

## Phosphorus Index in the Real World: Summary of Three Farms in the Vermont Dairy Farm Sustainability Project

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The Phosphorus Index is a tool developed to assess the potential for phosphorus runoff from individual fields based on soil and field characteristics and on management practices. The P Index is much more comprehensive than relying only on a soil test value because it considers the likelihood that phosphorus present on the field will actually leave a field and potentially reach a surface water body. The P Index provides a relative rating of the risk of P runoff from individual fields, which can be used to prioritize fields for nutrient and soil management practices, in particular application and management of manure.

The P Index considers a number of factors that affect the availability of a P source and the transport of the phosphorus within and off the field. These include application rate of manure and fertilizer P, season of application, type and timing of manure incorporation, annual erosion rate (as estimated by RUSLE), runoff estimate, and the distance and nature of the field-stream area.

The P Index was determined for 90 fields on three farms in the project. Data to calculate the P Index was collected from a number of sources: soil test results from sampling done by project personnel, management information from cooperating farmers, soil data from NRCS soil surveys, and data such as slope and slope length for individual fields measured in the field by a project intern (Figure 1). Initial P Index calculations were done using an earlier version of the Vermont P Index. What is reported here is from an improved version (Ver 5, 10/04) that was a result of a major revision carried out with support of the Vermont P Index Working Group. A working version of the P Index, including interpretation and background information, is available on the Web at <http://pss.uvm.edu/vtcrops/?Page=nutrientmanure.html#Phosphorus>



Figure 1. Project intern measuring slope in the field.

Phosphorus Index results for the three farms are shown in Figure 2. There was a wide range of P Index ratings on all three farms, a result of inherent soil differences such as erosion and runoff potential and varied crop and nutrient management. A large majority of fields rated either Low (0-30, 36%) or Medium (30-60, 43%), indicating that manure can be applied on a nitrogen basis. Nineteen percent were rated high (60-100), which requires that manure and fertilizer rate not exceed the crop P removal rate. Only two fields were rated Very High (>100), which means that no manure or fertilizer P is to be applied. The field with the highest PI was a corn silage field with very high annual erosion (>10 tons/acre) and a high rate of non-incorporated manure. If management changes are made to reduce erosion to five tons per acre and manure is either incorporated in 2 to 4 days or reduced in rate, the P Index drops into the high category, which allows P application up to the P crop removal rate.

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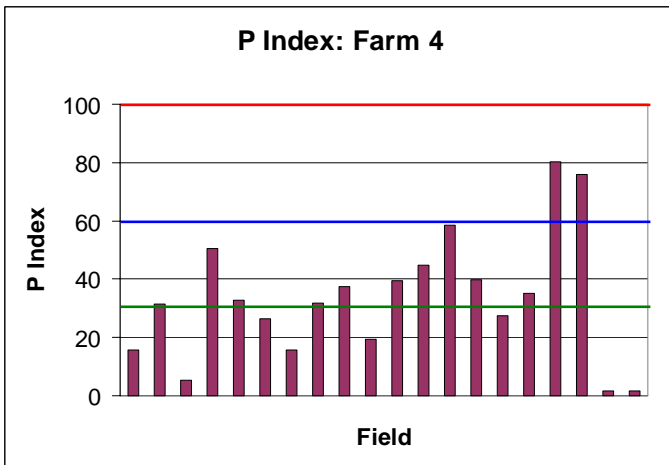
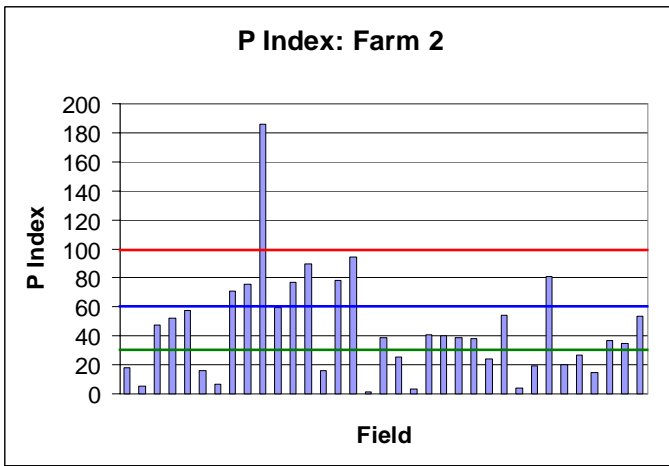
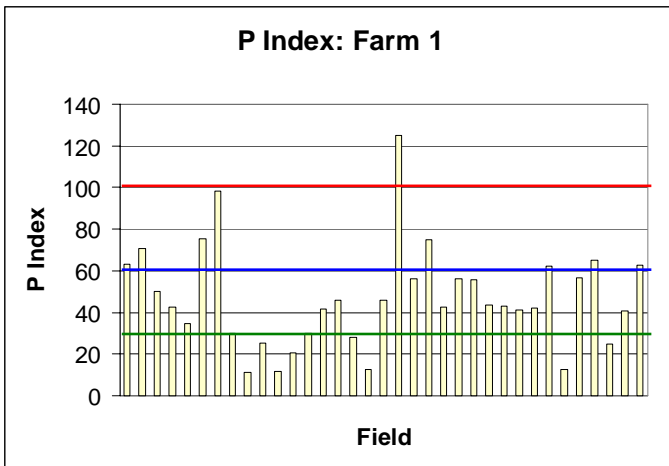


Figure 2 Phosphorus Index results from 90 fields on three VDFSP farms.