COMPANION DOCUMENTATION FOR THE ECO-POTATO STANDARDS

Prepared by the

WWF/WPVGA/UW Collaboration

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I. INTRODUCTION

The purpose of this document is to present the approaches and methods used to develop eco-label standards for ecologically grown Wisconsin potatoes. This standard and eco-label is an outgrowth of the partnership between World Wildlife Fund (WWF), Wisconsin Potato and Vegetable Growers Association (WPVGA) and the University of Wisconsin (UW)—known as the WWF/WPVGA/UW Collaboration. This document provides a general overview of progress of developing this new standard and eco-label. Further details on the collaboration in general and the approaches and methods used for this new eco-label can be found at http://ipcm.wisc.edu/bioIPM.

II. COLLABORATION BACKGROUND

A partnership between WWF and the WPVGA was founded through a memorandum of understanding (MOU) in 1996. The 1996 MOU outlined the following goals for the WWF/WPVGA Collaboration: promote the development and adoption of biointensive IPM practices; enhance habitat quality; refine measurement systems for BioIPM adoption; develop marketplace incentives for ecologically produced potatoes; and identify policies and programs to support environmental goals. UW, which has always contributed pertinent research, education, and information to the Collaboration, officially became a member in 1999 (Lynch et al., 2000).

III. OVERVIEW OF STANDARDS DEVELOPMENT

To insure a high degree of credibility and integrity, major eco-label components have been clearly defined and separated to avoid conflict of interests, provide transparency, and secure the necessary data to support market claims and product authenticity (Dlott and Curtis, 2000).

The collaboration proposed that a new eco-label logo (trademark) be owned by a 501(c)3 research and education nonprofit corporation (Consumer Reports, 2001). **Figure 1** presents an overview of the major eco-label components and responsible parties. The standards will be in the public domain for all interested parties to review. The nonprofit will decide how standard revisions will occur. In addition, the nonprofit will be responsible for accrediting third-party certifiers and chain of custody providers, and licensing the use of the eco-label trademark in marketing material such as product packaging and point of sale promotional material.

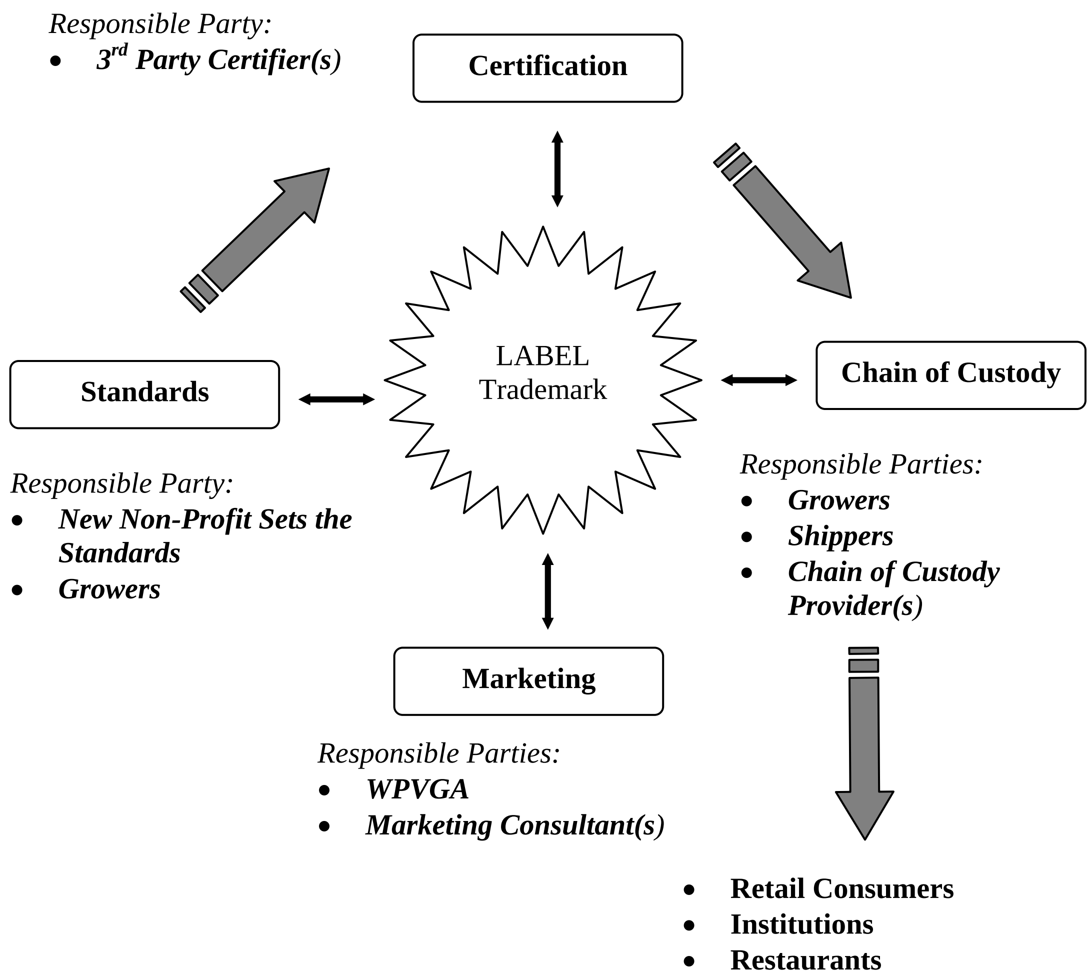

Figure 1. Overview of the major eco-label components and responsibly parties

A prerequisite to the development of market based incentives for BioIPM products was the design and field testing of pesticide risk and BioIPM adoption measurement methods. The collaboration has successfully developed a multiattribute toxicity index, described later in this document, to measure pesticide risks (Benbrook et al., *in preparation*). A BioIPM adoption measurement method, based on preventative practice points (PPPs), has also be developed and tested (Nowak et al, in *preparation*). These two measurement systems provide a solid foundation for the development of a performance-based eco-label for BioIPM grown potatoes.

Led by the University of Wisconsin potato IPM team[1] and with input from consultants[2], growers[3], and environmentalists[4], ecological standards, are being developed for growing environmentally friendly potatoes. The draft standards contain both a BioIPM adoption component and a pesticide toxicity section. An outline of these two components is presented in Section IV below.

IV. OUTLINE OF STANDARDS

The eco-standard is divided into 3 parts, 1) an eco-potato production section, 2) and natural community standard and 3) toxicity score. To become certified, growers must pass established thresholds in all 3 portions of the standards.

In the eco-production section, the adoption of BioIPM and ecological production practices are measured. Growers must incorporate certain practices into their potato production to quality, as well as accumulating the necessary amount of total points through various practices. This portion of the standard is based on the collaboration's method to measure BioIPM adoption (Nowak et al, *in preparation*)

The natural community standard focuses on restoration practices and establishment of privately owned non-agricultural landscapes found on grower’s farms. This entitles grower to management their farms in their entireties, not as individual fields.

The toxicity guidelines are set so that a grower minimizes the amount of high-risk pesticides applied to a field in a given year. The toxicity unit totals are derived from toxicity values developed from the WWF/WPVGA/UW Collaboration (Benbrook et al., *in preparation*).

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[1] The University of Wisconsin IPM team includes: Dr. Deana Sexson, Collaboration Coordinator; Dr. Jeff Wyman, Professor, Department of Entomology, Dr. Walt Stevenson, Professor, Department of Plant Pathology; Dr. Larry Binning, Professor, Department of Horticulture; Dr. Pete Nowak, Professor, Department of Rural Sociology; Dr. Leslie Cooperband, Assistant Professor, Department of Soil Science; Dr. Tim Connell, Central Wisconsin Vegetable Specialist for UW-Extension, and Kit Schmidt, Program Manager, Nutrient and Pest Management Program.
[2] Dr. Chuck Benbrook, Benbrook Consulting Services, has made substantial contributions to the standards. Contributions have also been made by Dr. Jeff Dlott, *Real*Toolbox.
[3] Participating project growers: Larry Alsum, Jim Okray, Steve Diercks, Andy Diercks, Chris Malek, John Wallendal, Andy Wallendal, Nick Sommers, Justin Isherwood, Brian Bushman, Rod Gumz, Scott Kempley, Pete Steuck, Bob Lapacinski, John Bobek III, Joe Malek, Jeff Sommers, Ron Wolosek, Tom Igl, and John Mommsen.
[4] Dr. Sarah Lynch, Agricultural Pollution Prevention Program Officer, World Wildlife Fund and Jeb Barzen, Director of Field Ecology, International Crane Foundation.

Growers must limit the total number of toxicity units applied during the year to be eligible for certification.

A. Eco-potato Production Standard

The potato production standards include the following nine areas: scouting section, information section, pest management decisions, field management decisions, weed management, insect management, disease management, soil and water quality, and storage management. A grower must achieve a minimum number of points in each section to qualify for certification (40%-50% of the points depending on the section). Furthermore, a total score of greater than 70% of the total points must be scored to achieve certification. Since growers must receive a minimum number of points in each of the nine sections, growers that are certified are implementing recommended practices throughout the production system.

The total points which can be scored on the production standard varies depending on whether growers choose a short season (less than 90 days from emergence to vinekill) or long season (greater than 90 days from emergence to vinekill) potato variety. In addition, the storage management section only applies to growers who are storing the crop. Growers who fresh pack directly off the field are not awarded nor penalized by points in the storage section, and do not answer the storage management section.

1. Required Practices and Bonus Points

Many practices found in the production standards are required practices, such as rotation, scouting, record keeping, planting certified seed, etc. Growers must implement these practices or else they are automatically eliminated from certification. Conversely, some practices are designated as bonus questions that allow growers to add to their total points without penalty for not implementing these practices (such as extra credit). These practices are considered to be cutting-edge practices that are not currently utilized in the vast majority of production systems. Many of these practices are still in the research and development stage so specific University recommendations have not been developed to educate the majority of growers on how to implement them. Therefore, bonus points are given to growers who try these practices in the field that they are certifying.

2. Point System

The point system used in the standards is designed to reward growers for implementing ecologically based practices. Point values for specific practices were allocated to reflect their relative contribution to BioIPM programs. Point contribution of the BioIPM sections were modeled after the preventative practice points (PPP's) measurement systems developed by the collaboration (Nowak et al, *in preparation*). Practices that provide multiple benefits such as long distance crop rotations (which benefit insect and disease management) are awarded points in multiple sections (e.g., insect, disease and field management sections). Growers are also awarded a certain amount of points for general management practices (e.g., field scouting) and can earn additional points through implementing specific techniques (e.g., utilizing the proper sampling technique for a major insect pest).

3. Verification of Practices and Pesticide Use

The questions in the standards have been written to maximize the percentage of points that can be verified through records. Records maintained by the grower will verify approximately 80% of the questions in the eco-potato production portion. A small proportion of questions fall into "self-evaluation" category and their score relies on the honor system. The intent of these questions is to capture the attitudes and beliefs of the growers and serve as an education tool. However, growers must achieve a range of 40%-50% in each of the nine sections and obtain a total score of 70% or greater. In addition, the toxicity unit scores and restricted use of materials are verified with records.

4. Future Refinements and New Sections

New technological advances will be incorporated into existing sections of the eco-production standards as the University and collaboration partners develop recommendations for the implementation of these practices. Additional sections will be added as they are developed. The soil and water quality section will be expanded further, and an ecosystem / conservation section will be added when the production practices recommend for these modules are developed.

B. Toxicity Guidelines

The WWF/WPVGA/UW Collaboration partners are using a multi-attribute index which includes 4 categories: (1) acute mammalian toxicity; (2) chronic mammalian toxicity; (3) ecotoxicity (risks to small aquatic organisms, fish, and birds); and (4) impacts on the viability of biointensive IPM (effects on beneficial organisms, bees, and resistance management). Toxicity factors allow the active ingredients of individual pesticide to be compared on a pound-for-pound basis so that the relative potential risk of a pesticide to human, wildlife and bioIPM risks can be compared. Toxicity factor values are calculated from the following formula:

Toxicity factor value = (0.5)*acute mammalian toxicity + chromic mammalian toxicity + ecotoxicity + (1.5)* BioIPM impacts

To determine the toxicity units per acre for the season, the pounds of active ingredient applied per acre for each compound are multiplied by the toxicity factor value for that specific compound. The total toxicity units per acre for each compound are then added together to accumulate total toxicity units per acre for all compounds applied during the growing season (Benbrook et al., *in preparation*).

The toxicity guidelines are set to minimize the amount of high-risk pesticides applied to a field in a given year. A cap of 800 toxicity units per acre is placed on short season potatoes (less than 90 days from emergence to vinekill) and 1200 toxicity units per acre are placed on long season potatoes (greater than 90 days from emergence to vinekill). As compared to conventional pesticide programs, these limits are low and growers must choose their chemical choices wisely in order to meet this strict standard (Wyman et al., 2000; Stevenson et al., 2000).

C. Late Blight Provision To Toxicity Units

Late blight (*Phytophthora infestans*) is found throughout the world and has been responsible for periodic epidemics when weather conditions favor infection. Late blight can be a very serious disease on potatoes particularly where the weather is consistently cool and rainy in late summer and fall. Late blight is responsible for millions of dollars of losses in the U.S. Since late blight is a serious threat to potato production and can spread rapidly through growing regions, all growers must implement preventative management strategies to remain economically viable. Protectant fungicide use is necessary to prevent the onset and/or spread of late blight.

Prediction modules are used to determine when fungicide applications need to occur to prevent late blight infection (Stevenson, 1993). The prediction module for late blight is weather dependent and calculates a value known as severity values. Once 18 severity values are accumulated, the conditions are favorable for the development of late blight, and a protectant fungicide spray program must be initiated to prevent infection. The date at which eighteen severity values is accumulated can vary depending on the weather conditions for a particular growing season. If 18 severity values are reached early in the growing season, substantially more fungicide sprays must be applied, therefore increasing the total toxicity units. Provisions are written into the eco-potato standard to accommodate this situation. If late blight is found in the vicinity of the field that will be certified (within 25 mile) additional fungicide applications will need to occur. A grower who is applying preventative fungicides on a 7-day schedule will now need to apply preventative fungicides on a 5-day schedule to prevent disease. This will add to the total toxicity units. As late blight is the most serious disease pest of potatoes, the following provisions are written into the standards FOR LATE BLIGHT ONLY:

- If 18 severity values are reached by June 1st, 400 more toxicity units may be used for fungicides.
- If 18 severity values are reached by June 15th, 200 more toxicity units may be used for fungicides.

The following conditions apply ONLY when late blight is found in the vicinity (within 25 miles of field):

- If late blight is found in the vicinity in June, than add 400 toxicity units
- If late blight is found in the vicinity after June 30th but before July 15th, than add 300 toxicity units
- If late blight is found in the vicinity after July 15th but before August 1st, than add 200 toxicity units
- If late blight is found in the vicinity in August, than add 100 toxicity units

D. Chemical Restrictions

Two key principles of this eco-label are reducing reliance on high-risk pesticides and increasing BioIPM adoption. Lists for “do not use” and “use with restriction” pesticides have been developed to insure that these two guiding principles are addressed in a credible manner. The "do not use" list includes pesticides for which alternative lower-risk pesticides and/or management practices are available and resistant management concerns are low. The "use with restrictions" list includes pesticides where limits in addition to the legal requirements are placed on their use and for which effective alternatives are not available or resistance management concerns are high (Extoxnet). Higher risks pesticides will be moved to the do not use list only after careful considerations and when they are no longer feasible in eco-potato production programs. This would occur when viable alternatives are developed or the material is no longer needed for managing resistance. In addition, growers must not exceed the toxicity unit totals specified for short and long season varieties.

1. <u>Do not use</u> The following compounds cannot be applied on the field that is to be certified for the following reasons:
Aldicarb – on list for groundwater protection issues
Azinphos-methyl – Acute tox class 1B
Disulfoton – Acute Tox class 1A
Methamidophos – Acute tox class 1B
Carbofuran – Acute tox class 1 B
Carbaryl – Harsh to beneficial insects
Oxamyl – Acute tox class 1B
Endosulfan – endocrine disruptor
Phorate –on list for groundwater protection issues
Diazinon – FQPA targeted material
Permethrin – endocrine disruptor
Paraquat – Acute toxicity concerns

2. <u>Use with restriction</u> The following compounds can only be applied on the field that is to be certified under the following restrictions:
Dimethoate – Endocrine disruptor, use with increased pre harvest interval (45 days for long season, 21 days for short season) and monitoring to ensure no detectable residues and in a resistance management program
Esfenvalerate – Endocrine disruptor, no more than 2 applications per year allowed and must be used in a resistance management program.
Ethoprop - Apply only as needed when wireworms or other soil insects are expected to be present.
Metiram, Mancozeb, Maneb (EBDC fungicides) Endocrine disruptor
Triphenyltim hydroxide – possible B2 carcinogen, is needed for resistance management of fungicides
Azoxystrobin –and all other strobilurin fungicies, any application must be followed by at least one application from another family
Basic copper sulfate – fungicide, must be used in a resistance management program
Chlorothalonil –possible B2 carcinogen, is needed for resistance management of fungicides, no more than 12 lbs ai per season
Copper hydroxide - fungicide, must be used in a resistance management program
Copper resinate - fungicide, must be used in a resistance management program
Copper sulfate- fungicide, must be used in a resistance management program
Cymoxanil- fungicide, must be used in a resistance management program
Dimethomorph- fungicide, must be used in a resistance management program
Metalaxyl- fungicide, must be used in a resistance management program
Propamocarb hydrochloride- fungicide, must be used in a resistance management program
Metribuzin –Endocrine disruptor, must be used at below labeled rates (no more than 0.75lbs ai per season. Used in a resistance management program with rimsulfuron.
Metam Sodium – Used only when soil test levels of nematodes and Verticillium exceed

threshold levels (greater than 10 propagules per centimeter of soil).

3. Able to use

All other registered materials for potatoes can be applied. However, the total toxicity units must still remain under the total toxicity units of 800 for short season and 1200 for long season with the possible late blight adjustment factors.

E. Materials Registered During Growing Season

Many years there are some promising new materials that may be registered within the production year. Once these materials are registered, either by full registration, section 18 or 24C, the materials may be utilized in eco-potato production upon the Collaboration Executive Committee approval. Toxicity factor values of these materials will be designated and distributed to participating growers.

F. Resistance Management Strategies

Resistance is an evolutionary process in which pests overcome chemicals effectiveness and management strategies (Gray et al, 1996). Resistance has occurred in insects, weeds, plant pathogens, rodents, and bacteria. Currently, over 450 species of insects are resistant to one or more insecticides (Georghiou, 1986). The Colorado potato beetle, a serious pest in potatoes, is known to develop resistance rapidly and is currently resistant to all chemical classes of insecticides making it impossible to control in certain parts of the county. Resistance to plant pathogens is becoming a serious concern as resistant strains of Late Blight have developed, and weed resistance to herbicides is increasing.

When pest resistance occurs, entire classes of chemicals may be lost as management tools. A resistance management program is essential in BioIPM programs and it is important to utilize resistance management programs in production systems. Pests may develop resistance to new, low-risk pesticides rapidly if they are used exclusively and without a proper resistance management program. Therefore, some older, high-risk chemicals must still be used to prevent the onset of resistance to the new, low-risk chemistries until new cultural, biological, or new low-risk chemicals with unique modes of action are successfully developed and implemented.

Following a resistance management program includes the rotation of chemical classes by application within a growing season and within years. Therefore, chemicals with the same mode of action should not be applied consecutively whenever possible. Rotation of chemical classes should also occur between years and by location. Spot treatments are recommended where appropriate. Pest selection pressure can be reduced by fewer sprays, more efficient timing of pesticide applications, and only applying pesticides at threshold levels. Finally, the implementation of other control strategies, such as cultural and biological controls, is essential to implementing a proper resistance management program.

An organism can develop resistance to different chemistries that utilize similar modes of actions. This is known as cross resistance and can be a concern with the introduction of low-risk compounds if not implemented in a resistance management program.

In the eco-potato standard, points are awarded for resistance management programs in the potato production standards. Practices that support resistance management strategies are given points in the insect, disease, and weed management sections. Furthermore, fungicide resistance management strategies must be utilized in the toxicity portion of the standard. All fungicides must be used in a resistance management program designed to limit the selection pressure stemming from applications of fungicides known to be vulnerable to resistance. Preserving the efficacy of strobilurin fungicides is the current focus of Wisconsin resistance management recommendations. Strobilurin applications may not be made consecutively on the same field. When required by disease pressure, multiple applications of a fungicide not prone to resistance (e.g. chlorothalonil, an EBDC, tin, or copper based compound) may be made between strobilurin applications, in order to limmit the number of season-long strobilurin applications to no more than six

G. Need For New Materials and Management Practices

A long-term goal of the collaboration has always been to work towards the development and implementation of new, low toxicity materials and effective cultural and biological controls that can be used in reduced-risk systems. However, the introduction of these materials does not necessarily mean that the high-risk materials can be eliminated. The targeting of many higher risk products for elimination is a serious threat to the potato industry since use of these products is necessary due to economic and ecological (resistance management) considerations. A complete loss of many of these high-risk materials would jeopardize the future usefulness of new, low toxicity chemistries due to the potential development of resistance to these low-risk compounds.

The need for new, safer chemistry with different modes of activity is essential and would greatly aid the potato production system. These new, low-risk chemistries when available must be utilized in a proper resistance management program that would ultimately maximize the efficacy of the compound, and limit the onset of resistance.

Many of these new, low-risk chemistries and cultural and biological controls will be available in the near future. As new chemicals and management practices become available for potatoes, they will be carefully researched and will be implemented with a proper resistance management strategy. Older, high-risk chemistries will only be moved to the "do not use" list when concerns over resistance are evaluated and it is determined that the chemical is no longer needed in the system for resistance management.

The research and development of alternative pest control strategies is necessary for the continued push toward ecologically sound pest management systems. The WPVGA has supported research of this type for many years and will continue to do so.

H. Genetically Modified Organisms

Genetically modified organisms (GMO's) are not currently discussed in the eco-potato standards. Due to limited supply and market pressures, there is essentially no commercial production of GMO potatoes grown in Wisconsin, and very limited and declining acreage in other potato producing states. In the event new transgenic potato cultivars are available, WPVGA will carefully review available evidence pertaining to food safety, environmental impacts, impacts on soil quality, cost of pest management systems, reliability, and resistance management prior to reaching a decision whether to recommend the planting of the new variety. Prior to such a recommendation, the above evidence shall be presented to the WWF/WPVGA/UW Collaboration Advisory Committee and the nonprofit board that licenses use of the eco-label trademark. The need for special studies or conditions governing the planting of the transgenic cultivar will then be agreed upon. It is understood that WPVGA may encourage, and its members may participate in properly sanctioned experimental trials with such cultivars prior to their full commercial approval.

I. Natural Community Standard (added in January 2006)

1. Background of Natural Community Standard

From the inception of the Collaboration participating growers have stated their desire to manage both their agricultural production and non-production lands as an integrated system. The implication of this approach can be paraphrased as the desire to manage the multiple resources and societal benefits that come from the farm as a whole rather than focusing upon one resource alone. Participating farms have enviable amounts of natural and non-production land comprising 15% - 30% of an individual farm. In addition, many participating farms are located adjacent or near managed natural areas owned by governmental or private conservation organizations. The desire of growers to manage their own land in the context of the significant surrounding natural acreage is an opportunity to positively affect the natural communities found on both.

In both the domestic and international green-labeling community, there has been a call for the development of a quantitative system that improves on the current schemes for measurement of conservation efforts.. Currently quantitative systems that focus on measuring populations of indicator species have failed to surmount several logistical. Specifically, the time and money required to train or hire specialists with sufficient expertise to determine the health of plant, bird or other taxonomic groups, or the population of individual wildlife species, typically used as indicators is prohibitive. In addition, many current quantitative indicator species are subjected to natural fluctuations inherent to individual and related groups of species. These fluctuations can operate independently from the management efforts of an individual attempting to manage for the species in question, especially within annual time frames that measurement systems seek to quantify.

Prior to the release of Natural Community Standards the Collaboration hired a full-time ecologist to work with growers and determine the potential for conservation efforts on their land as well as to develop new approaches to monitoring ecosystem programs. Land management activities focused on restoring natural areas back to pre-European condition were utilized to create demonstration areas as educational tools and to illustrate the effectiveness and cost of specific management techniques. This effort culminated in a standards protocol specific to the geographic area, and the growers involved, both of which were based on practical conservation experience.

The lessons learned from on-ground management efforts were utilized along with a review of new ways to develop progress towards ecosystem conservation that The Nature Conservancy was developing to create the Natural Community Standards for the “Healthy Grown” eco-label.

In 2005 the Collaboration and the Defenders of Wildlife drafted and signed a MOU outlining a mutually beneficial agreement that revolved around the creation of Natural Community Standards and the corresponding conservation outcomes. The Collaboration gains the Defender's public support and conservation expertise in developing its' natural community standards. Defender's benefits by influencing the conservation efforts of growers that overlap many of its' own organizational goals.

2. Outline of Natural Community Standard

The Natural Community Standard revolves around the creation of individual farm plans in the context of the "Central Sands" regional plan developed by the Collaboration and reviewed by our conservation partners. In creating our regional plan we modified and utilized the TNC's planning tool - the *Conservation Project Management Workbook*. In the resulting plan, regional focal conservation targets, indicators of target health and potential management strategies are listed along with both quantitative minimum ratings and mandatory practices required to ensure target viability. The specific management practices are used as goals within individual grower plans and are used for certification under the standard.

a. Regional plan

The use of a regional plan is intended to focus the management activities of individual farms on the wider regional conservation targets. The conservation targets within the Central Sands Plan include marginalized natural communities including: Oak/Pine Barrens, Sedge Meadow, Oak Savanna, Wet-mesic Hardwood Forest and Tallgrass Prairie.

Following the structure within the *Conservation Project Management Workbook*, indicators of each target's viability are determined by referencing both historical records that document the conditions in which the target flourished, as well as contemporary research focused on the targets. Where possible, quantitative measures are used for the indicator's "goal" status based on the minimum requirements necessary to ensure a conservation target's viability. If an indicator's status cannot be measured a categorical system is utilized to indicate the required minimum management. The categorical system takes the place of a quantitative assessment based on completion of the management activity.

To ensure that the "Central Sands" regional plan accurately identifies and addresses the conservation issues within the region, "conservation partners" with a stake in the region will be enlisted and listed on each version of the regional plan. Targets can be modified by the Collaboration based on the collective land of it's growers and changes in the status of existing or potential targets following review by our conservation partners and an opportunity to comment and advise regarding the resulting potential changes.

In areas outside of the central sands where we had not produced a regional plan the planning efforts of the WI-DNR or our conservation partners provided a regional set of objectives that would serve a similar purpose.

b. Grower plan
The Collaboration's staff ecologist prioritizes the natural land of individual farms based on personal observation and map survey. The quality and condition of existing natural areas are surveyed for:

- the presence of rare, listed, invasive and exotic species,
- hydrologic alteration
- structure and composition of woody growth

From the map survey, and airphoto analysis, the survey of individual site characteristics and landscape context, each farms' natural areas are prioritized and ranked for conservation. Ranking priorities are:

1. distance to other natural communities – when one natural area is located significantly closer to regional communities, it receives priority.
2. size of the plot – larger areas have priority over smaller ones
3. the amount of impact which the minimum management requirement of the current year's standards would have. For example, a natural area which could be easily cleared of invasive species and returned to an optimal area may take priority over one on which the number of invasive species are so numerous that significantly more labor will be needed.
4. approximation to historic natural community type – intact natural communities receive priority
5. hydrologic integrity to historic conditions – plots with unaltered hydrology have priority

To begin the process the top 2-4 (based on the criteria above) areas on each farm are selected for management and from the regional plan the appropriate target or targets are pared with the selected areas. Again from the regional plan, indicators of target viability or health are chosen that best address specific site conditions. Corresponding management techniques are selected by both the grower and Ecologist and written into an annual plan of work. Future annual plans can add additional conservation areas or activities to meet the minimum requirement of certification purposes.

The Collaboration's previous demonstration and land management activities established time/cost/material expenditures per acre managed will be used as a basis to determine the scope of the farm plans for the upcoming season. A minimum expenditure per certified farm will be set by the Collaboration and made public. Due to unpredictable seasonal/weather variability in any given year, grower plans will include additional management activities beyond the established minimum expenditure, ensuring farms have to opportunity to certify if conditions are unfavorable for certain activities. For example, if prescribed burns were not accomplished due to a wet spring, were commiserate measures of invasive weed control or prairie plantings done?

c. Certification/Scoring
Certification will be determined by establishing adherence to the grower's plan. Additionally, management activity at or above established minimum expenditures will be required for certification. Records of expenditures for each activity on an individual natural area are required

to be maintained by the grower and will be complied by the Collaboration to document effort and refine expenditure estimates in future planning.

d. Verification

Within the regional plan are potential monitoring/documentation methods for each indicator. Many methods are inherent to the specific activity and best demonstrated in the field should an audit be required. Other methods require specific documentation to demonstrate completion of the activity. Within the grower plan, the documentation method best suited to the farm will be selected by the grower and listed for each activity within the plan.

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