

Directory of Resources for Irrigation in Maine

The following is a curated list of online resources for information and contacts regarding irrigation. It was compiled originally as part of the Maine Climate Adaptation Practices professional development program, funded by Northeast SARE, and is maintained by Ellen Mallory, of UMaine Extension. Please contact Ellen with updates and corrections (ellen.mallory@maine.edu).

Abbreviations used:

ME DACF = Maine Department of Agriculture, Conservation & Forestry

NOAA = National Oceanic and Atmospheric Administration

NRCS = Natural Resources Conservation Service

UMaine = University of Maine

USDA = United States Department of Agriculture

USGS = United States Geological Survey

UVM = University of Vermont

General Guides

- [The Maine Irrigation Guide 2005: Information on water-source development and irrigation practices](#), Central Maine Soil and Water Conservation District. Regulations must be updated but much of it is still relevant and valuable. Includes: Introduction to irrigation costs and returns. Tim Dalton, UMaine Dept of Resource Economics and Policy.
- [Irrigation for Fruit and Vegetable Production](#), Penn State Extension. Describes the different types of irrigation systems and their relative advantages.
- [Getting Started with Irrigation](#), a recorded webinar that took place on February 7, 2022. Talks by Candace Gilpatric (Maine NRCS) and Trevor Hardy (Brookdale Fruit Farm, Inc. and Brookdale Farm Supplies) on assessing water resources and crop needs, and irrigation equipment options and considerations.

Planning Checklists

- [Planning To Irrigate: A Checklist](#), North Dakota State University. Checklist of the steps to follow once you've determined that you want to install an irrigation system, with links to resources specific to Michigan and Indiana.
- [Checklist for Planning Irrigation Systems](#), Michigan State and Purdue Universities. Checklist of the steps to follow once you've determined that you want to install an irrigation system, with links to resources specific to Michigan and Indiana.

Suppliers and Consultants

- [List of irrigation and pond/well consultants](#), ME DACF.
- [List of irrigation suppliers](#), ME DACF.
- [List of Northeast irrigation supply and design providers](#), UMaine Extension.

Drought & Water Monitoring

Monitoring Water and Drought

- [Monitoring Water Conditions](#), ME DACF. Directory of online resources with drought and weather information. Includes some of the resources listed here, as well as others.
- [Drought Management Resources](#), Maine Public Utilities Commission. Directory of online resources with drought and weather information. Includes some of the resources listed here, as well as others.
- [U.S. Drought Monitor](#) (includes [Maine Drought Monitor](#)), joint effort of the National Drought Mitigation Center, USDA, and NOAA. Maps are updated each Thursday to show the location and intensity of drought across the country using a five-category system, from Abnormally Dry (D0) conditions to Exceptional Drought (D4). The website also includes a list of [tutorials](#) on what the U.S. Drought Monitor (USDM) is and how it can be used.
- [Northeast Regional Climate Center](#), based at Cornell University, provides weekly updates of current conditions and impacts. Includes [Northeast Drought Early Warning Signs Dashboard](#).
- [National Integrated Drought Information System](#) (NIDIS), a multi-agency partnership that includes NOAA. Maintains the [Drought Early Warning System](#) (DEWS) with state maps of drought conditions.
- [Water Deficit Calculator](#), Climate Smart Farming. Cornell University. Allows users to estimate soil water content within a crop's effective root zone at specific locations to inform irrigation decisions.
- [Water Watch](#), USGS. Map of real-time streamflow compared to historical streamflow for the day of the year. This link takes you to the map for Maine.

Drought Resources

- [Sources of Drought Assistance](#), ME DACF. List of federal and state programs for disaster assistance, financial assistance, and low-interest loans.
- [Resources to Navigate Drought Successfully](#), UMaine Extension. Organized by the various impacts that drought may have (ex. Dry wells, inadequate hay)
- [Preparing, Responding, and Recovering From a Drought](#), Maine Center for Disease Control and Prevention. Fact sheet that covers the impacts of drought on drinking water and response options. Includes links to other informational resources.

Water

Rules and Regulations

- [Agricultural Water Management Program](#), ME DACF. Website lists where to go for information about requirements for building new ponds and withdrawing water from surface water bodies.
- [Irrigation Pond Permit Application Process](#), Maine NRCS. Explains the steps to permit construction of a new pond.

Irrigation Water Quality

- [Interpreting Irrigation Water Tests](#), PSU Extension factsheet.

Water Sources

- [Ponds - Planning, Design and Construction](#). USDA Handbook. 85-page free PDF on pond design and construction.

Types of Irrigation Systems

- [Irrigation for Fruit and Vegetable Production](#), Penn State Extension. Good list of critical periods of irrigation for specific crops as well as an overview of all the types of irrigation systems for vegetable and fruit production. Skip the Pennsylvania specific info (rainfall, laws).
- [Getting Started with Drip Irrigation: Components and Costs](#), UVM Extension. Fact sheet that includes breakdown of component costs for a drip irrigation system. Information is from 2018 so specific costs may need updating.
- [Irrigation Systems](#), Greenhouse Best Management Practices Manual, UMass Amherst. An overview of irrigation systems for greenhouse and floriculture crops. The guide also has useful info on water supply and sources, water analysis, water quality, and preventing groundwater contamination.
- [Micro-Sprinkler Irrigation for Orchards](#), Colorado State University Extension. Fact sheet that outlines the use and considerations for installing micro-sprinklers in orchards for frost protection and irrigation.

Economics

- [Irrigation Economic Tool](#), UVM, UMaine, and the Northeast Climate Hub. An “economic tool to assist farmers and their advisors in understanding what the general costs, revenues and profits may be for a farm that implements different climate adaptation practices. A farmer or advisor can input farm-specific data using the estimator to generate a general understanding of many of the economic costs associated with

implementation of a practice.” Part of the [Climate Adaptation Resources for Northern New England Farms](#).

- [Introduction to Irrigation Costs and Returns](#), UMaine Dept of Resource Economics and Policy. Section 7 of the [Maine Irrigation Guide 2005](#).
- [Benefits of Irrigation: Intervale Farm](#). Economic Case Studies of Climate Adaptation Practices, University of Vermont.
- [Adapting to Climate Change: Irrigation Benefits at the Intervale Community Farm](#). Talk by Lynn Knight for the Maine Climate and Agriculture Network webinar on April 28. Lynn is an Agricultural Economist with NRCS East National Technology Support Center (ENTSC) and co-Director of the USDA Northeast Climate Hub. Her talk starts at minute 28:20.

Irrigation Management

Crop Critical Periods

- [Irrigation for Fruit and Vegetable Production](#), Penn State Extension. Lists the critical periods for irrigation of vegetables, tree fruits, and small fruits.

Irrigation Scheduling & Calculators

- [Irrigation Management Calculators](#) from Washington State Univ., Oregon State Univ., and Univ. of Idaho. A set of over 50 online calculators to compute a variety of factors associated with irrigation management including application rates for different types of irrigation systems, pipeline pressure loss, irrigation frequency, water depth, nozzle flows or diameters, etc.
- [Irrigation Scheduling Methods](#), Univ. of Georgia Extension bulletin.

Soil Moisture Monitoring

Feel and Appearance Method

- [Estimating Soil Moisture by Feel and Appearance](#), NRCS Publication.

Sensors and Automation

- [Improving Irrigation Water Use Efficiency: Using Soil Moisture Sensors](#), MSU Extension bulletin.
- [A grower Perspective on Climate Change & Water Management](#), talk by Ben Waterman, Waterman Orchards for Maine Climate and Agriculture Network webinar on April 28. Ben describes his [automated watering system](#) in Vermont. His talk starts at minute 15:30.
- [Irrigation Sources and Systems at Johnny's Selected Seeds](#), talk by Collin Thomson, Field Manager at JSS, presented as part of MOFGA's Producer Meeting series on January 19, 2022.

- [Using Tensiometers for Vegetable Irrigation Scheduling in Miami-Dade County](#), University of Florida Extension.
- [Soil Moisture Sensors: A Tool For Smart Irrigation Decision Making](#), Univ. New Hampshire fact sheet.

Water Deficit Tool

- [Climate Smart Farming CSF Water Deficit Calculator](#)

Efficiency & Water Conservation

- [SARE Videos and Factsheets](#)
- [Strategies for Efficient Irrigation Water Use](#), Oregon State. Univ. Extension fact sheet.

Crop Specific Resources

Potatoes

- [Cost of Supplemental Irrigation for Potato Production in Maine](#), Maine Agricultural and Forest Experiment Station Technical Bulletin. 2011 publication; costs may need updating.
- [Irrigating Potatoes in Maine](#). UMaine Extension fact sheet.

Lowbush Blueberries

- [Investment, ownership and operating costs of supplemental irrigation systems for Maine wild blueberries](#), Maine Agricultural and Forest Experiment Station Technical Bulletin. 2002 publication; costs may need updating.
- [Guide to efficient irrigation of the wild blueberry](#), UMaine fact sheet.
- [Penman-Montieth ET Worksheet with Solar Estimate and Equation Instructions](#)

Mixed Vegetable and Fruit

- [Irrigation for Fruit and Vegetable Production](#), Penn State Extension guide.
- [Drip, Drip, Drip](#), Maine Organic Farmers and Gardeners Association.

Home Garden

- [Trickle irrigation: Using and conserving water in the home garden](#). UMaine Extension fact sheet.
- [Victory Garden for ME: How to Water Your Garden](#), UMaine Extension. Short video on the basics of irrigating a home vegetable garden for first time gardeners.

Additional Resources

- [**Backflow Prevention for Produce Farms**](#), UVM Extension Ag Engineering. Provides information on the importance of backflow prevention and some common practices that help mitigate the risk of backflow.
- Irrigation Resources from Michigan State University
 - [Cooperative Extension](#)
 - [Biosystems and Agricultural Engineering Dept.](#)
 - [Irrigation Webinar Series](#)
- [**Understanding Crop Irrigation Website**](#), University of Wisconsin
- [**Proceedings of the Northeast Specialty Crop Water Symposium Conference**](#) , December 18-19, 2019, Burlington, Vermont.
- [**Online Courses & Education**](#), compiled by the Innovation Irrigation Consortium.
- [**Irrigation Training Toolbox**](#), NRCS