

Appendix 3: Agricultural Best Management Practices (BMPs) & Environmental Regulations

BEST MANAGEMENT PRACTICES

The following list of agricultural best management practices (BMPs) is based primarily on the ‘*User Guide for the Pollutant Reduction Impact Comparison Tool (PRedICT)*’, and includes additional information specific to Maine. PRedICT is a software application developed for use in evaluating the implementation of both rural and urban pollution reduction strategies at the watershed level. This tool allows the user to create various “scenarios” in which current landscape conditions and pollutant loads (both point and nonpoint) can be compared against “future” conditions that reflect the use of different pollution reduction strategies such as agricultural and urban best management practices (BMPs), stream protection activities, the conversion of septic systems to centralized wastewater treatment, and upgrading of treatment plants from primary to secondary to tertiary.

Cover Crops

Involve the use of annual or perennial crops to reduce the amount of nutrient runoff and soil loss from fields during the time period between the harvesting and planting of the primary crop. Typically legumes are planted to cover the bare soil and replenish nitrogen to the cropland.

Conservation Tillage

Refers to the planned use of crop residue to protect the soil surface. There are many forms of this management practice including no-till planting, mulch tillage, and other tillage techniques. In general, conservation tillage is defined as any production system that leaves at least 30% of the soil surface covered with crop residue after planting. This BMP reduces soil disturbance and conserves the soil allowing for greater movement of water, less fertilizer use, and less soil compaction.



Strip-Cropping/Contour Farming

Contour farming refers to the practice of conducting tillage, planting and harvesting operations perpendicular to the gradient of a hill or slope in order to reduce erosion. This practice is usually most effective on moderate slopes of 3-8% when there are measurable ridges left from tillage and/or planting operations that serve as miniature terraces, retarding runoff and increasing infiltration. Strip-cropping refers to the system of placing crops in strips or bands on or near the contour. This practice involves alternating strips with high-residue cover or perennial crops with strips with low residue cover.



Conservation Plan

A plan designed to help better manage the natural resources of a farm. A conservation plan includes: an aerial photo or diagram of agricultural fields, a list of management decisions, the location of and schedule for applying new conservation practices, a soil map and soil descriptions, information sheets explaining how to carry out the specific management decisions, and a plan for operation and maintenance of practices, if needed. A conservation plan is required if a farm is participating in any of NRCS's programs.

Nutrient Management

Controlling the timing, amount, application method, source and placement of plant nutrients through the use of nutrient enhancers (fertilizers). Augmenting nutrients in soils increases the chance of higher nutrient outputs to groundwater and other basins. By controlling application variables, a landowner can limit the amount of non-point source enriched runoff. Entails a farm-wide nutrient management plan that is based on established Maine Department of Agriculture, Conservation, and Forestry criteria.



Grazing Land Management

Refers to the utilization of practices that ensure adequate vegetation cover in order to prevent excessive soil erosion due to over-grazing and other forms of overuse. This is usually achieved by rotating animals, changing feeding locations, alternating crops with grazing, etc. Grazing land management practices, such as rotational grazing, protect land areas from excessive soil erosion and add needed nitrogen to the soil base.

Agricultural Land Retirement

Involves allowing cultivated land to revert back to a "natural" state of vegetative cover to reduce the export of sediment and nutrients due to agricultural activities. Includes the conversion of agricultural land to both forest and wetlands.

Livestock AWMS (Animal Waste Management Systems)

May include a variety of practices, including techniques to (1) limit waste runoff, such as cementing and curbing animal confinement areas or planting grassed buffers around these areas; (2) collect and store waste, such as scraping or flushing systems and storage tanks or retention ponds; or (3) alter or treat waste, such as reformulating feed mixes or composting, among others. A farmer's selection of a particular practice or system of practices depends on site-specific factors, the type and volume of waste to be managed and the proximity of the production facility to surface water or groundwater, cost considerations, and state and local regulations.



Runoff Control

Runoff management allows farmers to direct rainwater and/or other runoff water away from their manure storage facilities and confined animal feeding areas. Techniques include roof gutters, surface water diversions, drip trenches, grass filter buffers, sediment basins, subsurface drainage, and evaporative or shallow holding ponds in drier conditions.



Phytase in Feed

Phytase is a naturally produced enzyme that targets phytic acid. Breaking down phytic acid from feed allows inorganic phosphorus to be absorbed by the stomach and not excreted into the environment. Supplementing phytase in feed further increases phosphorus uptake.

Streambank Vegetated Buffer Strips

Planted vegetation to be used for filtering of runoff, wind relief, detoxifying properties, crop separation, stream erosion prevention, etc. Streambank buffers should consist of native plants. Some buffers are used to reduce wind on flat crop land. All buffers are aimed at reducing nutrient and soil runoff and pollutants from activities.



Streambank Stabilization and Fencing

Collectively refers to several practices that can be employed for the purpose of mitigating the effects that eroding or slumping stream banks have on adjacent streams. The most frequently used form of protection is fencing that prohibits livestock from trampling stream banks, destroying protective vegetation, and stirring up sediment in the streambed. In addition to reducing direct soil loss caused by stream bank degradation, fencing also reduces nutrient loads caused by defecation and urination of the animals in the stream. *Streambank protection* also often involves the use of *stable crossings* and/or *streambank stabilization* measures such as the rip-rap, gabion walls, or bioengineered solutions.

REGULATIONS

There exist a number of federal and state laws designed to protect the environment. These laws are intended to be incorporated into local town ordinances, providing protection for wildlife habitat, water and air quality, and endangered and threatened species. Major laws pertaining to habitat conservation and local land-use planning include the Federal Endangered Species Act and the Clean Water Act, both of which are federally mandated laws. Additional laws mandated by the state of Maine include:

- **The Protection and Improvement of Waters Law** regulates activities which discharge or could potentially discharge materials into waters of the state (rivers, streams, brooks, lakes and ponds and tidal waters). This law requires that a license be obtained before directly or indirectly discharging any pollutant. **Source:** <http://www.maine.gov/dep/water/laws/index.html>
- **The Erosion and Sedimentation Control Law** regulates activities involving filling, displacing or exposing soil. Erosion is one of the primary sources of nutrients leading to degraded water quality in

lakes, streams, and coastal waters. This law provides a brief and basic standard requiring that erosion control practices be in place prior to earthmoving, and that erosion and sedimentation must not leave the project site. **Source:** <http://www.maine.gov/dep/land/erosion/index.html>

- **The Natural Resources Protection Act (NRPA)** regulates activities in, on, over or adjacent to lakes, ponds, rivers, streams, brooks, freshwater wetlands and tidal areas. Activities regulated under the NRPA include disturbing soil, placing fill, dredging, removing or displacing soil, sand or vegetation, draining or dewatering, and building permanent structures, in, on, over or adjacent to these areas. **Source:** <http://www.maine.gov/dep/land/nrpa/>
- **Shoreland Zoning** was enacted to prevent water pollution, and damage to the natural beauty and habitat provided by Maine's surface waters. The law targets development along the immediate shoreline of these resources and requires towns to enact a Shoreland zoning ordinance at least as stringent as a model ordinance developed by the state. **Source:** <http://www.maine.gov/dep/land/slz/>
- **The Maine Endangered Species Act** was passed in 1975 by the State Legislature. The Act provides the Maine Department of Inland Fisheries & Wildlife with a mandate to conserve all of the species of fish and wildlife found in the State, as well as the ecosystems upon which they depend. **Source:** http://maine.gov/ifw/wildlife/species/endangered_species/es_act_part13.htm
- **The Wetlands and Waterbodies Protection** rule recognizes important roles of wetlands in our natural environment and supports the nation-wide goal of no net loss of wetland functions and values. In some cases, however, the level of mitigation necessary to achieve no net loss of wetland functions and values through construction of replacement wetlands will not be practicable, or will have an insignificant effect in protecting the State's wetlands resources. In other cases, the preservation of unprotected wetlands or adjacent uplands may achieve a greater level of protection to the environment than would be achieved by strict application of a no net loss standard through construction of replacement wetlands. Therefore, the rule recognizes that a loss in wetland functions and values may not be avoided in every instance. The purpose of this rule is to ensure that the standards set forth in Section 480-D of the NRPA, Section 464, Classification of Maine Waters and Section 465, Standards for Classification of Fresh Surface Waters are met by applicants proposing regulated activities in, on, over or adjacent to a wetland or water body. **Source:** <http://www.maine.gov/dep/land/nrpa/ip-wetl.html>
- **The Maine Nutrient Management Law (1998)** requires that a farm have and implement an approved nutrient management plan if it meets one or more of the following criteria, (a) farm confines and feeds 50 or more animal units (50,000 lbs.) at any one time, (b) farm utilizes more than 100 tons of manure per year not generated on that farm, (c) farm is the subject of a verified improper manure handling complaint, and (d) farm stores and utilizes residuals (materials generated as a byproduct of a nonagricultural production or treatment process that have value as a source of crop nutrients or soil amendments). **Source:** <http://www.maine.gov/agriculture/narr/nutrientmanagement.html>
- **Maine Site Location of Development Law** recognizes that some developments because of their size and nature are capable of causing irreparable damage to the natural environment of the state. The law's intent is to address the adverse environmental effects of development and to minimize these

effects. The Board of Environmental Protection reviews each development on a case-by-case basis and issues permits for certain activities and developments. In order to obtain a permit, a storm water management plan designed to control a 25 year, 24-hour storm is required.

Source: <http://www.maine.gov/dep/land/sitelaw/index.html>

References

- Evans, B.M., D.W. Lehning, and K.J. Corradini, 2003. PRedict, Version 7.1: USERS GUIDE for the Pollutant Reduction Impact Comparison Tool. Penn State Institutes of Energy and the Environment, Penn State University, 53 pp.
- National Water Program. Research – nitrogen – BMPs. Nutrient and Pesticide Management. http://www.usawaterquality.org/themes/npm/research/N_BMP.html.
- NRCS. Agroforestry for Farms and Ranches. USDA. Updated Sep 2008. retrieved 27 Oct 2008. <http://www.nrcs.usda.gov/TECHNICAL/ECS/forest/technote.html>
- NRCS. What is a Conservation Plan?. Retrieved 10 Sep 2012. <http://www.nj.nrcs.usda.gov/documents/WhatisaConservationPlan.pdf>
- UMASS Amherst Extension, Runoff Control from Barnyards and Feedlots. Retrieved 10 Sep 2012. <http://extension.umass.edu/cdle/sites/extension.umass.edu.cdle/files/factsheets/pdf/RunoffControlfromBarnyardsandFeedlots%2811-39%29.pdf>>