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Standard Guide for Monitoring Aqueous Nutrients in Watersheds¹

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INTRODUCTION

Various forms of nitrogen and phosphorus are plant nutrients, both naturally occurring and manmade, that can threaten water resources. Nutrients that run off or infiltrate through the soil profile can result in unfishable and unswimmable streams, lakes, and estuaries, and unsafe surface and ground water used for drinking. High concentrations of nitrate in drinking water are a threat to young infants, and surface waters can suffer from algal blooms, fish kills, and unpalatable and unsafe water for swimming and drinking. Nutrients are also added to watersheds by means of chemigation.

This guide recommends a process for developing and implementing monitoring projects for nutrients in a watershed. It follows Guide **D5851** with more specifics applicable to watersheds and nutrients. These guidelines are presented for use in the nationwide strategy for monitoring developed by the Intergovernmental Task Force on Monitoring (ITFM). The nationwide monitoring strategy is an effort to improve the technical aspects of water monitoring to support sound water quality decision-making. It is needed to integrate monitoring activities more effectively and economically to achieve a better return of investments in monitoring projects **(1)**.²

Guide **D6145** is offered as a guide for monitoring actual and potential nonpoint and point source pollution within a watershed. The guide is applicable to surface water and ground water resources, recognizing the need for a comprehensive understanding of naturally occurring and manmade impacts to the entire watershed hydrologic system.

1. Scope

1.1 *Purpose*—This guide is intended to provide general guidance on a watershed monitoring program directed toward the plant nutrients nitrogen and phosphorus. The guide offers a series of general steps without setting forth a specific course of action. It gives assistance for developing a monitoring program but not a program for implementing measures to improve water quality.

1.2 This guide applies to waters found in streams and rivers; lakes, ponds, and reservoirs; estuaries; wetlands; the atmosphere; and the vadose and subsurface saturated zones (including aquifers). This guide does not apply to nutrients found in soils, plants, or animals.

1.3 Nutrients as used in this guide are intended to include nitrogen and phosphorus in dissolved, gaseous, and particulate

forms. Specific species of nitrogen include: nitrate, nitrite, ammonia, organic, total Kjeldahl, and nitrous oxide. The species of phosphorus include total, total dissolved, organic, acid-hydrolyzable, and reactive phosphorus as described in Ref **(2)**.

1.4 *Safety*—Health and safety practices developed for a project may need to consider the following:

1.4.1 During the construction of sampling stations:

1.4.1.1 Drilling practices during monitoring well installations,

1.4.1.2 Overhead and underground utilities during monitoring well drilling,

1.4.1.3 Traffic patterns/concerns during sampling station installation,

1.4.1.4 Traffic patterns/concerns during surveying sampling station locations and elevations,

1.4.1.5 Drilling through materials highly contaminated with fertilizers, and

1.4.1.6 Installing monitoring equipment below the soil surface.

1.4.2 During the collection of water samples:

1.4.2.1 Using acids for sample preservation,

1.4.2.2 Sampling during flooding events and ice conditions,

1.4.2.3 Traffic on bridges,

¹ This guide is under the jurisdiction of ASTM Committee **D19** on Water and is the direct responsibility of Subcommittee **D19.02** on Quality Systems, Specification, and Statistics.

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² The boldface numbers given in parentheses refer to a list of references at the end of this standard.