

**Environment and Natural Resources Trust Fund (ENRTF)**

Research projects completed between July 1, 2022 and June 30, 2024

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RFP Year	Subd.	Proposal ID #	Project Title	Organization	Project Manager	Amount Appropriated
2015	06a	n/a	Minnesota Invasive Terrestrial Plants and Pests Center	U of MN - MITPPC	Robert Venette	\$ 5,000,000
2015	06a-01	----	<i>Subproject 06a-01: Garlic Mustard Biocontrol: Ecological Host Range of Biocontrol Agents</i>	<i>U of MN - MITPPC</i>	<i>Roger Becker</i>	<i>\$ 600,000</i>
2015	06a-02	----	<i>Subproject 06a-02: Mountain Pine Beetle, Phase II: Protecting Minnesota</i>	<i>U of MN - MITPPC</i>	<i>Brian Aukema</i>	<i>\$ 444,982</i>
2015	06a-03	----	<i>Subproject 06a-03: Biological Control of the Soybean Aphid by Aphelinus Certus</i>	<i>U of MN - MITPPC</i>	<i>George Heimpel</i>	<i>\$ 479,859</i>
2015	06a-04	----	<i>Subproject 06a-04: Decreasing Environmental Impacts of Soybean Aphid Management</i>	<i>U of MN - MITPPC</i>	<i>Robert Koch</i>	<i>\$ 570,000</i>
2015	06a-05	----	<i>Subproject 06a-05: Optimizing Tree Injections against Emerald Ash Borer</i>	<i>U of MN - MITPPC</i>	<i>Brian Aukema</i>	<i>\$ 318,927</i>
2015	06a-06	----	<i>Subproject 06a-06: Distribution and Traits of the Fungal Pathogen Fusarium Virguliforme that Influence Current and Future Risk to Soybean and Other Legumes in Minnesota</i>	<i>U of MN - MITPPC</i>	<i>Dean Malvick and Kathryn Bushley</i>	<i>\$ 383,651</i>
2015	06a-07	----	<i>Subproject 06a-07: Tools to Distinguish Native from Exotic Reed Canary Grass</i>	<i>U of MN - MITPPC</i>	<i>Neil O. Anderson</i>	<i>\$ 263,273</i>
2015	06a-08	----	<i>Subproject 06a-08: Accurate Detection and Integrated Treatment of Oak Wilt (Ceratocystis fagacearum) in Minnesota</i>	<i>U of MN - MITPPC</i>	<i>Jeannine Cavender-Bares</i>	<i>\$ 356,382</i>
2015	06a-09	----	<i>Subproject 06a-09: Characterizing Dispersal of Larval Gypsy Moth to Improve Quarantine Regulations</i>	<i>U of MN - MITPPC</i>	<i>Brian Aukema</i>	<i>\$ 35,000</i>
2015	06a-10	----	<i>Subproject 06a-10: Management Strategies for the Invasive Spotted Wing Drosophila</i>	<i>U of MN - MITPPC</i>	<i>Mary Rogers</i>	<i>\$ 477,541</i>
2015	06a-11	----	<i>Subproject 06a-11: Will Future Weather Favor Minnesota's Woody Invaders?</i>	<i>U of MN - MITPPC</i>	<i>Peter Reich</i>	<i>\$ 526,000</i>
2015	06a-12	----	<i>Subproject 06a-12: Developing Robust Identification Assays for Amaranthus Palmeri in Seed Mixture</i>	<i>U of MN - MITPPC</i>	<i>Don Wyse</i>	<i>\$ 208,230</i>

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Research projects completed between July 1, 2022 and June 30, 2024

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2015	06a-13	----	<i>Subproject 06a-13: Terrestrial Invasive Species Prioritization</i>	<i>U of MN - MITPPC</i>	<i>Amy Morey</i>	\$ 71,461
2015	06a-14	----	<i>Subproject 06a-14: Improved Detection and Future Management of Leafy Spurge and Common Tansy using Remote Sensing, Mechanistic Species Distribution Models, and Landscape Genomics</i>	<i>U of MN - MITPPC</i>	<i>David Moller and Ryan Briscoe Runquist</i>	\$ 70,812
2015	06a-16	----	<i>Subproject 06a-16: Effects of Puccinia species complex on common buckthorn (Rhamnus cathartica)</i>	<i>U of MN - MITPPC</i>	<i>Pablo Olivera Firpo</i>	\$ 26,908
2015	06a-17	----	<i>Subproject 06a-17: Studies of entomopathogenic fungi for effective biocontrol of the emerald ash borer, Phase 2</i>	<i>U of MN - MITPPC</i>	<i>Robert Blanchette</i>	\$ 33,000
2015	06a-18	----	<i>Subproject 06a-18: Incorporating adaptation into forecasts of range shifts with climate change</i>	<i>U of MN - MITPPC</i>	<i>Ryan Briscoe Runquist</i>	\$ 33,000
2015	06a-19	----	<i>Subproject 06a-19: Genetic control of invasive insect species: Phase 3</i>	<i>U of MN - MITPPC</i>	<i>Michael Smanski</i>	\$ 50,000
2015	06a-20	----	<i>Subproject 06a-20: Making revegetation as part of buckthorn management feasible in Minnesota</i>	<i>U of MN - MITPPC</i>	<i>Michael Schuster</i>	\$ 40,000
2016	06a	n/a	<b>Minnesota Invasive Terrestrial Plants and Pests Center - Phase III</b>	<b>U of MN - MITPPC</b>	<b>Robert Venette</b>	\$ 3,750,000
2016	06a-01	----	<i>Subproject 06a-01: Fungi in Ash Trees: Towards Protecting Trees from Emerald Ash</i>	<i>U of MN - MITPPC</i>	<i>Robert Blanchette</i>	\$ 500,000
2016	06a-02	----	<i>Subproject 06a-02: Understanding the Benefits and Limitations of using Goats for Invasive Plant Control</i>	<i>U of MN - MITPPC</i>	<i>Tiffany Wolf</i>	\$ 410,267
2016	06a-03	----	<i>Subproject 06a-03: Genetic Control of Invasive Insect Species: Phase I</i>	<i>U of MN - MITPPC</i>	<i>Michael Smanski</i>	\$ 295,717
2016	06a-04	----	<i>Subproject 06a-04: Dwarf Mistletoe Detection and Management in Minnesota</i>	<i>U of MN - MITPPC</i>	<i>Marcella Windmuller-Campione</i>	\$ 455,606

**Environment and Natural Resources Trust Fund (ENRTF)**

Research projects completed between July 1, 2022 and June 30, 2024

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2016	06a-05	----	<i>Subproject 06a-05: Developing Spatially Explicit Bio-economic Dispersal Model to Aid with the Management of Brown Marmorated Stink Bug</i>	<i>U of MN - MITPPC</i>	<i>Senait Senay</i>	\$ 329,304
2016	06a-06	----	<i>Subproject 06a-06: Management of Invasive Knotweeds</i>	<i>U of MN - MITPPC</i>	<i>Alan Smith</i>	\$ 476,723
2016	06a-07	----	<i>Subproject 06a-07: Building Mechanistic and Process based Species Distribution Models for Common Tansy and Leafy Spurge: from Landscapes to Genomes</i>	<i>U of MN - MITPPC</i>	<i>David Moller and Ryan Briscoe Runquist</i>	\$ 351,188
2016	06a-08	----	<i>Subproject 06a-08: Using Plants to Control Buckthorn: an Expanded Approach</i>	<i>U of MN - MITPPC</i>	<i>Peter Reich</i>	\$ 560,000
2016	06a-09	----	<i>Subproject 06a-09: Genetic control of invasive insects, Phase 2</i>	<i>U of MN - MITPPC</i>	<i>Michael Smanski</i>	\$ 55,100
2016	06a-10	----	<i>Subproject 06a-10: Novel Diagnostic Tools for Rapid and Early Detection of Oak Wilt</i>	<i>U of MN - MITPPC</i>	<i>Abdennour Abbas</i>	\$ 170,637
2018	06a	n/a	<b>Minnesota Invasive Terrestrial Plants and Pests Center - Phase 4</b>	<b>U of MN - MITPPC</b>	<b>Robert Venette</b>	\$ 3,500,000
2019	06a-21.2	----	<i>Subproject 06a-21.2: Field Validation of Multibeam Sonar Zebra Mussel Detection (Year 2)</i>	<i>U of MN - MAISRC</i>	<i>Jessica Kozarek</i>	\$ 228,764
2019	06a-22.2	----	<i>Subproject 06a-22.2: Assessing and Refining Copper-Based Treatment to Suppress Zebra Mussel populations</i>	<i>U of MN - MAISRC</i>	<i>Diane Waller</i>	\$ 249,056
2019	06a-23.2	----	<i>Subproject 06a-23.2: AIS and Tourism - A Socio-Economic Assessment</i>	<i>U of MN - MAISRC</i>	<i>Amit Pradhananga</i>	\$ 249,088
2019	06a-25.2	----	<i>Subproject 06a-25.2: Examining Motivations for Illegal Baitfish Release</i>	<i>U of MN - MAISRC</i>	<i>Nicholas Phelps</i>	\$ 74,636
2019	06a-28.2	----	<i>Subproject 06a-28.2: Enzyme-Based Coatings to Suppress Priority AIS</i>	<i>U of MN - MAISRC</i>	<i>Mikael Elias</i>	\$ 187,480
2019	06a-33	----	<i>Subproject 06a-33: Optimizing eDNA Monitoring for Multiple Aquatic Invasive Species</i>	<i>U of MN - MAISRC</i>	<i>Josh Dumke</i>	\$ 436,331

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Research projects completed between July 1, 2022 and June 30, 2024

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2019	06a-35	----	<i>Subproject 06a-35: Genetic Biocontrol of Invasive Species - Understanding Attitudes and Risk Perceptions</i>	<i>U of MN - MAISRC</i>	<i>David Fulton</i>	\$ 209,313
2019	06a-36	----	<i>Subproject 06a-37: RNA-Interference Screens for Zebra Mussel Biocontrol Target Genes</i>	<i>U of MN - MAISRC</i>	<i>Daryl Gohl</i>	\$ 255,979
2019	06a-37	----	<i>Subproject 06a-37: Improving the Efficiency of Watercraft Inspections through Coordination and Cooperation</i>	<i>U of MN - MAISRC</i>	<i>Amy Kinsley</i>	\$ 198,241
2019	06a-38	----	<i>Subproject 06a-38: Evaluating Native Phragmites as a Wastewater Treatment Alternative</i>	<i>U of MN - MAISRC</i>	<i>Daniel Larkin</i>	\$ 355,122
2019	06a-39	----	<i>Subproject 06a-39: Increasing Effectiveness of Bigheaded Carp Deterrents by Carbon Dioxide Integration</i>	<i>U of MN - MAISRC</i>	<i>Allen Mensinger</i>	\$ 340,327
2019	06a-40	----	<i>Subproject 06a-40: Enhancing Habitat and Diversity in Cattail-Dominated Shorelines</i>	<i>U of MN - MAISRC</i>	<i>Amy Schrank</i>	\$ 338,066
2019	03d	n/a	Minnesota Trumpeter Swan Migration Ecology and Conservation	U of MN	David Andersen	\$ 300,000
2019	03e	n/a	Spruce Grouse as Indicators for Boreal Forest Connectivity	U of MN - Raptor Center	Julia Ponder	\$ 350,000
2019	03f	n/a	Understanding Brainworm Transmission to Find Solutions for Minnesota Moose Decline	U of MN	Tiffany Wolf	\$ 400,000
2019	03l	n/a	Mapping Aquatic Habitats for Moose	U of MN	Joseph Bump	\$ 199,000
2019	04a	n/a	Determining Influence of Insecticides on Algal Blooms	U of MN	William Arnold	\$ 350,000
2019	04e	n/a	Improving Nitrogen Removal in Greater Minnesota Wastewater Treatment Ponds	U of MN	Paige Novak	\$ 325,000
2019	04f	n/a	Improving Drinking Water for Minnesotans through Pollution Prevention	U of MN	Raymond Hozalski	\$ 345,000

**Environment and Natural Resources Trust Fund (ENRTF)**

Research projects completed between July 1, 2022 and June 30, 2024

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2019	04g	n/a	Protecting Minnesota Waters by Removing Contaminants from Wastewater	U of MN	Matt Simcik	\$ 250,000
2019	04h	n/a	Reducing Municipal Wastewater Mercury Pollution to Lake Superior	Minnesota Pollution Control Agency	Scott Kyser	\$ 250,000
2019	04j	n/a	Transformation of Plastic Waste into Valued Resource	U of MN	Brett Barney	\$ 225,000
2019	04l	n/a	Farm-Ready Cover Crops for Protecting Water Quality	Central Lakes College - Ag and Energy Ctr	Keith Olander	\$ 741,000
2019	06a	n/a	Building Knowledge and Capacity to Solve AIS Problems	U of MN - MAISRC	Nicholas Phelps	\$ 4,000,000
2018	06a-01	---	<i>Subproject 06a-01: Early Detection of Invasive Tree Pathogens Using Molecular Tools for Prevention and to Mitigate Damage</i>	<i>U of MN - MITPPC</i>	<i>Robert Blanchette</i>	<i>\$ 383,865</i>
2018	06a-02	---	<i>Subproject 06a-02: Accurate Detection of Oak Wilt Disease at Landscape Scales for Enhanced Forest Management</i>	<i>U of MN - MITPPC</i>	<i>Jeannine Cavendar-Bares</i>	<i>\$ 301,941</i>
2018	06a-03	---	<i>Subproject 06a-03: Early Detection of Invasive Tree Pathogens Using Molecular Tools for Prevention and to Mitigate Damage</i>	<i>U of MN - MITPPC</i>	<i>Benjamin Held</i>	<i>\$ 233,924</i>
2018	06a-04	---	<i>Subproject 06a-04: Detection and Monitoring of Invasive Phragmites</i>	<i>U of MN - MITPPC</i>	<i>Joe Knight</i>	<i>\$ 203,781</i>
2018	06a-05	---	<i>Subproject 06a-05: Improve Invasive Plant Treatment Efficacy Using Climate Based Phenology Models</i>	<i>U of MN - MITPPC</i>	<i>Rebecca Montgomery</i>	<i>\$ 346,211</i>
2018	06a-06	---	<i>Subproject 06a-06: Biology and Biocontrol Potential of a Rust Fungus Infecting Phalaris Arundinacea and Frangula Alnus</i>	<i>U of MN - MITPPC</i>	<i>Pablo Olivera Firpo</i>	<i>\$ 247,507</i>
2018	06a-07	---	<i>Subproject 06a-07: Managing Buckthorn with Trees: Diversity, Density, and Practicality</i>	<i>U of MN - MITPPC</i>	<i>Peter Reich</i>	<i>\$ 499,734</i>

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2018	06a-08	---	<i>Subproject 06a-08: Integrated Emerald Ash Borer Management: Testing a Novel Approach to Assess Stakeholder Perceptions</i>	<i>U of MN - MITPPC</i>	<i>Ingrid Schneider</i>	\$ 436,072
2018	06a-09	---	<i>Subproject 06a-09: Distribution, Risks, and Management of Phyllachora Maydis, the Causal Agent of Corn Tar Spot</i>	<i>U of MN - MITPPC</i>	<i>Dean Malvick</i>	\$ 176,618
2018	06a-10	---	<i>Subproject 06a-10: Detecting Hybrid Barberry and Investigating its Role in Rust Epidemiology</i>	<i>U of MN - MITPPC</i>	<i>Pablo Olivera Firpo</i>	\$ 206,783
2018	06a-11	---	<i>Subproject 06a-11: Confronting Soybean Aphid with Advanced Plant Breeding and Remote Sensing</i>	<i>U of MN - MITPPC</i>	<i>Robert Koch</i>	\$ 292,492
2018	06a-12	---	<i>Subproject 06a-12: Expanding and Strengthening the Prioritization of Terrestrial Invasive Species in Minnesota</i>	<i>U of MN - MITPPC</i>	<i>Amy Morey</i>	\$ 151,601
2019	07c	n/a	Sustainable Solar Energy from Agricultural Plant By-Products	U of MN - Morris	Ted Pappenfus	\$ 185,000
2019	08a	n/a	Saving Endangered Pollinators through Data-Driven Prairie Restoration	Minnesota Zoo	Erik Runquist	\$ 800,000
2019	08d	n/a	Conserving and Monitoring of Minnesota's Rare Arctic Plants	U of MN - Duluth	Briana Gross	\$ 135,000
2020	03h	2020-003	Bee Minnesota – Protect Our Native Bumblebees	U of MN, College of Veterinary Medicine	Declan Schroeder	\$ 650,000
2020	03k	2020-027	Freshwater Sponges And AIS: Engaging Citizen Scientists	U of MN, Crookston	Venugopal Mukku	\$ 400,000
2020	03l	2020-016	Do Beavers Buffer Against Droughts And Floods?	National Park Service, Voyageurs National Park	Steve Windels	\$ 168,000
2020	03o	2020-007	Conserving Black Terns And Forster's Terns In Minnesota	U of MN, Duluth - NRRI	Annie Bracey	\$ 198,000
2020	04a	2020-037	Managing Highly Saline Waste From Municipal Water Treatment	U of MN, College of Science and Engineering	Natasha Wright	\$ 250,000

**Environment and Natural Resources Trust Fund (ENRTF)**

Research projects completed between July 1, 2022 and June 30, 2024

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2020	04d	2020-013	Developing Strategies To Manage PFAS In Land-Applied Biosolids	Minnesota Pollution Control Agency	Summer Streets	\$ 1,404,000
2020	04e	2020-055	Quantifying New Urban Precipitation and Water Reality	U of MN, College of Science and Engineering	Joe Magner	\$ 500,000
2020	04f	2020-034	Innovative Solution for Protecting Minnesota from PFAS Contamination	Dem-Con	Bill Keegan	\$ 250,000
2020	06f	2020-063	Testing Effectiveness of Aquatic Invasive Species Removal Methods	U of MN, Duluth - NRRI	Valerie Brady	\$ 110,000
2020	06g	2020-035	Invasive Didymosphenia Threatens North Shore Streams	Science Museum of Minnesota, St. Croix Watershed Research Station	Mark Edlund	\$ 197,000
2020	07a	2020-073	Storing Renewable Energy In Flow-Battery For Grid Use	U of MN, Morris	Bryan Herrmann	\$ 250,000
2020	07b	2020-018	Eco-Friendly Plastics From Cloquet Pulp-Mill Lignin	U of MN, College of Food, Agricultural and Natural Resource Sciences	William Tai Yin Tze	\$ 193,000
2020	08c	2020-077	Lignin-Coated Fertilizers for Phosphate Control	U of MN, Duluth - NRRI	Eric Singaas	\$ 250,000
2020	08i	2020-052	Prescribed Burning For Brushland-dependent Species-Phase II	U of MN, College of Food, Agricultural and Natural Resource Sciences	Rebecca Montgomery	\$ 147,000
2020	20a1	2020-070	Unprecedented Change Threatens Minnesota's Pristine Lakes	Science Museum of Minnesota, St. Croix Watershed Research Station	Mark Edlund	\$ 482,000
2021	03a	2021-032	What's Bugging Minnesota's Insect-Eating Birds?	U of MN, Duluth - NRRI	Alexis Grinde	\$ 199,000
2021	03k	2021-278	Exploring Minnesota's Wetlands: Our Resource for Future Medicine	U of MN, Crookston	Brian Dingmann	\$ 210,000

**Environment and Natural Resources Trust Fund (ENRTF)**

Research projects completed between July 1, 2022 and June 30, 2024

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2021	03l	2021-289	A Biodiversity Checkup for Minnesota's Big Woods	U of MN, College of Food, Agricultural and Natural Resource Sciences	Lee Frelich	\$ 109,000
2021	03m	2021-321	Microbiome in Raptors: A New Tool for Conservation	U of MN, Raptor Center	Julia Ponder	\$ 129,000
2021	04b	2021-115	Novel Nutrient Recovery Process from Wastewater Treatment Plants	U of MN, College of Food, Agricultural and Natural Resource Sciences	Bo Hu	\$ 200,000
2021	04c	2021-121	Monitoring Emerging Viruses in Minnesota's Urban Water Cycles	U of MN, College of Biological Sciences	Sebastian Behrens	\$ 416,000
2021	04f	2021-358	Assessing Membrane Bioreactor Wastewater Treatment Efficacy	Minnesota State Colleges and Universities, St. Cloud State University	Heiko Schoenfuss	\$ 419,000
2021	04g	2021-364	Evaluating Coronavirus and Other Microbiological Contamination of Drinking Water Sources from Wastewater	U of MN, College of Science and Engineering	Timothy LaPara	\$ 594,000
2021	04j	2021-390	Antibiotic Resistance and Wastewater Treatment: Problems and Solutions	University of St. Thomas,	Justin Donato	\$ 432,000
2021	06a	2021-017	Starch Allocation Patterns of Invasive Starry Stonewort Harvested from Lake Koronis	Minnesota State Colleges and Universities, Minnesota State University Mankato	Ryan Wersal	\$ 101,000
2021	06d	2021-164	Biocontrol of Invasive Species in Bee Lawns and Parklands	U of MN, College of Food, Agricultural and Natural Resource Sciences	Vera Krischik	\$ 425,000
2021	06f	2021-217	Evaluating Minnesotas Last Best Chance to Stop Carp	U of MN, College of Food, Agricultural and Natural Resource Sciences	Peter Sorensen	\$ 424,000
2021	07a	2021-010	Enhanced Thermo-Active Foundations for Space Heating in Minnesota	U of MN, Duluth	Alison Hoxie	\$ 312,000



**Environment and Natural Resources Trust Fund (ENRTF)**

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2021	07c	2021-191	Agrivoltaics to Improve the Environment and Farm Resiliency	U of MN, WCROC	Bradley Heins	\$ 646,000
2021	07d	2021-294	Behavioral Response of Bald Eagles to Acoustic Stimuli	U of MN, St. Anthony Falls Laboratory	Christopher Feist	\$ 261,000
2021	08i	2021-212	Reducing Plastic Pollution with Biodegradable Erosion Control Products	Agricultural Utilization Research Institute	Matthew Leiphon	\$ 200,000
2021	08n	2021-308	Creating Cost-Effective Forage and Management Actions for Pollinators	U of MN, College of Food, Agricultural and Natural Resource Sciences	Daniel Cariveau	\$ 198,000
2022	08f	2022-188	PFAS Fungal-Wood Chip Filtering System	U of MN, College of Food, Agricultural and Natural Resource Sciences	Jiwei Zhang	\$ 189,000