

May 8, 2017

Legislative-Citizens Commission on Minnesota Resources  
100 Rev. Dr. Martin Luther King Jr. Blvd.  
State Office Building, Room 65  
St. Paul, MN 55155

Dear Members of the Legislative-Citizens Commission on Minnesota Resources,

I am writing in support of the proposal by the Minnesota Department of Agriculture (MDA), University of Minnesota (U of M), and Conservation Corps Minnesota (CCM) entitled **Palmer Amaranth Detection and Eradication**.

In September 2016, Palmer amaranth was confirmed at some of the 30 conservation plantings where a contaminated seed mix was sowed in Lyon and Yellow Medicine counties in Minnesota. This was the first discovery of the invasive plant in the state. Palmer amaranth is of great concern to Minnesota's agriculture industry and environment. Each plant can produce up to one million seeds, which allows it to spread quickly. It is a serious threat to row crops and prairies because it overgrows and outcompetes crop and native plants. This can substantially reduce yields in crops and limit diversity in native plantings. Because of the plant's resistance to many herbicide classes, controlling Palmer amaranth is expensive and challenging.

The MDA has taken several steps to help bring this threatening weed under control. As commissioner, I declared Palmer amaranth's discovery an agricultural emergency in Minnesota on October 27, 2016. This freed up funding to begin eradicating known infestations. The MDA is also using existing funding to prevent additional infestations by enforcing weed and seed regulations. We are extensively sampling native seed mixes and using a newly developed genetic test to find Palmer amaranth seed before it is planted. Additionally, we will continue a federally-funded survey for Palmer amaranth in soybeans. However, more is needed because of the severity of this invasive plant.

The MDA, U of M and CCM jointly propose to find and control Palmer amaranth in conservation plantings with a combination of ground and aerial survey work. It is critical to ensure we have accounted for all Palmer amaranth infestations so that none go unchecked and are allowed to multiply and spread. CCM will also utilize sustainable and effective methods to control the weed. This will limit additional application of costly herbicides and can protect conservation areas. Additionally, the drone survey work benefit future endeavors by pushing the envelope of invasive plant detection.

There are currently less than 200 acres with Palmer amaranth in Minnesota, and Palmer amaranth density in these plantings is currently low. Now is the time for rapid and effective management. Failure to address these small infestations will enable Palmer amaranth to establish and spread. This will result in damage and increased costs to farmers and natural resource managers.

Federal officials, state agencies, and private landowners are willing to work together on this issue. With a narrow window of opportunity to extinguish Palmer, I ask for your support of this project and encourage swift action.

Sincerely,



David J. Frederickson  
Commissioner

**Environment and Natural Resources Trust Fund  
2017 Request for Proposals (RFP)**

**DRAFT  
N**

**Project Title:**

Palmer Amaranth Detection and Eradication

**Category:** D. Aquatic and Terrestrial Invasive Species

**Total Project Budget:** \$ 653,300

**Proposed Project Time Period for the Funding Requested:** 3 years from 07/01/2017 to 06/30/2020

**Summary:**

Find and control Palmer amaranth in conservation plantings to prevent severe economic damage and protect prairies.

**Name:** Monika Chandler

**Sponsoring Organization:** Minnesota Department of Agriculture

**Address:** 625 Robert Street North  
St. Paul MN 55155

**Telephone Number:** 651-201-6537

**Email** Monika.Chandler@state.mn.us

**Web Address** http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol.aspx

**Location**

**Region:** Statewide

**County Name:** Statewide

**City / Township:**

**Alternate Text for Visual:**

Map top left shows Minnesota with Yellow Medicine and Lyon Counties highlighted. Image top right is of Palmer amaranth seedheads. Bottom image is of a crew burning Palmer amaranth.

**MP:** 0517-2-169-proposa

**Budget:** 0517-2-169-bud

**Qual:** 0517-2-169-qualifi

**Map:** 0517-2-169-map-P

**Resolution:**

**List:**

	<input type="checkbox"/>	Funding Priorities	<input type="checkbox"/>	Multiple Benefits	<input type="checkbox"/>	Outcomes	<input type="checkbox"/>	Knowledge
Base								
	<input type="checkbox"/>	Extent of Impact	<input type="checkbox"/>	Innovation	<input type="checkbox"/>	Scientific/Tech Basis	<input type="checkbox"/>	Urgency
	<input type="checkbox"/>	Capacity	<input type="checkbox"/>	Readiness	<input type="checkbox"/>	Leverage	<input type="checkbox"/>	TOTAL %



## PROJECT TITLE: Palmer Amaranth Detection and Eradication

### I. PROJECT STATEMENT

Palmer amaranth is an invasive plant that threatens row crop production and prairies. Growing quickly at 2-3 inches per day and reaching heights of 10 feet tall, it outcompetes other plants. Palmer amaranth is an annual that produces prolific seed – up to a million per plant. It developed resistance to multiple classes of herbicides making it challenging to control. Palmer amaranth can cause yield losses up to 91% in corn (Weed Sci. 49:202-208) and 78% in soybeans (Weed Sci. 51:37-43). It has invaded established prairies in Illinois.

Palmer amaranth was first found in Minnesota in fall 2016 and declared an agricultural emergency. Palmer amaranth seed was a contaminant of a conservation seed mix that was planted at 30 locations. Infrastructure developed with our *Elimination of Target Invasive Plant Species* LCCMR project and Minnesota Department of Agriculture (MDA) emergency funds enabled us to respond quickly. Palmer plants, including seedheads, were incinerated to reduce establishment and spread. There are currently less than 200 acres of Palmer amaranth in Minnesota and the density is low. Rapid and effective management now could prevent statewide establishment and spread. We will

- **Intensively monitor sites with Palmer amaranth.** Vegetation at Palmer sites will be monitored closely to identify Palmer plants before seed is produced. Palmer germinates throughout the growing season so monitoring the entire season is needed. Palmer amaranth seedbanks are not long-lived so aggressive management now could eradicate Palmer from these sites.
- **Continue control efforts at sites with Palmer amaranth.** Control methods may include flame weeding with torches, prescribed fire, spot treatment, increased plant competition by seeding more native grasses and, if necessary, broadcast herbicide application (ENRTF dollars will not be used for broadcast application).
- **Conduct ground and aerial surveys.** Additional conservation planting will be surveyed for Palmer amaranth presence or absence. Aerial survey will increase efficiency of ground survey by advance scouting for Palmer or similar looking plants. It will also reduce the amount of field entries and exits thereby reducing the risk of inadvertent spread of Palmer.

We request funding from the emerging issues account for Year 1 and continuation funding for Years 2 and 3 with the 2018 proposal process. The emerging issues funding will enable us to survey and manage Palmer amaranth during the 2017 growing season, before further establishment and spread. MDA is using existing project funds to hire a survey specialist now but needs additional funding to continue work.

### II. PROJECT ACTIVITIES AND OUTCOMES

#### Emerging Issues Funding Request for project to begin July 1, 2017

##### Activity 1: Monitor, survey and control

**Budget: \$ 222,100**

We will regularly monitor existing infestations to look for Palmer and determine control steps needed. We will survey additional conservation plantings both on the ground and with drones. Prescribed fire and flame weeding are methods that will control Palmer amaranth while benefitting native species in conservation plantings. Initial drone survey will focus on imaging fields. This is relatively simple and the technology and methods are largely developed. For aerial survey method testing, we request to use project funds for out of state travel to areas where Palmer is more common such as Iowa for method testing.



**Environment and Natural Resources Trust Fund (ENRTF)**  
**2018 Main Proposal**  
**Project Title: Palmer Amaranth Detection and Eradication**

Outcome	Completion Date
1. Infestations will be monitored during the growing season a minimum of three times per year. Palmer plants will be controlled prior to seed development. Currently there are 30 locations to monitor in Lyon and Yellow Medicine Counties.	10/31/18
2. At least 75 additional conservation plantings statewide are surveyed each year for the presence/absence of Palmer amaranth. Selection of sites to survey will be based on geographic distribution and newer plantings will be prioritized.	10/31/18
3. Investigate potential infestation reports from the public and agency partners. We anticipate approximately 300 reports per week during the growing season.	10/31/18
4. A minimum of 30 plantings will be imaged using a drone.	10/31/18
5. Utilize prescribed fire and flame weeding to control Palmer amaranth.	10/31/18

**2018 Proposal for Continuation Funding beginning July 1, 2018**

**Activity 2: Develop and utilize aerial survey methods (U of M)**

**Budget: \$ 167,000**

Remote sensing will be utilized with the goal of developing methods to identify probable Palmer amaranth by aerial survey. This will increase the efficiency of ground survey by identifying areas with possible Palmer amaranth plants. We request to use project funds for out of state travel to areas where Palmer is more common such as Iowa for method testing.

Outcome	Completion Date
1. Test remote sensing tools and methods.	03/31/20
2. Identify areas with Palmer or similar looking plants for targeted ground surveys.	06/30/20

**Activity 3: Monitor, ground survey and control (MDA and CCM)**

**Budget: \$ 316,200**

We will regularly monitor existing infestations to look for Palmer and determine control steps needed. We will survey additional conservation plantings on the ground. Prescribed fire and flame weeding are methods that will control Palmer amaranth while benefitting native species in conservation plantings. Additionally, these methods will not lead to herbicide resistance development.

Outcome	Completion Date
1. Infestations will be monitored during the growing season a minimum of three times per year. Palmer plants will be controlled prior to seed development. Currently there are 30 locations to monitor in Lyon and Yellow Medicine Counties.	06/30/20
2. At least 75 additional conservation plantings statewide are surveyed each year for the presence/absence of Palmer amaranth. Selection of sites to survey will be based on geographic distribution and newer plantings will be prioritized.	06/30/20
3. Investigate potential infestation reports from the public and agency partners. We anticipate approximately 300 reports per week during the growing season.	06/30/20
4. Utilize prescribed fire and flame weeding to control Palmer amaranth.	06/30/20

**III. PROJECT STRATEGY**

**A. Project Team/Partners**

**Receiving funds:** Monika Chandler (MDA) will lead infestation monitoring, ground survey and report follow up. She will also provide overall project coordination. Demoz Gebre Egziabher (U of M) will lead the development and utilization of aerial survey methods. Dorian Hasselmann and Dustin Looman (CCM) will manage crews and



**Environment and Natural Resources Trust Fund (ENRTF)**  
**2018 Main Proposal**  
**Project Title: Palmer Amaranth Detection and Eradication**

lead Palmer amaranth control activities. Their salaries will not be paid with these funds. All organizations will provide in-kind equipment, facilities and GIS/technical support.

**Not receiving funds:** We will collaborate with federal and state agencies and private landowners to identify sites to survey and to manage Palmer infestations.

**B. Project Impact and Long-Term Strategy**

Palmer amaranth eradication would have enormous positive ecological and economic implications. If Palmer amaranth becomes widespread in cropping systems, additional herbicides would be used. This could be detrimental to pollinators and water quality. Crop production costs would increase by an estimated \$20-30 per acre for soybean and \$15-20 for corn production. If half of Minnesota's 7.4 million acres of soybeans and 8.7 million acres of corn were infested, production costs would increase by approximately 165 million dollars annually. This burden would be borne by farmers and consumers and does not take into account the threat of non-target treatment impacts to surrounding agricultural natural areas. Additionally, Palmer amaranth is becoming problematic in prairie in Illinois and is outcompeting native vegetation. The stakes are high. There is not much Palmer amaranth in Minnesota. Now is the time to control it and keep it out of conservation plantings.

Despite efforts to prevent contaminated seed from entering Minnesota, we anticipate additional introduction of Palmer amaranth. Early detection and rapid response to Palmer amaranth will be an ongoing effort.

**C. Timeline Requirements**

The project will run for three years. Emerging issues funding would be for 07/01/2017 to 10/31/2018. Standard ENRTF funding would be for two years from 07/01/2018 to 06/30/2020. The time overlap in summer 2018 will ensure funding continuity while contracts are written. The total funding amount is not increased because of this overlap period.



## 2018 Detailed Project Budget

**Project Title: Palmer Amaranth Detection and Eradication**

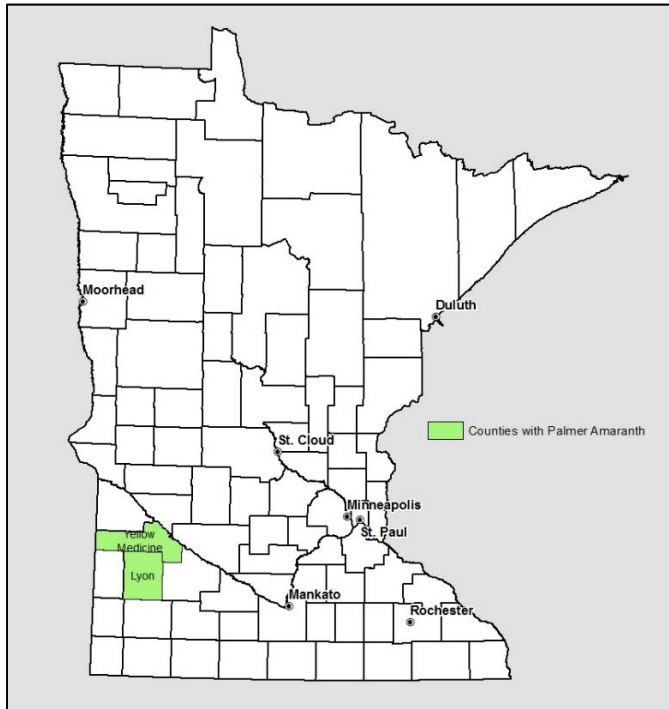
### IV. TOTAL ENRTF REQUEST BUDGET 3 years with Year 1 funding requested from the emerging issues account

BUDGET ITEM	Emerging Issues	Years 2 & 3	Total Project
<b>MDA Personnel:</b> One 3 year full time Plant Health Specialist position estimated salary \$42,000 per year plus fringe benefits @ 43% for Activities 1 & 3	\$60,000	\$122,700	\$182,700
<b>Professional/Technical/Service Contracts:</b> Contract with Conservation Corps Minnesota for Palmer amaranth survey and management in conservation areas. Management methods include spot herbicide application, flame weeding and prescribed burning. Training and equipment (tools and personal protective equipment such as fire retardant clothing, gloves, hardhats, etc.) for crews (control and survey) and field specialists (survey) is included.	\$38,000	\$123,000	\$161,000
<b>Professional/Technical/Service Contracts:</b> Contract with University of Minnesota to develop and utilize aerial survey methods. Costs include a post-doc \$189,163 (salary \$154,545 and fringe @ 22.4% \$34,618), travel \$23,700 (mileage \$16,200 and meals and lodging \$7,500), equipment \$26,000 (airframe and sensors 6 @ \$4,000 each and ground station \$2,000) and other (repairs \$3,000 and specialized pix4d software license \$8,700)	\$83,500	\$167,000	\$250,500
<b>MDA Equipment:</b> Truck with hitch to pull ATV and trailer (truck purchase \$29,400, sales tax 6.5% \$1,900, registration and fees \$50, insurance @ \$400/yr = \$1,200, maintenance @ \$250/yr = \$750). It costs approximately \$25,000 less to purchase rather than lease a truck for 3 years.	\$32,000	\$1,300	\$33,300
<b>MDA Supplies:</b> Herbarium supplies, flagging materials, etc.	\$500	\$1,000	\$1,500
<b>MDA Travel:</b> Fuel @ 15,000 miles/yr (\$2,000/yr and \$6,000 total), approximately 27 days of lodging/yr (\$2,700/ yr and \$8,100 total) and 100 days of meals/yr (\$3,400/yr and \$10,200 total)	\$8,100	\$16,200	\$24,300
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	\$222,100	\$431,200	\$ 653,300

### V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	STATUS
<b>Other State \$ To Be Applied To Project During Project Period:</b> MDA Emergency Funds M.L. 2016, Chp. 17, Sec. 17.041, Subd. 1	\$ 50,000	Secured
<b>In-kind Services To Be Applied To Project During Project Period:</b> <b>MDA:</b> Overhead, field equipment, computing/software, GIS and data management, and project management for 3 years (\$36,000); <b>U of M:</b> UAV Lab equipment for 3 years (\$30,000); and <b>CCM:</b> Approximately \$2.50/hr difference between actual cost per member (\$23.50/hr) and billing rate (\$21.00/hr) = \$37,350.	\$ 103,350	Secured
<b>Current ENRTF Appropriation:</b> 2017 Elimination of Target Invasive Plants - Phase 2 project M.L. 2016, Chp. 186, Sec. 2, Subd. 06e1 and Subd. 06e2	\$ 750,000	Spent or obligated
<b>Past ENRTF Appropriation:</b> 2017 Elimination of Target Invasive Plants - Phase 1 project M.L. 2013, Chp. 52, Sec 2, Subd. 06d	\$ 350,000	Spent
<b>Other Funding History:</b> MDA Emergency Funds	\$ 50,000	Spent

## Palmer Amaranth Detection and Eradication



Palmer amaranth was detected in Yellow Medicine and Lyon Counties.



Palmer amaranth's long seedheads produce a lot of seed that enables spread.



Conservation Corps Minnesota burning Palmer amaranth in a conservation planting



**Project title: Palmer Amaranth Detection and Eradication**

**Qualifications**

**Project Manager: Monika Chandler, M.S., Biological Control and Invasive Plant Management Coordinator, Minnesota Department of Agriculture**

Monika has worked with invasive plants for 17 years. She is currently the project manager for the LCCMR projects titled *Elimination of Target Invasive Plant Species – Phase 2* and *Biosurveillance and Biocontrol of Emerald Ash Borer – Phase 2*.

Her responsibilities with invasive plant management are to:

- Facilitate identification/species determination
- Aid infestation delineation, quantification, and mapping
- Compile suggested practices from literature, weed scientists and land managers for management recommendations
- Coordinate management efforts with public and private partners
- Communicate about species of concern with land managers in Minnesota and neighboring states.
- Work with local partners to implement biological control of invasive plants where appropriate.
- Write risk assessments for and present species of concern to the Noxious Weed Advisory Committee for evaluation. This committee makes formal recommendations to the Commissioner of Agriculture about listing and categorizing species as regulated noxious weeds.

**Organization Description**

The Minnesota Department of Agriculture's Plant Protection Division will lead infestation monitoring, ground survey, report follow up and provide overall project coordination. The Minnesota Department of Agriculture is authorized to eradicate and prevent the spread of harmful or dangerous plants pests in Minnesota by MN Statute 18G.03 subd. 1(e) (2008).