

Minnesota Invasive Terrestrial Plants & Pests Center

2020 Request for Pre-Proposals

Deadline to submit online (z.umn.edu/mitppcgrant) is April 30, 2020 at 4:30 p.m.

The Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC) was established by the Minnesota Legislature "to research and develop methods to prevent and minimize the threats posed by terrestrial invasive plants, other weeds, pathogens, and pests in order to protect the state's prairie's, forests, wetlands, and agricultural resources."

Funds provided through the Environment and Natural Resources Trust Fund directed to the MITPPC are to support applied research in terrestrial invasive species' biology and management by faculty, post-doctoral associates, and graduate students. The success of the MITPPC will be determined by the impact that the Center's research has on management of terrestrial invasive species in Minnesota.

Priorities

Pre-proposals should directly address one or more high-priority invasive terrestrial plants or pests and one or more research themes identified by the MITPPC's prioritization process. Those priorities are summarized in this RFP. Projects that are primarily educational will not be funded by the MITPPC, but individuals supported by the MITPPC are expected to engage in outreach and education.

Eligibility

Faculty and postdocs with the authority to serve as principal investigators at all University of Minnesota campuses and Research and Outreach Centers are invited to submit pre-proposals. Multidisciplinary projects are strongly encouraged. Researchers or

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managers from other academic, governmental, or private institutions are strongly encouraged to serve as cooperators. Proposals should include one or more implementation partners (i.e., representatives of organizations who are likely to use results from the project).

Funding availability

At least \$1 million will be allocated to new or continuing projects under this request for pre-proposals. A single pre-proposal may be for up to \$150,000 per year for **a maximum of two years**. (Note: this shorter-time frame is different from previous requests from MITPPC.) Funding is primarily to support graduate students and postdocs. Capital requests are not eligible. Funding is likely to begin the winter of 2021.

Deadline to submit proposals

April 30, 2020 (4:30 PM) Electronic submissions are required. **New for this cycle, pre-proposals must be submitted through the MITPPC online grant management portal at z.umn.edu/mitppcgrant.** Principal investigators will receive confirmation when their pre-proposal is received.

Questions?

Program and scientific questions should be directed to Dr. Robert Venette, Director, MITPPC, venet001@umn.edu; 612-301-1405. Administrative questions should be directed to Heather Koop, Associate Director, MITPPC, hkoop@umn.edu; 612-626-1914.

Please note that the Legislative-Citizen Commission on Minnesota Resources (LCCMR) is running a concurrent RFP, which encourages principal investigators from the University of Minnesota to apply for terrestrial invasive species research funding from MITPPC, when applicable.

The Research Priorities

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Detection and distribution of invasive terrestrial plants and pests

Strategic and tactical decisions for the statewide management of terrestrial invasive species depend on accurate, detailed information about the geographic distribution of those species. Currently, many agencies and organizations in Minnesota are gathering information about the distribution of terrestrial invasive species to support internal decision-making. There is a growing recognition of the value of sharing information about the distribution of invasive plants and pests more broadly.

Some tools already exist for this purpose. For example, EDDMapS (www.eddmaps.org) has been used as a clearinghouse for terrestrial invasive plants data for some state agencies. Such tools are useful for collecting presence points, but do not “connect the dots” to show the complete, potential distribution of an invasive plant or pest. Maps that depict where terrestrial invasive species are present and abundant across the state are essential to coordinate regional terrestrial invasive species management plans and to evaluate the effectiveness the activities conducted under those plans.

Some terrestrial invasive species may not be reliably detected with typical approaches. Ground-based surveys are time and resource intensive and are frequently limited to relatively small areas. Aerial surveys for widespread woody species, such as buckthorn, have been attempted but have yielded too many false positives to be useful. New approaches to reliably detect and identify priority species are needed.

Response of invasive terrestrial plants and pests to future conditions

Temperature and moisture conditions, land use patterns, and global trade activity in Minnesota have been changing over the past 100 years and are projected to continue to change. Each of these future conditions can directly or indirectly affect the distribution, abundance, and/or impact of terrestrial invasive species that are already present or might arrive in the state. Tools are needed to describe which terrestrial invasive species are likely to become more widespread, abundant, or damaging and which are likely to experience geographic range contractions, become less abundant, or have less impact under future climate conditions.

These descriptions should be as spatially explicit as possible. For example, the USDA Forest Service developed the Climate Change Tree Atlas (Prasad et al. 2007)¹ to describe the impact of future climate conditions on tree species. Equivalent products are needed for terrestrial invasive plants and pests in Minnesota. This information could be used, for example, by the Noxious Weed Advisory Committee as it conducts risk analyses on terrestrial invasive plants. Those analyses are used to justify exclusion, eradication, or other regulatory actions. The information could also be used by land-managers to help them target priority invasive species and explore mitigation and adaptation strategies to minimize future damage.

¹ Prasad, A. M., L. R. Iverson., S. Matthews., M. Peters. 2007-ongoing. A Climate Change Atlas for 134 Forest Tree Species of the Eastern United States [database]. <http://www.nrs.fs.fed.us/atlas/tree>, Northern Research Station, USDA Forest Service, Delaware, Ohio.

Effectiveness of management alternatives for invasive terrestrial plants and pests

A variety of cultural, manual, mechanical, biological and chemical approaches are being used alone and in combinations to control terrestrial invasive plants and pests in Minnesota. Invasive plant and pest managers face a two-part challenge when choosing a course of action.

First, managers must contend with difficult questions about what constitutes successful management. For example, while the timely application of appropriate herbicides is likely to kill targeted plants, is the treatment "successful" if seeds are so plentiful that the plant readily re-establishes itself in the following year or if the composition of the plant community does not "improve"? Similarly, at what time- or spatial-scale should management be considered successful, for example, only within the treated area or over the entire range of the plant within the state?

Second, managers frequently have little information about the effectiveness of novel management tactics. For example, the use of large-grazing animals (e.g., sheep, goats, and cattle) increasingly is proposed as a strategy for invasive-plant management, yet reliable information about the effectiveness of generalist grazers is limited. New control options are needed, and their effectiveness rigorously evaluated, to ensure management goals are being met.

Human dimensions of priority invasive-species issues

Socio-economic factors and human dimensions play a major role in the likelihood of new species arriving, the effectiveness of management strategies, factors motivating landowners and others to implement management strategies, and the consequences of new invasions. This research theme addresses these four major elements.

Research is needed to identify and measure the strength (i.e., propagule pressure) of different pathways that might bring new species to Minnesota. This research will inform regulatory decisions to help prevent the arrival of new species and direct early-detection surveys to areas where initial introductions are most likely.

In addition, decision-support tools are needed to determine the relative effectiveness of eradication, containment, or suppression strategies under various conditions, while accounting for uncertainties in our knowledge about an invading species and/or its response to management.

More information is needed about the effectiveness of various educational, regulatory, economic, or other interventions to promote implementation of management treatments by landowners. In other words, once effective treatment options are identified, what strategies are most effective to promote their implementation by landowners? Hypothesis-driven research is needed to understand what motivates landowners to invest in treatments individually or through partnerships.

Finally, the economic impacts from invasive species frequently depend on micro- and macroeconomic forces and often dictate the appropriate level of investment in a management response. Research is needed to better characterize the realized and potential economic impacts of invasive species in Minnesota and to incorporate this information and associated uncertainties into scalable budgeting tools for management decisions.

Top 15 Prioritized Terrestrial Invasive Insects, Pathogens & Plants

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Priority taxa for research were originally identified in the white paper, "Minnesota's Top 124 Invasive Plants and Pests: Priorities for Research" (<http://z.umn.edu/whitepaper>) and updated as of January 2020 to reflect new information. This list outlines taxa (plants, pathogens, and insects) that pose the greatest threats to Minnesota's natural and agricultural resources if left unmanaged. The top 15 prioritized species groups in each category are listed alphabetically in the following table. Only taxa identified by scientific name in this RFP are eligible for funding.

INSECTS & Earthworms (A-Z)	
Scientific name	Common name
<i>Agrilus planipennis</i> , <i>A. biguttatus</i>	Flatheaded borers (emerald ash borer, two-spotted oak borer)
<i>Amyntas</i> spp.	Jumping worms
<i>Anoplophora glabripennis</i>	Asian longhorned beetle
<i>Aphis glycines</i>	Soybean aphid
<i>Dendroctonus ponderosae</i>	Mountain pine beetle
<i>Drosophila suzukii</i>	Spotted wing drosophila
<i>Eupoecilia ambiguella</i>	European grape berry moth
<i>Halyomorpha halys</i>	Brown marmorated stink bug
<i>Helicoverpa armigera</i>	Old world bollworm
<i>Lymantria dispar dispar</i> , <i>L. dispar asiatica</i>	Gypsy moth (European, Asian)
<i>Popillia japonica</i>	Japanese beetle
<i>Scolytus schevyrewi</i> , <i>S. multistriatus</i>	Elm bark beetle (banded, smaller European)
<i>Sirex noctillo</i>	Sirex woodwasp
<i>Spodoptera littoralis</i>	Egyptian cotton leafworm
<i>Tetropium fuscum</i>	Brown spruce longhorned beetle

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PATHOGENS (A-Z)	
Scientific name	Common name
<i>Aster yellow phytoplasma</i>	Aster yellows
<i>Ceratocystis fagacearum</i>	Oak wilt
<i>Cronartium ribicola</i>	White pine blister rust
<i>Fusarium virguliforme</i>	Soybean sudden death
<i>Geosmithia morbida</i>	Thousand cankers disease
<i>Globodera pallida</i> ; <i>G. rostochiensis</i>	Potato cyst nematodes
<i>Heterobasidion irregulare</i>	Annosus root rot
<i>Heterodera latipons</i> ; <i>H. filipjevi</i>	Cereal cyst nematodes
<i>Hymenoscyphus fraxineus</i>	Ash dieback
<i>Ophiostoma novo-ulmi</i>	Dutch elm disease
<i>Phyllachora maydis</i>	Corn tar spot
<i>Phytophthora ramorum</i>	Sudden oak death
<i>Raffaelea quercivora</i>	Japanese oak wilt
<i>Ralstonia solanacearum</i> (Race 3, biovar 2)	Potato brown rot
<i>Tilletia controversa</i>	Dwarf bunt of wheat

PLANTS (A-Z)	
Scientific name	Common name
<i>Ailanthus altissima</i>	Tree of heaven
<i>Amaranthus palmeri</i>	Palmer amaranth
<i>Berberis x ottawensis</i>	Barberry
<i>Centaurea stoebe</i> subsp. <i>microanthos</i> ; <i>C. diffusa</i>	Knapweeds (spotted, diffuse)
<i>Cirsium arvense</i>	Canada thistle
<i>Cotoneaster lucidus</i>	Hedge cotoneaster
<i>Euphorbia esula</i>	Leafy spurge
<i>Frangula alnus</i> , <i>Rhamnus cathartica</i>	Buckthorn (glossy, common)
<i>Gypsophila paniculata</i>	Baby's breath
<i>Lonicera</i> spp. (<i>L. maackii</i> , <i>L. morrowii</i> , <i>L. tatarica</i> , <i>L. japonica</i>)	Honeysuckles
<i>Lupinus polyphyllus</i>	Large-leaved lupine
<i>Microstegium vimineum</i>	Japanese stiltgrass
<i>Phragmites australis</i> subsp. <i>australis</i>	European common reed
<i>Tanacetum vulgare</i>	Common tansy
<i>Typha angustifolia</i>	Narrowleaf cattail

Application & Review Process

2020 Request for Pre-Proposals

Principal investigators may submit more than one pre-proposal. Each pre-proposal will be reviewed by a team of researchers from the University of Minnesota and will be evaluated upon the following criteria:

- ▶ **Funding priorities:** Responds to research priorities for the MITPPC outlined in this RFP.
- ▶ **Scientific foundation:** Presents testable hypotheses that have a clear connection to scientific principles and knowledge.
- ▶ **Outcomes:** Identifies clear objectives likely to result in measurable, demonstrated, and meaningful outcomes that have clear relevance to invasive terrestrial species management in Minnesota.
- ▶ **Innovation:** Employs or demonstrates innovative approaches to more effectively and efficiently solve specific environment and natural resources issues.
- ▶ **Partnerships:** Leverages collaborative partnerships and additional efforts, resources, and non-state funds.

Principal investigators with highly-rated pre-proposals will be asked to submit a detailed research plan, which will be externally reviewed during the summer of 2020. Invited applicants are not assured funding.

New for 2020, the MITPPC pre-proposal will be submitted through an online grant management portal (z.umn.edu/mitppcgrant) that will guide applicants through the following two components, explained in further detail in this document:

- Main research pre-proposal
- Project budget

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Main Pre-Proposal

The pre-proposal should include:

- ▶ **Abstract:** Provide a non-technical summary of the problem, proposed solution, and potential impact on terrestrial Invasive species management In Minnesota (<250 words).
- ▶ **Problem statement:** Provide an overview statement that addresses the necessity of the project, the context or problem to which it is responding, the urgency and the overall goals of the project and the outcomes to be achieved (<500 words).
- ▶ **Methods:** Break the project into no more than three research activities and provide a concise explanation how the activity contributes to addressing the research hypothesis for priority themes and targeted invasive terrestrial species (<1000 words).
- ▶ **Impact of management:** Describe the project team and their professional affiliations. Address the team members' qualifications to conduct the research and the specific role each will play in the project. Indicate if any partners will be contributing funds or resources from other sources. Also describe how the research project will impact the management of invasive species, including how implementation partners will be involved in its development and implementation (<500 words).
- ▶ **Academic references:** Provide a complete reference to each cited work. See the [application guidance document](#) for details on how to format references.
- ▶ **Figures and tables:** Are not allowed as part of the pre-proposal.

Project Budget

Your budget must clearly account for how all requested funds would be used. Please review [a detailed list of allowable expenses](#) for more information, and contact MITPPC for questions (hkoop@umn.edu).

- ▶ **Personnel costs:** Funds are intended to support primarily graduate students and postdocs, but faculty on a 9-month appointment may request summer salary (up to 25% of current salary) as part of the proposal. Faculty salary must be spent on research project activities only. Grant management, including the administrative supervision of graduate students and postdocs, should be included as an in-kind contribution to the project and may not be more than 5% of full-time effort.
- ▶ **Capital equipment:** Capital equipment is that in excess of \$5,000. Clear justification for research project needs must be provided. All equipment is the property of MITPPC and LCCMR and may be re-purposed for other research upon completion. Computers are not automatically considered an allowable expense. Please note why a new computer might be needed or whether a re-purposed computer (3-5 years old) might suffice.
- ▶ **Travel:** In-state travel to conduct field research is an allowable expense. Out-of-state travel must be necessary for the research and be clearly justified. PI's may budget for only one team member to attend one out-of-state conference or meeting at which MITPPC-funded research is presented.

Deadline

All pre-proposals are due via the online grant management portal – z.umn.edu/mitppcgrant – by 4:30PM, April 30, 2020.

This request for pre-proposals is made possible by funding to MITPPC from the Environment and Natural Resource Trust Fund, as recommended by the Legislative Citizen Commission on Minnesota Resources (LCCMR).

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