

1 INTRODUCTION

The Nutrient Management Plan (NMP) in British Columbia has been developed as a subcomponent of the Environmental Farm Plan (EFP) process. This publication is part of the Environmental Farm Planning family of documents.

It is recommended that farmers first do an Environmental Farm Plan and then do a Nutrient Management Plan if directed to do so by the Environmental Farm Plan process.

Developing a Nutrient Management Plan is intended to help farmers optimize their nutrient usage, while protecting valuable soil, water, and air resources. In addition to the economic and environmental benefits, nutrient management planning is a valuable educational process that helps to ensure a farmer is in compliance with all relevant legislation.

This publication is intended for Planning Advisors and agricultural producers in British Columbia who want to do a Nutrient Management Plan.

OBJECTIVES OF NUTRIENT MANAGEMENT PLANNING

The core objectives of nutrient management planning are:

- to supply crops with nutrients at the appropriate rate, timing, and with the appropriate method to produce an economically optimal crop in terms of both yield and quality; and
- to minimize the risk of pollution by loss of nutrients via runoff, leaching, emissions to the air or other loss mechanisms

CRITERIA FOR DECIDING WHO WILL DO A NUTRIENT MANAGEMENT PLAN

Chapter 6 (Soil Amendments) of the **BC Environmental Farm Plan Reference Guide** deals most specifically with nutrient management issues and contains criteria for helping a farmer decide if a Nutrient Management Plan should be done on their farm. For producers in any of the following four situations, completing a Nutrient Management Plan is recommended:

1. Farms that may be out of Compliance with Nutrient Application Legislation. This applies to farms that answer “No” to any of the legislative questions on the Nutrient Application Worksheet in the EFP Workbook, and the proposed action is the development of a Nutrient Management Plan.

2. Livestock Producers and Producers of Intensively-Managed Outdoor Horticultural Crops Located over Moderately or Highly Vulnerable Aquifers that are Used for Drinking Water. Examples of such aquifers within the province include, but are not limited to, the Abbotsford-Sumas, Hopington, Grand Forks, Vedder River Fan aquifers and other aquifers referred to in Schedule 5 of the *Municipal Sewage Regulation*.

3. Significant Manure Nitrogen Generation or Use. Producers that generate or use manure should complete one of the following two assessments:

- **Screening Assessment 1 (EFP Workbook, Worksheet 4): A Manure Nitrogen Assessment for Farms that Generate Manure, or**
- **Screening Assessment 2 (EFP Workbook, Worksheet 5): A Manure Nitrogen Assessment for Farms that Use Manure as a Fertilizer (but do not generate the manure)**

The objective of the assessments is to determine if manure nitrogen utilization is above the values in Table 1.1 below. Farms that apply manure at rates below these values are considered to be at a low risk of causing pollution as long as the manure is being stored, handled and applied in compliance with the Code of Agricultural Practice for Waste Management.

Farms that apply manure at rates above these values may be managing their nutrients in full compliance with the *Code*, but the risk of over-applying nutrients and potentially causing pollution is higher. The actual risk would be specific to the farm being assessed, depending on a variety of factors including crops being grown, yield potential, topography, proximity to watercourses and climate. For farms that apply manure at rates above these values, a Nutrient Management Plan is recommended.

Table 1.1 Baseline Values Used for Assessing the Requirement for a Nutrient Management Plan	
Crop Type	Baseline Manure Nitrogen Application Rate (kg N/ha/yr)*
Non-forage (e.g., berries, tree fruits, vegetables)	50
Forage grass (Fraser Valley)	300
Forage grass (rest of BC)	200
Forage corn	150
<i>*Value based on Total Manure N</i>	

4. High Soil Phosphorus. This applies if a farm is located in a phosphorus sensitive area (areas where surface water eventually flows to a lake or pond) and soil test phosphorus levels exceed 80 ppm in the 0 - 15 cm depth (by the Kelowna soil test method, for mineral soils). Phosphorus sensitive areas include, but are not limited to, the Okanagan Basin, Christina Lake Basin, Thompson River at Kamloops and other sensitive surface waters as defined by Schedule 5 of the *Municipal Sewage Regulation*.

In addition, livestock farms that have high soil potassium levels (above 300 ppm, Kelowna soil test method) or high forage potassium levels (above 3% on a dry matter basis) should consider developing a Nutrient Management Plan to minimize the impacts of potassium in their production system.

CONTENTS OF THIS PUBLICATION

This section summarizes the contents of each of the chapters in the publication.

Data Collection	Chapter 2 outlines the information that needs to be collected to develop a Nutrient Management Plan. In many cases, this information will be collected during the site visit that is done while developing an Environmental Farm Plan. In other cases a follow-up visit or phone call may be required. The data that is collected will later be used in the NMP software to assess current practices and make recommendations for future improvements.
Nutrient Optimization	Chapter 3 describes the steps to determine a strategy for how nutrients will be balanced. These steps involve determining a priority nutrient for each field or section of a farm that is to be managed separately and then applying concepts of agronomic and crop removal balances to meet production and environmental protection goals.
NMP Calculators	Chapter 4 serves as a user guide for the three NMP Calculator spreadsheet programs (Forage, Field Vegetables, and Berry). It outlines the steps used to make all the calculations necessary to determine appropriate rates and timing of nutrient applications for all the fields on a farm. There is information to support decisions to be made in the NMP Calculators and explanations of the results.
Assembling the Nutrient Management Plan	Chapter 5 provides suggestions on how to assemble the Nutrient Management Plan once all the calculations have been completed. This includes a suggested format for organizing the information and printouts into a binder.
Record-Keeping and Monitoring	Chapter 6 provides suggestions on how to set up a record-keeping and monitoring system. Record-keeping enables a producer to track actual nutrient management practices and increase production efficiencies over time. Monitoring allows a producer to evaluate the performance of the plan during and after the growing season during which the plan is made.
Nutrient Management Factsheet Series	Throughout the nutrient management planning process, there are references to recommended technical procedures that need to be done correctly to ensure the plan is as reliable as possible. These procedures, such as collecting representative soil samples and manure samples, are described in detail as stand-alone Nutrient Management Factsheets at the end of this publication.

LIMITATIONS OF THIS PUBLICATION

The general principles of nutrient management discussed in this publication can apply to all forms of agriculture where crop nutrients are applied to land. In British Columbia, the planning tools for nutrient management have been developed primarily for areas with intensive livestock production and areas of greater environmental concern. For example, raspberries and blueberries are grown on soils overlying the vulnerable Abbotsford Aquifer, which is also an area of intensive poultry production. Thus, greater effort has been dedicated to developing nutrient management planning tools for berry production since the first generation of nutrient management planning in the Canada – BC EFP program. Conversely, tree fruits in the Okanagan have not received the same attention to date partly because a soil nutrient survey in 2007 suggested post-harvest nutrient levels were lower in these crops.

As the science of nutrient management advances, further improvements will be made to the nutrient management planning process and additional cropping systems will be added to the suite included in this publication.



USE OF THIS PUBLICATION

Conventions and Acronyms

Measurements

- ac – acre
- ha – hectare
- imp. gallon – imperial gallon
- ppm – parts per million
- t – tonnes

Commonly used styles in this publication include the following:

- *Italics* – identifies a piece of legislation
- **Bold** – emphasizes particularly important information
-  – indicates a reference publication
-  – indicates an interactive web site

Measurement Units

The nutrient management planning program was originally developed using the metric system and in some instances still use only metric units. Tables and examples for conversion to imperial units are provided, and at the time of printing, an imperial version of the ‘Forage NMP Calculator’ is available.