
United States
Department of
Agriculture

Natural
Resources
Conservation
Service

Part 612 Water Quality
National Resource Economics Handbook

Exhibits

Exhibit A—Policy Basis for NRCS Guide on Water Quality Economics

The USDA Water Quality Policy contains several provisions relating to economic assessment of water quality impacts. GM-401, Subpart B (DR 9500-7) states in part:

"The Department, in order to further promote the achievement of surface water and ground water quality goals, will...

(11) Continue to support and conduct research to identify cause-effect relationships between management practices and impacts on beneficial uses and to evaluate social costs and benefits associated with nonpoint control."

GM Part 401 Subpart A states in part:

"§401.2 Policy

To promote the improvement, protection, restoration, and maintenance of surface and ground water quality for beneficial uses, the Soil Conservation Service will...

(h) Support improved data gathering and research efforts to define and assess water quality and nonpoint source pollution areas, including economic offsite effects;

(i) Develop technical tools necessary to quantify the environmental and economic on- and offsite effects of soil and water conservation measures commensurate with their relative importance; ..."

Part 612, Water Quality, of the National Resource Economics Handbook is intended to disseminate information that can assist in implementing Natural Resources Conservation Service water quality activities.

Exhibit B—Least Cost Analysis

Background

The producer is growing corn and soybeans on 200 acres of Marshall, Monoa, and Ida soils. Soil loss from sheet and rill erosion is estimated to be 37 tons per acre per year. Ephemeral gully erosion directly affects 20 of the 200 acres.

Soil erosion depresses crop yields. Runoff enters Beaver Creek and is carried to a municipal water supply impoundment. Sediment associated with the runoff is reducing the storage capacity of the reservoir, and nutrients and other agriculture chemicals are suspected of affecting water quality in the reservoir.

The producer uses a moldboard plow. Fertilizer is applied in the fall to take advantage of price discounts and seasonal labor availability. A conservation planner has discussed three resource management systems (RMS) with the landowner to address the onsite and offsite effects of erosion.

RMS-1 Conservation tillage and conservation cropping sequence (no-till corn, chisel tilled soybeans), terraces, waterways, and contouring

RMS-2 Conservation tillage and conservation cropping sequence (no-till corn, chisel tilled soybeans), water and sediment control basins, waterways, and contouring

RMS-3 Conservation tillage and conservation cropping sequence (chisel tilled corn and soybeans), water and sediment control basins, waterways, and contouring

Each RMS treats sheet and rill erosion, ephemeral erosion, and reduces the amount of sediment and the associated agricultural chemicals entering Beaver Creek.

Strategy

The conservation planner assists the land user in evaluating the three proposed resource management systems.

Table A, developed with the land user, displays trade-offs between the resource management systems. Cost information is shown along with each RMS's estimated effect on sediment, chemical, and nutrient runoff.

The land user would probably not adopt RMS-1 because no-till requires the use of additional chemicals to control weeds. Although the cost difference between RMS-2 and RMS-3 is small, RMS-3 uses mechanical weed control rather than chemical control, and therefore better addresses the local water quality concern about agricultural chemicals.

Based on the information in table A, the land user would probably select RMS-3.

Table A Comparison of resource management systems

Alternative	Sheet & rill erosion rate (t/a/y)	Sheet & rill erosion reduction (t/a/y)	Cost ^{1/} (\$/ac)	Cost/ton ^{1/} (\$/t)	Sediment ^{2/}	Chemical	Nutrient
Current	37	0					
RMS-1	4	33	\$18.97	\$0.57	+	-	+
RMS-2	10	27	\$10.03	\$0.37	+	-	+
RMS-3	15	22	\$ 7.30	\$0.33	+	+	+

^{1/} Cost figures are expressed in average annual 1988 dollars. The interest rate is 9 percent.

^{2/} A "+" indicates a potential positive impact, and a "-" indicates a potential negative impact.