

Environment and Natural Resources Trust Fund (ENRTF)

Research Projects completed between January 1, 2021 and December 31, 2022

Full abstracts are included in Section III. Completed Research Projects

Year	Subd.	Title	Organization	Project Manager	Funding Amount
2014	Sec 8	Minnesota Invasive Terrestrial Plants and Pests Center	U of MN - MITPPC	Robert Venette	\$ 1,460,000
2015	06a-01	Sub-Project 01: Garlic Mustard Biocontrol: Ecological Host Range of Biocontrol Agents	U of MN - MITPPC	Roger Becker	\$ 600,000
2015	06a-02	Subproject #2: Mountain pine beetle, Phase III: Protecting Minnesota	U of MN - MITPPC	Brian Aukema	\$ 444,982
2015	06a-03	Subproject #3: Biological control of the soybean aphid by <i>Aphelinus certus</i>	U of MN - MITPPC	George Heimpel	\$ 479,859
2015	06a-04	Subproject #4: Decreasing environmental impacts of soybean aphid management	U of MN - MITPPC	Robert Koch	\$ 570,000
2015	06a-05	Subproject #5: Optimizing tree injections against emerald ash borer	U of MN - MITPPC	Brian Aukema	\$ 318,927
2015	06a-06	Subproject #6: Distribution and Traits of the Fungal Pathogen <i>Fusarium Virguliforme</i> that Influence Current and Future Risk to Soybean and Other Legumes in Minnesota	U of MN - MITPPC	Dean Malvick	\$ 383,651
2015	06a-07	Sub-Project 07: Tools to Distinguish Native from Exotic Reed Canary Grass	U of MN - MITPPC	Mary Rogers	\$ 263,273
2015	06a-08	Sub-Project #8. Accurate detection and integrated treatment of oak wilt (<i>Bretziella fagacearum</i>) in Minnesota	U of MN - MITPPC	Jeannine Cavender-Bares	\$ 356,382
2015	06a-10	Subproject #10: Overwintering, Migration and Development of Cost-Effective Practical	U of MN - MITPPC	Mary Rogers	\$ 477,541
2015	06a-11	Subproject #11: Will Future Weather Favor Minnesota's Woody Invaders?	U of MN - MITPPC	Peter Reich	\$ 526,000
2016	06a-01	MITPPC - Phase III - Fungi in Ash Trees: Towards Protecting Trees from Emerald Ash Borer and New Diseases	U of MN	Robert Blanchette	\$ 500,000

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2016	06a-02	MITPPC - Phase III - Understanding the Benefits and Limitations of Using Goats for Invasive Plant Control	U of MN	Tiffany Wolf	\$ 445,533
2016	06a-03	Sub-Project 03: Genetic Control of Invasive Insect Species: Phase I	U of MN	Michael Smanski	\$ 296,655
2016	06a-04	Sub-Project 04: Dwarf Mistletoe Detection and Management in Minnesota	U of MN	Marcella Windmuller-Campione	\$ 433,250
2016	06a-05	Sub-Project 05: Developing Spatially Explicit Bio-economic Dispersal Model to Aid with the Management of Brown Marmorated Stink Bug	U of MN	Senait Senay	\$ 329,354
2016	06a-07	Sub-Project 07: Building Mechanistic and Process based Species Distribution Models for Common Tansy and Leafy Spurge: from Landscapes to Genomes	U of MN	David Moller and Ryan Briscoe Runquist	\$ 351,188
2016	06a-09	Sub-Project 09: Genetic control of invasive insects, Phase 2	U of MN	Michael Smanski	\$ 60,000
2016	06c	Advancing Microbial Invasive Species Monitoring from Ballast Discharge	U of MN - Duluth	Randall Hicks	\$ 368,000
2016	08b	Measuring Pollen and Seed Dispersal for Prairie Fragment Connectivity	U of MN	Lauren Sullivan	\$ 556,000
2016	08d	Evaluate Prescribed Burning Techniques to Improve Habitat Management for Brushland Species	U of MN	Rebecca Montgomery	\$ 267,000
2017	03c	Preserving Minnesota Prairie Plant Diversity – Phase II	U of MN	Ruth Shaw	\$ 900,000
2017	03f	Assessment of Microbes for Improving Wild Rice Restoration	U of MN - Duluth NRRI	Chan Lan Chun	\$ 334,000
2017	03k	Cedar Creek Natural Area Wolf Recolonization Assessment	U of MN	Forest Isbell	\$ 398,000
2017	03l	Effects of Wolf Predation on Beaver, Moose, and Deer	Voyageurs National Park	Steve Windels	\$ 293,000

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2017	03m	Mapping Taxonomy and Environmental Toxicology of Minnesota Freshwater Sponges	U of MN	Anthony Schroeder	\$ 258,000
2017	04b	Wastewater Nitrogen Removal Technology to Protect Water Quality	U of MN	Paige Novak	\$ 450,000
2017	04e	Reassessing Toxicity of Petroleum Spills on Groundwater and Surface Water	St. Thomas University	Dalma Martinovic-Weigelt	\$ 300,000
2017	06a	Aquatic Invasive Species Research Center - Phase II	U of MN - MAISRC	Nicholas Phelps	\$ 2,700,000
2017	06a-04.3	Social Learning and Carp Removal	U of MN - MAISRC	Przemek Bajer	\$ 189,475
2017	06a-08.2	Impacts of Invader Removal on Native Vegetation Recovery	U of MN - MAISRC	Daniel Larkin	\$ 119,034
2017	06a-12.2	Historical Analyses of Spiny Water Flea Invasion Patterns	U of MN - MAISRC	Donn Branstrator	\$ 53,795
2017	06a-15	Determining Highest Risk Vectors of Spiny Water Flea Spread	U of MN - MAISRC	Valerie Brady	\$ 26,581
2017	06a-16.2	AIS Impacts on Walleye Populations and Mercury Concentrations	U of MN - MAISRC	Gretchen Hansen	\$ 199,862
2017	06a-18.2	Genetics to Improve Hybrid and Eurasian Watermilfoil Management	U of MN - MAISRC	Raymond Newman	\$ 236,423
2017	06a-20	A Novel Technology for eDNA Collection and Concentration	U of MN - MAISRC	Abdenmour Abbas	\$ 96,264
2017	06a-21.2	Field validation of multibeam sonar zebra mussel detection (Year 1)	U of MN - MAISRC	Jessica Kozarek	\$ 14,247
2017	06a-22	Copper-Based Control – Zebra Mussel Settlement and Non-Target Impacts	U of MN - MAISRC	James Luoma	\$ 152,090
2017	06a-23	AIS Management: An Eco-economic Analysis of Ecosystem Services	U of MN - MAISRC	Amit Pradhananga	\$ 110,245
2017	06a-24	Genetic Method for Control of Invasive Fish Species	U of MN - MAISRC	Michael Smanski	\$ 140,004
2017	06a-25	What's in Your Bucket? Quantifying AIS Introduction Risk	U of MN - MAISRC	Nicholas Phelps	\$ 84,094

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2017	06a-28	Evaluating Innovative Coatings to Suppress Priority AIS	U of MN - MAISRC	Mikael Elias	\$ 51,234
2017	06a-30	Managing Midwestern Aquatic Invasions in a Changing Climate	U of MN - MAISRC	Ranjan Muthukrishnan	\$ 39,000
2017	07a	Extraction of Solar Thermal Energy in Minnesota	U of MN	Lian Shen	\$ 250,000
2017	08c	Evaluating the Use of Bison to Restore and Preserve Savanna Habitat	U of MN	Forest Isbell	\$ 388,000
2017	08e	Enhancing Spawning Habitat Restoration in Minnesota Lakes	U of MN - St. Anthony Falls Laboratory	William Herb	\$ 294,000
2018	03e	Assessing Natural Resource Benefits Provided by Lichens and Mosses	U of MN	Daniel Stanton	\$ 213,000
2018	03g	Conserving Minnesota's Forest Birds of Management Concern	U of MN - Duluth NRRI	Alexis Grinde	\$ 500,000
2018	03h	Mapping Avian Movement in Minnesota	U of MN - Duluth NRRI	Alexis Grinde	\$ 200,000
2018	03j	Develop Sonar Data Mapping on Three Rivers to Assess Suitability for Native Mussel Habitat	National Park Service	Nancy Duncan	\$ 200,000
2018	03k	Conserving Minnesota's Nine Species of Freshwater Turtles	Minnesota Zoo	Seth Stapleton	\$ 300,000
2018	04f	Evaluate Emerging Pathogens in Lakes, Rivers, and Tap Water to Keep Drinking Water Safe	U of MN	Timothy LaPara	\$ 325,000
2018	04h	Mapping Antibiotic Resistance in Minnesota to Help Protect Environmental, Animal, and Human Health	U of MN	Randall Singer	\$ 750,000
2018	06c	Evaluate Control Methods for Invasive Hybrid Cattails	Voyageurs National Park	Steve Windels	\$ 131,000
2018	06f	Determining Risk of a Toxic Alga in Minnesota Lakes	Science Museum of Minnesota - St. Croix	Adam Heathcote	\$ 200,000
2018	08f	Develop Strategies for Timber Harvest to Minimize Soil Impacts to Maintain Healthy and Diverse Forests	U of MN	Charles Blinn	\$ 200,000

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2018	08g	Restoring Wetland Invertebrates to Revive Wildlife Habitat	MN DNR	Megan Fitzpatrick	\$ 400,000
2018	10a	Subproject 01 - State-Wide Reconnaissance of SARS-CoV-2 in Drinking Water Supplies	U of MN	Timothy LaPara	\$ 59,297
2019	03c	Quantifying Exposure of Minnesota's Raptors to Mercury and PFAS	Hawk Ridge Bird Observatory	Matthew Etterson	\$ 250,000
2019	03g	Mapping Habitat Use and Disease of Urban Carnivores	U of MN	Nicholas McCann	\$ 500,000
2019	03i	Den Boxes for Fishers and other Nesting Wildlife	U of MN - Duluth NRRI	Michael Joyce	\$ 190,000
2019	03j	Red-headed Woodpeckers as Indicators of Oak Savanna Health	U of MN	David Andersen	\$ 171,000
2019	03q	Forest and Bioeconomy Research	U of MN - Duluth NRRI	Rolf Weberg	\$ 2,200,000
2019	03r	Minerals and Water Research	U of MN - Duluth NRRI	Rolf Weberg	\$ 883,000
2019	04d	Quantifying Microplastics in Minnesota's Inland Lakes	U of MN - Duluth	Kathryn Schreiner	\$ 200,000
2019	04i	Extracting Deicing Salt from Roadside Soils with Plants	U of MN	Bo Hu	\$ 360,000
2019	04m	Setting Realistic Nitrate Reduction Goals in Southeast Minnesota	U of MN	John Nieber	\$ 350,000
2019	04n	Mapping Unprofitable Cropland for Water and Wildlife	Science Museum of Minnesota - St. Croix	Jason Ulrich	\$ 100,000
2019	04o	Evaluating Locally Sourced Materials for Road Salt Reduction	U of MN - Duluth NRRI	Chan Lan Chun	\$ 162,000
2019	07a	Development of Clean Energy Storage Systems for Farms	U of MN - WCROC	William Northrop	\$ 650,000