



**Demonstration results from the Lower Missisquoi
Water Quality Project in Franklin County, Vermont**

Dairy Farmers Save Dollars and Nutrients by Participating in HUA Crop Management Service

Introduction and Background

Missisquoi Bay is one of the most eutrophic in Lake Champlain with phosphorus concentrations as high as those in Lake Erie in the 1970's. A significant portion of the bay's phosphorus load in this dairy production area has been attributed to runoff from agricultural nonpoint sources such as manure, fertilizer and cropland erosion.

As part of the Lower Missisquoi Hydrologic Unit Area (HUA) Project, an integrated crop management service was established as a pilot project in order to demonstrate the value of whole-farm nutrient management plans, including nutrient, pest, and other crop management services. Only a few crop consultants operate in Vermont, none in the local area before the Missisquoi Crop Management Service was established. Many dairy farmers concentrate their management efforts on cows and milk production rather than crops, even though crop yields and quality may greatly affect net returns from the whole operation. Crop consultant service are an option to provide crop management expertise to farmers who may lack the time and/or expertise themselves.

Methods

A separate study was conducted to evaluate the economic and environmental impacts of the crop management service, specifically a) to determine if farmers changed their use of fertilizer or manure nutrients as a result of joining the crop management service, b) to determine if joining the crop management service increased farm profitability, and c) to assess what confidence the farmers had in the consultant's recommendations.

The study included seven dairy farms that had been crop management participants continuously for the 1991 to 1993 period. Herd size ranged from 42 to 150 cows, mostly Holsteins. Total crop acreage was 731 acres, 325 in corn and 406 in hay forages. Crop

acreage on individual farms ranged from 19 to 145 acres of hayland and 0 to 88 acres of corn. Total corn acreage remained roughly the same over the years; most was in a corn-hay rotation. Data collected for individual fields on each farm included crop grown, manure application rates, nutrients (N, P, or K) applied as either fertilizer or manure (based on manure analyses), and other field practice information. Data was collected from a baseline (pre-crop management service) year, 1990, and the subsequent three years. Also included in the analysis were the crop consultant's annual manure and fertilizer recommendations for each field. This allowed a comparison to be made between what the crop management consultant recommended and the amount that the farmer actually applied over time.

Results

Overall, while total manure application remained approximately the same, there was a significant reduction in the use of commercial fertilizer after the farms enrolled in the crop management service. Phosphorus (P) fertilizer use decreased by an average of 40 percent over the 3-year period compared to the 1990 baseline amount (Figure 1). On average, farmers applied somewhat more than recommended amounts of P in 1991, the first crop service year, but applied less than or equal to recommended amounts the following two years (Figure 2). They applied somewhat more phosphorus than recommended on corn but less on hay forages (data not shown). This indicates that farmers place greater value, and are more risk averse, with their corn crop than with their hay forage crop.

Nitrogen use varied from year to year with no overall net change (Figure 1). However, this variability reflected the annual changes in recommended amounts (Figure 2). In the case of corn, N recommendations were based on the Pre-Sidedress Nitrate Soil Test (PSNT), which accounts for changes in N availability among fields and years as affected by soil and weather conditions. Amounts of N applied averaged only slightly above the recommended amounts. Farmers also changed the timing of nitrogen application, applying less pre-plant and more as a sidedress, which should improve N utilization and decrease leaching potential.

Lower fertilizer application rates translated into economic savings as well. The farms in the study reduced total fertilizer expenditures by an average of \$2800 per farm, or \$27 per acre, while maintaining crop yields. Following consultant recommendations fully could have reduced costs an additional \$6 per acre. Overall, the changes in farmers' nutrient application practices reflect a confidence in recommendations made by the crop consultant and support for continuation of a crop management service program, although it is important to note that it took about three years for that confidence to be established. This success can be expected to contribute to both environmental and economic goals of the HUA project.

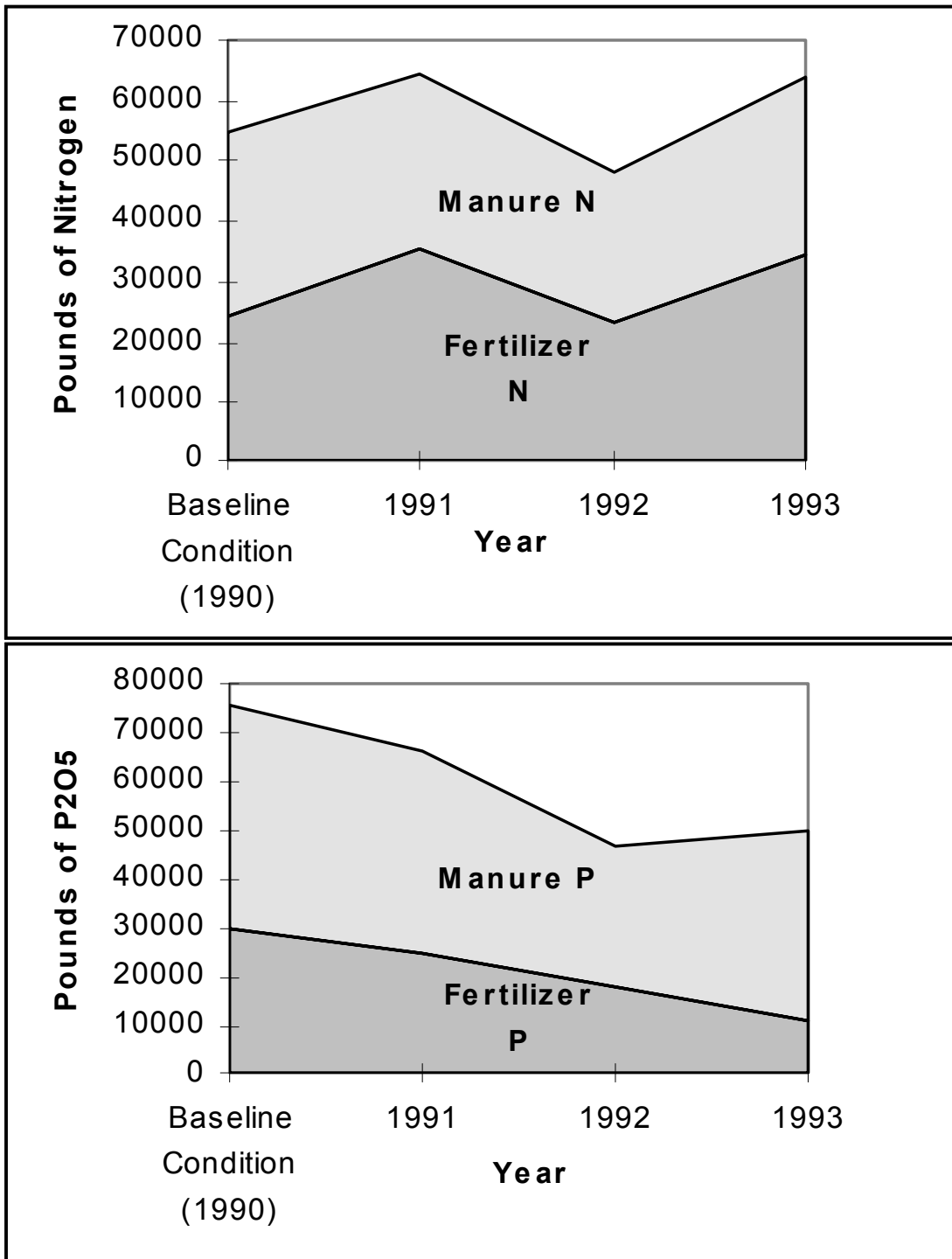


Figure 1. Total amounts of manure and fertilizer nitrogen (top) and phosphorus (bottom) applied on seven dairy farms. 1990-1993.

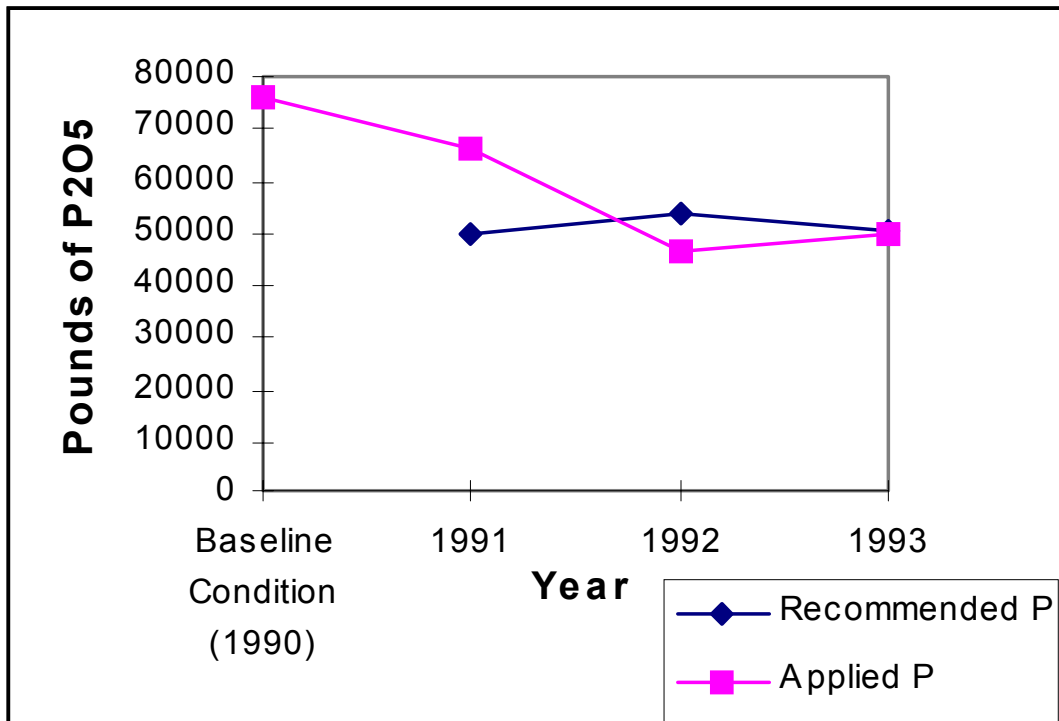
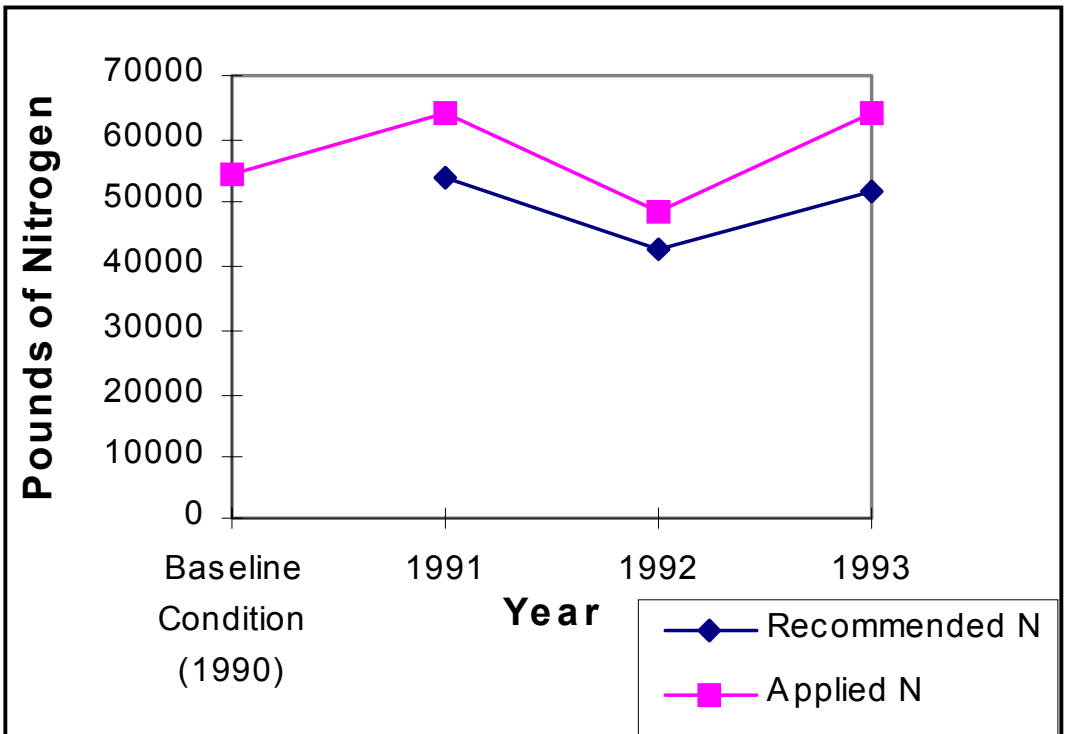


Figure 2. Total amounts of nitrogen (top) and phosphorus (bottom) recommended and applied on seven dairy farms. 1990-1993.

Project Cooperators:

The Lower Missisquoi Water Quality Project is a cooperative effort among, the following participants:

- Missisquoi Watershed Project Area Farmers
- UVM Extension System
- USDA Farm Services Agency
- USDA Natural Resource Conservation Service
- Vermont Department of Agriculture, Food and Markets
- Franklin County Natural Resource Conservation District

For More Information:

This factsheet is one in a series on the Lower Missisquoi Water Quality Project. To obtain other factsheets or for more information on the project, contact:

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