



# THE IMPORTANCE OF ROADSIDE DITCH MANAGEMENT AND DESIGN IN WATER RESOURCE MANAGEMENT

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## INTRODUCTION

Recently I had the opportunity to attend a Zoom presentation hosted by the Finger Lakes Land Trust - entitled "Re-Plumbing Roadside Ditches in the Finger Lakes Region" by Rebecca Schneider, Ph.D. of Cornell University. This presentation was very enlightening and I thought I would bring to your attention some of the relevant details I learned. Roadside ditches divert water from roads, preserving the roadbed. They can also capture subsurface water that otherwise could undermine the road. Farmers and other land owners also utilize ditches to discharge water from tile drains away from their property. What is now known is that the proper maintenance and design of roadside ditches is not only important for the road itself, but also to preserve and perhaps improve the quantity and quality of both local groundwater and surface water resources.

## WHAT IS THE ISSUE?

The Cornell Local Roads Program and Dr. Schneider have produced a fact sheet that can be downloaded at <https://cornell.app.box.com/v/clrp-tt-ditches> that is entitled "Roadside Ditches: Best Management Practices to Reduce Floods, Droughts, and Water Pollution". The water resource implications of ditch management are very well stated in this four page document as well as other materials from researchers at Cornell University. As documented in the fact sheet, roadside ditches intercept on average about 20 percent of the runoff in a watershed. These ditches quickly direct stormwater runoff into larger streams, often bypassing local, smaller streams. Ditches provide a pathway for deicing salts, fertilizers, suspended sediment, and pathogens to streams. Runoff in roadside ditches directly contributes to stream flooding and stream bank erosion, increasing peak stream discharge as much as 300%. In contrast, groundwater recharge is diminished as precipitation is rapidly shifted to ditches and not allowed to infiltrate to the subsurface. Reduced recharge can lead to declining water tables and increased impacts of local drought..

## DITCH MANAGEMENT

As spelled out in the above mentioned fact sheet, one of the ditch management issues that needs to be addressed with best management practices is the cleaning of ditches. The issue with ditch cleaning is that soils uncovered during cleaning become a major source of sediment for local streams.

To minimize this, Cornell University's fact sheet recommends cleaning, not scraping ditches. The following practices should ideally be observed: a) remove as little material as possible; (b) do not scrape back and fore slopes unless necessary; (c) try to leave some intact vegetated strips in the downhill part of the ditch in order to trap sediment; and (d) seed the ditch immediately with native grass seeds and through hydroseeding if needed early in the growing season.

## DITCH DESIGN

Road side ditches that are very deep, V-shaped, or steeply sloping are not only a safety hazard (as I can personally attest to when a car got stuck in the roadside ditch adjacent to my home), but can lead to higher velocity runoff, increased erosion, and sediment generation. Reshaping ditches to a shallower, more trapezoidal or rounded profile is best. A ditch depth of 18 to 24 inches is indicated by Cornell University as being adequate in most cases. Shallower, gently sloping ditches can be maintained simply by mowing. If reshaping ditches are not possible, check dams can be installed to slow water velocities. These are small dams constructed in the ditch that allows sediments to settle out and can be built from stone, sandbags filled with pea gravel, or logs.

In order to restore groundwater recharge, roadside ditches can be disconnected from streams. Flow at the end of the ditch end can be diverted to structures such as a basin or constructed wetland in order to allow for infiltration to groundwater. Recharge to groundwater can also be encouraged along the course of the ditch by redirecting flow downslope to areas where water can infiltrate into the ground.

## CLOSING THOUGHTS

Local highway superintendents often face limited resources in terms of manpower, time, and money. Initially, roadside ditch improvements may sound daunting. However, with education and an understanding that some relatively simple best management practices can reduce the impacts of floods and droughts and also improve water quality, more effective roadside ditch management and design practices could perhaps be implemented. 💧💧