Research Activities Supported by the Nonpoint Project from 1996 to 2006

Prepared by
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I. Research Studies.

A. Phosphorus Management in Crop Systems to Protect Water Resources.

1. Controlling Excessive Phosphorus Accumulation in Agricultural Soils.

a. Factors Affecting Corn Response to Starter Fertilizer (1996).
b. Best Management Practices for Starter Fertilizer in Wisconsin Farming Systems (1996-1997).
c. Planting Date and Hybrid Maturity Effects on Corn Response to Starter Fertilizer (1997).
d. Long-Term Effects of N- and P-Based Manure Rates on Corn Production, Soil Properties, and Runoff P Losses in Three Tillage Systems (2001-present).

2. Management Practice Effects on Phosphorus Leaching to Groundwater.

a. Phosphorus Leaching Under a Restored Tallgrass Prairie and Corn Agroecosystems (1996-present).
b. Soil Phosphorus Forms, Amounts, and Movement in Biosolids-Treated Soils (1999).
c. Soil P Saturation Level and P Leaching in Biosolids-Treated Soils (2002).
d. Long-Term Effects of N- and P-Based Manure Rates on Corn Production, Soil Properties, and Runoff P Losses in Three Tillage Systems (2001-present).

3. Management Practice Effects on Phosphorus Losses in Surface Runoff.

a. Soil Test P Level Effects on P Losses in Runoff (1998).
b. Biosolids and Dairy Manure Effects on Soil Test P Levels and Soil, Water, and P Losses in Runoff in Corn (1998).
c. Tillage and Manure Effects on P Losses in Runoff (1998-2001, 2005).
d. Dairy Diet P Effects on P Losses in Runoff from Land-Applied Manure (1999-2000).
e. Manure History Effects on P Losses in Runoff from Land-Applied Manure (2001).
f. Phosphorus Losses in Runoff from Alfalfa and Grasses After Freezing or Drying (2001-2003).
g. Manure Handling Characteristics and Placement Effects on P Losses in Runoff (2002-2003).

h. Over-Winter P Losses in Runoff from Land-Applied Manure (2002-2003).
i. Long-Term Effects of N- and P-Based Manure Rates on Corn Production, Soil Properties, and Runoff P Losses in Three Tillage Systems (2001-present).
j. Tillage and Dairy P Diet Effects on P Losses in Runoff from Land-Applied Manure (2003-2004).
k. Effect of Animal Species and Consistency of Surface-Applied Manure to No-Till Ccorn on P in Runoff (2004).
l. Phosphorus Concentrations in Runoff from Plot and Sub-Watershed Scales in Wisconsin Cropping Systems (2004-2006).
m. Manure Sample Handling and Extraction Methods for Determining Water-Soluble P in Manures (2004-2005).

B. Nitrogen Management in Crop Systems to Protect Water Resources.

1. Characterizing Nitrogen Mineralization and Availability to Minimize Nitrate Losses to Groundwater.

a. Residue and N Source Effects on N Availability to No-Till Corn (1996).
b. Site-Specific Prediction of Soybean N Credits (1996).
c. Management of Sweet Corn Processing Wastes to Protect Groundwater Quality (1996-1997).
d. Nitrogen Cycling in Crop Residues and Cover Crops on Irrigated Sandy Soils (1996-1998).
e. Site-Specific N Tests to Predict Optimum N Rates for Winter Wheat (1996-1999).
f. Long-Term N Fertilizer Effects on N Availability to Continuous Corn (1996-present).
g. Nitrogen Leaching Under a Restored Tallgrass Prairie and a Corn Agro-ecosystem With and Without Tillage (1996-2006).
h. Development of a Within-Field Variable Rate N Application Approach for Corn (1997-1998).
i. Planting Date and Hybrid Maturity Effects on Optimum N Rates for Corn (1997-1999).
j. Nitrogen Contributions from Annual Legumes to Corn Following Winter Wheat (1998-2001).
k. Nitrogen Application Effects on Residue Decomposition and No-Till Corn Yields (1998-2001).
l. Long-Term Rotation and Corn N Rate Effects on Nitrate Leaching (1998-2003).
m. Nitrification Inhibitor Effects on Optimum N Rates for Corn (2000).
n. Winter Cover Crop Effects on Optimum N Rates for Corn on Irrigated Sandy Soils (2000-2003).
o. Nitrogen Availability and Nitrate Leaching in Biosolids-Treated Soils (2001-2002).

p. Evaluation and Field Calibration of the Amino Sugar N Soil Test for Predicting Optimum N Rates for Corn in Wisconsin (2002-2005).
q. Improving N Management for Corn on Irrigated Sandy Soils (2003-2006).
r. Cropping System Effects on Winter Wheat Response to Fertilizer Nitrogen (2005-2006).
s. Evaluation of Slow-Release Urea N Fertilizers for Improving N Management for Corn on Irrigated Sandy Soils (2005-2006).
t. Corn Response to Nitrogen on Non-Irrigated Sandy Soils (2006).

2. Management Practice Effects on Nitrogen Losses in Surface Runoff.

a. Tillage and Manure Effects on N Losses in Runoff (2000-2001, 2005).
b. Manure History Effects on N Losses In Runoff From Land-Applied Manure (2001).
c. Manure Handling Characteristics and Placement Effects on N Losses in Runoff (2002-2003).
e. Nitrogen Losses in Runoff from Alfalfa and Grasses after Freezing or Drying (2001-2003).
f. Effect of Animal Species and Consistency of Surface-Applied Manure to No-Till Corn on N in Runoff (2004).
g. Long-Term Effects of N- and P-Based Manure Rates on Corn Production, Soil Properties, and Runoff N and P Losses in Three Tillage Systems (2001-present).

II. Publications.

A. Journals.

1. Vanotti, M.B., L.G. Bundy, and A.E. Peterson. 1997. Nitrogen fertilizer and legume-cereal rotation effects on soil productivity and organic matter dynamics in Wisconsin. p. 105-119. In E.A. Paul et al. (eds.) Soil Organic Matter in Temperate Agroecosystems: Long-Term Experiments in North America. CRC Press, Boca Raton, FL.

2. Bundy, L.G., and T.W. Andraski. 1999. Site-specific factors affecting corn response to starter fertilizer. J. Prod. Agric. 12:664-670.

3. Andraski, T.W., L.G. Bundy, and K.R. Brye. 2000. Crop management and corn nitrogen rate effects on nitrate leaching. J. Environ. Qual. 29:1095-1103.

4. Bundy, L.G., T.W. Andraski, J.M. Powell. 2001. Management practice effects on phosphorus losses in runoff in corn production systems. J. Environ. Qual. 30:1822-1828.

5. Bundy, L.G., and S.J. Sturgul. 2001. A phosphorus budget for Wisconsin cropland. J. Soil Water Conserv. 56:243-249.

6. Andraski, T.W., and L.G. Bundy. 2002. Using the presidedress soil nitrate test and organic nitrogen crediting to improve corn nitrogen recommendations. Agron. J. 94:1411-1418.

7. Brye, K.R., T.W. Andraski, W.M. Jarrell, L.G. Bundy, and J.M. Norman. 2002. Phosphorus leaching from a restored tallgrass prairie and corn agroecosystems. J. Environ. Qual. 31 :769-781.

8. Ebeling, A.M., L.G. Bundy, J.M. Powell, and T.W. Andraski. 2002. Dairy diet phosphorus effects on phosphorus losses in runoff from land-applied manure. Soil Sci. Soc. Am. J. 66:284-291.

9. Andraski, T.W., and L.G. Bundy. 2003. Relationships between phosphorus levels in soil and in runoff from corn production systems. J. Environ. Qual. 32:310-316.

10. Andraski, T.W., L.G. Bundy, and K.C. Kilian. 2003. Manure history and long-term tillage effects on soil properties and phosphorus losses in runoff. J. Environ. Qual. 32:1782-1789.

11. Ebeling, A.M., L.R. Cooperband, and L.G. Bundy. 2003. Phosphorus availability to wheat from manures, biosolids, and an inorganic fertilizer. Commun. Soil Sci. Plant Anal. 34:1347-1365.

12. Ebeling, A.M., L.R. Cooperband, and L.G. Bundy. 2003. Phosphorus source effects on soil test phosphorus and forms of phosphorus in soil. Commun. Soil Sci. Plant Anal. 34:1897-1917.

13. Bundy, L.G., and T.W. Andraski. 2004. Diagnostic tests for site-specific nitrogen recommendations for winter wheat. Agron. J. (96:608-614).

14. Bundy, L.G., H. Tunney, and A.D. Halvorson. 2005. Agronomic aspects of phosphorus management. p. 685-727. In J.T. Sims and A.N. Sharpley, (ed.) Phosphorus, agriculture and the environment. ASA/CSSA/SSSA, Madison, WI.

15. Bundy, L.G., and T.W. Andraski. 2005. Recovery of fertilizer nitrogen in crop residues and cover crops on an irrigated sandy soil. Soil Sci. Soc. Am. J. 69:640-648.

16. Andraski, T.W., and L.G. Bundy. 2005. Cover crop effects on corn yield response to nitrogen on an irrigated sandy soil. Agron. J. 97:1239-1244.

17. Osterhaus, J.T., L.G. Bundy, and T.W. Andraski. 200_. Evaluation of the Illinois soil nitrogen test and soil organic nitrogen fractions for predicting corn nitrogen needs. Soil Sci. Soc. Am. J. (submitted 6/1/06).

18. Roberson, T., L.G. Bundy, and T.W. Andraski. 2007. Freezing and drying effects on potential plant contributions to phosphorus in runoff. J. Environ. Qual. (in press).

19. Ebeling, A.M., L.G. Bundy, A.W. Kittell, and D.D. Ebeling. 200_. Evaluating the Bray P1 test on high pH, calcareous soils. Soil Sci. Soc. Am. J. (submitted 10/6/06).

B. Conference Proceedings.

1. Bundy, L.G. 1996. Sweet corn silage – The final chapter. Summary and recommendations for land application (Wisconsin). Proc. Midwest Food Processors Assoc. Processing Crops Conf., La Crosse, WI, 8:75-77

2. Bundy, L.G., and T. W. Andraski. 1996. End-of-season soil and plant nitrate tests to evaluate nitrogen management practices for corn. p. 247-256. In K.A. Kelling (ed.) Proc. 1996 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

3. Schoessow, K.A., K.C. Killian, and L.G. Bundy. 1996. Soybean residue management and nitrogen credits to corn. p. 199-210. In K.A. Kelling (ed.) Proc. 1996 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

4. Andraski, T.W., and L.G. Bundy. 1997. Nitrogen availability to corn following small grains. In G. Hergert (ed.) North-Central Extension-Industry Soil Fertility Workshop, November 19-20, St. Louis, MO.

5. Bundy, L.G., and T.W. Andraski. 1997. Crop residue and nitrogen source effects on nitrogen availability in no-till corn. p. 216-225. In K.A. Kelling (ed.) Proc. 1997 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

6. Bundy, L.G., and T.W. Andraski. 1997. Fate of fertilizer nitrogen applied to sweet corn and potato on an irrigated sandy soil. p. 55-67. In 1997 Midwest Food Processors Association Processing Crops Manual and Proceedings, Univ. of Wisconsin-Extension at Madison, Univ. of Illinois-Extension at Champaign, and Univ. of Minnesota-Extension.

7. Bundy, L.G., T.W. Andraski, and W.L. Bland. 1997. Nitrogen cycling in crop residues and cover crops. p. 53-61. In Proc. 1997 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

8. Bundy, L.G., and T.W. Andraski. 1998. Nitrogen recovery by potato, sweet corn, and cover crops. p. 97-105. In Proc. Wisconsin's Annual Potato Meetings, Univ. of WI-Extension.

9. Bundy, L.G., and T.W. Andraski. 1999. Three-year summary of on-farm trials with starter fertilizer. p. 296-299. In K.A. Kelling (ed) Proc. 1999 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

10. Bundy, L.G., T.W. Andraski, J. M. Powell, J.S. Studnicka, and A.M. Ebeling. 2000. Management practice effects on phosphorus losses in runoff. p. 23-34. In K.A. Kelling (ed) Proc. 2000 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

11. Bundy, L.G., and T.W. Andraski. 2001. Evaluation of nitrogen tests for site-specific nitrogen recommendations for winter wheat. p. 350-368. In K.A. Kelling (ed) Proc. 2001 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

12. Bundy, L.G., and T.W. Andraski. 2001. Manure and tillage effects on phosphorus in runoff. p. 25-38. 2001 North Central Extension-Industry Soil Fertility Conf, Nov. 14-15, 2001, Des Moines, IA.

13. Ebeling, A.M., L.G. Bundy, T.W. Andraski, and J.M. Powell. 2001. Dairy diet phosphorus effects on phosphorus losses in runoff from land-applied manure. p. 58-69. In K.A. Kelling (ed) Proc. 2001 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

14. Bundy, L.G., and W.M. Jarrell. 2003. Progress on the Wisconsin P index. p. 35-39. In K.A. Kelling (ed) Proc. 2003 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

15. Roberson, T., L.G. Bundy, and T.W. Andraski. 2003. Phosphorus runoff losses from alfalfa. p. 132-144. In K.A. Kelling (ed) Proc. 2003 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

16. Bundy, L.G. 2004. Potential for N carryover from 2003 to 2004. p. 5-9. In K.A. Kelling (ed) Proc. 2004 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

17. Good, L.W. 2004. The research basis for the Wisconsin phosphorus index. p. 255-257. In K.A. Kelling (ed) Proc. 2004 Wisc. Fert., Aglime, and Pest Manage. Conf., Univ. of WI-Extension.

18. Pearson, B., L.W. Good, P. Kaarakka, L. Bundy, K. Erb, and W. Jarrell. 2004. SNAP-Plus - Nutrient management software for Wisconsin. Proc. Wis. Fert. Aglime and Pest Mgmt. Conf. 43:258-261.

19. Bohl, N.L., L.G. Bundy, C.A. Baxter, T.W. Andraski, and L.W. Good. 2005. Scale of measurement effects on phosphorus runoff losses from cropland. In Proc. North Central Extension-Industry Soil Fertility Conf., Des Moines, IA. Vol.21, Potash and Phosphate Inst., Brookings, SD.

20. Bundy, L.G., and A.P. Mallarino. 2005. Field-scale tools for reducing nutrient losses to water resources. p. 151-162. In Proc. Gulf hypoxia and local water quality concerns workshop. Sept 26-28, 2005, Ames, IA. Iowa State Univ., Ames, IA.

21. Good, L.W., and L.G. Bundy. 2005. Validating the Wisconsin P index with measured runoff P losses from agricultural fields. p. 115-122. In Proc. North Central Ext. – Industry Soil Fertility Conf., Des Moines, IA Vol.21, Potash and Phosphate Inst., Brookings, SD.

22. Mallarino, A.P., and L.G. Bundy. 2005. Agronomic and environmental implications of phosphorus management practices. p. 85-103. In Proc. Gulf hypoxia and local water quality concerns workshop. Iowa State Univ., Ames, IA. 26-28 September 2005.

23. Osterhaus, J.T., L.G. Bundy, and T.W. Andraski. 2005. Evaluation of the Illinois soil nitrogen test for corn production in Wisconsin. In Proc. North Central Extension-Industry Soil Fertility Conf., Des Moines, IA Vol.21, Potash and Phosphate Inst., Brookings, SD.

24. Bohl, N.L., L.G. Bundy, C.A. Baxter, T.W. Andraski, and L.W. Good. 2006. Scale of measurement effects on phosphorus in runoff from cropland. Proc. Wis. Fert. Aglime and Pest Mgmt. Conf. 45:288-295.

25. Bundy, L.G. 2006. Sidedressing nitrogen: Useful on all soils? Proc. Wis. Fert. Aglime and Pest Mgmt. Conf. 45:39-43.

26. Bundy, L.G. 2006. How can we improve nitrogen use efficiency? Proc. Wis. Fert. Aglime and Pest Mgmt. Conf. 45:54-60.

27. Bundy, L.G. 2006. Nitrogen mineralization estimates for N rate suggestions. In Proc. North Central Extension–Industry Soil Fert. Conf., Des Moines, IA. Vol. 22:66-71, Potash and Phosphate Inst., Brookings, SD.

28. Ebeling, A., L. Bundy, A, Kittell, and D. Ebeling. 2006. Evaluation of the Bray P1 soil test on eastern red soils in Wisconsin. Proc. Wis. Fert. Aglime and Pest Mgmt. Conf. 45:296-302.

29. Good, L.W., and L.G. Bundy. 2006. Development and validation of the Wisconsin phosphorus index. Proc. Wis. Fert. Aglime and Pest Mgmt. Conf. 45:135-138.

30. Laboski, C.A.M., J.E. Sawyer, D.T. Walters, L.G. Bundy, R. G. Hoeft, G.W. Randall, and T.W. Andraski. 2006. Evaluation of the Illinois soil nitrogen test in the North Central Region. In Proc. North Central Extension–Industry Soil Fert. Conf., Des Moines, IA. Vol. 22:86-93, Potash and Phosphate Inst., Brookings, SD.

31. Osterhaus, J.T., and L.G. Bundy. 2006. Using the Illinois soil nitrogen test to predict optimum nitrogen rates for corn in Wisconsin. Proc. Wis. Fert. Aglime and Pest Mgmt. Conf. 45:61-67.

C. Technical.

1. Bundy, L.G., and T.W. Andraski. 1996. Starter fertilizer for corn. New Horizons in Soil Science, No. 4-96.

2. Bundy, L.G., and T.W. Andraski. 1997. Predicting corn response to starter fertilizer. New Horizons in Soil Sci. No. 5-97.

3. Bundy, L.G., and T.W. Andraski. 1998. Site-specific factors affecting corn response to starter fertilizer: Results from 100 on-farm trials. New Horizons in Soil Sci. No. 1-98.

4. Bundy, L.G., T.W. Andraski, and J.G. Lauer. 2000. Planting date and hybrid relative maturity effects on optimum nitrogen rates for corn. New Horizons in Soil Sci. No. 5-00.

5. Bundy, L.G., and T.W. Andraski. 2001. Starter fertilizer response on high and very high testing soils. Better Crops 85:3-5.
6. Bundy, L.G., T.W. Andraski, and S. Sturgul. 2004. Determining optimum nitrogen application rates for corn. New Horizons in Soil Sci. No. 1-04.
7. Laboski, C., and L. Bundy. 2005. New nitrogen rate guidelines for corn in Wisconsin using a regional approach. New Horizons in Soil Sci. No. 3-05. Dept. of Soil Science, Univ. of Wisconsin. 8 p.

D. Abstracts.

1. Bundy, L.G., and T.W. Andraski. 1996. Residue effects on nitrogen availability in no-till corn. p. 255. *In* 1996 Agronomy abstracts. ASA, Madison, WI.

2. Andraski, T.W., and L.G. Bundy. 1997. Nitrogen availability to corn following small grains. p. 242. *In* 1997 Agronomy abstracts. ASA, Madison, WI.

3. Bundy, L.G., and T.W. Andraski. 1998. Site-specific factors affecting corn response to starter fertilizer. p. 237. *In* 1998 Agronomy abstracts. ASA, Madison, WI.

4. Andraski, T.W., and L.G. Bundy. 1999. Nitrogen cycling in crop residues and cover crops. p. 244. *In* 1999 Agronomy abstracts. ASA, Madison, WI.

5. Andraski, T.W., L.G. Bundy, J.S. Studnicka, and J.M. Powell. 2000. Simulated rainfall duration and soil sampling depth effects on interpretation of phosphorus runoff data. p. 353. *In* 2000 Agronomy abstracts. ASA, Madison, WI.

6. Bundy, L.G., T.W. Andraski, J.S. Studnicka, and J.M. Powell. 2000. Management practice effects on P losses in runoff in corn production systems. p. 354. *In* 2000 Agronomy abstracts. ASA, Madison, WI.

7. Ebeling, A.M., L.G. Bundy, T.W. Andraski, and J.M. Powell. 2000. Dairy diet phosphorus effects on phosphorus losses in runoff from land-applied manure. p. 354. *In* 2000 Agronomy abstracts. ASA, Madison, WI.

8. Studnicka, J.S., T.W. Andraski, L.G. Bundy, and D.S. Taylor. 2000. Phosphorus forms, amounts, and movement in biosolids-treated soils. p. 354. *In* 2000 Agronomy abstracts. ASA, Madison, WI.

9. Brye, K.R., T.W. Andraski, W.M. Jarrell, L.G. Bundy, and J.M. Norman. 2001. Phosphorus leaching from a restored tallgrass prairie and corn agroecosystems. *In* 2001 Agronomy abstracts. ASA, Madison, WI.

10. Bundy, L.G., T.W. Andraski, and J.G. Lauer. 2001. Planting date and hybrid relative maturity effects on optimum nitrogen rates for corn. *In* 2001 Agronomy abstracts. ASA, Madison, WI.

11. Studnicka, J.S., T.W. Andraski, and L.G. Bundy. 2001. Nitrogen tests to predict optimum N rates for winter wheat. *In* 2001 Agronomy abstracts. ASA, Madison, WI.

12. Bundy, L.G., and T.W. Andraski. 2002. Using the presidedress soil nitrate test and organic nitrogen crediting to improve corn nitrogen recommendations. *In* 2002 Agronomy abstracts. ASA, Madison, WI.

13. Roberson, T., L.G. Bundy, and T.W. Andraski. 2002. Phosphorus losses from alfalfa and grasses after freezing or drying. *In* 2002 Agronomy abstracts. ASA, Madison, WI.

14. Andraski, T.W., and L.G. Bundy. 2003. Timing and placement effects of land-applied manure on phosphorus in runoff. *In* 2003 Agronomy Abstracts.

15. Good, L.W., T.W. Andraski, and L.G. Bundy. 2003. Use of simulated runoff research for development of the Wisconsin phosphorus index. *In* 2003 Agronomy Abstracts.

16. Bundy, L.G., S.J. Sturgul, and SM. Porter. 2003. Implementing BMP's and nutrient management planning in Wisconsin. *In* 2003 Agronomy Abstracts.

17. Bundy, L.G. 2003. How do manure and commercial fertilizer phosphorus sources differ? *In* 2003 Agronomy Abstracts.

18. Studnicka, J.S., T.W. Andraski, J.M. Powell, and L.G. Bundy. 2004. Dairy diet phosphorus source effects on phosphorus losses in runoff from land-applied manure. *In* 2004 Agronomy Abstracts.

19. Osterhaus, J.T., and L.G. Bundy. 2004. Evaluation of soil nitrogen tests for predicting corn nitrogen needs. *In* 2004 Agronomy Abstracts.

20. Bundy, L.G., J. S. Studnicka, and J.M. Powell. 2004. Manure handling and extraction procedure effects on determination of water extractable phosphorus in manures. *In* 2004 Agronomy Abstracts.

21. Good, L.W., L.G. Bundy, P.W. Barak, and J.M. Meyer. 2004. Predicting runoff sediment phosphorus concentrations using routine soil analyses. *In* 2004 Agronomy Abstracts.

22. Ebeling, A.M., and L.G. Bundy. 2004. Phosphorus source effects on the soil phosphorus buffering capacity. *In* 2004 Agronomy Abstracts.

23. Bohl, N.L., L.G. Bundy, C.A. Baxter, T.W. Andraski, and L.W. Good. 2005. Scale of measurement effects on phosphorus runoff losses from cropland. *In* Annual meetings abstracts [CD-ROM]. ASA, CSSA, and SSSA, Madison, WI.

24. Ebeling, A., A, Kittell, D. Ebeling, and L. Bundy. 2005. Evaluating Bray P1 on high pH, calcareous soil. *In* Annual meetings abstracts [CD-ROM]. ASA, CSSA, and SSSA, Madison, WI.

25. Good, L.W., and L.G. Bundy. 2005. Verification of the Wisconsin phosphorus index through infield runoff monitoring. *In* Annual meetings abstracts [CD-ROM]. ASA, CSSA, and SSSA, Madison, WI.

26. Osterhaus, J.T., L.G. Bundy, and T.W. Andraski. 2005. Evaluation of the Illinois soil nitrogen test for corn production in Wisconsin. *In* Annual meetings abstracts [CD-ROM]. ASA, CSSA, and SSSA, Madison, WI.

27. Studnicka, J.S., L.G. Bundy, J.M. Powell, and T.W. Andraski. 2005. Measuring water-extractable phosphorus in manures to predict phosphorus concentrations in runoff. *In* Annual meetings abstracts [CD-ROM]. ASA, CSSA, and SSSA, Madison, WI.

E. Extension Educational Materials.

1. Sturgul, S.J., and L.G. Bundy. 2002. Understanding soil phosphorus. Univ. Wis. Coop. Ext. Serv. Bull. A3731. *Received ASA 2002 Educational Material Award.*

2. Ebeling, A.M., L.G. Bundy, J.M. Powell, and L.D. Satter. 2002. Dietary phosphorus considerations in dairy management. Univ. Wis. Coop. Ext. Serv. Bull. I-11-02-4M.

3. Kelling, K.A., L.G. Bundy, A. Ebeling. 2003. Management options for farms with high soil test phosphorus levels. Nutrient & Pest Mgmt. Progr. Pub., Univ. of Wisconsin-Madison. 8 p. *Received ASA 2003 Educational Material Award.*

4. Kelling, K.A., L.G. Bundy, A. Ebeling. 2003. When and where to apply manure – Seasonal guidelines for minimizing phosphorus losses from manured fields. Nutrient & Pest Mgmt. Progr. Pub., Univ. of Wisconsin-Madison. 2 p.

5. Ebeling, A.M., L.G. Bundy, and S.J. Sturgul. 2004. Phosphorus movement from land to water. Nutrient & Pest Mgmt. Progr. Pub., Univ. of Wisconsin-Madison. 4 p.

6. Laboski, Carrie A.M., John B. Peters, and L.G. Bundy. 2006. Nutrient application guidelines for field, vegetable, and fruit crops in Wisconsin. Publ. A2809. Univ. of Wisconsin Extension, Madison.

7. Sawyer, J., E. Nafziger, G. Randall, L. Bundy, G. Rehm, and B. Joern. 2006. Concepts and rationale for regional nitrogen rate guidelines for corn. Publ. PM2015, Iowa State Univ. Extension, Ames, IA.

8. Sharpley, A.N., T. Daniel, G. Gibson, L. Bundy, M. Cabrera, T. Sims, R. Stevens, J. Lemunyon, P. Kleinman, and R. Parry. 2006. Best management practices to minimize agricultural phosphorous impacts on water quality. USDA-ARS Publ. ARS-163

III. Extension/Outreach activities conducted by Larry Bundy using information generated with Nonpoint Project funding.

A. 2001

1. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 17 Jan 2001, The Wisconsin P index and its relationship to P losses in runoff. 30 min presentation to 600.
2. Servi-Tech Ag. Professionals Workshop, Madison, 29 Jan 2001, Phosphorus losses in runoff. 45 min presentation to 30.
3. Polk Co. Nutrient Management Workshop, Balsam Lake, 13 Feb 2001, Phosphorus basics and Management effects on P losses in runoff. 30 min presentation to 40.
4. Madison Metropolitan Sewerage District Meeting, Madison, 28 Feb 2001, Phosphorus amounts and movement in biosolids-treated soils and P losses in runoff from biosolids-treated soils. 30 min presentation to 20.

5. Basin Educators Workshop, Green Lake, 10 Apr 2001, Phosphorus basics and Management effects on P losses in runoff. 60 min presentation to 25.
6. Phosphorus Research Roundtable, Madison, 2 May 2001, Management Practice Effects on Soluble and Total P in Runoff. 30 min presentation to 50. **See web site for full information about this program designed to promote communication and understanding about phosphorus and its role in agriculture and the environment.**
   http://www.soils.wisc.edu/extension/p_roundtables/title.htm
7. Marshfield Agr. Research Station Field Day, Marshfield, 11 Jul 2001, Management practice effects on P losses in runoff. 30 min presentation to 30.
8. DNR pollution trading meeting, Menominee, 1 Aug 2001, Soil P and Diet P effects on P in runoff. 60 min presentation to 12.
9. Training for Nutrient Management Planners, Wisconsin Dells, 11-12 Sep 2001, Manure and phosphorus issues. 20 min presentation to 60. Management practice effects on P losses in runoff. 20 min presentation to 50.
10. North Central Extension-Industry Soil Fertility Conference, Des Moines, IA, 11 Nov 2001, Tillage and manure effects on P losses in runoff. 20 min presentation to 150.

B. 2002

1. Indiana Fertilizer Conference, Indianapolis, IN (invited), 8 Jan 2002, Variable rate nitrogen management. 60 min presentation to 150.
2. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 16 Jan 2002, Variable rate nitrogen management. 30 min presentation to 300.
3. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 17 Jan 2002, Importance of starter fertilizer in reduced tillage systems. 25 min presentation to 200.
4. Wisconsin Corn-Soy Expo, Madison, 5 Feb 2002, Phosphorus-based nutrient management. 45 min presentation to 50.
5. Fluid Fertilizer Forum, Scottsdale, AZ (invited), 18 Feb 2002, Importance of starter fertilizer for reduced tillage corn. 30 min presentation to 150.
6. Certified Crop Advisor Training Program – Honeywell, Minneapolis, MN (invited), 12 Mar 2002, Controlling nitrogen volatilization losses. 45 min presentation to 110.
7. Wisconsin Phosphorus Roundtable Program, Madison, 17 Jul 2002, Refinement and application of the Wisconsin phosphorus index. 25 min presentation to 40.
   http://www.soils.wisc.edu/extension/p_roundtables/title.htm
8. Columbia County Corn Growers Association Field Day, Cambria, 16 Aug 2002, Nitrogen management for corn production. 30 min presentation to 50.
9. Fond du Lac County Agronomy Field Day, Lamartine, 27 Aug 2002, Managing fields testing high in phosphorus. 30 min presentation to 35.
10. Agronomy-Soils Field Day, Arlington Agr. Research Station, 5 Sep 2002, Phosphorus in runoff from alfalfa and grasses. 20 min presentation to 120.
11. UW-Extension Nutrient Management Team Meeting, Platteville, 26 Sep 2002, The Wisconsin phosphorus index. 30 min presentation to 40.

12. Oregon Rotary Club Meeting, Oregon, 5 Nov 2002, Wisconsin's phosphorus budget. 30 min presentation to 25.
13. Ohio Agribusiness Association Crop Nutrient Workshop, Columbus, OH (invited), 6 Nov 2002, Nitrogen efficiency and fall nitrogen applications. 40 min presentation to 115.
14. UW-Extension NE District ANRE Agent Inservice Training, Appleton, 8 Nov 2002, Refinements and application of the Wisconsin phosphorus index. 30 min presentation to 20.
15. American Society of Agronomy Annual Meeting, Indianapolis, IN (invited), 12 Nov 2002, How can we reduce volatilization losses? 30 min presentation to 250.
16. Phosphorus Research Update, UW-Green Bay, 2 Dec 2002, Management practice effects on soluble and total phosphorus in runoff. 30 min presentation to 100. Fall phosphorus losses from frozen vegetation. 15 min presentation to 100.
17. Area Soil and Water Management Meetings, eight Wisconsin locations, 3-12 Dec 2002, Understanding soil phosphorus. 30 min to 483.
18. Area Fertilizer Dealer Meetings, eight Wisconsin locations, 3-12 Dec 2002, Importance of starter fertilizer composition. 25 min to 478.

C. 2003

1. Sheboygan County Meeting, Waldo, 9 Jan 2003, Importance of starter fertilizer composition. 30 min to 40.
2. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 21 Jan 2003, Progress on the Wisconsin phosphorus index. 20 min presentation to 300.
3. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 21 Jan 2003, Phosphorus losses in runoff from alfalfa and grasses. 15 min presentation to 200.
4. Wisconsin Corn-Soy Expo, Madison, 5 Feb 2003, Phosphorus-based nutrient management. 30 min presentation to 100.
5. Four State soil Testing Labs. Conference, Dubuque, IA, 21 Feb 2003, Understanding soil phosphorus. 30 min presentation to 80.
6. Spring Biosolids Symposium, Stevens Point, 11 Mar 2003, Phosphorus accumulation and movement in biosolids-treated soils. 30 min presentation to 200.
7. American Society of Agronomy North Central Branch Meeting, Madison (invited), 25 Mar 2003, The Phosphorus index: Upper Midwest update. 20 min presentation to 150.
8. Agronomy-Soils Field Day, Arlington Agr. Research Station, 9 Jul 2003, Manure timing and placement effects on P losses. 15 min presentation to 80.
9. Agronomy Field Day, Hancock Agr. Research Station, 29 Jul 2003, Cover crop effects on corn yield and N response. 20 min presentation to 50.
10. Training for Nutrient Management Planners Program, 4-5 Sep 2003, Madison, Legume nitrogen credits. 30 min presentation to 60.
11. Training for Nutrient Management Planners Program, 4-5 Sep 2003, Madison, Special considerations for nutrient management planning. 40 min presentation to 60.

12. Training for Nutrient Management Planners Program, 4-5 Sep 2003, Madison, Implications of P-based nutrient management planning. 40 min presentation to 60.
13. Training for Nutrient Management Planners Program, 9-10 Sep 2003, Eau Claire, Legume nitrogen credits. 30 min presentation to 40.
14. Training for Nutrient Management Planners Program, 9-10 Sep 2003, Eau Claire, Special considerations for nutrient management planning. 40 min presentation to 40.
15. Training for Nutrient Management Planners Program, 9-10 Sep 2003, Eau Claire, Implications of P-based nutrient management planning. 40 min presentation to 40.
16. Training for Nutrient Management Planners Program, 9-10 Sep 2003, Eau Claire, Phosphorus index exercise and demonstration. 50 min presentation to 40.
17. American Society of Agronomy Annual Meeting, Div. A-4, Denver, CO (invited), 3 Nov 2003, Implementing nutrient management planning in Wisconsin. 30 min presentation to 100.
18. American Society of Agronomy/Soil Science Society of America Annual Meeting, Denver, CO, 4 Nov 2003, Using simulated rainfall data to create the Wisconsin P index. Poster presentation to 50.
19. American Society of Agronomy Annual Meeting, Div. A-9, Denver, CO (invited), 5 Nov 2003, How do manure and fertilizer P sources differ? 30 min presentation to 150.
20. Cornell-Wisconsin Nutrient Management Software Evaluation Seminar, Madison (Video broadcast to Ithaca, NY), 18 Nov 2003, The Wisconsin Phosphorus Index. 25 min presentation to 150.
21. Area Soil and Water Management Meetings, eight Wisconsin locations, 2-11 Dec 2003, Tillage and manure timing to minimize P losses. 30 min to 509.
22. Area Fertilizer Dealer Meetings, eight Wisconsin locations, 2-11 Dec 2003, Results from on-farm N rate response trials. 30 min to 502.
23. Area Fertilizer Dealer Meetings, eight Wisconsin locations, 2-11 Dec 2003, Soil test P vs. total P in Wisconsin soils. 15 min to 502.

D. 2004

1. Polk County Meeting, Osceola, 12 Jan 2004, Nitrogen carryover potential in 2004. 30 min presentation to 15. Phosphorus-based nutrient management and P indexing. 30 min to 15.
2. Barron County Meeting, Cumberland, 13 Jan 2004, Nitrogen carryover potential in 2004. 30 min presentation to 25. Phosphorus-based nutrient management and P indexing. 30 min to 25.
3. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 20 Jan 2004, Nitrogen carryover potential in 2004. 25 min presentation to 700.
4. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 21 Jan 2004, Long-term N application effects on soil productivity. 20 min presentation to 300.
5. Wisconsin Corn-Soy Expo, Madison, 3 Feb 2004, Nitrogen management techniques for 2004. 30 min presentation to 100.

6. Corn-Soybean Management Seminar, Mauston, 26 Feb 2004, Fertility management for corn and soybean in 2004. 30 min presentation to 35.
7. Corn-Soybean Management Seminar, Stevens Point, 2 Mar 2004, Fertility management for corn and soybean in 2004. 30 min presentation to 30.
8. Corn-Soybean Management Seminar, Marshfield, 4 Mar 2004, Fertility management for corn and soybean in 2004. 30 min presentation to 40.
9. Nutrient Management on Wisconsin Soils Program. Madison, 8-9 Mar 2004, Nitrogen reactions and management. 2.5 hr presentation to 38.
10. Nutrient Management on Wisconsin Soils Program. Madison, 8-9 Mar 2004, Sulfur and micronutrients. 1 hr presentation to 38.
11. Corn Producer's Meeting, Eau Claire, 30 Mar 2004, Nutrient management for irrigated corn. 45 min presentation to 50.
12. Corn Producer's Meeting, Hampton, MN, 31 Mar 2004, Nutrient management for irrigated corn. 45 min presentation to 50.
13. Invited Seminar, USDA-ARS, National Soil Erosion Research Lab., West Lafayette, IN, 14 Jul 2004, Effects of manure management and soil properties on phosphorus losses in runoff. 60 min presentation to 50.
14. Juneau-Adams-Marquette County Corn Growers Field Day, Wisconsin Dells, 26 Aug 2004, Polymer-coated urea performance and N management. 30 min presentation to 100.
15. Agronomy-Soils Field Day, Arlington, 1 Sep 2004, No-till corn response to potassium fertilization. 15 min presentation to 100.
16. Chippewa County Field Day, Chippewa Falls, 2 Sep 2004, Starter fertilizer recommendations for corn, and timing of fertilizer applications for alfalfa. 35 min presentation to 20.
17. DATCP Agricultural Resource Management Division Meeting, Arlington, 14 Sep 2004, Research basis for developing the Wisconsin phosphorus index. 30 min presentation to 60.
18. National Association of Institutional Agribusiness Convention, Appleton, 28 Sep 2004, Implementing nutrient management practices in Wisconsin. 60 min presentation to 40.
19. American Society of Agronomy/Soil Science Society of America Annual Meeting, Seattle, WA, 3 Nov 2004, Manure handling and extraction procedure effects on determination of water extractable phosphorus in manures. Poster presentation to 50.
20. American Society of Agronomy/Soil Science Society of America Annual Meeting, Seattle, WA, 3 Nov 2004, Evaluation of soil nitrogen tests for predicting corn nitrogen needs. Poster presentation to 50.
21. American Society of Agronomy/Soil Science Society of America Annual Meeting, Seattle, WA, 3 Nov 2004, Dairy diet phosphorus source effects on phosphorus losses in runoff from land-applied manure. Poster presentation to 50.
22. American Society of Agronomy/Soil Science Society of America Annual Meeting, Seattle, WA, 3 Nov 2004, Predicting runoff sediment phosphorus concentrations using routine soil analyses. Poster presentation to 50.

23. American Society of Agronomy/Soil Science Society of America Annual Meeting, Seattle, WA, 3 Nov 2004, Phosphorus source effects on the soil phosphorus buffering capacity. Poster presentation to 50.
24. Area Soil and Water Management Meetings, four Wisconsin locations, 30 Nov-9 Dec 2004, Sub-watershed scale sediment and nutrient losses in runoff. 30 min presentation to 250.
25. Area Fertilizer Dealer Meetings, eight Wisconsin locations, 30 Nov-9 Dec 2004, SNAP-plus and phosphorus index update. 20 min presentation to 472.
26. Area Fertilizer Dealer Meetings, eight Wisconsin locations, 30 Nov-9 Dec 2004, Crop response to soil test P and K and starter fertilizer. 20 min presentation to 472.

E. 2005

1. Columbia County Meeting, Otsego, 11 Jan 2005, Nitrogen rates and economics in corn production. 40 min presentation to 35.
2. Northwest Wisconsin Conservation Tillage Meetings, Baldwin and Cumberland, 12 Jan 2005, Conservation Tillage effects on water quality. 45 min presentation to 40 at each location.
3. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 19 Jan 2005, Phosphorus source effects on phosphorus availability, 20 min to 300.
4. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 19 Jan 2005, Should soybean N credits be taken in 2005? 20 min to 300.
5. Midwest Forage Association/Nutrient Applicators Association Conference, Wisconsin Dells, 26 Jan 2005, Nutrient management changes on-farm. 50 min to 50.
6. Corn-Soy Expo, Wisconsin Dells, 27 Jan 2005, Nitrogen timing and sources, 20 min to 200.
7. Central Wisconsin Corn-Soybean Management Seminar, Adams, 22 Feb 2005, Nitrogen prices and management, 45 min to 30.
8. Central Wisconsin Corn-Soybean Management Seminar, Marshfield, 24 Feb 2005, Nitrogen prices and management, 45 min to 12.
9. Four State Soil Testing Labs Conf., Dubuque, IA, 25 Feb 2005, Bray-Mehlich soil test P comparisons, 30 min to 65. Predicting total soil P from soil test P and soil organic matter, 30 min to 65.
10. J-Mar Grower's Meeting, Plover, 2 Mar 2005, Nitrogen management and ESN performance, 40 min to 75.
11. Managing Nutrients on Wisconsin Soils Workshop, Madison, 22-23 Mar 2005, Nitrogen reactions in soils, 60 min to 35. Nitrogen management, 90 min to 35. Sulfur and micronutrients, 75 min to 35.
12. Barron County Meeting, Rice Lake, 29 Mar 2005, Tillage effects on water quality and fertility management in no-till, 60 min to 25.
13. Nitrogen Management on Dairy Farms Symposium, Madison, 30 Mar 2005, Balancing fertilizer and organic N sources for agronomic and environmental benefits, 25 min to 40.

14. Outagamie County Forage Council Spring Field Day, 14 Apr, 2005, Using economic optimum fertilizer rates, 30 min to 30.
15. Nutrient Management Policy Meeting, DATCP-UW, Madison, 6 Jul 2005, Development and validation of the Wisconsin P index, 30 min to 50.
16. SERA-17 Phosphorus and the Environment Regional Committee meeting, Banff, 27-28 Jul 2005, Development and validation of the Wisconsin P index, Poster presentation to 50.
17. Hancock Field Day, Hancock, 4 Aug 2005, Nitrogen timing and slow release nitrogen fertilizers, 30 min to 100.
18. Training for Nutrient Management Planners Workshop, 23-24 Aug 2005, Wausau, Legume nitrogen credits, 30 min presentation to 25. Special considerations for nutrient management planning, 40 min to 25. N vs, P-based nutrient management plans, 15 min to 25. The P index and implications for nutrient management planning, 20 min to 25.
19. Fond du Lac County Field Day, 30 Aug 2005, Potassium management issues, 20 min to 50.
20. Arlington Agronomy-Soils Field Day, 31 Aug 2005, N and P-based manure rates on corn yield and soil test P, 15 min to 125. Manure in grain production systems: Soil fertility implications, 20 min to 100.
21. Training for Nutrient Management Planners Workshop, 7-8 Sep 2005, Madison, Legume nitrogen credits, 30 min presentation to 34. Special considerations for nutrient management planning, 40 min to 34. N vs, P-based nutrient management plans, 15 min to 34. The P index and implications for nutrient management planning, 20 min to 34.
22. Invited Presentation- Upper Mississippi Hypoxia Water Quality Conf., Ames, IA, 28 Sep 2005, Field-scale tools to reduce nutrient losses, 25 min to 200.
23. Manure Management Task Force Meeting, Madison, 20 Oct 2005, Development and validation of the Wisconsin P index, 30 min to 50.
24. Invited Presentation- American Society of Agronomy Annual Meeting, Salt Lake City, UT, 7 Nov 2005, How can we improve nitrogen use efficiency? 30 min to 250.
25. Area Fertilizer Dealer Meetings, eight Wisconsin locations, 29 Nov-8 Dec 2005, Maximizing profitability with nitrogen management, 25 min to 471. Short subjects on soil fertility, 15 min to 471.
26. WDATCP Board Meeting, Madison, 14 Dec 2005, Phosphorus management and the Wisconsin P index, 20 min to 50.

F. 2006

1. Columbia County Meeting, Otsego, 10 Jan 2006, Nitrogen rate guidelines and Nitrogen timing for corn production. 30 min presentation to 60.
2. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 18 Jan 2006, Sidedressing N: Useful on all soils?, 15 min to 500.
3. Wisconsin Fertilizer, Aglime and Pest Management Conference, Madison, 18 Jan 2006, How can we improve N use efficiency? , 30 min to 600.

4. Corn-Soy Expo, Wisconsin Dells, 26 Jan 2006, Profitable N use and controlling losses through management, 30 min to 100.
5. Corn Grower's Meeting, Hancock, 1 Feb 2006, Selecting profitable N rates for corn using MRTN guidelines, 30 min to 60.
6. Invited Presentation-Iowa Agriculture and Environment conference, Ames, IA, 3 Mar 2006, Management practices to reduce phosphorus losses from cropland, 30 min to 150.
7. Invited Presentation-American Soc. Agronomy North Central Branch meeting, Des Moines, IA, 15 Mar 2006, Regional experiences with the Illinois amino sugar N test. 30 min to 100.
8. Chippewa County Crop Care Clinic, Chippewa Falls, 27 June 2006, Nitrogen management for corn. 30 min to 15.
9. Hancock Field Day, Hancock ARS, 27 Jul 2006, Nitrogen management for corn on sandy soils. 30 min to 60.
10. Agronomy/Soils Field Day, Arlington, 30 Aug 2006. Long-term nitrogen use in continuous corn: Effects on soil organic matter. 15 min to 200.
11. Invited Presentation-North Central Extension-Industry Soil Fertility Conference, Des Moines, IA, 8 Nov 2006, Nitrogen mineralization estimates for N rate suggestions, 30 min to 150.
12. Area Fertilizer Dealer Meetings, eight Wisconsin locations, 28 Nov-7 Dec 2006, Nitrogen rate guidelines and management in new A2809 publication, 20 min to 469, Exercise on using the new Soil Fertility Guidelines, 30 min to 469.
13. On-farm Research Workshop, Wisconsin Dells, 19 Dec 2006, Conducting on-farm research, 30 min to 55.

IV. Projects with Co-funding from the Nonpoint Project

1. Phosphorus losses in runoff from Wisconsin soils, 7/97 to 6/02, $24,970, Wis. Fert. Res. Fund.
2. Evaluation of nitrogen tests for site-specific N recommendations for winter wheat, 7/97-6/00, $33,680, Wis. Fert. Res. Fund.
3. Planting date and hybrid effects on N recommendations for corn, 7/97-6/00, $29,440, Wis. Fert. Res. Fund.
4. Phosphorus forms, amounts, and movement in biosolids treated soils, 5/99-6/00, $ 23,800, Madison Metropolitan Sewerage District.
5. Nutrient management in biosolids-treated soils, 5/01 to 9/02, $17, 200, Madison Metropolitan Sewerage District.
6. Phosphorus losses in runoff from Wisconsin soils, 7/00 to 6/03, $49, 800, Consortium for Agric. & Nat. Resources, UW System.
7. Tillage effects on phosphorus losses in runoff from land-applied manure, 10/00 to 9/03, $185,460, Wis. Dept. Agric., Trade, & Consumer Protection (WDATCP).
8. Plant availability of phosphorus from manure differing in phosphorus concentration compared with other phosphorus sources, 7/00-6/01, $6,340, Wis. Fert. Res. Fund.
9. Manure management and history effects on P losses in runoff, 7/01 to 6/04, $47,190, Wis. Fert. Res. Fund.

10. A systems approach to improved phosphorus management on dairy farms, 10/97-9/00, $200,000, USDA-NRI-CGP, Agricultural Systems.
11. A systems approach to improving phosphorus management on dairy farms, 7/01 to 6/04, $236,000, USDA-CSREES NRI CGP.
12. Integration of phosphorus research, education, and policy development, 10/01 to 12/05, $700,000, USDA-IFAFS.
13. Timing and placement effects of land-applied manure on phosphorus losses in runoff, 7/02-6/04, $58,320, Consortium for Agric. & Nat. Resources, UW System.
14. Enhancement and support of the Wisconsin P index – Management effects on P losses in runoff from cropland, 10/03 to 9/04, $100,000, WDATCP.
15. Development, maintenance and support of comprehensive nutrient management planning tools, 10/03 to 9/04, $156,000, USDA-NRCS.
16. Evaluation of the amino sugar nitrogen soil test for predicting optimum N rates for corn, 7/03 to 6/05, $25,000, Wis. Fert. Res. Fund.
17. Field calibration of the amino sugar nitrogen soil test in Wisconsin, 7/03 to 6/06, $35,250, Wis. Fert. Res. Fund.
18. Improving nitrogen management for corn on irrigated sandy soils, 7/03 to 6/06, $68,500, Agrium Inc., Wis. Fert. Res. Fund, and Honeywell Inc.
19. Nitrogen and phosphorus-based manure application rate effect on P losses in runoff, 7/03 to 6/06, $43,510, Wis. Fert. Res. Fund.
20. Phosphorus concentrations in runoff from plot and sub-watershed scales in Wisconsin cropping systems, 7/04 to 6/06, $63,025, Consortium for Agric. & Nat. Resources, UW System.
21. Effect of animal species and consistency of surface-applied manure to no-till corn on phosphorus in runoff, 7/04 to 6/05, $1,500, Wisconsin Egg Producers Assoc.
22. Enhancement and support of the Wisconsin P index – Management effects on P losses in runoff, 10/04 to 9/05, $90,000, WDATCP.
23. Wisconsin Buffer Initiative – Adapting SNAP-Plus as a practical buffer effectiveness assessment tool, 7/04 to 12/05, $180,000, USDA/NRCS.
24. Wisconsin Buffer Initiative – SNAP-Plus and P index adaptation for the Wisconsin Buffer Initiative, 10/05 to 9/06, $65, 597, USDA/NRCS.

Total Funding = $2,440,582