. Since FY 2009, there have been 3 times more applications than funded contracts. The analysis contained in this document assumes that funding allocations for EQIP will be fully utilized every year through FY 2023.

Table 3. Historical Funding and Participation in EQIP

Fiscal Year	Apportioned Funds (\$ billion)	Obligated Funds¹ (\$ billion)	Applications Received	Applications with Funds Obligated	Contracted Percent of Applications
2009	1.05	1.05	103,542	32,009	30.91
2010	1.18	1.17	97,998	36,702	37.45
2011	1.24	1.23	103,186	38,597	37.41
2012	1.38	1.37	128,896	45,098	34.99
2013	1.37	1.37	135,477	45,056	33.26
2014	1.35	1.30	133,842	37,261	27.84
2015	1.35	1.24	136,918	33,068	24.15
2016	1.46	1.44	136,732	36,500	26.69
2017	1.55	1.66	132,482	38,840	29.32
2018	1.80	1.86	93,778	43,009	45.86
Total	13.73	13.69	1,202,851	386,140	32.10

Sources: NRCS Budget Data, May 2019, RCA-- Natural Resources Conservation Service, Washington DC, and NRCS Protracts FY 2018 EOY database, 2019.

¹ Does not include reimbursable obligations. Obligated funds may exceed apportioned funds in any one year due to unobligated funds from previous-year apportionments that are carried over for use in subsequent years and de-obligated funds from previous contracts that are re-obligated.

2018 Farm Bill Changes to EQIP

Revisions to EQIP in the 2018 Farm Bill include expanding eligibility to irrigation districts and similar water control entities, creating conservation incentive contracts, and increasing the share of funds that must be spent on wildlife to 10 percent. More specifically, the 2018 Farm Bill:

- Expands the EQIP purpose to include identified new or expected resource concerns, and adapting to and mitigating against, increasing weather volatility, and drought resiliency measures.
- Adds environmentally sensitive areas to the list of eligible lands.
- Adds soil testing and soil remediation as land enhancement practices or activities.
- Expands the list of conservation activity plan types to include resource-conserving crop rotation, soil health, conservation planning assessment, and precision conservation management.
- Defines a priority resource concern as a significant concern in an identified state or region.

- Adds the term “soil testing” to mean the evaluation of soil health for organic matter, nutrients, contaminants, and proper biological and physical function.
- Changes the advance payment amount from "not more than" to "at least 50 percent" and adds a requirement for producers to be notified at the time of enrollment of the advance payment option and that the notification must be documented.
- Decreases the livestock funding target from 60 percent to 50 percent for FY 2019 through FY 2023.
- Increases the wildlife funding target from 5 percent to 10 percent for FY 2019 through FY 2023.
- Introduces incentive contracts, which can address up to three priority resource concerns within state-identified watersheds or other areas of high priority. Participating producers are required to implement, adopt, manage and maintain incentive practices that address at least one eligible priority resource concern. Payments are made as incentives, through annual payments for incentive practices or a bundle, or as practice payments to be paid upon practice implementation. Contract terms are 5-10 years in length and are not subject to EQIP contract limitations. NRCS imposes through the interim rule a \$200,000 payment limitation per person or legal entity to align incentive contracts with the Conservation Stewardship Program. NRCS seeks public comment on this payment limitation.
- Adds a provision for increased payments for high-priority practices, which provides a state the option to designate up to 10 practices for increased payment eligibility, not to exceed 90 percent of the costs associated with planning, design, materials, equipment, installation, labor, management, maintenance, or training. These practices will address excess nutrients in ground or surface waters, drought mitigation/declining aquifers, or other environmental priorities or targeted watershed
- Provides payments for water conservation and system efficiency to certain entities (State, irrigation district, groundwater management district, acequia, land grant-mercedes, or similar entity) or producers for water conservation scheduling, distribution efficiency, soil moisture monitoring, practices that conserve surface or groundwater, or manage aquifer recovery, and practices that transition to water-conserving crops, crop rotations, or deficit irrigation. The eligibility of certain entities is tied to a watershed-wide project that will conserve water, provide fish and wildlife habitat, or will provide drought-related mitigation, and must be eligible land of a producer or land under the entity control or adjacent land. Under the “Water Conservation or Irrigation Efficiency” practice, the Secretary may waive the Adjusted Gross Income limit and EQIP payment limitations. NRCS imposes through the interim rule a \$900,000 payment limitation, which will prevent EQIP contracts from competing with the availability of assistance for irrigation infrastructure projects under other NRCS programs. NRCS seeks public comment on this payment limitation.

- Increases the organic initiative payment limitation to \$140,000 (up from \$80,000) during the period FY 2019-23 and removes the annual \$20,000 payment limitation. These limits do not apply towards technical assistance provided to organic producers.

Funding Pools and Application Prioritization

Each State Conservationist develops funding priorities based on resource assessments and through recommendations from the State Technical Committee. Legislatively-created funding targets—such as the 50 percent for livestock and 10 percent for wildlife—are met as part of the funding pool determination process. State Conservationists then distribute the state allocation to funding pools based on the funding priorities where applications from eligible producers are considered through a competitive ranking process.

The statute requires NRCS to group applications of similar crop or livestock operations for ranking and funding consideration. In addition, the statute states that EQIP must promote agricultural production, forest management, and environmental quality; optimize conservation benefits; and ensure national, State, and local conservation priorities are effectively addressed. The statute also requires NRCS to prioritize applications using the following criteria:

- Cost effectiveness to ensure that the conservation practices and approaches proposed are the most efficient means of achieving the anticipated environmental benefits.
- Effectiveness and comprehensiveness of the application in addressing designated resource concerns.
- Fulfillment of EQIP’s purposes.
- Improvement of conservation practices or systems in place on the operation at the time the contract offer is accepted or practices that will complete a conservation system.

Based on these requirements, the annual competitive ranking process measures the relative effectiveness of each application in enhancing natural resources and the cost-effectiveness of the proposed practices for producers. The cost-effectiveness of each proposed conservation practice to be implemented is derived from a formula evaluating the cost of practice implementation and the period of time the practice is anticipated to provide the conservation benefit; and an NRCS-assigned value of the expected effect the practice will have on the identified resource concern. The ranking process involves assigning a score to each application. Then, applications are selected based on their ranking score.

Least-Cost Payment Rates and Practice Selection

While cost-effectiveness is important to the ranking process, as noted above, it is also a key element in other aspects of EQIP. For example, EQIP payment rates require use of practice components that meet the practice standard at the least cost to the Government. For example, NRCS technical experts determine that PVC is the least costly pipeline material typically needed for a pasture irrigation system. Costlier cast iron or steel pipe could also be used but is not needed to meet the typical application and lifespan of this practice. Therefore, the final payment rate reflects the lower PVC pipe cost.

NRCS requires least-cost practice selection. For example, suppose a producer and planner identify the need for a stream crossing to address a resource concern and the options are a low-water crossing or a bridge. Either option addresses the resource concern; however, the low-water crossing is the least-cost option. Although the producer may prefer to install the bridge, the NRCS planner selects the payment rate associated with the low-water crossing for use in the contract. This does not preclude the participant from installing the higher-cost bridge; however, any additional costs are borne by the participant.

Analysis

Estimated Public and Private Costs¹

The 2018 Act authorizes EQIP funding at \$9,175 million from FY 2019-23, with annual amounts of \$1,750 million in FY 2019², \$1,750 million in FY 2020, \$1,800 million in FY 2021, \$1,850 million in FY 2022, and \$2,025 million in FY 2023 (Table 4). These government costs are assumed to be composed of a historical average technical assistance share of 27 percent (\$2,477.3 million total over FY 2019-23) and a financial assistance share of 73 percent (\$6,697.8 million in total over FY 2019-23). The combined public and private cost³ of implementing EQIP conservation practices is estimated at \$13,640.2 million dollars (FY2019–2023), assuming that the producer pays a 40 percent share of the total financial cost (0.4 X (\$6,697.8 million + \$4,465.2 million)). The producer cost accounts for 32.7 percent of the total program cost (\$4,465.2 million/\$13,640.2 million).

Table 4. Projected Total Costs of EQIP¹ as authorized by the 2018 Farm Bill, FY 2019 - FY 2023

	NRCS Technical Assistance	Transfer Payment²	Public Costs	Private Costs	Total Costs
	<i>--- million \$ ---</i>				
FY 2019	472.5	1,277.5	1,750.0 ³	851.7	2,601.7
FY 2020	472.5	1,277.5	1,750.0	851.7	2,601.7
FY 2021	486.0	1,314.0	1,800.0	876.0	2,676.0
FY 2022	499.5	1,350.5	1,850.0	900.3	2,750.3
FY 2023	546.8	1,478.3	2,025.0	985.5	3,010.5
Total	2,477.3	6,697.8	9,175.0	4,465.2	13,640.2

¹Based on a historical average participant cost of 40 percent and a historical average technical assistance share of 27 percent. ²Transfer payments represent financial assistance (FA) provided to producers. ³This represents the level of authorized funds for FY 2019 in the 2018 Farm Bill; total available public funds for FY 2019 as provided through the funding process were \$1,610.8 million.

¹ Public costs are those ultimately borne by the taxpayer. Private costs are borne by landowners and others.

² This represents the amount authorized in the new Farm Bill. This amount for FY 2019 was reduced through the funding process and sequestration to \$1,611 million.

³ Public costs include total technical assistance (TA) and transfer payments (often referred to as financial assistance (FA)). Private costs are out-of-pocket costs paid voluntarily by participants.

The present value of public EQIP costs are shown in Table 5. The present value of the total EQIP authorization under the 2018 Act discounted by 3 percent is \$8.06 billion (\$1.76 billion on an annualized basis). The present value of the total EQIP authorization discounted by 7 percent is \$7.21 billion (\$1.76 billion on an annualized basis). This means that the annualized market cost and the social cost of the program are similar over the (short) five-year Farm Bill cycle.

Table 5. Estimated Public Costs of EQIP Transfer Payments, FY 2019-2023

	Nominal-dollar Farm-Bill Authorization	Real-dollar Authorization 2% GDP Deflator¹	Present Value of Real-dollar Authorization Discounted at 3%	Present Value of Real-dollar Authorization Discounted at 7%
	<i>--- billion \$ ---</i>			
FY 2019 ²	1.75	1.75	1.70	1.64
FY 2020	1.75	1.72	1.62	1.50
FY 2021	1.80	1.73	1.58	1.41
FY 2022	1.85	1.74	1.55	1.33
FY 2023	2.03	1.87	1.61	1.33
Total	9.18	8.81	8.06	7.21
Average Annualized	1.84	1.76 ³	1.76 ³	1.76 ³

¹ The GDP deflator (implicit price deflator for GDP) is a measure of the level of prices of all new, domestically produced, final goods and services in an economy. Although the expert consensus estimate currently is slightly more than 2.0 percent, a rounded 2.0 percent is used here for simplicity. ² This represents the level of authorized funds for FY 2019 in the 2018 Farm Bill; total available public funds for FY 2019 as provided through the funding process were \$1,610.8 million. ³ Results are similar because of rounding to two decimal places and the short time frame (5 years) over which the annualization occurs.

Impact of Funding Limits

Annual bills have typically capped EQIP funding below the amounts authorized in Farm Bills. For example, bills reduced 2014 Farm Bill funding from \$8.0 billion over FY2014-18 to \$7.506 billion, a 6.18 percent reduction (Table 6). A similar reduction in 2018 Farm Bill authorized funding levels leads to a decrease in funding of \$0.567 billion over five years to \$8.608 billion ((1-0.0618) x \$9.175 billion).

Table 6. Nominal Funding for EQIP

	2014 Act	2018 Act	2014 Act Annualized	2018 Act Annualized
	<i>--- million \$ ---</i>			
Authorized Funds	8,000	9,175	1,600	1,835
Obligation Cap	7,506	8,608 ¹	1,501	1,722 ¹

¹Hypothetical; assumes same funding reductions as existed under the 2014 Farm Bill.

Discounted Payments Under Alternative Scenarios

Financial assistance funding for EQIP could follow three scenarios. If Congress continues to limit funding by the percentage it did under the 2014 Farm Bill, transfer payments or financial assistance payments to producers from FY2019-2023 would total \$6,283.9 million (see the primary estimate in Table 7). Alternatively, if the current program funding is limited on an

Table 7. Possible Funding Scenarios for EQIP under the 2018 Farm Bill

	Estimated Financial Assistance¹	High (authorized level)	Primary² (93.825% below authorized level)	Low² (92.04% of authorized level)
	--- million \$ ---			
2019	1,277.5	1,277.5	1,198.6	1,175.9
2020	1,277.5	1,277.5	1,198.6	1,175.9
2021	1,314.0	1,314.0	1,232.8	1,209.5
2022	1,350.5	1,350.5	1,267.0	1,243.0
2023	1,478.3	1,478.3	1,386.9	1,360.6
Total	6,697.8	6,697.8	6,283.9	6,164.8

¹Represents payments to participants and classified by the Office of Management and Budget as transfer payments. Based a historical average technical assistance share of 27 percent. ²This represents the level of authorized funds for FY 2019 in the 2018 Farm Bill; total available public funds for FY 2019 as provided through the funding process were \$1,610.8 million or \$1,175.9 million after subtracting technical assistance. The 93.825% for the primary estimate is calculated as \$7,506 million/\$8,000 million (Table 6); the 92.04% for the low estimate is \$1,175.9 million/\$1,277.5 million.

annual basis to 92.04 percent of authorized levels, as reflected in the FY 2019 obligation cap, then financial assistance payments to producers would be \$6,164.8 million over the remainder of the 2018 Farm Bill (see the low estimate in Table 7). Finally, a third scenario would be that financial assistance funding remains consistent with authorized levels (the high estimate of \$6,697.8 million, also shown in Table 4).

Calculating the present value (Table 8) allows a more accurate assessment of the impacts of funding caps. With the primary scenario (funding 93.825 percent below authorized levels), the \$413.9 million (\$6,697.8 million - \$6,283.9 million) in reduced nominal financial assistance funding over the life of the 2018 Farm Bill would, after adjusting for inflation and discounting by 3 percent private cost of funds, translate to a \$362.9 million (\$5,874.0 million - \$5,511.1) or 6.2 percent reduction. The biggest decline in funding would occur under the low estimate, where the nominal level of funding is reduced by \$532.9 million (\$6,697.8 million - \$6,164.8 million). When discounted by the 3 percent social cost of funds, the difference between the high and low estimates on an annualized basis is \$102.1 million (\$1,282.6 million - \$1,180.6 million), a 8.0 percent reduction.

Table 8. EQIP Federal Transfer Payments¹–Nominal and Discounted 2018 Present Value, FY 2019-FY 2023

Category	Discount rate	Primary Estimate	Low Estimate	High Estimate
		--- million \$ ---		
Total Monetized	Nominal	6,283.9	6,164.8	6,697.8
	3%	5,511.1	5,406.7	5,874.0
	7%	4,929.1	4,835.6	5,253.7
Annualized Monetized	3%	1,203.4	1,180.6	1,282.6
	7%	1,202.1	1,179.4	1,281.3

¹Transfer payments refer to payments made to participants and are commonly referred to as financial assistance payments.

Impacts of Funding Shifts

Livestock

The 2018 Farm Bill reduced the amount of EQIP funding to be spent on livestock from 60 percent to 50 percent. NRCS has consistently hit slightly above the 60 percent target over the last five years (Table 9).

Table 9. Livestock Share of EQIP Transfer Payment Obligations, FY 2014-18

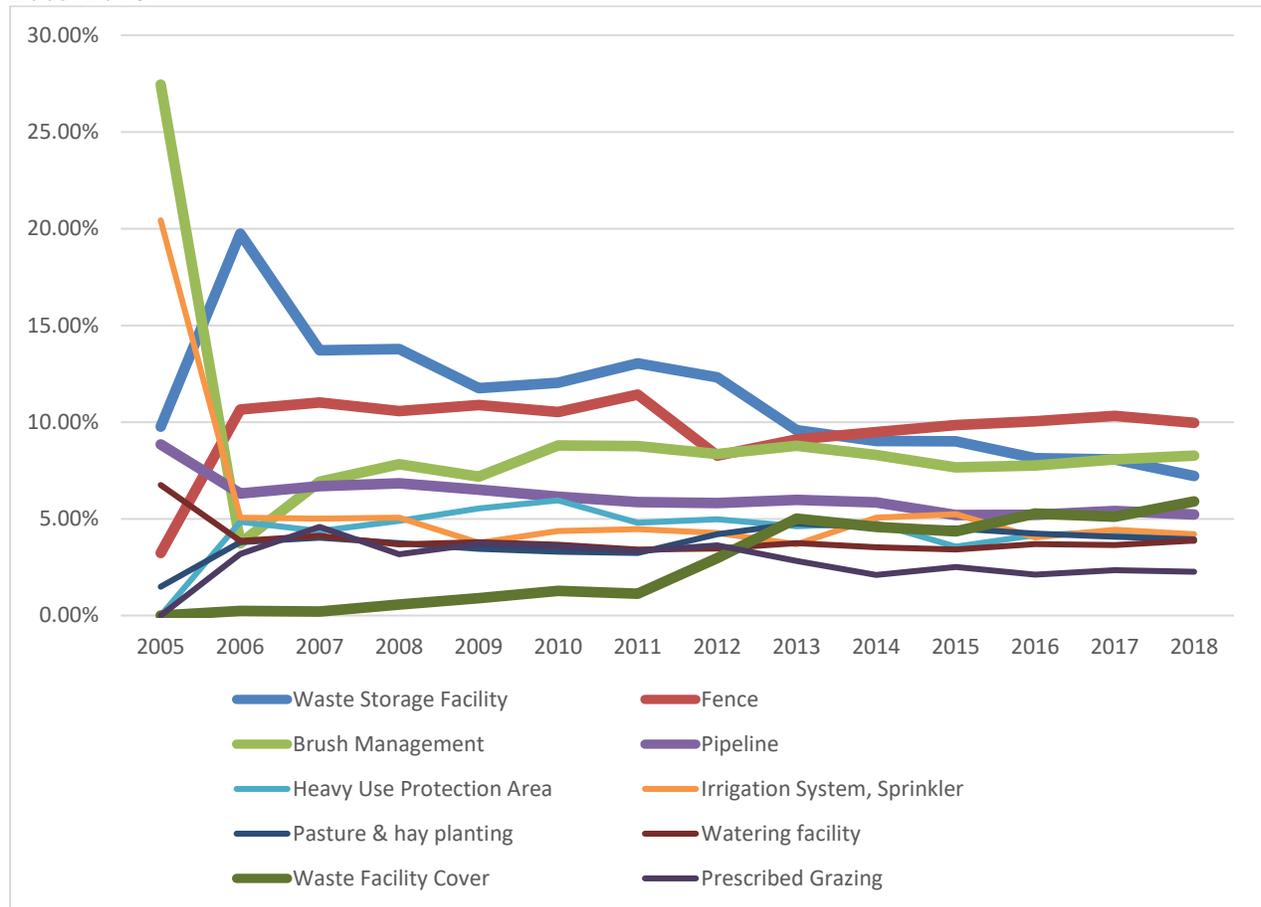
Fiscal Year	Livestock Obligations (\$ million)	All Obligations ¹ (\$ million)	Share of All Obligations
2014	484.3	789.3	61.4%
2015	471.8	762.5	61.9%
2016	579.7	949.1	61.1%
2017	686.1	1,093.5	62.7%
2018	802.5	1,302.6	61.6%

Source: NRCS ProTracts Data FY 2018, 4th Quarter. ¹Differs from amount reported in Table 3 because it does not include technical assistance funds.

Figure 2 illustrates the top ten EQIP livestock practices from 2005-18. In 2018, fencing, brush management, and waste storage facilities were the top three practices in terms of funding share. Note that the share of funds for waste storage facilities, fence, brush management, heavy use protection areas, and prescribed grazing increased rapidly in 2006. Since then, funding for most practices shown has remained fairly stable with the exception of waste storage facilities. Waste storage facility funding has steadily declined from its peak of 20 percent in 2006 to 7 percent in 2018. Also note that the waste facility cover category has shown the greatest rate of increase in funding in recent years.

While the new Farm Bill reduces the share of funding for livestock practices, there is little reason to expect changes in the funding trends shown in Figure 2. In addition, greater aggregate EQIP funding—barring significant reductions in funding—may not result in a meaningful change in funding for livestock practices in dollar terms.

Figure 2. Top Ten Livestock Conservation Practices Share of Total EQIP Livestock Funding, 2005-2018



Source: NRCS ProTracts data, FY 2018, 4th Quarter.

Wildlife

NRCS has identified 16 conservation practices, such as conservation cover and upland wildlife management, that directly contribute to improving wildlife habitat. NRCS also has created many special wildlife initiatives. NRCS uses EQIP funds obligated to these wildlife initiatives and the 16 wildlife practices to track performance and to determine whether the agency is meeting its mandated funding percentages (Table 10). NRCS prefers to allocate wildlife funding through the Working Lands for Wildlife Initiatives (WLFWI) because funding can be directed to areas where wildlife protection is needed and practices providing the most protection can be adopted.

The 2018 Farm Bill increases EQIP funding to be spent on wildlife from 5 percent to 10 percent. Under the 2014 Farm Bill, EQIP funding for wildlife practices and initiatives have averaged around 7.6 percent of total EQIP financial assistance funding (Table 10). To meet the new 10 percent requirement, NRCS will need to boost funding over the life of the 2018 Farm Bill on an

annual basis by about \$32.43 million (\$162.15 million/5) or 2.4 percent of total annual EQIP financial assistance (Table 11).

Table 10. Wildlife Funding Share of EQIP Financial Assistance Obligations, FY 2014-18

Fiscal Year	Wildlife Obligations¹ (\$ million)	All Obligations² (\$ million)	Share of All Obligations
2014	63.5	789.3	8.1%
2015	63.7	762.5	8.4%
2016	71.3	949.1	7.5%
2017	81.6	1,093.5	7.5%
2018	91.0	1,302.6	7.0%
Total	371.1	4,896.9	7.6%

Source: NRCS ProTracts Data, FY 2018, 4th Quarter.

¹Includes funding for practice codes 327, 390, 391, 395, 396, 422, 472, 580, 643, 644, 645, 646, 647, 657, 658, and 659, and all other practices funded under wildlife initiatives and projects. ²Differs from amount reported in Table 3 because it does not include technical assistance funds.

Table 11. Wildlife Funding—Estimated Increase in Funding Needed to Meet the 2018 Farm Bill Mandate using Authorized Levels of Funding

Fiscal Year	Estimated Total EQIP Financial Assistance Funding¹	Estimated Wildlife Goal of 10 percent	Estimated Baseline of EQIP Wildlife Financial Assistance Funding²	Additional Amount of Needed to Meet the Wildlife Goal of 10 Percent	Additional Amount Needed Share of Total EQIP Financial Assistance
	<i>--- million \$ ---</i>				<i>--- % ---</i>
2019 ³	1,277.5	127.8	96.8	30.9	2.4%
2020	1,277.5	127.8	96.8	30.9	2.4%
2021	1,314.0	131.4	99.6	31.8	2.4%
2022	1,350.5	135.1	102.4	32.7	2.4%
2023	1,478.3	147.8	112.0	35.8	2.4%
Total	6,697.8	669.8	507.7	162.2	2.4%

Source: NRCS ProTracts Data, FY 2018, 4th Quarter.

¹See Table 7 High scenario. ²Based on the average percentage of EQIP financial assistance funding going to wildlife funding over the life of 2014 Farm Bill (FY 2014-2018) of 7.579 percent. This represents the level of authorized funds for FY 2019 in the 2018 Farm Bill; ³total available public funds for FY 2019 as provided through the funding process were \$1,610.8 million.

Over 85 percent of wildlife initiative funding goes towards habitat improving and management practices like brush management, tree/shrub site preparation and establishment, prescribed grazing, prescribed burning, fencing, and pipeline for transporting water to livestock (Table 12).

Table 12. Conservation Practices Funded under Wildlife Initiatives¹, 2014-2018

	2014	2015	2016	2017	2018	Total
	--- million \$ ---					
16 wildlife conservation practices ²	3.75	5.99	9.36	9.24	11.48	39.82
Top four practices						
Conservation Cover	0.68	1.11	2.08	2.13	3.47	9.46
Upland Wildlife Habitat Management	1.38	1.24	1.94	1.82	2.72	9.10
Streambank and Shoreline Protection	0.17	1.43	1.27	1.80	1.16	5.83
Early Successional Habitat Development /Management	0.37	0.00	1.24	1.22	1.58	4.41
Other conservation practices	36.43	37.91	46.15	52.69	57.78	230.96
Top seven practices						
Brush Management	9.72	8.11	10.27	8.78	8.51	45.39
Tree/Shrub Establishment	2.29	5.05	6.66	8.58	9.39	31.97
Tree/Shrub Site Preparation	0.97	2.22	4.10	5.43	6.52	19.23
Prescribed Grazing	4.21	3.86	2.54	2.43	3.20	16.24
Prescribed Burning	1.55	2.15	2.80	4.57	4.83	15.91
Fence	1.83	1.75	2.66	2.76	3.68	12.68
Livestock Pipeline	2.23	2.17	2.79	2.47	2.48	12.15
All conservation practices (includes 16 Wildlife conservation practices)	40.18	43.90	55.51	61.93	69.26	270.78
16 Wildlife practices funding share of funding for all practices	9.3%	13.6%	16.9%	14.9%	16.6%	14.7%
Non-16 Wildlife practices funding share of funding for all practices	90.7%	86.4%	83.1%	85.1%	83.4%	85.3%

Source: NRCS ProTracts Data, FY 2018, 4th Quarter.

¹Includes Pollinator, Sage-Grouse Initiative, Lesser Prairie Chicken Initiative, Long Leaf Pine Initiative, Bog Turtle WLFW, NE Cottontail WLFW, SWN Flycatcher WLFW, G Tortoise WLFW, G Winged Warbler WLFW, Everglades, HB Pollinator, Wildlife 5%' and Monarch Butterfly Project.

²Wildlife conservation practice codes 327, 390, 391, 395, 396, 422, 472, 580, 643, 644, 645, 646, 647, 657, 658, and 659.

Impacts of Expanded Eligibility to Irrigation Districts, Etc.

To address increasing demands on the nation's water supply, the 2018 Farm Bill expands EQIP eligibility to water management entities like irrigation districts, ground water management districts, and acequias, along with providing the Secretary with the authority to waive adjusted gross income, contract, and payment limits to encourage continued efforts in agricultural water conservation. In some states, particularly in the West, these water management entities may increase competition for funding and enhance conservation benefits per dollar spent.

The impacts, however, on the allocation of EQIP funding will be limited. The 2018 Farm Bill directs NRCS to maintain current funding allocations to states, limiting the impact nationally. Also, NRCS proposes in its interim rule at establishing a payment limit of \$900,000 on all contracts with water management entities.

Little information is available to gauge the potential demand for EQIP funds from water management entities. For example, a national survey of irrigation organizations was last conducted in 1978. To obtain better information about the number of irrigation organizations and the amount of acreage controlled by their membership, USDA's Economic Research Service (ERS) is preparing to conduct a survey of current irrigation organizations in 2019. The 2019 Survey of Irrigation Organizations (SIO) encompasses the 25 states most likely to have a substantial number of irrigation water management entities based on the percentage of irrigated acres using groundwater and off-farm sources. In developing the SIO, ERS created a table with the latest estimates of the number of irrigation entities, the number of irrigated acres, and the source of irrigated water by state (Table 13).

EQIP funds conservation activities that improve irrigation efficiency and irrigation management. The amount of EQIP FY 2018 funds obligated and the acres treated on contracts that identified inefficient irrigation use as a resource concern for the 25 states identified in the SIO are reported in Table 13. In FY 2018, NRCS treated 581,882 acres in these 25 states (Table 14), compared to total irrigated acreage in these states of 50.508 million (Table 13). The average size of contract was considerably less than the \$900,000 payment limit for water management entities. Average obligations per contract ranged from \$5,124 in North Carolina to \$116,709 in Oklahoma (Table 14).

Table 13. Estimated Number of Irrigation Entities, Irrigated Acres, and Source of Irrigated Water by State

State	Estimated Number of Irrigation Entities	2017 Census of Agriculture Irrigated Acres (Thousands)	2013 Farm and Ranch Irrigation Survey—Source of Irrigated Water	
			Ground-water	Off-farm surface water
Colorado	600	2,309.5	43.5%	48.0%
Utah	700	1,125.1	24.9%	67.5%
Montana	327	1,872.4	2.9%	75.3%
Idaho	541	3,511.8	40.8%	48.8%
Wyoming	177	1,418.3	9.7%	69.6%
California	600	7,549.2	51.1%	53.2%
New Mexico	500	694.6	58.3%	29.4%
Oregon	246	1,554.2	32.8%	49.7%
Washington	161	1,623.4	31.8%	57.5%
Louisiana	100	1,096.4	80.6%	3.8%
Arizona	179	851.9	37.0%	63.4%
Nevada	63	690.0	52.1%	32.8%
Texas	150	4,492.0	90.4%	7.9%
Nebraska	100	8,297.6	92.4%	6.2%
South Dakota	7	369.9	65.1%	27.4%
Kansas	19	2,851.3	98.4%	1.2%
Oklahoma	26	426.6	87.8%	5.3%
North Dakota	26	213.7	72.5%	21.3%
Hawaii	21	76.5	37.5%	79.3%
Florida	12	1,364.6	54.5%	29.3%
Arkansas	18	4,950.1	90.8%	1.2%
Mississippi	9	1,701.6	94.6%	0.5%
Georgia	20	1,196.9	80.5%	1.4%
South Carolina	10	133.9	75.9%	1.6%
North Carolina	5	136.7	28.1%	8.8%
Total/Average	4,617	50,508	65.42%	28.4%

Source: Wallander and Aillery, ERS internal estimates, June 2019.

Table 14. Treated Acres and Obligations for EQIP Contracts with Inefficient Irrigation Use as a Resource Concern, FY 2018

State	Treated Acres			Obligations		
	Irrigated (Thousand acres)	All (Thousand acres)	Irrigated share	Irrigated (\$Million)	All Contracts (\$Million)	Average per Irrigated Contract (\$)
Colorado	23.955	392.579	6.10%	19.065	37.97	75,655.92
Utah	16.116	290.955	5.54%	13.564	25.55	71,017.25
Montana	13.599	338.503	4.02%	6.911	23.23	67,750.48
Idaho	12.656	150.429	8.41%	6.497	14.29	55,060.42
Wyoming	7.009	503.264	1.39%	6.054	14.14	71,221.95
California	51.431	527.474	9.75%	37.979	97.94	65,936.50
New Mexico	14.960	1,170.945	1.28%	11.345	29.12	74,639.99
Oregon	4.506	550.198	0.82%	3.070	24.44	63,952.18
Washington	2.466	97.552	2.53%	2.750	14.75	105,784.40
Louisiana	41.891	132.251	31.68%	10.031	25.49	59,352.41
Arizona	3.420	1,136.653	0.30%	4.250	20.49	86,729.67
Nevada	12.090	64.673	18.69%	6.615	8.03	112,122.13
Texas	138.506	3,176.931	4.36%	31.563	141.73	50,419.38
Nebraska	24.471	475.661	5.14%	6.710	28.76	31,801.85
South Dakota	6.363	382.868	1.66%	0.589	18.15	58,885.73
Kansas	7.220	307.587	2.35%	3.401	38.10	85,021.25
Oklahoma	5.375	295.124	1.82%	4.085	24.56	116,709.28
North Dakota	5.222	303.399	1.72%	2.563	21.91	116,507.53
Hawaii	0.146	15.878	0.92%	0.753	8.12	31,374.50
Florida	5.708	170.369	3.35%	4.957	21.98	69,820.27
Arkansas	45.265	250.269	18.09%	19.440	45.26	73,083.65
Mississippi	103.584	393.640	26.31%	31.553	60.31	28,841.61
Georgia	22.149	151.370	14.63%	4.578	47.13	15,413.81
South Carolina	13.403	121.528	11.03%	4.321	32.93	40,766.72
North Carolina	0.371	60.358	0.61%	0.046	19.96	5,124.67
Total	581.882	11,460.458	5.08%	242.690	844.32	52,326.51

Source: NRCS ProTracts Data, FY 2018, 4th Quarter.

Incentive Contracts

The 2018 Farm Bill establishes incentive contracts to address up to three priority resource concerns for a given watershed, or other region, or area. The identification of the watersheds, regions, or areas within a state and the corresponding priority resources concerns for those watersheds or other regions or areas are based on local work groups and state technical committee input recommendations to the State Conservationist. Contracts will range from a minimum of five up to ten years in length and provide an annual payment and an incentive practice payment. Incentive practice payment rates will typically be based on the costs associated with implementing designated incentive practices and payment is made at the time of their implementation. They also receive annual payments for the life of the contract for certain incentive practices to attain increased levels of conservation on eligible land through managing, maintaining, and improving the incentive practices, as well as foregone income. Incentive practices will be determined by the national office and adjusted within each state through the typical conservation practice standards delivery process.

The impact of the new incentive contracts is uncertain, particularly regarding benefits per dollar. On one hand, participants will receive payments for incentive practices over a longer period, five to ten years versus the three years typically supported through regular EQIP contracts, as well as an annual payment for operation and maintenance and foregone income as part of the annual practice payment that they typically did not receive under regular EQIP. This aspect of program may tend to reduce the benefits per dollar. On the other hand, producers may—because of the increased assistance being provided for offsetting foregone income and the cost of operating and maintaining practices—choose to test new conservation systems and methods on a portion of their operation. This aspect would tend to increase benefits per dollar. Also, the additional assistance provided under new incentive contracts will likely result in an expanded pool of applicants who choose to keep conservation practices in place for a longer time. Overall, given the current demand for regular enrollment in EQIP, and the currently uncertain impacts that incentive contracts will have, the aggregate benefits from these new incentive contracts may be limited.

Organic Contract Payment Limits

The 2008 Farm Bill was the first Farm Bill to target organic producers through the NRCS Organic Initiative, and NRCS began providing technical and financial assistance to transitioning organic and National Organic Program (NOP) certified producers at that time. Examples of EQIP practices funded under the Organic Initiative include establishing buffer zones, installing high tunnels, and adopting nutrient and integrated pest management activities. Payments were limited to \$20,000 annually or up to \$80,000 over a rolling six-year period. These payment limits were maintained under the 2014 Farm Bill.

The 2018 Farm Bill increases the payment limit for organic producers to \$140,000 and removes the annual contract limit. This increase may allow larger organic producers who participate in EQIP under other funding pools, or those who have not applied because of the previous limits, to

participate directly in the organic initiative. Note that existing organic initiative contracts are usually well below the current multi-year payment limit of \$80,000 (Table 15).

For large operators who are participating, the impact may be the greatest. In the past, organic producers who had applications exceeding the \$80,000 payment limit could participate in general EQIP funding pools which have contract limits of \$450,000. As a result, the increased annual payment limit may encourage use of expanded practices by organic producers as they are now more able to participate directly in the organic funding pools rather than competing against all other types of operations for funding.

Table 15. The EQIP Organic Initiative Program Enrollment

	Fiscal Year			
	2014	2015	2016	2017
Acres Enrolled (thousand)	41.145	38.638	57.823	50.075
Feet Enrolled (thousand)	344.727	326.259	380.900	372.323
Contracts	388	342	375	412
Funding Obligated (million)	\$4.391	\$4.028	\$5.219	\$5.391
FA Paid (million)	\$3.495	\$2.769	\$2.374	\$817
<i>Average Funding Obligated per Contract</i>	\$11,317	\$11,778	\$13,918	\$13,087

Source: EQIP Organic Crosscut, 2018

Conservation Effects

EQIP provides funding for a wide range of conservation practices on agricultural lands and animal feeding operations, treating a variety of resource concerns. Individual effects of conservation actions cannot easily be linked, however, to measurable changes in environmental attributes such as nearby water bodies (Ribaud and Hellerstein, 1992). This is because pollutant emissions from the land and corresponding changes in environmental attributes are complex, cumulative, and variable over both time and location.

While Table 1 provides recent key performance indicator impacts, this section draws on USDA and other studies to categorize the type of ecological services and environmental impacts that conservation practices historically funded by EQIP are expected to produce. The conservation effects discussed represent a portion of the benefits expected to accrue from the types of conservation practices implemented through EQIP funding.

Sheet and rill water erosion

Soil erosion is a major natural resource concern affected by climatic factors, soil characteristics, landscape features, and cropping practices. The National Resources Inventory (NRI) estimates that between 1982 and 2015 conservation practices and programs reduced soil erosion on United States cropland by 34 percent. Soil erosion is comprised of water erosion and wind erosion. Sheet and rill water erosion on cropland declined from 1.60 billion tons in 1982 to 990 million tons in 2015; soil losses to wind erosion decreased from 1.35 billion tons in 1982 to 700 million tons in 2015. Although the average annual erosion rates have declined from 7.03 tons per year in

982 to 4.62 million tons per year in 2015 most of the gains since 1997 have come from reductions in wind erosion. While water erosion (sheet and rill) has remained constant between 2002 and 2015, average cropland acreage increased by 2 million acres (USDA, 2018).

We expect further reductions in sheet and rill erosion resulting from increased EQIP funding. There are many conservation practices available in EQIP for reducing sheet and rill water erosion on cropland. The 2010 NRI data indicate that annual sheet and rill erosion rates on cropland in 2010 averaged 2.7 tons per acre. Modeling results from the Conservation Effects Assessment Project (CEAP) reported in the 2011 Resource Conservation Act Appraisal estimate that the potential for reducing sediment from the nation's 49 million acres of high treatment need cropland averages 2.2 tons per acre per year. The potential for reducing sediment from the 97.4 million acres of moderate treatment need cropland averages 0.8 tons per acre per year. Conservation practices supported by EQIP funds could contribute to achievement of these potential gains.

For the purpose of this analysis, the two main categories of impacts from reduced sheet and rill water erosion are the reduction of nutrient losses from fields and improved water quality.

Reduction of fertilizer nutrient loss

On average, a ton of topsoil consists of 40 pounds of organic matter, of which 23.2 pounds are carbon. With an average carbon-nitrogen ratio of 10 to 1, each ton of soil contains 2.32 pounds of nitrogen. The soil also contains 0.05 percent phosphorus, or one pound per ton of soil. Thus, the reduction in nitrogen, phosphorous and potassium loss associated with reducing soil erosion improves soil productivity and reduces fertilizer input needs to meet current yield goals. While the economic benefit of reduced fertilizer input needs associated with reducing sheet and rill erosion is primarily realized by the producer, the entire agro-ecosystem benefits from associated improvements in soil health, which provides a long-term public good.

Improved water quality due to reduced erosion and nutrient loading

Reduced sheet and rill erosion lessen agriculture's impacts on water quality and result in a public benefit.

The seven CEAP major water basin studies (USDA NRCS CEAP, 2011-2014) completed to date indicate that the adoption of the types of structural and management conservation practices funded through EQIP lead to reductions in sediment, nitrogen, and phosphorous loads delivered from cropland to the nation's rivers and streams (Table 16). Consequently, conservation practices funded under EQIP contribute to improvement of national water quality. The CEAP survey and modeling exercises estimated that reductions in sediment loss due to adoption of conservation practices in place in 2003-2006 ranged from 24 to 76 percent, while reductions in nitrogen loads ranged from 5 to 75 percent and reductions in phosphorous loads ranged from 6 to 60 percent.

Table 16. Estimated Reductions in Loading of Sediment and Nutrients Delivered to Rivers and Streams due to Adoption of Conservation Practices in place in 2003-2006 Relative to Simulated Conditions of No Conservation Practices in Place

Region/Sub-Basin	Sediment	Nitrogen	Phosphorous
Upper Mississippi River	65%	26%	41%
Ohio-Tennessee River	55%	26%	32%
Missouri River	76%	54%	60%
Arkansas-White-Red River	64%	59%	59%
Lower Mississippi River	35%	21%	52%
Great Lakes	50%	37%	36%
Chesapeake Bay	57%	36%	39%
Texas Gulf Basin	60%	41%	55%
South Atlantic Gulf Basin	24%	5%	6%
Pacific Northwest Basin	53%	57%	60%
Souris-Red-Rainy	50%	75%	52%

Source: USDA NRCS CEAP, 2011-2015

CEAP simulations data also suggested considerable potential for further reductions in sediment and nutrient loads in rivers and streams through the adoption of additional conservation practices on cropland acres (Table 17).

Table 17. Estimated Potential for Further Reductions in Loadings of Sediment and Nutrients to Rivers and Streams from 2003-2006 Loss Levels with Comprehensive Conservation Practice Adoption on all High and Moderate Treatment Need Cropland Acres

Region/Sub-Basin	Sediment	Nitrogen	Phosphorous
Upper Mississippi River	74%	49%	41%
Ohio-Tennessee River	81%	41%	58%
Missouri River	28%	13%	12%
Arkansas-White-Red River	25%	21%	13%
Lower Mississippi River	80%	43%	57%
Great Lakes	58%	37%	33%
Chesapeake Bay	84%	52%	51%
Texas Gulf Basin	84%	32%	63%
South Atlantic Gulf Basin	52%	32%	42%
Pacific Northwest Basin	73%	47%	41%

Source: USDA NRCS CEAP, 2011-2015

Animal waste management

Although the 2018 Farm Bill reduced the required percentage of funding to be allocated for livestock-related EQIP activities, several conservation practices are available to producers for mitigating damages caused by animal waste. Farmers and ranchers, for example, may install concrete or metal structures to store animal waste until conditions are suitable for proper applications to crops and pasture, plant vegetative filter strips to treat wastewater runoff, and use

manure application techniques to minimize impacts to the environment. Those practices involve management, construction, and cropping activities implemented in a comprehensive manner and ensure that environmental impacts are minimized while not compromising farm viability. Comprehensive Nutrient Management Plans, required by EQIP to be developed and implemented on Animal Feeding Operations (AFO), provide a blueprint for producers on how to address animal waste management. Producers may also install anaerobic digesters and place covers on waste water lagoons and storage ponds to reduce the amount of methane emitted during the handling of animal waste.

An environmental and economic analysis of the Concentrated Animal Feeding Operations (CAFO) regulation done by the Environmental Protection Agency (EPA)¹ estimated the benefits from CAFOs complying with animal waste handling regulations. The EPA study included estimated national benefits in the following categories for which data and methodology were available:

- Improvements in water quality and suitability for recreational activities (\$5 million to \$145 million);
- Reduced incidence of fish kills (up to just over \$1 million);
- Improved commercial shell fishing (\$2 million to \$3 million); and
- Reduced contamination of private wells (\$70 million to \$77 million).

Note that in addition to potential water quality benefits from animal waste management, there is a likely increase in productivity to the producer through application of animal waste to cropland, mainly due to lower production costs. The use of conservation practices to reduce the impacts of nutrients on water quality will likely have no net impact on methane emissions from animal waste.

Grazing land productivity

As with other conservation practices, grazing practices provide both private and public benefits for several different resource concerns. Namken and Flanagan (2000) report that these practices resulted in an average productivity increase of 1.3 animal unit months (AUMs) per acre. Practices that increase forage production can also improve wildlife habitat and water quality. Existing studies do not allow for a quantification of these impacts at this time.²

Irrigation water use

EQIP funds are used in certain areas to implement irrigation system improvements, as well as irrigation water management plans that prescribe more efficient water use measures. It is assumed that farmers could achieve a net reduction in irrigation water applied by any or all of the following three methods: convert from irrigation to dryland production, convert to a crop or land use requiring smaller applications of water, and improve irrigation efficiency for the current

¹Based on work underlying the EPA Environmental and Economic Benefit Analysis of Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations 2002 available at: https://www3.epa.gov/npdes/pubs/cafo_benefit_p1.pdf

² CEAP assessments of the effects of conservation practices on grazing lands will enable more complete estimates of benefits in future analyses.

crop. Reductions in the total water applied, depending on hydrologic conditions, could be available for other agricultural activities, municipal water, power generation, fish habitat, or leased or sold locally via local water markets.

Air quality

Data on the impact of EQIP-funded conservation practices to air quality is limited and is linked to reductions in wind erosion. In addition, conservation effects may include reduced chemical drift associated with crop production, improved dust and odor control in animal feeding operations, and reductions in nitrous oxide (NO_x) emissions, organic compounds, and ozone precursors and depleters through improved animal feeding practices and crop nutrient management.

Wildlife habitat

EQIP provides technical and financial assistance to develop, improve, and manage wildlife habitat. The 2018 Farm Bill requires that at least 10 percent of available EQIP funding be targeted to practices which address wildlife habitat.

NRCS has identified 16 conservation practices with the primary purpose of benefitting wildlife populations (these practices are the basis for the NRCS wildlife habitat performance measure). In addition, other practices can accomplish specific wildlife objectives. For example, reducing sedimentation often improves aquatic habitat. Pasture and hay planting, fencing, and ponds can provide recreational benefits, which can also stimulate rural economies (Smith, 1996; U.S. Fish and Wildlife Service, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation). The NRCS Prescribed Grazing (528) conservation practice standard is essential in facilitating the development and maintenance of habitat to benefit the lesser prairie-chicken and the greater sage grouse.

Energy use

No-till and mulch-till, often referred to as reduced tillage or conservation tillage, are practices that reduce the number of passes over cropland with farm equipment. This results in fuel savings as well as time savings for the producer. Using CEAP estimates of the gallons of diesel fuel saved by implementing no-till and mulch tillage practices results in an estimated savings of 2.99 gallons per acre.

Carbon sequestration

Numerous conservation practices promoted by NRCS provide secondary benefits which increase carbon sequestration (see Appendix). These practices include conservation cover, wildlife habitat, and range improvement practices. Residue and tillage practices associated with erosion control reduce oxidation of carbon from cultivated cropland and can also increase carbon sequestration. Practices funded through EQIP to address forest health and watershed protection on non-industrial private forest land also sequester carbon.

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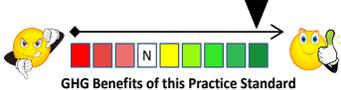
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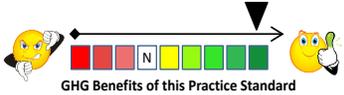
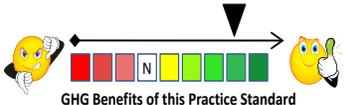
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Appendix: NRCS Practice Standards for Greenhouse Gas Emission Reduction and Carbon Sequestration

Qualitative Ranking N=Neutral	Practice Code	Practice Standard and Associated Information Sheet	Beneficial Attributes
 <p>GHG Benefits of this Practice Standard</p>	327	Conservation Cover (Information Sheet)	Establishing perennial vegetation on land retired from agriculture production increases soil carbon and increases biomass carbon stocks.
	329	Residue and Tillage Management, No Till/Strip Till/Direct Seed (Information Sheet)	Limiting soil-disturbing activities improves soil carbon retention and minimizes carbon emissions from soils.
	366	Anaerobic Digester (Information Sheet)	Biogas capture reduces CH ₄ emissions to the atmosphere and provides a viable gas stream that is used for electricity generation or as a natural gas energy stream.
	367	Roofs and Covers	Capture of biogas from waste management facilities reduces CH ₄ emissions to the atmosphere and captures biogas for energy production. CH ₄ management reduces direct greenhouse gas emissions.
	372	Combustion System Improvement	Energy efficiency improvements reduce on-farm fossil fuel consumption and directly reduce CO ₂ emissions.
	379	Multi-Story Cropping	Establishing trees and shrubs that are managed as an overstory to crops increases net carbon storage in woody biomass and soils. Harvested biomass can serve as a renewable fuel and feedstock.
	380	Windbreak/Shelterbelt Establishment (Information Sheet)	Establishing linear plantings of woody plants increases biomass carbon stocks and enhances soil carbon.
	381	Silvopasture Establishment	Establishment of trees, shrubs, and compatible forages on the same acreage increases

<p>Continuation...</p>  <p>GHG Benefits of this Practice Standard</p>			biomass carbon stocks and enhances soil carbon.
	512	Forage and Biomass Planting (Information Sheet)	Deep-rooted perennial biomass sequesters carbon and may have slight soil carbon benefits. Harvested biomass can serve as a renewable fuel and feedstock.
	590	Nutrient Management (Information Sheet)	Precisely managing the amount, source, timing, placement, and form of nutrient and soil amendments to ensure ample nitrogen availability and avoid excess nitrogen application reduces N ₂ O emissions to the atmosphere.
	592	Feed Management	Diets and feed management strategies can be prescribed to minimize enteric CH ₄ emissions from ruminants.
	612	Tree/Shrub Establishment (Information Sheet)	Establishing trees and shrubs on a site where trees/shrubs were not previously established increases biomass carbon and increases soil carbon. Mature biomass can serve as a renewable fuel and feedstock.
	666	Forest Stand Improvement (Information Sheet)	Proper forest stand management (density, size class, understory species, etc.) improves forest health and increases carbon sequestration potential of the forest stand. Managed forests sequester carbon above and below ground. Harvested biomass can serve as a renewable fuel and feedstock.
Qualitative Ranking N=Neutral	Practice Code	Practice Standard and Associated Information Sheet	Beneficial Attributes
 <p>GHG Benefits of this Practice Standard</p>	332	Contour Buffer Strips (Information Sheet)	Permanent herbaceous vegetative cover increases biomass carbon sequestration and increases soil carbon stocks.

	391	Riparian Forest Buffer (Information Sheet)	Planting trees and shrubs for riparian benefits also increases biomass carbon sequestration and increases soil carbon stocks.
	601	Vegetative Barrier	Permanent strips of dense vegetation increase biomass carbon sequestration and soil carbon.
	650	Windbreak/Shelterbelt Renovation (Information Sheet)	Restoring trees and shrubs to reduce plant competition and optimize planting density increases carbon sequestration.
Qualitative Ranking N=Neutral	Practice Code	Practice Standard and Associated Information Sheet	Beneficial Attributes
 <p>GHG Benefits of this Practice Standard</p>	311	Alley Cropping	Trees and/or shrubs are planted in combination with crops and forages. Increasing biomass density increases carbon sequestration and enhances soil carbon stocks.
	390	Riparian Herbaceous Cover	Perennial herbaceous riparian cover increases biomass carbon and soil carbon stocks.
	550	Range Planting (Information Sheet)	Establishing deep-rooted perennial and self-sustaining vegetation such as grasses, forbs, legumes, shrubs and trees improves biomass carbon sequestration and enhances soil carbon.
	603	Herbaceous Wind Barriers (Information Sheet)	Perennial herbaceous vegetation increases biomass carbon sequestration and soil carbon.