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# **DRAFT 4R Nutrient Stewardship Certification Standard**

*Requirements for Nutrient Service Providers*

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7

*Version 1.0*

8

March 8, 2013

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11 **Table of Contents**

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12

13 Introduction ..... 2

14     A    Background ..... 2

15     B    Scope ..... 2

16     C    Goals ..... 3

17     D    Structure and Implementation ..... 3

18     E    Contact ..... 4

19 Terms and Definitions ..... 5

20 References ..... 7

21 Standard ..... 8

22     1    Education and Training ..... 8

23     2    Record Keeping ..... 8

24     3    Nutrient Recommendations ..... 10

25     4    Nutrient Application ..... 12

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## 28 Introduction

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### 29 **A Background**

30 The 4R Certification Standard was created under the auspices of the 4R Advisory Committee, members  
31 of which are based in the tri-state region of Indiana, Michigan, and Ohio. The 4R Advisory Committee  
32 members (listed in *Appendix A*) represent a diversity of stakeholders from the business, government,  
33 university, and non-governmental sectors with the common goal of maintaining agricultural productivity  
34 while also improving the water quality of Lake Erie and its tributaries.

35  
36 The 4Rs of nutrient stewardship refer to using the Right Source of nutrients at the Right Rate and Right  
37 Time in the Right Place (TFI, 2013). 4R nutrient stewardship provides a science-based framework for  
38 plant nutrition management while also considering site-specific needs of a particular farm (IPNI, 2012).

39  
40 In creating a 4R Certification Program, the 4R Advisory Committee has sought to provide guidance and  
41 direction for a consistent, recognized program for agricultural retailers, agricultural service providers,  
42 and certified professionals to help ensure that 4R nutrient management goals are adopted and that in  
43 turn lead to long term positive impacts on water quality in the Western Lake Erie Basin. While this  
44 Standard does not apply to individual growers, on-farm adoption of the recommendations made by  
45 Nutrient Service Providers that become certified under this standard is critical to meeting the goal of  
46 improved water quality.

47  
48 In addition to general principles of 4R nutrient stewardship (IPNI, 2012), the Standard has incorporated  
49 additional criteria, such as that nutrient recommendations are consistent with the Tri-State Fertilizer  
50 Recommendations (Vitosh et al., 2012), nutrients are not applied to frozen ground, and current,  
51 representative soil tests are used prior to nutrient application. The Standard also follows guidelines put  
52 forth in the Conservation Practice Standard for Nutrient Management, National 590 Standard (NRCS,  
53 2012), where appropriate.

54  
55 This Standard is intended to encourage the adoption of 4R nutrient stewardship by specifying best  
56 practices for nutrient recommendations and nutrient application. The Standard also includes an  
57 education component to ensure that new practices related to nutrient stewardship are adopted by the  
58 Nutrient Service Providers and shared with their growers/customers.

59  
60 The 4R Advisory Committee members will continue to support research to help identify the most  
61 effective conservation and nutrient management practices, and anticipate that revisions to the Standard  
62 may be necessary on a regular basis to take advantage of the most current research available.

### 63 **B Scope**

64 The 4R Nutrient Stewardship Program, of which this Standard is a central component, is designed to  
65 recognize Nutrient Service Providers who have adopted the principles and practices of 4R Nutrient  
66 Stewardship (IPNI, 2012). This Standard translates 4R Nutrient Stewardship into a set of auditable  
67 criteria.

68

69 The Standard is voluntary, and applies to Nutrient Service Providers working in the Western Lake Erie  
70 Basin, including agricultural retailers, agricultural service provides, and certified professionals. Growers  
71 and customers of the Nutrient Service Providers are **not** included under the scope of the Standard.  
72

73 Further information about the scope and certification procedure are provided in the companion  
74 documents to the Standard, which include the *Auditor Manual for 4R Nutrient Stewardship Certification*  
75 (for auditors) and the *Applicant Manual for 4R Nutrient Stewardship Certification* (for Nutrient Service  
76 Providers who wish to be certified under the program). **[NOTE: These documents are currently in**  
77 **development.]**

## 78 **C Goals**

79 The 4R Nutrient Stewardship Certification Standard was drafted as part of an initiative to improve the  
80 watershed conditions of the Western Lake Erie Basin, lying within portions of Indiana, Michigan, and  
81 Ohio, with the long-term goal of developing and implementing 4R certification in other agricultural areas  
82 in the United States. The Standard was created to address the following goals:  
83

- 84 • minimize nutrient losses and maximize crop uptake of nutrients
- 85 • create long-term positive impacts on watersheds associated with agricultural production areas,  
86 including the reduction of eutrophication and incidence of harmful algal blooms
- 87 • encourage sharing of the most up-to-date information about responsible nutrient stewardship  
88 with Nutrient Service Providers and growers
- 89 • help the agricultural sector adapt to new research and technology in the area of nutrient  
90 stewardship

## 91 **D Structure and Implementation**

92 The Standard is divided into four main Sections:  
93

- 94 1. Education and Training
- 95 2. Record Keeping
- 96 3. Nutrient Recommendations
- 97 4. Nutrient Application  
98

99 Sections 1 and 2 apply to all types of Nutrient Service Provider pursuing certification in the program.  
100 Section 3 additionally applies to Nutrient Service Providers that make recommendations for nutrient use,  
101 and Section 4 additionally applies to Nutrient Service Providers that carry out nutrient application.  
102

103 Within each Section, requirements are subdivided into groups based on related subject matter. Each  
104 group consists of auditable evaluation criteria, which form the basis of the Standard. There are a total  
105 of 60 auditable evaluation criteria. Of that total: 5 address Education and Training, 15 address Record  
106 Keeping, 24 address Nutrient Recommendations, and 16 address Nutrient Application.  
107

108 In most cases, a Nutrient Service Provider will offer nutrient recommendations or nutrient application  
109 services to multiple farms. Unless otherwise specified, 100% of growers/customers of the Nutrient  
110 Service Provider must meet the requirements specified by the auditable evaluation criteria during every  
111 audit year in order to achieve conformance with the Standard. Other auditable evaluation criteria have  
112 specific % acreage requirements, or are designated as Year 2 or Year 3 requirements. Year 2 or Year 3

113 auditable evaluation criteria become mandatory on the year specified and for all subsequent years  
114 thereafter. Currently there are 13 auditable evaluation criteria listed as Year 2 requirements, and 2  
115 auditable evaluation criteria listed as Year 3 requirements.

116  
117 Using the Standard as the normative reference, audits will be conducted by third-party auditors to  
118 determine whether a specified agricultural retailer, agricultural service provider, or crop adviser has met  
119 the requirements of the Standard. The degree of conformance to the Standard will be assessed by the  
120 auditor who will evaluate each auditable evaluation criterion as: Comply, Not Comply, or Not Applicable.

121  
122 The certification program will be on a three year audit cycle. For a Nutrient Service Provider new to the  
123 program, an onsite desk audit will be conducted on the first and second years of the audit cycle. If the  
124 Nutrient Service Provider performs well during the second year of the audit cycle, it may be possible to  
125 submit a progress report in lieu of an onsite desk audit at the time of the third year of the audit cycle.  
126 For subsequent audit years, an onsite desk audit will be required for the first year and depending on the  
127 performance of the Nutrient Service Provider, a progress report may be submitted in lieu of an onsite  
128 audit for the second and third years of the audit cycle. **[NOTE: The specific requirements for “good  
129 performance” to justify the progress report are in development.]**

130  
131 Further information about the audit and certification process is presented in the *Auditor Manual for 4R*  
132 *Nutrient Stewardship Certification* (for auditors) and the *Applicant Manual for 4R Nutrient Stewardship*  
133 *Certification* (for program participants). **[NOTE: These documents are currently in development, as is  
134 the audit protocol as described in the preceding paragraphs.]**

## 135 **E Contact**

136 Questions about the 4R Nutrient Stewardship Certification Program or this document should be directed  
137 to The Nature Conservancy (TNC) – Western Lake Erie Basin Office in Angola, Indiana at +1.260.665.9141  
138 or [csanders@tnc.org](mailto:csanders@tnc.org).

## 139 Terms and Definitions

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140

141 **4R:** An approach for best nutrient management practices developed by the International Plant Nutrition  
142 Institute. “4R” refers to the “Right source of nutrient, applied at the Right rate in the Right place, at the  
143 Right time.” The philosophy of the 4R approach is to base nutrient recommendations and application on  
144 scientific principles while at the same time ensuring that recommendations and application are sensitive  
145 to site-specific considerations.

146

147 **Agricultural Retailer:** An entity that sells agricultural services or inputs.

148

149 **Agricultural Service Provider:** An entity that provides agronomic services related to agricultural  
150 production.

151

152 **Auditable Evaluation Criteria:** Normative statements that are used by auditors to evaluate compliance  
153 to a standard.

154

155 **Certification:** The process by which an accredited or authorized person or organization (often a third  
156 party) will follow established procedures to assess the conformity against an applicable performance  
157 standard. When the assessment confirms adequate conformity to the standard, the accredited or  
158 authorized person or organization will attest in writing that a product, process or service conforms to  
159 specified requirements.

160

161 **Certified Professional:** An individual that has the designation of at least one of the following: Certified  
162 Crop Advisor (CCA), Comprehensive Nutrient Management Plan (CNMP) Specialist, Certified Professional  
163 Agronomist (CPAg) or other relevant accreditation from the American Society of Agronomy or National  
164 Alliance of Independent Crop Consultants.

165

166 **Crop Adviser:** An individual who provides advice to growers about crop management and inputs.

167

168 **Desk Audit:** Assessing conformance to a standard through review of documents and records without  
169 direct field observations.

170

171 **Eutrophication:** The enrichment of surface waters with nutrients, usually associated with human-  
172 related sources (e.g., agricultural nutrients, sewage), which may cause changes in water quality and  
173 conditions in streams and lakes (e.g., algal blooms).

174

175 **Field Audit:** The process of assessing conformance to a standard through an onsite visit to the office or  
176 place of agricultural production of the auditee. A field audit typically entails review of documentation,  
177 interviews, and field observations.

178

179 **Frozen Ground:** For the purposes of this Standard, frozen ground is when soil conditions are such that  
180 tillage, or nutrient incorporation and/or injection after application are not possible.

181

182 **Grower/Customer:** Individual growers or farmers who are clients of the Nutrient Service Provider and  
183 receive either a nutrient recommendation from the Nutrient Service Provider, or have nutrients applied  
184 by the Nutrient Service Provider.

185  
186 **Maintenance Limit:** Threshold of soil test level which indicates that soil nutrient levels are sufficient for  
187 crop requirements. Soil test levels above the maintenance limit usually indicate that no additional  
188 nutrients are required. For the purposes of this Standard, maintenance limits for phosphorus are  
189 specified in the Tri-State Fertilizer Recommendations (Vitosh et al., 2012).  
190  
191 **Nutrient Stewardship:** Implementation of best nutrient management practices that optimize nutrient  
192 use.  
193  
194 **Nutrient Service Provider:** General term that refers to entities covered under the scope of the 4R  
195 Nutrient Stewardship Standard, including agricultural retailers, agricultural service providers, and  
196 certified professionals.  
197  
198 **Progress Report:** The report that is required from the Nutrient Service Provider in years during which  
199 there is no onsite audit.  
200  
201 **Setback:** The spatial zone established between the edge of a crop to an identifiable feature such as a  
202 water body for the purpose of protecting the feature from adverse impacts.  
203  
204 **Standard:** In general, the normative reference by which a decision to award certification is made. For  
205 the purposes of this document, when capitalized, “Standard” refers to the specific guidelines and  
206 references established in the 4R Nutrient Stewardship Program.  
207  
208 **Variable Rate Application (VRA):** Application of nutrient according to site-specific rate requirements, as  
209 opposed to uniformly throughout a field.

## 210 **References**

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### 211 **Certification Program References**

212

213 *Audit Checklist for 4R Nutrient Stewardship Certification.* [in development]

214

215 *Auditor Manual for 4R Nutrient Stewardship Certification.* [in development]

216

217 *Applicant Manual for 4R Nutrient Stewardship Certification.* [in development]

218

### 219 **Primary External References**

220

221 International Plant Nutrition Institute (IPNI). *4R Plant Nutrition: A Manual for Improving the*  
222 *Management of Plant Nutrition.* North American Version. Norcross, GA, 2012.

223

224 International Plant Nutrition Institute (IPNI). "4R Nutrient Stewardship Portal." <http://www.ipni.net/4R>  
225 Accessed February 2013.

226

227 Natural Resources Conservation Service (NRCS). *Conservation Practice Standard. Nutrient Management*  
228 *(Ac.) Code 590.* [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1046433.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046433.pdf) January  
229 2012.

230

231 Vitosh, ML, Johnson, JW, Mengel, DB, eds. *Tri-State Fertilizer Recommendations for Corn, Soybeans,*  
232 *Wheat and Alfalfa. Bulletin E-2567.* <http://ohioline.osu.edu/e2567/index.html> Accessed February 2013.

233

234 The Fertilizer Institute (TFI). "Nutrient Stewardship | The Right Time for Nutrient Stewardship Is Right  
235 Now." <http://www.nutrientstewardship.com> Accessed February 2013.



237 **1 Education and Training**

238 This Section of the Standard applies to all Nutrient Service Providers in the 4R Nutrient Stewardship  
239 Certification Program.

240  
241 **Overview:** Nutrient Service Providers and their growers/customers must be educated and trained on the  
242 principles of 4R Nutrient Stewardship. An ancillary goal of the requirement for education and training  
243 on 4R Nutrient Stewardship is to encourage adoption to new research and technologies for nutrient  
244 management.

245  
246 **1.1 Education and Training of Nutrient Service Providers, Sales, and Application Staff**

247  
248 1.1.1 Nutrient Service Providers, sales, and application staff have been trained within the  
249 prior 2 years on the practices and principles of 4R Nutrient Stewardship. *(YEAR 2 REQUIREMENT)*

250  
251 1.1.2 Nutrient Service Providers, sales, and application staff have been trained within the  
252 prior 2 years on soil sampling and testing techniques and can explain the soil test results. *(YEAR*  
253 *2 REQUIREMENT)*

254  
255 1.1.3 Certified professionals must have current certification in good standing and have been  
256 trained in writing nutrient management plans. *(YEAR 2 REQUIREMENT)*

257  
258 **1.2 Education and Training of Growers/Customers**

259  
260 1.2.1 Nutrient Service Provider has conveyed informational materials on 4R Nutrient  
261 Stewardship to growers/customers. *(YEAR 2 REQUIREMENT)*

262  
263 1.2.2 Nutrient Service Provider has sponsored or directly provided a training session on 4R  
264 Nutrient Stewardship for growers/customers. *(YEAR 2 REQUIREMENT)*

265  
266 **2 Record Keeping**

267 This Section of the Standard applies to all Nutrient Service Providers in the 4R Nutrient Stewardship  
268 Certification Program.

269  
270 **Overview:** Nutrient Service Providers must maintain adequate records on grower/customers including:  
271 nutrient recommendations, nutrient application, and education and training activities related to 4R  
272 Nutrient Stewardship. The implementation of 4R principles and practices are recorded and monitored.  
273 All relevant legal requirements related to nutrient management are maintained.

274  
275 **2.1 Farm Records**

276  
277 2.1.1 Nutrient Service Provider maintains records related to all growers/customers.

278

279 2.1.2 Records of individual farms include, at minimum: field maps, current soil test results,  
280 nutrient recommendations, crop yield goals used for making recommendations, and actual crop  
281 yields for previous year(s).

282  
283 2.1.3 The Nutrient Service Provider maintains a record of the nutrient application, including a  
284 field map, weather (temperature and precipitation) conditions at the time of application, soil  
285 temperature at the time of application, and weather forecast for the day after application.  
286 *Note: This criterion applies to all Nutrient Service Providers, even those that only provided the*  
287 *nutrient recommendation.*

288  
289 2.1.4 If nutrient recommendations have been made, the Nutrient Service Provider supplies a  
290 copy of soil test results, field maps, and nutrient recommendations to the grower/customer.

291  
292 2.1.5 If nutrients have been applied, the Nutrient Service Provider supplies a record of the  
293 nutrient application to the grower/customer. The record of nutrient application should include  
294 maps showing locations of application, if applicable and rates for the fields otherwise.

295  
296 2.1.6 Farm records are kept confidential by the Nutrient Service Provider but are made  
297 available to the auditor.

298  
299 2.1.7 Nutrient Service Provider maintains records of a written agreement signed by  
300 growers/customers that attests to their support of the implementation of 4R Nutrient  
301 Stewardship. *At least 80% of farm acres must meet Criterion 2.1.7. (YEAR 2 REQUIREMENT)*

## 302 303 **2.2 Maps**

304  
305 2.2.1 Field maps must include information about yield, surface water and inlets, and soil test  
306 results.

307  
308 2.2.2 Field maps related to nutrient application must include all details related to locations of  
309 nutrient application.

310  
311 2.2.3 Field maps are in a digital form such as Geographic Information Systems (GIS) shapefiles.  
312 *At least 25% of farm acres Nutrient Service Provider must meet Criterion 2.2.3. (YEAR 2*  
313 *REQUIREMENT)*

## 314 315 **2.3 Education and Training Records**

316  
317 2.3.1 Nutrient Service Provider maintains training records related to 4R Nutrient Stewardship  
318 for Nutrient Service Providers, sales, and application staff. *(YEAR 2 REQUIREMENT)*

319  
320 2.3.2 Nutrient Service Provider maintains training records related to 4R Nutrient Stewardship  
321 for growers/customers. *(YEAR 2 REQUIREMENT)*

## 322 323 **2.4 Monitoring of 4R Implementation**

324

325 2.4.1 Nutrient Service Provider records and monitors the implementation of the practices and  
326 principles of 4R Nutrient Stewardship to participating farms, including the following information,  
327 at minimum: number and acreage of farms following 4R principles, and number of  
328 growers/customers in the program.

329  
330 2.4.2 Records related to monitoring of 4R implementation must also include information  
331 about number and percentage of farm acres according to the watershed where the farms are  
332 located.

## 333 334 **2.5 Legal Requirements**

335  
336 2.5.1 Nutrient Service Provider keeps onsite copies (either electronic or hard-copy) of all  
337 relevant national, state, or local laws related to nutrient recommendations and application.  
338

## 339 **3 Nutrient Recommendations**

340 This Section of the Standard applies only to Nutrient Service Providers who provide nutrient  
341 recommendations.

342  
343 **Overview:** Nutrient recommendations are made with the goal of minimizing nutrient losses to the  
344 environment and maximizing crop uptake. Soil testing plays an important role in the development of  
345 well-founded nutrient recommendations and such testing must be based on appropriate sampling  
346 frequency and intensity. Goals for crop yields must be calculated and included in the recommendation.  
347 Nutrient recommendations must be made in accordance with the Tri-State Fertilizer Recommendations  
348 (Vitosh et al., 2012), observing setbacks to water bodies and other features, and nutrients must not be  
349 recommended for application on frozen ground. All sources of nutrients must be accounted for in the  
350 recommendation, and the recommendation must be reviewed by a certified professional.

### 351 352 **3.1 Soil Tests**

353  
354 3.1.1 Soil tests are conducted which include, at minimum, macronutrient, soil pH, and cation  
355 exchange capacity.

356  
357 3.1.2 Soil tests are conducted within 3 years prior to nutrient application.

358  
359 3.1.3 Soil tests are taken in relatively uniform areas smaller than 25 acres.

360  
361 3.1.4 The location of soil test samples is geo-referenced using a Global Positioning System  
362 (GPS) device, or similar. *At least 25% of farm acres treated by Nutrient Service Provider must*  
363 *meet Criterion 3.1.4. (YEAR 3 REQUIREMENT)*

364  
365 3.1.5 Geo-referenced soil test results are included on a farm map using Geographic  
366 Information System (GIS) software. *At least 25% of farm acres treated by Nutrient Service*  
367 *Provider must meet Criterion 3.1.5. (YEAR 3 REQUIREMENT)*

### 368 369 **3.2 Crop Yield Determination and Monitoring**

- 370  
371 3.2.1 Goals for crop yield have been established and documented.  
372  
373 3.2.2 Goals for crop yield are demonstrably based on previous crop yields achieved, soil  
374 potential, and level of crop management.  
375  
376 3.2.3 Attainment of goals for crop yield are evaluated and documented at least bi-annually by  
377 monitoring trends of soil test levels and crop yields. (YEAR 2 REQUIREMENT)  
378  
379 3.2.4 Crop nutrient balances are calculated and documented.  
380

### 381 3.3 Nutrient Recommendations (General)

- 382  
383 3.3.1 Nutrient recommendations are documented.  
384  
385 3.3.2 Nutrient recommendations are based on the soil test history of the field, including  
386 results from the most recent soil test.  
387  
388 3.3.3 No additional phosphorus is recommended for application if the soil test results indicate  
389 that phosphorus levels are higher than the maintenance limit. *For the purposes of the Standard,*  
390 *maintenance limits for phosphorus are specified in the Tri-State Fertilizer Recommendations,*  
391 *Tables 13–17 (Vitosh et al., 2012).*  
392  
393 3.3.4 Recommended nutrient application levels are at or below limits specified by the Tri-  
394 State Fertilizer Recommendations. *For the purposes of the Standard, application levels are*  
395 *specified in the Tri-State Fertilizer Recommendations (Vitosh et al., 2012). Phosphorus levels are*  
396 *specified in Tables 13–17; Nitrogen values for corn and wheat are provided in Tables 9–10.*  
397 *Tables 11–12 provide the critical soil test values and crop removal values used for calculating tri-*  
398 *state fertilizer recommendations at various soil test levels.*  
399  
400 3.3.5 All sources of nutrients are accounted for in the nutrient management recommendation,  
401 including but not limited to commercial nutrients, manure, biosolids, cover crops, and the  
402 previous crop.  
403  
404 3.3.6 Anhydrous ammonia is not recommended for application in the months of September  
405 to March unless it is applied with a stabilizer and the soil temperature at the time of application  
406 is below 50° F.  
407  
408 3.3.7 Phosphorus nutrients are recommended to be:  
409 a) applied to a growing crop or cover crop or,  
410 b) injected or,  
411 c) banded or,  
412 d) surface applied, provided that it was recommended to the grower/customer to  
413 incorporate the nutrients, leaving at least 30% cover.  
414 *At least 50% of farm acres recommended for nutrients by Nutrient Service Provider must meet*  
415 *Criterion 3.3.7.*

416  
417 3.3.8 Nutrients are not recommended for surface application within 24 hours prior to heavy  
418 rainfall. *Conditions for “heavy rainfall” include the following: 50% chance of more than ½ inch*  
419 *rainfall.*

420  
421 3.3.9 Phosphorus is not recommended for application on frozen ground.  
422

423 3.3.10 If nitrogen and phosphorus are recommended for application on snow covered ground,  
424 the recommendation must specify that these nutrients are incorporated or injected. *Note: this*  
425 *Criterion only applies if there is snow cover but the ground is not frozen.*  
426

427 3.3.11 Nutrients are recommended for application at no greater than a 2-year application rate,  
428 including all forms of nutrients. *At least 75% of farm acres recommended for nutrients by*  
429 *Nutrient Service Provider must meet Criterion 3.3.11.*  
430

### 431 **3.4 Setbacks**

432  
433 3.4.1 Nutrient application recommendations adhere to minimum setbacks from all water  
434 resources according to applicable national, state, or local laws.  
435

436 3.4.2 Nutrient application recommendations include a setback of at least 100 ft. from water  
437 resources unless the nutrients are incorporated, banded, or injected.  
438

### 439 **3.5 Review of Recommendations**

440  
441 3.5.1 Nutrient recommendations have been reviewed and signed by the grower/customer.  
442 *(YEAR 2 REQUIREMENT)*  
443

444 3.5.2 Nutrient recommendations have been approved and signed by a Certified Professional.  
445 *(YEAR 2 REQUIREMENT)*  
446

## 447 **4 Nutrient Application**

448 This Section of the Standard applies only to Nutrient Service Providers who apply nutrients.  
449

450 **Overview:** Nutrient application is done with the goal of minimizing nutrient run-off and maximizing crop  
451 intake. Nutrient application must be based on recommendations, according to the results of recent  
452 representative soil test(s), and at levels consistent with the Tri-State Fertilizer Recommendations (Vitosh  
453 et al., 2012). Setbacks to water bodies and other features are observed. Variable Rate Application is  
454 used when justified. Nutrients are not applied to frozen ground or prior to heavy rain. Nutrients are not  
455 applied at more than a 2-year application frequency.  
456

### 457 **4.1 Nutrient Application Recommendations**

458

459 4.1.1 Nutrients are applied according to soil test history of the field including results from the  
460 most recent soil test. The soil test was completed within 3 years of nutrient application.

461  
462 4.1.2 Nutrients are applied according to a written nutrient recommendation that has been  
463 prepared within the prior 2 years.

464  
465 4.1.3 Nutrient recommendations used to guide nutrient applications were approved by a  
466 Certified Professional. (*YEAR 2 REQUIREMENT*)

## 467 468 **4.2 Application Equipment and Technology**

469  
470 4.2.1 All nutrient application equipment is calibrated, at least annually.

471  
472 4.2.2 Variable Rate Application is determined according to results of geo-referenced soil tests  
473 (e.g., according to GIS map). *At least 25% of farm acres treated by Nutrient Service Provider*  
474 *must meet Criterion 4.2.2.*

475  
476 4.2.3 Variable Rate Technology is used to apply nutrients. *At least 25% of farm acres treated*  
477 *by Nutrient Service Provider must meet Criterion 4.2.3.*

## 478 479 **4.3 Application Conditions**

480  
481 4.3.1 Nutrient application levels are at or below levels specified by the Tri-State Fertilizer  
482 Recommendations. *For the purposes of the Standard, application levels are specified in the Tri-*  
483 *State Fertilizer Recommendations (Vitosh et al., 2012). Phosphorus levels are specified in Tables*  
484 *13–17; Nitrogen values for corn and wheat are provided in Tables 9–10. Tables 11–12 provide*  
485 *the critical soil test values and crop removal values used for calculating tri-state fertilizer*  
486 *recommendations at various soil test levels.*

487  
488 4.3.2 Phosphorus is not applied if the soil test results indicate that phosphorus levels are  
489 higher than the maintenance limit. *For the purposes of the Standard, maintenance limits are*  
490 *specified in the Tri-State Fertilizer Recommendations (Vitosh et al., 2012).*

491  
492 4.3.3 Anhydrous ammonia is not applied through the months of September to March unless it  
493 is applied with a stabilizer and the soil temperature at the time of application is below 50° F.

494  
495 4.3.4 Phosphorus nutrients are:  
496 a) applied to a growing crop or cover crop, or  
497 b) injected or,  
498 c) banded or,  
499 d) surface applied, provided that it was recommended to the grower/customer to  
500 incorporate the nutrients, leaving at least 30% cover.

501 *At least 50% of farm acres treated by Nutrient Service Provider must meet Criterion 4.3.4.*

502  
503 4.3.5 Nutrients are not surface applied within 24 hours prior to heavy rainfall. *Conditions for*  
504 *“heavy rainfall” include the following: 50% chance of more than ½ inch rainfall.*

505  
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507  
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513  
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516  
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518  
519  
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521

4.3.6 Phosphorus is not applied on frozen ground.

4.3.7 If nitrogen and phosphorus are applied on snow covered ground, they are incorporated or injected. *Note: this criterion only applies if there is snow cover but the ground is not frozen.*

4.3.8 Nutrients are applied at no more than a 2-year application rate including all nutrient forms. *At least 75% of farm acres treated by Nutrient Service Provider must meet Criterion 4.3.8.*

**4.4 Setbacks**

4.4.1 Nutrient application adheres to minimum setbacks from all water resources according to national, state or local regulations and laws.

4.4.2 Nutrient application adheres to at least a 100 ft. setback from water resources unless the nutrients are incorporated, banded or injected.

DRAFT

522 **Appendix A. List of Members on the 4R Advisory Committee – Western Lake Erie Basin**

523

524 • Larry Antosch (Ohio Farm Bureau)

525 • Mindy Bankey (Ohio SWCD)

526 • Cindy Brookes (Sandusky River Watershed)

527 • Tom Bruulsema (International Plant Nutrition Institute)

528 • Doug Busdeker (The Andersons)

529 • Jim Byrum (Michigan Ag Business Association)

530 • Karen Chapman (Environmental Defense Fund)

531 • Larry Clemens (The Nature Conservancy)

532 • Ed Crawford (Conservation Action Project)

533 • Kevin Elder (Ohio Department of Agriculture)

534 • Joe Kelpinski (Michigan Department of Agriculture)

535 • Greg LaBarge (OSU Extension)

536 • Jim Lake (Indiana State Department of Agriculture)

537 • Cecelia Lokai-Minnich (Ohio CCA Board)

538 • Lara Moody (The Fertilizer Institute)

539 • John Motter (Ohio Soybean Council)

540 • Greg Nageotte (Ohio Department of Natural Resources)

541 • Joe Nester (Nester Ag, LLC)

542 • Sarah Orlando (Lake Erie Clean Marinas Coordinator)

543 • John Oster (Morrall Companies)

544 • Gary Pennell (Farmers Elevator - CCA)

545 • Mark Smith (Ohio NRCS)

546 • Bill Stanley (The Nature Conservancy)

547 • Mark Sunderman (Deshler Farmers Elevator – OABA Board Vice President)

548 • Carrie Vollmer-Sanders (The Nature Conservancy)

549 • Beth Warner (The Nature Conservancy)