Idaho Code Section 22-101A Statement: Section 22-101A, Idaho Code, provides that ISDA must meet certain requirements when it formulates and recommends rules which are broader in scope or more stringent than federal law regulations. The Rules Governing Nutrient Management are broader in scope and more stringent than federal law in the following manner: 1) This rule requires all Grade A dairies in Idaho submit an environmental/nutrient management plan (E/NMP) for ISDA approval, regardless of size. 2) This rule requires all beef cattle animal feeding operations (CAFOs) of a certain size in Idaho submit an environmental/nutrient management plan (E/NMP) for ISDA approval. 3) This rule requires all poultry operations of a certain size in Idaho submit an environmental/nutrient management plan (E/NMP) for ISDA approval. 4) This rule requires all E/NMPs be written by a certified NMP planner. The NPDES rule (federal law) does not require any dairy, beef CAFO or poultry operations to submit an E/NMP unless the facility has been designated to require one. Federal law also does not have certification/training requirements for E/NMP planners. Therefore, this rule does represent a standard that is broader in scope and more stringent than federal law.

Section 22-101A, Idaho Code, also applies to a rule which "proposes to regulate an activity not regulated by the federal government." This rule may be used to regulate an activity not regulated by the federal government. The following is a summary of additional information required by Sections 22-101A (3) and (4), Idaho Code. Information relating to Section 22-101A (2) has also been provided. The requirements set forth in this rule are based upon best available peer reviewed science and studies and analyses conducted by other states, the U.S. Environmental Protection Agency (EPA), USDA Agriculture Research Service (ARS), and professional and scientific and medical journals. The referenced studies and analyses will be included in the rulemaking record and can be reviewed during the public comment period for further detailed information regarding health effects.

Section 22-101A(2)(a), Idaho Code. To the degree that a department action is based on science the department shall utilize the best available peer reviewed science and supporting studies conducted in accordance with sound objective scientific practices.

Nutrient Management is the science and practice of achieving optimal nutrient use efficiency, crop yields and economic benefits by properly managing farm produced crop nutrients while reducing off-site transport of nutrients that may impact the environment. Among several farm produce nutrients, soil phosphorus (P) losses to surface waters are a serious concern in some regions, as elevated P concentrations can cause water quality problems in P-sensitive water bodies. "Non-point" or "diffuse" sources of P, such as agricultural fields that can transport both sediment and soluble P via irrigation/precipitation/snow melt runoff, can be difficult to identify, as their contribution to P loading of surface waters can vary greatly with time and space. The requirements set forth in this rule, designed to protect surface waters by regulating phosphorus storage and land application from Grade A dairies, beef CAFOs and poultry CAFOs are based upon the best available peer reviewed science and studies and analyses conducted by other states, the USDA-Natural Resources Conservation Service (NRCS), USDA Agriculture Research Service, and professional and scientific journals. Several tools (i.e., Agricultural Policy Environmental eXtender; APEX (Ramierez-Avila et al., 2017, Bhandari et al., 2017), Soil and Water Assessment Tool; SWAT, (Chaubey et al., 2006) including Phosphorus Site Index (PSI) (Weld et al., 2002; Moncrief and Drewitz , 2006) have been developed and used for P management and planning. The referenced studies and analyses will be included in the rulemaking record and can be reviewed during the public comment period for further detailed information regarding the impact of the nutrient management practices of these facilities to surface waters of the state.

Section 22-101A(2)(b), Idaho Code. To the degree that a department action is based on science the department shall utilize data collected by accepted methods or best available methods if the reliability of the method and the nature of the decision justifies use of the data.

A controlled experiment was conducted by ISDA as part of this rulemaking process to evaluate the accuracy and consistency of all the laboratories in Idaho that offer soil nutrient analysis services. The purpose of the experiment was to determine if a "margin of error" for soil testing could be calculated based upon the variability of the test results received from each laboratory. The results of the experiment identified a variability of up to 62% in nutrient test results from different laboratories that evaluated the same soil sample. The experiment also revealed soil collected by different samplers from the same fields and analyzed by the same laboratory could vary up to 46%. Similar study conducted by Murdock et al., (1993) at Lexington Kentucky reported about 80% of sampling variability in P concentrations, however variation in the laboratory was very small. In addition to this data, in the rule itself, the "P site index" establishes data/evaluation criteria for each field in a dairy producer's nutrient management plan. These data points identify each variable that determines the level of risk each field represents when phosphorus is applied to the soil. The two primary variables are "P source" and "P transport". The P transport factors includes soil erodibility, soil surface runoff index and saturated hydraulic conductivity, which will be obtained from NRCS-USDA web soil survey. Other sub-categories of each variable are established in published literature by the scientific community and from multiple states and that have adopted a similar method of regulating phosphorus application on crop fields. Beef and Poultry CAFOs do not offer a "P site index" option to manage nutrients on their facilities. ISDA also relied upon additional information available to the public from peer-reviewed scientific journals in this analysis.

Section 22-101A(3)(a), Idaho Code. Identification of each population or receptor addressed by an estimate of public health effects or environmental effects.

Soil P is an essential macronutrient for plant growth. However, immobilization of soil P in inorganic and organic forms unavailable for crop uptake necessitates P amendments as fertilizer or animal manure to achieve desired crop yield goals. Although P is not directly toxic, the continued application of P to agricultural land and its subsequent movement to surface waters in runoff can accelerate eutrophication. Undesirable aquatic plant growth results from additions of phosphorus, increases the demand for oxygen by microorganisms and depletes the level of oxygen in the water. This can impair water use for industry, recreation, drinking, and fisheries. Although nitrogen (N) and carbon (C) are also associated with accelerated eutrophication, most attention has focused on P, due to the difficulty in controlling the exchange of N and C between the atmosphere and a water body, and fixation of atmospheric N by some blue-green algae. Thus, P is often the limiting element and its control is of prime importance in reducing the accelerated eutrophication of surface waters.

In areas of intensive crop and livestock production, continual P applications as mineral fertilizer and manure have been made at levels exceeding crop uptake (Sharpley, 1995). As a result, surface soil accumulations of P have occurred to such an extent that the loss of P in surface runoff has become a priority management concern. Up to 80% of P applied to soil can react with Al, Fe, and Ca to form complexes that are unavailable for plant uptake. This P can, however, be transported from the site of application by runoff and erosion. Unless added P is incorporated into the soil, it usually accumulates in the surface 10 cm of soil, increasing the potential for its transport in runoff.

Limited success has been achieved in minimizing nonpoint agricultural inputs. This is exacerbated where P input in manure from confined animal operations often exceeds local crop removal rates. The subsequent accumulation of P in soil is of environmental rather than agronomic concern in many cases. As many years are required to bring about a significant reduction in soil P levels by crop removal, once eutrophication of a body of water is accelerated, it is usually not cost effective to treat the water body, in addition the internal recycling of sedimentary P can support the growth of aquatic biota even if external inputs are discontinued.

Most of Idaho's drinking water comes from ground water sources. However, approximately 5% of public water systems in Idaho draw from surface water that may be at risk for harmful algal blooms (HABs). Blue-green algae are naturally occurring bacteria that photosynthesize like algae and plants. Under certain conditions, however, the blue-green algae can grow rapidly and produce toxins called cyanotoxins that pose a risk to human health as well as wildlife and domestic animals (Idaho DEQ).

Section 22-101A(3)(b) and (c), Idaho Code. Identification of the expected risk or central estimate of risk for the specific population or receptor and identification of each appropriate upper bound or lower bound estimate of risk.

Eutrophication on the environment may have deleterious consequences for the health of exposed animal and human populations, through various pathways. Specific health risks appear when fresh water, extracted from eutrophic areas, is used for the production of drinking water. However cyanotoxins are not currently regulated for public water systems. Cyanotoxins have been reported in Idaho's surface waters and in July 2018, one public drinking water system was impacted by a harmful algal bloom; however, cyanotoxin levels in the treated (finished) water were below health advisory levels. Unregulated private drinking water sources that receive drinking water from surface water sources are also at risk from cyanotoxins. In Idaho, approximately 400,000 people are not served by regulated public water systems, but rely on private domestic wells to withdraw ground water for drinking water. The potential or absolute risk of this possibility is not quantified. Harmful algal blooms have been reported in Idaho during the summer months for the past several years. (Idaho DEQ)

Section 22-101A(3)(d), Idaho Code. Identification of each significant uncertainty identified in the process of the assessment of public health effects or environmental effects and any studies that would assist in resolving the uncertainty.

Modern nutrient management planning seeks to identify critical source areas of phosphorus (P) loss—fields within watersheds that are disproportionately responsible for P export from the watershed, but as previously mentioned, diffuse sources of pollution are complicated to identify, let alone quantify. The tools currently available to Idaho dairy producers for management and planning of phosphorus application are phosphorus threshold (PT) and phosphorus site indexing (PSI). Beef and Poultry CAFOs only may utilize the PT method for nutrient management. The PT method uses a soil test to quantify phosphorus available for crop uptake, however soil testing alone cannot predict environmental losses, as many other factors (i.e. rainfall, erosion, drainage, etc.) will influence the concentration of P in runoff and leaching waters (SERA 17, 2005). The P Index is founded on a well-documented framework of "source" and "transport" factors and represents the "state of the science" of available tools to rank fields based on their relative risk of P loss. Many states including Oregon, Washington, Iowa, Minnesota, Pennsylvania and Arkansas have developed P-Indices by modifying the basic components to make it suitable for local conditions. Such widespread adoption of the indexing concept shows the consensus among scientists, the fertilizer industry and policymakers with regards to the validity of the P-Index approach. P-Indices are preferable to soil test P threshold values or any other current risk assessment techniques, in situations where P loss assessment must be carried out by a variety of personnel and stakeholders (SERA 17, 2005). As P-Indices require field input information such as soil erodibility, soil surface runoff, nearby surface water resources, and irrigation practices. A site visit is needed for the first year of an assessment of the P-Index. Therefore, P-Indices are more costly to initially determine and implement than a soil test P threshold. For most animal feeding operations land application of manure is the only economic path for use and in some situations P-Indices will serve to move manure applications away from sites with a high risk for P loss to those with a lover risk, or to change management to reduce risk of P loss (SERA 17, 2005).

Despite widespread implementation of the P Index, P continues to be a major contributor to the impairment of a large proportion of surface waters in the United States (Sharpley, 2017). Harmful algal blooms have been linked to excess P in Western Lake Erie and Florida, as well as to hypoxia in the Northern Gulf of Mexico (Sharpley, 2017). These concerns, along with an inability to meet eutrophication mitigation goals in areas where the P Index has been implemented, such as in the Chesapeake Bay Watershed (Chesapeake Bay Program, 2013; USEPA, 2010), have heightened attention on the need to improve P management strategies. The differences in regional and statewide nutrient and land management priorities, landscape properties, climatic regimes, and dominant hydrologic process, however, are widely variable and preclude developing a single, national P Index. Thus, the development of the Idaho Phosphorus Site Index protocol was an appropriate action.

Efforts to minimize P transport from terrestrial to aquatic environments and to slow down freshwater eutrophication must identify critical source areas of P in a watershed that present a greater risk to P-sensitive waterbodies, in order to target cost-effective remedial strategies. In areas of confined animal operations, the development and adoption of innovative measures to transport manure greater distances and to find alternative end-uses must be encouraged. Finally, perhaps most crucial to any strategy for water quality improvement is efficient transfer of research technology to the land user. Effective implementation will involve education programs to overcome the perception by end-users of water, that it is often much cheaper to treat the symptoms of eutrophication rather than control the nonpoint sources.

ISDA acknowledges that the accuracy and consistency of soil phosphorus sampling and testing is an additional unknown. A review of published data and scientific literature did not reveal any peer reviewed studies that address or offer conclusions on the variability of soil phosphorus sampling or testing.

Section 22-101A(3)(e), Idaho Code. Identification of studies known to the director that support, are directly relevant to, or fail to support any estimate of public health effects or environmental effects and the methodology used to reconcile inconsistencies in the data.

The referenced studies and analyses will be included in the rulemaking record and can be reviewed during the public comment period for further detailed information regarding health effects.

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