

Field Assessment for Water Resource Protection

WQ-42



For use with all agricultural fields and adjacent land uses.



Farm Assessment for Water Resource Protection

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Introduction

The Field Assessment for Water Resource Protection helps you to quickly assess your nutrient, soil, pest, drainage and irrigation management, as well as areas adjacent to your fields that may be vulnerable to contamination from agricultural activities. The flexible format offers a voluntary approach to environmental accountability. This assessment will help connect you with a variety of resources and actions that are based on good science and field tested best management practices. You decide what actions to take.

Field Assessment for Water Resource Protection is based on previous successful Farmstead Assessment worksheets and was pilot tested by Indiana landowners. It asks the right questions and quickly points you in the right direction for answers. By completing your field assessment and following up with a recommended action plan you will be learning more about your land and current practices, and most importantly doing what is needed to protect the environment and water quality. Use the Extension publication *On-Farm Soil Monitoring for Water Resource Protection WQ-43* to help you monitor changes in soil quality of your fields.

These Farm Assessment publications are available from Purdue Extension by calling 1-888-398-4636 or online at <http://www.ces.purdue.edu/extmedia>.

- WQ-22 Indiana Farmstead Assessment for Drinking Water Protection
- WQ-32 Indiana Farmstead Assessment: Basic Questions (a quick check introduction for WQ-22)
- WQ-39 Pasture Assessment for Water Resource Protection
- WQ-40 Livestock Confinement Assessment for Water Resource Protection
- WQ-42 Field Assessment for Water Resource Protection
- WQ-43 On-Farm Soil Monitoring for Water Resource Protection

Field Assessment can provide you an advantage in successful land management and water quality protection.

Steps to Completing the Field Assessment System

1. Answer the questions in the Field Assessment Quick Check on page 3 and 4.
2. For any questions where you answered “No” or “Don’t Know”, investigate the recommended actions for those questions by reading the corresponding recommendations for nutrient management (page 5), soil conservation (page 9), pest management (page 12), water management (page 16), and areas adjacent to fields (page 18).
3. Complete the action plan on page 21 by listing the actions you plan to take and also by identifying the publications or other sources of information you need in order to learn more about the issue.

Field Assessment for Water Resource Protection is a Purdue Extension publication written by Brent Ladd and Jane Frankenberger, Department of Agricultural & Biological Engineering. The following reviewers helped improve this publication: Tony Bailey, Sylvie Brouder, Brett Canaday, Michele Conyer, Ken Eck, Mark Evans, Dana Goodman, Allen Haynes, William Johnson, Jim Lake, Jim Luzar, Matt Marrs, Gene Matzat, Cliff Sadoff, Gary Steinhardt, Kim Winninger, Fred Whitford. This publication was funded by the Indiana Department of Environmental Management through a 319 nonpoint grant.

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Field Assessment Quick Check

Consider the following questions to assess the potential impact of your management on water and other natural resources.

Nutrient Management See page 5 for recommendations on addressing any areas you mark “No” or “Don't Know.”	Yes	No	Don't Know Or N/A
1. Do you routinely test your soil to monitor fertility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Do you use realistic crop yield expectations, and follow recommended rates to determine how much fertilizer to apply?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you account for additional nutrient sources such as previous cover crops and legumes, manure applications, and soil reserves, when calculating how much fertilizer to apply?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you apply nutrients at or after planting to coincide with crop nutrient demand (i.e., most N applied as side-dress) ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. If you sidedress inorganic N fertilizer to supplement manure applications, do you use the pre-sidedress nitrate test to adjust your sidedress rates?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. If manure is used on your fields, do you apply manure at rates that prevent excess available nitrogen and phosphorus?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Do you balance phosphorus inputs and outputs in order to prevent excessive soil phosphorus test levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. When applying manure, do you inject, promptly incorporate, or otherwise manage manure applications within 48 hours to minimize runoff into surface water?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Do you test corn stalk nitrate levels at kernel maturity (blacklayer stage) to identify field areas that received excess N?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Do you calibrate your nutrient application equipment on at least an annual basis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Do you maintain records of fertilizer and manure rates and application dates for each field?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Do you follow a nutrient management plan for each field?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Do you review and update your nutrient management plan on a yearly basis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Have you identified environmentally sensitive areas that may require additional management when applying nutrients and/or manure? These are karst (sink holes) areas, land near streams, rivers, ponds, lakes, ditches, and highly erodible land, as well as soils with a high leaching and/or runoff rate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil Conservation See page 9 for recommendations on addressing any areas you mark “No” or “Don't Know.”			
15. Do you use conservation tillage practices that leave a minimum of 30% surface plant residue on your fields following planting?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Do you follow a soil conservation plan that you have developed with your local Natural Resources Conservation Service to minimize erosion on areas of highly erodible land (HEL)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Have you protected all streams, wetlands, ditches, and other water bodies on your farm from runoff and sediment with conservation buffers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Do you monitor soil quality indicators such as earthworm populations, water infiltration rates, soil compaction, percent plant and residue cover, and percent organic matter?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Do you plant cover crops to prevent erosion, trap nutrients susceptible to loss over winter, and help improve soil quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Have you made a long-term commitment to no-till cropping systems on all fields?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pest Management	Yes	No	Don't Know Or N/A
See page 12 for recommendations on addressing any areas you mark “No” or “Don't Know.”			
21. Do insect scouting reports and economic thresholds guide your insect pest management decisions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Do weed scouting reports and economic thresholds guide your weed management decisions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Do you maintain records of crop history, pest problems, and control measures used for each field?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Have you evaluated soils and topographical field features for their potential to leach to ground water and runoff to surface water?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Do you apply pesticides according to the label, including following setbacks from environmentally sensitive areas required for products containing atrazine?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Do you apply pesticides only when the risk of pesticide drift is low?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Do you apply pesticides only when the weather forecast indicates no heavy rain?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Do you inspect and calibrate your pesticide application equipment at least annually?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Do you employ anti-backflow devices on water supply hoses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Do you draw water from the well into a separate water holding tank, rather than directly into the sprayer tank?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Do you mix and load pesticides over a solid concrete pad that contains any spills on the pad?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Do you triple rinse and properly recycle or dispose of all containers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Do you consider alternative solutions to using insecticides and herbicides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drainage and Irrigation Management			
See page 16 for recommendations on addressing any areas you mark “No” or “Don't Know.”			
34. If your land has subsurface (tile) drainage, have you explored using at least one of the following methods to reduce nitrogen loss? <ul style="list-style-type: none"> • raising the water table during the non-growing season (November to March), • discharging drainage water into a constructed wetland before it discharges into a stream, or • storing drainage water and reusing it for crop irrigation during the summer? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. If you irrigate, do you schedule irrigation in order to apply only enough water to meet crop needs, and make sure that water is applied uniformly at a rate the soil can absorb without causing runoff and erosion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Areas Adjacent to Fields			
See page 18 for recommendations on addressing any areas you mark “No” or “Don't Know.”			
36. Do you know where your drinking water well is located?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Do you take steps to protect your drinking water well, and neighbors’ wells that may be adjacent to your fields?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Do you manage pasture areas near streams to prevent livestock from entering the streams or degrading the banks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Have you restored wetlands on your farm and excluded livestock from entering wetland areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Do you manage woodlands using sustainable harvesting methods, while preventing soil erosion and excluding livestock?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Do you manage field borders to encourage beneficial insect populations and wildlife habitat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Recommendations for Nutrient Management

Address any areas of concern or areas that you are interested in improving with an action plan (see [page 21](#)). A list of technical and educational resources is provided on [page 8](#), and a list of contacts on [page 23](#).

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<p>Nutrient Management:</p> <p><input type="checkbox"/> 1. Soil is not tested regularly.</p>	<p>Conduct fertility soil testing on all fields at least every four years. This will help provide the information necessary for effective nutrient management. Contact your County Purdue Extension office for recommendations about conducting soil sampling and testing to monitor soil fertility.</p>	<p>N1, N2</p> <p>See page 8 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 2. Realistic crop yield goals have not been determined, or rates are not followed.</p>	<p>Look at historic yield history for your fields. Averaging the three highest yields in five consecutive crop years is one method of determining realistic yield goals. Using soil test results and expected yields based on soil type can also inform your decisions about fertilizer applications.</p>	<p>N3, N16</p> <p>See page 8 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 3. Additional sources of nitrogen, such as previous cover crops and legumes, manure applications, and soil reserves have not been credited.</p>	<p>First year legumes typically fix 30 to 120 lbs. of nitrogen per acre. The nutrient content of animal manure varies widely depending on species, and if the manure is applied as a solid or liquid. For example, 1,000 lbs. of liquid hog manure incorporated into the soil will provide 15 pounds of plant available nitrogen. Even previous crop residue may supply some nutrients for new crop growth, and should be credited. Test soil and manure to determine these values for your farm.</p>	<p>N2, N3, N4, N5, N16, N18</p> <p>See page 8 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 4. Nutrients are applied in the Fall or in the Spring before planting.</p>	<p>Side dressing nitrogen for corn during a period 6-10 weeks after planting results in better crop yields and less N loss compared with pre-plant applications. On sandy soils, split or multiple applications during the growing season may be the most effective method for reducing nitrogen losses. The use of a pre-sidedress soil nitrate test and a chlorophyll meter during the growing season can help you fine-tune your nutrient applications.</p>	<p>N2, N3, N4, N16</p> <p>See page 8 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 5. Manure is not tested and/or application rates for nitrogen and phosphorus are unknown.</p>	<p>Conduct regular N and P testing for manure, sludge, compost, or other by-products you apply to fields. Regular testing is necessary in order to balance application rates with crop N and P requirements.</p>	<p>N5, N6, N7, N8, N9, N16, N17</p> <p>See page 8 for full titles and how to obtain.</p>	

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<input type="checkbox"/> 6. Pre-sidedress nitrate testing is not performed before sidedressing N to supplement manure applications.	Use the pre-sidedress nitrate soil test to adjust any additional inorganic N fertilizer. This test can prevent excess N from being applied, as well as help determine the amount of N needed to meet crop nutrient demand.	N2, N4 See page 8 for full titles and how to obtain.	
<input type="checkbox"/> 7. Phosphorus inputs and outputs have not been balanced.	Conduct soil testing to reveal soil P levels. Target manure or sludge applications to meet P, rather than N crop needs. Then, meet remaining N crop needs with fertilizer or legumes. If applications are based on N requirement of the crop, then rotate fields so that a build up of excess P does not occur. If fields have a high leaching potential, grow deep rooted legume or small grain cover crops that will scavenge unused soil nutrients.	N5, N6, N7, N8, N9, N16 See page 8 for full titles and how to obtain.	
<input type="checkbox"/> 8. Manure applications are not incorporated into the soil in a timely fashion.	Inject liquid manure directly into the soil, and time solid manure applications with field operations that will incorporate the manure. Avoid surface applying manure prior to predicted storm events, and always avoid applying manure when the soil is frozen.	N9, N10, N16 See page 8 for full titles and how to obtain.	
<input type="checkbox"/> 9. Corn stalk nitrate levels are not tested in order to identify field areas that received excess N.	Collect corn stalk samples when 80% of the kernels have formed a blacklayer, and send these samples to your soil lab for N analysis. This test is useful for improving your nitrogen fertilizer management and preventing excess nitrogen from being applied to future crops.	N11 See page 8 for full titles and how to obtain.	
<input type="checkbox"/> 10. Nutrient application equipment is not calibrated regularly.	Take time to inspect and calibrate application equipment. This will ensure accurate delivery of nutrients at levels that do not exceed crop needs.	N7, N15 See page 8 for full titles and how to obtain.	
<input type="checkbox"/> 11. Records of nutrient sources and uses for each field are not kept.	A good record keeping system is vital for nutrient management planning. You should record for each field: field ID, crop(s) planted, nutrient source(s) applied and amounts, as well as the calculated levels of N and P applied per acre.	N3, N12, N16, N18 See page 8 for full titles and how to obtain.	
<input type="checkbox"/> 12. A nutrient management plan is not followed.	Contact your local USDA service center or County Extension Office for assistance in developing a nutrient management plan that will help you meet crop nutrient needs, while minimizing loss of nutrients to the environment.	N3, N5, N16, N17 See page 8 for full titles and how to obtain.	
<input type="checkbox"/> 13. The nutrient management plan has not been reviewed or updated.	Review your plan annually to determine if changes for the next crop year are needed. A detailed review of the plan should be done every five years, or once per crop rotation period.	N16 See page 8 for full titles and how to obtain.	

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<p><input type="checkbox"/> 14. Environmentally sensitive areas have not been identified, or are not given specific management attention.</p>	<p>Environmentally sensitive areas need to be protected. Identify streams, ponds, wetlands, sink holes and karst areas, soils that are highly erodible or have a high leaching potential, land with steep slopes, as well as private and public wells and wildlife habitat areas on farm maps. Then establish set-back distances to guide nutrient applications. This will reduce risks of polluting surface and ground water, and help protect these sensitive areas.</p>	<p>N13, N14, N16 See page 8 for full titles and how to obtain.</p>	



Contact your local USDA Service Center or County Extension Office for assistance in developing a nutrient management plan that will help you meet crop nutrient needs, while minimizing loss of nutrients to the environment.

Resources for Improving Nutrient Management

	<p>Purdue Extension Publications & Web Sites: For publications call your County Extension Office or toll free 1-888-EXT-INFO and ask for the Media Distribution Center. Publications are also on-line http://www.ces.purdue.edu/extmedia</p>
N1	Soil Sampling for P, K, and Lime Recommendations (AY-281)
N2	The Pre-Sidedress Soil Nitrate Test For Improving N Management In Corn (AY-314-W)
N3	Tri-State Fertilizer Recommendations (AY-9-32-W)
N4	Determining Nitrogen Fertilizer Sidedress Application Needs In Corn Using A Chlorophyll Meter (AY-317-W)
N5	Manure Management Planner Web Site, http://www.agry.purdue.edu/mmp/
N6	Calculating Manure and Manure Nutrient Application Rates (AY-277)
N7	Estimating Manure Spreader Capacity (AY-278)
N8	Animal Manure as a Plant Nutrient Resource (ID-101)
N9	Land Application of Manure (WQ-16)
N10	Livestock Confinement Assessment for Water Resource Protection (WQ-40)
N11	Cornstalk Testing to Reveal the Nitrogen Status of Mature Corn: Nitrogen Management Assurance (AY-322-W)
N12	Crop Production Recordkeeping (PPP-18) and Annual Field Records (pocket sized record, PPP-19)
N13	Vegetated Filter Strips for Improved Water Quality (AY-285)
N14	Indiana Farmstead Assessment (WQ-22)
N15	Boom Sprayer Calibration (Ohio State Extension) http://ohioline.osu.edu/aex-fact/0520.html
	<p>Additional Publications and Web Sites: Natural Resources Conservation Service (NRCS) Conservation Practice Standards are available by calling your local NRCS office, or electronically at http://www.nrcs.usda.gov/technical/efotg/ , click on Indiana, select your county, then go to Section IV, practices. Direct URL's are given below.</p>
N16	Nutrient Management (NRCS-590), http://efotg.nrcs.usda.gov/references/public/IN/nutrient_management.pdf
N17	Waste Utilization (NRCS-633), http://efotg.nrcs.usda.gov/references/public/IN/waste_utilization.pdf
N18	The Nutrient Management Yardstick http://www.iatp.org/yardstick/cp.cfm

Recommendations for Soil Conservation

Address any areas of concern or areas that you are interested in improving with an action plan (see [page 21](#)). A list of technical and educational resources is provided on [page 11](#), and a list of contacts on [page 23](#).

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<p>Soil Conservation:</p> <p><input type="checkbox"/> 15. Conservation tillage practices are not used.</p>	<p>Investigate conservation tillage options and technologies that can maintain and improve soil productivity of your fields, while lowering the risk of soil erosion and sedimentation of nearby surface waters.</p> <p>For more information contact:</p> <ul style="list-style-type: none"> • Purdue Soil & Water Quality Program Specialists, 765/494-8383, <http://www.agry.purdue.edu/swq/> • Indiana Conservation Tillage Initiative, 765-653-5716, <http://www.agry.purdue.edu/cti/> 	<p>S1, S2, S3, S4, S5, S6, S7, S8, S9, S14, S18</p> <p>See page 11 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 16. Highly erodible land (HEL) is not addressed by a soil conservation plan.</p>	<p>Contact an NRCS representative at your local Conservation District/NRCS office for assistance with developing a plan to address any HEL in your fields. This is required if you are a Farm Service Agency (FSA) farm program participant. Lands with soils considered highly erodible are often noted with the abbreviation HEL in your Farm Service Agency (FSA) map.</p>	<p>S10, S11, S12, S18</p> <p>See page 11 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 17. Some streams, wetlands, ditches, or other water bodies are not protected by conservation buffers.</p>	<p>Conservation buffers made up of perennial vegetation protect water bodies by slowing and trapping pollutants moving off of fields during heavy rains. Conservation buffers are paid an attractive rental rate through the Conservation Reserve Program (CRP). Contact your local USDA service center for assistance and information.</p>	<p>S12, S13, S15</p> <p>See page 11 for full titles and how to obtain.</p>	



Conservation buffers protect water bodies by storing and trapping pollutants.

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<p><input type="checkbox"/> 18. Soil quality indicators such as earthworm populations, water infiltrations rates, percent plant/residue cover, and percent organic matter are not monitored.</p>	<p>High-quality soils tend to efficiently provide nutrients, water, and minerals to growing crops, while reducing risks of plant disease and other stresses. High quality soil is supported by stable soil aggregates and adequate pore space for efficient water infiltration.</p> <p>Earthworms help incorporate crop residue and break up compacted soil layers. High organic matter content allows soil to quickly absorb and then slowly release moisture. Organic matter also helps a soil maintain good structure.</p> <p>To learn how to effectively monitor soil quality on the farm consult the Extension publication On-Farm Soil Monitoring for Water Resource Protection (S7).</p>	<p>S3, S4, S6, S7, S8, S17, S18</p> <p>See page 11 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 19. Cover crops are not utilized.</p>	<p>Include cover crops in your crop rotation and during post-harvest times for corn and soybeans to provide important soil and field productivity benefits. Cover crops protect the soil surface from rain, wind, and sun. They also add beneficial organic matter, draw nutrients and minerals to the root zone for subsequent crops, and improve soil structure. Proper use of cover crops requires monitoring for pest and water management.</p>	<p>S11, S16</p> <p>See page 11 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 20. A commitment to a long-term no-till cropping system has not been made.</p>	<p>Investigate the benefits of no-till systems for your farm. No-till cropping systems can provide many benefits compared with conventional tillage such as building organic matter and reducing soil erosion and water runoff problems, while remaining profitable.</p> <p>For no-till knowledge, research, and successful methods contact:</p> <ul style="list-style-type: none"> • Purdue Soil & Water Quality Program Specialists, 765/494-8383, http://www.agry.purdue.edu/swq/ • Indiana Conservation Tillage Initiative, 765-653-5716, http://www.agry.purdue.edu/cti 	<p>S8, S9</p> <p>See page 11 for full titles and how to obtain.</p>	

Resources for Improving Soil Conservation

	<p>Purdue Extension Publications & Web Sites: For publications call your County Extension Office or toll free 1-888-EXT-INFO and ask for the Media Distribution Center. Publications are also on-line http://www.ces.purdue.edu/extmedia</p>
S1	Soil Compaction in Indiana (AY-221)
S2	Estimating Corn & Soybean Residue Cover (AY-269)
S3	Earthworms & Crop Management (AY-279)
S4	Managing Crop Residue with Farm Equipment (AY-280)
S5	A Dozen Do's for Successful No-till Corn following Soybeans (AY 313)
S6	Conservation Tillage & Water Quality (WQ-20)
S7	On-Farm Soil Monitoring for Water Resource Protection (WQ-43)
S8	Purdue Soil & Water Quality Program http://www.agry.purdue.edu/swq
S9	Indiana's Conservation Tillage Initiative http://www.agry.purdue.edu/cti/
S10	Soil Erosion in Indiana-An Overview (AY-228)
S11	Winter Cover Crops (AY-247)
S12	Wind Erosion Concerns in Indiana (AY-271)
S13	Vegetated Filter Strips for Improved Water Quality (AY-285)
	<p>Additional Publications and Web Sites: Natural Resources Conservation Service (NRCS) Conservation Practice Standards are available by calling your local NRCS office, or electronically at <http://www.nrcs.usda.gov/technical/efotg/>, click on Indiana, select your county, then go to Section IV, practices. Direct URL's are given below.</p>
S14	Residue Management (NRCS-329), http://efotg.nrcs.usda.gov/references/public/IN/residue_management_no_till_strip_till.pdf
S15	Riparian Forest Buffer (NRCS-391), http://efotg.nrcs.usda.gov/references/public/IN/riparian_forest_buffer.pdf Filter Strip (NRCS-393), http://efotg.nrcs.usda.gov/references/public/IN/filter_strip.pdf Grassed Waterways (NRCS-412), http://efotg.nrcs.usda.gov/references/public/IN/grassed_waterway.pdf
S16	Cover and Green Manure Crop (NRCS-340), http://efotg.nrcs.usda.gov/references/public/IN/cover_crop.pdf
S17	NRCS Soil Quality Web Site http://soils.usda.gov/sqi/
S18	Sustainable soil management, http://attra.ncat.org/attra-pub/soilmgmt.html

Recommendations for Pest Management

Address any areas of concern or areas that you are interested in improving with an action plan (see [page 22](#)). A list of technical and educational resources is provided on [page 15](#), and a list of contacts on [page 23](#).

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<p>Pest Management:</p> <p><input type="checkbox"/> 21. Insecticide applications are not based on scouting reports or economic thresholds.</p>	<p>Only apply insecticides when a clear economic benefit will be achieved. Good pest problem scouting and knowledge of pest damage and input costs are necessary to determine economic thresholds. Enroll in training for Integrated Pest Management, consult the resources in the next column, and consider the services of professional IPM and pest scouting consultants. You can also contact your local Extension office for assistance in determining the economic threshold for pest damage in your crops.</p>	<p>P1, P2, P3, P21, P25</p> <p>See page 15 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 22. Herbicide applications are not based on weed scouting reports or economic thresholds.</p>	<p>Only apply herbicides when a clear economic benefit will be achieved. Good weed problem scouting and knowledge of weed pressure and input costs are necessary to determine economic thresholds.</p>	<p>P4, P5, P27</p> <p>See page 15 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 23. Records on pest problems, crop histories, and control measures for fields are not kept.</p>	<p>Good records are imperative for a long-term pest management plan. Compile the following information together with farm map references for each field:</p> <ul style="list-style-type: none"> • Crop history and crops to be grown to track crop rotations • Soil types with information on leaching/runoff potentials • Exact acreage for each field to cross-reference for application rate information • Past pest problems and the solutions or pesticides used to check for trends and effectiveness of solutions. 	<p>P6, P7, P8, P21</p> <p>See page 15 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 24. Soils and field features have not been evaluated for leaching or runoff potentials.</p>	<p>Identify sinkholes, drainage wells, and abandoned wells. These field features allow direct flow to ground water and require buffers. Identify distance to surface water from field edges and employ buffers of grasses/trees around water bodies. Fields containing steep slopes, conventional tillage, heavy or compacted soils have higher risks for pesticide runoff. Prevent pesticide runoff by building organic matter and leaving crop residue through conservation tillage and cover cropping. Use pesticides that have a lower leaching potential. These have reduced persistence in the environment and tend to absorb to soil better.</p>	<p>P9, P10, P21</p> <p>See page 15 for full titles and how to obtain.</p>	

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<input type="checkbox"/> 25. Labels, set-back distances, and safety recommendations are not followed.	<p>Always read and follow product labels. Following label recommendations helps to protect your safety and health, and the environment. Any product containing atrazine requires a no-spray setback distance of 50 feet from wells, 66 feet from outlets to streams or rivers, 200 feet from lakes or reservoirs, and 66 feet from tile inlets unless conservation tillage is used or herbicide is incorporated.</p>	<p>P9, P11, P12, P13, P21</p> <p>See page 15 for full titles and how to obtain.</p>	
<input type="checkbox"/> 26. Pesticides are sometimes applied when the risk of drift is high.	<p>Avoid applications when wind speeds are above label directions. Be particularly sensitive to risk of drift at field edges and areas bordering neighboring property and home sites.</p>	<p>P9, P11, P12, P13, P21</p> <p>See page 15 for full titles and how to obtain.</p>	
<input type="checkbox"/> 27. Pesticides are sometimes applied even if heavy rain is possible.	<p>Although weather is often unpredictable, make use of the high quality weather prediction information available today. Avoid applying pesticides when there is a good chance that rainfall will wash pesticides off of fields. Maximum runoff occurs following the month of planting. This is because the crop has not grown enough to intercept rainfall, and the soil is exposed. Conservation tillage practices will decrease runoff compared to conventional tillage. Avoid applying prior to predicted rain events or when the soil is saturated.</p>	<p>P14</p> <p>See page 15 for full titles and how to obtain.</p>	
<input type="checkbox"/> 28. Pesticide application equipment is not inspected or calibrated regularly.	<p>Take time to inspect and calibrate application equipment. This will ensure accurate delivery of levels that meet crop needs, while eliminating leaks and problems.</p>	<p>P24</p> <p>See page 15 for full titles and how to obtain.</p>	
<input type="checkbox"/> 29. Water supply hoses do not have anti-backflow devices in place.	<p>If you use a hose from a water well to fill or mix, install an anti-backflow device on the hose or well. They are inexpensive and prevent pesticides from back washing or siphoning into the water supply. Flush out hoses after mixing/filling and designate a specific hose to be used only for mixing and filling operations.</p>	<p>P9, P15</p> <p>See page 15 for full titles and how to obtain.</p>	
<input type="checkbox"/> 30. Water is drawn directly from the well into the sprayer tank.	<p>The risk in this situation is that the well water hose could become submerged in the pesticide-water mixture, and back-siphoning to the well becomes possible. Using a separate water holding tank eliminates this risk. Water in the holding tank is then transferred to the sprayer tank.</p>	<p>P9, P15</p> <p>See page 15 for full titles and how to obtain.</p>	

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<input type="checkbox"/> 31. Mixing and loading takes place in an uncontained area subject to drainage and runoff.	If you regularly mix and load pesticides consider constructing a mixing pad that will contain any chemical spills. A chemical spill can contaminate groundwater, runoff into nearby surface waters, and even contaminate your own well. Spills can be expensive and time consuming to clean up. For detailed information review the pesticide storage and handling fact sheet found in the Farmstead Assessment packet from Purdue Extension (P14) or online at http://www.ecn.purdue.edu/SafeWater/farmasyst/	P9, P16, P17, P18, P22 See page 15 for full titles and how to obtain.	
<input type="checkbox"/> 32. Proper handling and storage of pesticide containers is not known, or not followed.	Empty containers can lead to contamination if not properly handled. Do not burn empty pesticide containers. Triple rinse containers and ask your pesticide dealer about recycling/disposal options. Participate in local container recycling drop-off days.	P9, P15, P19, P20 See page 15 for full titles and how to obtain.	
<input type="checkbox"/> 33. Alternative solutions to insecticides and herbicides for pest and weed control are not considered.	Investigate alternatives to insecticides and herbicides to control pests and weeds. These two publications provide insights into alternative solutions: <ul style="list-style-type: none"> • Weed Management for Croplands, http://attra.ncat.org/attra-pub/weed.html • Bio-intensive Integrated Pest Management, http://attra.ncat.org/attra-pub/ipm.html 	P8, P21, P25, P26, P27 See page 15 for full titles and how to obtain.	



Good pest problem scouting and knowledge of pest damage and input costs are necessary to determine economic thresholds for applying insecticides.

Resources for Improving Pest Management

	Purdue Extension Publications & Web Sites: For publications call your County Extension Office or toll free 1-888-EXT-INFO and ask for the Media Distribution Center. Publications are also on-line http://www.ces.purdue.edu/extmedia
P1	Scout for Potential Insect Problems (CRP-5-W)
P2	Common Natural Enemies (E-92)
P3	Purdue Integrated Pest Management Web Site, http://www.entm.purdue.edu/Entomology/ext/fieldcropsipm/
P4	Purdue Weed Science Web Site http://www.btny.purdue.edu/weedscience
P5	Weed Control Guidelines for Indiana http://www.btny.purdue.edu/Pubs/ws/ws-16
P6	Crop Production Recordkeeping (PPP-18) & Annual Field Records (pocket sized record PPP-19).
P7	The Why's and How-to's of Pesticide Recordkeeping (PPP-54)
P8	Alternative Control Outreach Research Network Web Site, http://www.entm.purdue.edu/ACORN
P9	Indiana Farmstead Assessment (WQ-22)
P10	National Agricultural Pesticide Risk Analysis Web Site: http://danpatch.ecn.purdue.edu/~napra/
P11	Pesticides and the Label (PPP-24)
P12	Pesticides and Personal Protective Equipment (PPP-38)
P13	Stay On Target: Prevent Drift (PPP-51)
P14	Indiana Weather Resources http://www.agry.purdue.edu/level1_weather.asp
P15	Pesticide Safety Tips for the Workplace and Farm: A Pictorial Guide to Best Pesticide Management Practices. (PPP-61)
P16	Pesticides and Spill Management (PPP-28)
P17	The Quick Response Emergency Plan (PPP-45)
P18	Managing Farm Chemicals (PPP-50)
P19	Pesticides and Container Management (PPP-21)
P20	Pesticides and their Proper Storage (PPP-26)
	Additional Publications and Web Sites: Natural Resources Conservation Service (NRCS) Conservation Practice Standards are available by calling your local NRCS office, or electronically at < http://www.nrcs.usda.gov/technical/efotg/ > , click on Indiana, select your county, then go to Section IV, practices. Direct URL's are given below.
P21	Pest Management (NRCS-595), http://efotg.nrcs.usda.gov/references/public/IN/pest_management.pdf
P22	Agri-Chemical Handling Facility (NRCS-702),
P23	NRCS Leaching & Runoff Potentials of Soils (WIN-PST software), http://www.wcc.usda.gov/pestmgt/winpst.html
P24	Boom Sprayer Calibration http://ohioline.osu.edu/aex-fact/0520.html
P25	Bio-intensive integrated pest management, http://attra.ncat.org/attra-pub/ipm.html
P26	Farmscaping to enhance biological control, http://attra.ncat.org/attra-pub/farmscape.html
P27	Weed management for croplands, http://attra.ncat.org/attra-pub/weed.html

Recommendations for Drainage and Irrigation Management

Address any areas of concern or areas that you are interested in improving with an action plan (see [page 22](#)). A list of technical and educational resources is provided on [page 17](#), and a list of contacts on [page 23](#).

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<p>34. Tile drains discharge freely, directly into ditches or streams</p>	<p>Tile drainage water is a major source of nitrate in Indiana’s streams and rivers. Follow good nutrient management practices, and then use one or more of the following technologies to further reduce excess nitrate loss through subsurface drains.</p> <p>Drainage water management (also called controlled drainage) is the practice of raising the water table when a higher water table will not cause damage to the crop, such as during the non-growing season. Control structures installed in the drains provide farmers the ability to raise the water table level, which can result in a 10-50% reduction in the discharge of nitrate, while increasing the water available to plants in dry periods.</p> <p>Constructed wetlands may be used to remove sediment, nitrogen and phosphorus from drainage water. Strategically-located and designed wetlands can remove 40-90% of the nitrate in tile drainage water from croplands. Ask your NRCS office about cost-share funding for wetland restoration.</p> <p>Drainage water reuse can reduce nitrate loss and supply water during dry times of the year. Ohio State has developed a system that combines water storage and a wetland, then reuses the water through subirrigation.</p>	<p>W1, W2, W5, W6</p> <p>See page 17 for full titles and how to obtain.</p>	
<p>35. Irrigation is not scheduled by crop needs, may not be uniform, or may cause runoff or erosion</p>	<p>Schedule irrigation by monitoring soil moisture, or through an accounting approach such as a “checkbook” system. Apply water only when needed, to save money and reduce leaching. Check that irrigation water is being applied uniformly by using rain gauges in the field. Uniform irrigation increases water efficiency and reduces the chance of runoff and leaching. Make sure irrigation rate does not exceed the infiltration rate of the soil. Use efficient irrigation systems such as drip irrigation where appropriate to minimize water use.</p>	<p>W3, W4, W7</p> <p>See page 17 for full titles and how to obtain.</p>	

Resources for Improving Drainage and Irrigation Management

Extension Publications and Web Sites:	
W1	Agricultural Drainage: Water Quality Impacts and Subsurface Drainage Studies in the Midwest. http://ohioline.osu.edu/b871/
W2	Wetland Reservoir Subirrigation Systems. http://ohioline.osu.edu/b871/b871_9.html
W3	Irrigation Scheduling Checkbook Method, Univ. of Minnesota Extension publication, http://www.extension.umn.edu/distribution/cropsystems/DC1322.html
W4	The University of Nebraska has 33 Extension publications on various aspects of irrigation management, at http://www.ianr.unl.edu/pubs/irrigation/
Additional Publications and Web Sites:	
Natural Resources Conservation Service (NRCS) Conservation Practice Standards are available by calling your local NRCS office, or electronically at < http://www.nrcs.usda.gov/technical/efotg/ > , click on Indiana, select your county, then go to Section IV, practices. Direct URL's are given below.	
W5	Drainage Water Management (NRCS-554) http://efotg.nrcs.usda.gov/references/public/IN/drainage_water_management.pdf
W6	Wetland Restoration (NRCS-657) http://efotg.nrcs.usda.gov/references/public/IN/wetland_restoration.pdf
W7	Irrigation Water Management (NRCS-449) http://efotg.nrcs.usda.gov/references/public/IN/irrigation_water_management.pdf



Tile drainage is a major source of nitrate in Indiana's streams and rivers. Restored wetlands can remove 40-90% of nitrate in tile drainage water from croplands.

Recommendations for Areas Adjacent to Fields

Address any areas of concern or areas that you are interested in improving with an action plan (see [page 22](#)). A list of technical and educational resources is provided on [page 20](#), and a list of contacts on [page 23](#).

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<p>Areas Adjacent to Fields:</p> <p><input type="checkbox"/> 36. The location of drinking water wells is unknown.</p>	<p>Wells constructed after the 1950's often have a capped casing or pipe that extends above the soil surface. Older wells were often constructed below ground in concrete pits – sometimes called frost pits. Also, many shallow dug wells still exist in Indiana. If obvious signs of well location are lacking, talk to previous owners and neighbors. A well driller may also be of help in locating your well. Locate abandoned wells and have them plugged.</p>	<p>A1, A2, A3, A4, A12</p> <p>See page 20 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 37. Steps for protecting drinking water wells are not taken.</p>	<p>Many farming activities can lead to contamination of your or your neighbors' wells. Consider the location of your well and your neighbors wells that border your fields. A recommended minimum set-back distance for pesticides, fertilizers, and livestock of 100 feet for private wells and 300 feet for public wells will reduce contamination risks. Consult the Purdue Extension Farmstead Assessment worksheets (A8) or online at http://www.ecn.purdue.edu/SafeWater/farmasyst/</p>	<p>A2, A3, A4</p> <p>See page 20 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 38. Livestock are not prevented from entering streams or stream bank areas.</p>	<p>Livestock can have a serious negative impact on stream banks and water quality. Use fencing, managed grazing, and stock watering options to protect streams and other water bodies. Consult the Purdue Extension pasture management resources in the next column and also contact your local Soil & Water Conservation office for assistance. There are funds available to help implement these best management practices.</p>	<p>A5, A13, A14, A15, A20</p> <p>See page 20 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 39. Wetland areas have not been restored, and/or livestock have access to wetland areas.</p>	<p>Wetlands should be protected and restored, and livestock need to be prevented from entering these sensitive habitats. Wetlands have many benefits such as storm water control, aquifer recharge, removing contaminants from runoff, and improving the diversity and stability of ecosystems. Contact your local USDA service center or DNR Fish & Wildlife personnel for financial and technical assistance with protecting and restoring wetlands.</p>	<p>A6, A7, A13, A14, A16, A20</p> <p>See page 20 for full titles and how to obtain.</p>	

Area of Concern	Recommendations	Publications & Resources	Record Your Actions
<p><input type="checkbox"/> 40. Woodlands are not protected from livestock, fires, and/or sustainable harvesting methods are not followed during timber removal.</p>	<p>Woodlands can be an important source of farm income, as well as provide beneficial wildlife habitat. Woodlands provide useful products and recreational opportunities, but must be managed carefully. In most cases, livestock should be excluded from woodland areas.</p>	<p>A8, A9, A13, A14, A17, A19 See page 20 for full titles and how to obtain.</p>	
<p><input type="checkbox"/> 41. Field borders are not managed for beneficial insects or wildlife habitat.</p>	<p>Develop the borders surrounding your fields by encouraging perennial grasses, wildflowers, and shrubs. This will provide habitat for wildlife and predatory insects. Field borders managed for wildlife beautify the landscape, provide game bird and songbird habitat and recreational opportunities, as well as create a travel corridor for other wildlife. They also can reduce wind erosion of soil and trap or slow field runoff.</p>	<p>A10, A11, A18 See page 20 for full titles and how to obtain.</p>	



Farming activities have the potential to contaminate your and your neighbors' wells. Consider the location of drinking water wells that border your fields.

Resources for Improving Areas Adjacent to Fields

	<p>Purdue Extension Publications & Web Sites: For publications call your County Extension Office or toll free 1-888-EXT-INFO and ask for the Media Distribution Center. Publications are also on-line http://www.ces.purdue.edu/extmedia</p>
A1	Plugging Abandoned Wells: A Landowner's Guide (WQ-21)
A2	Indiana Farmstead Assessment (WQ-22)
A3	Indiana Farmstead Assessment Basic Questions (WQ-32)
A4	Farmstead Assessment for Water Resource Protection < http://www.ecn.purdue.edu/SafeWater/farmasyst >
A5	Pasture Assessment for Water Resource Protection (WQ-39)
A6	Management of Forested Wetland Ecosystems (FNR-151)
A7	Wetlands, Regulations, and You (FNR-171)
A8	Forestry & Water Quality (FNR-88)
A9	A Landowner's Guide to Sustainable Forestry in Indiana (FNR-180 through FNR-187)
A10	Forestry & Wildlife Management Assistance (FNR-87)
A11	Assessing Your Land's Potential for Wildlife (FNR 175-W)
	<p>Additional Publications and Web Sites: Natural Resources Conservation Service (NRCS) Conservation Practice Standards are available by calling your local NRCS office, or electronically at <http://www.nrcs.usda.gov/technical/efotg/> , click on Indiana, select your county, then go to Section IV, practices. Direct URL's are given below.</p>
A12	Well Decommissioning (NRCS-351), http://efotg.nrcs.usda.gov/references/public/IN/well_decommissioning.pdf
A13	Fence (NRCS-382), http://efotg.nrcs.usda.gov/references/public/IN/fence.pdf
A14	Use Exclusion (NRCS-472), http://efotg.nrcs.usda.gov/references/public/IN/use_exclusion.pdf
A15	Watering Facility (NRCS-614), http://efotg.nrcs.usda.gov/references/public/IN/watering_facility.pdf
A16	Wetland Restoration (NRCS-657), http://efotg.nrcs.usda.gov/references/public/IN/wetland_restoration.pdf
A17	Forest Stand Improvement (NRCS-666), http://efotg.nrcs.usda.gov/references/public/IN/forest_stand_improvement.pdf
A18	Field Border (NRCS-386), http://efotg.nrcs.usda.gov/references/public/IN/field_border.pdf
A19	Indiana Woodlands Web Site, http://www.inwoodlands.org
A20	Protecting Riparian Areas: Farmland Management Strategies http://attra.ncat.org/attra-pub/PDF/riparian.pdf

Action Plans to Improve Field Management Practices.

Write down your priorities for improving your management. Identify the resources you need in order to improve your management.

What are your priorities for improving Nutrient Management?	List the resources you have identified and actions you intend to take to improve Nutrient Management
What are your priorities for improving Soil Conservation?	List the resources you have identified and actions you intend to take to improve Soil Conservation

<p>What are your priorities for improving Pest Management?</p>	<p>List the resources you have identified and actions you intend to take to improve Pest Management</p>
<p>What are your priorities for improving Drainage and Irrigation Management?</p>	<p>List the resources you have identified and actions you intend to take to improve Drainage and Irrigation Management</p>
<p>What are your priorities for improving Areas Adjacent to your Fields?</p>	<p>List the resources you have identified and actions you intend to take to improve Areas Adjacent to your Fields</p>

If you have completed your field assessment, consider the following actions:

1. Obtain and use Purdue Extension publication *WQ-43 On-Farm Soil Monitoring for Water Resource Protection*. This publication provides easy-to-learn methods for on-farm monitoring of soil indicators important to soil quality, as well as ground and surface water quality. Contact your County Extension Educator and ask for this publication, print directly from the web <<http://www.ces.purdue.edu/extmedia>> (listed under the water quality publications), or request a copy by calling 1-888-398-4636.
2. Once you are able to answer “yes” to the questions on pages 3 and 4, apply for recognition in the *Indiana River Friendly Farmer Program*. You may qualify for public recognition for protecting and enhancing Indiana’s rivers, lakes, and streams. For information contact your local Soil & Water Conservation District. Indiana River Friendly Farmer Web Site: <http://www.iaswcd.org/programs_rff.htm>



For assistance with areas of concern, conservation planning, or additional information please contact the following offices:

Purdue Extension

- Your Local Purdue Extension office Check your phone book under “County Government” or call toll free 1-888-EXT-INFO (398-4636)
- Purdue Extension Web Site <<http://www.ces.purdue.edu>>
- Purdue Extension Water Quality Web Site <<http://www.ces.purdue.edu/waterquality>>
- Purdue Soil & Water Quality Program Web Site, <<http://www.agry.purdue.edu/swq/>>
- Purdue Pesticide Programs 765/494-4580 and Web site <<http://www.btny.purdue.edu/>>



Your Local USDA-NRCS service center Check your phone book under “County Government”

- Indiana Association of Soil & Water Conservation Districts (SWCD) Web Site <<http://www.iaswcd.org>>
- Natural Resources Conservation Service (NRCS) Web Site <<http://www.in.nrcs.usda.gov>>
- Indiana Department of Natural Resources-Soil Conservation Web Site (DNR) <<http://www.INgov/dnr/soilcons>>

Your Local Extension Office Phone Number:

Appropriate Technology Transfer for Rural Areas (ATTRA) (for sustainable practices)
 The National Sustainable Farming Information Center in agreement with USDA Rural Business Cooperative Service Agency
 ATTRA Web Site < <http://attra.ncat.org>>, Phone 1-800-346-9140 (toll free)

Your Local Soil & Water Conservation District Phone Number:

Indiana Conservation Tillage Initiative
 ICTI Web Site <<http://www.agry.purdue.edu/cti>>, Phone 765-653-5716.

Conservation Technology Information Center (CTIC)
 (for conservation tillage information)
 CTIC Web Site <<http://www.ctic.purdue.edu/>>, Phone 765-494-9555

Indiana Department of Environmental Management (IDEM)
 (for environmental regulations information)
 IDEM Web Site <<http://www.IN.gov/idem/visitors/agricultural.htm>>
 Ag Relations Office Phone 317/232-8587



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Knowledge to Go

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12/03

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