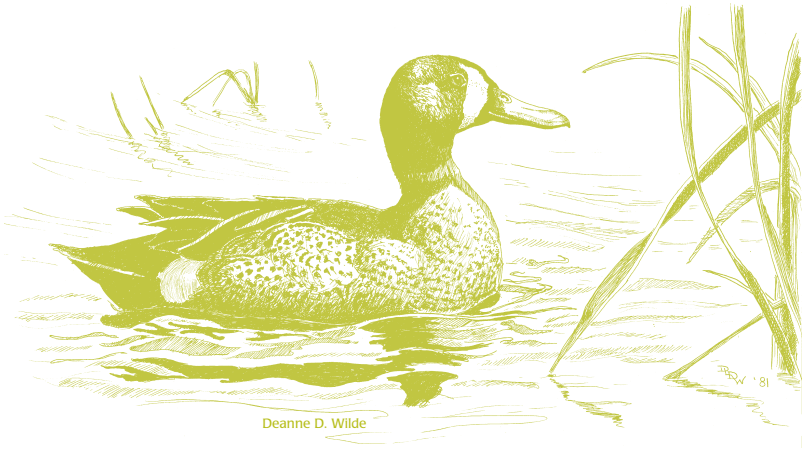

Deanne D. Wilde

CHAPTER 10. IMMEDIATE POST-RESTORATION MANAGEMENT

This chapter discusses management of your site after construction. Further long-term management is discussed in Chapter 6 and Chapter 11.

The post-construction monitoring of your site should begin immediately after the project is completed. Your first efforts should be to watch for and identify potential problems. If you planned your restoration project well, made necessary mid-course corrections during the restoration process, and paid attention to the nuances of your site, much of the information that follows may not concern you and your project. If you are concerned, you should have a pretty good idea of the specific areas on your site that need the most watching. Early identification and management of post-construction site problems will help prevent "a trickle from turning into a torrent". Most construction failures are a result of poor design, faulty construction, improper erosion control, or because you have failed to properly assess the site. The rest of the failures may be beyond your control. Some failures will require long term care and planning, others short term immediate fixes, but addressing these problems is important to the overall success of your site.

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Immediate Post-Construction Failures

Most wetland restoration construction failures occur where excess water is being held back or where water is flowing over newly disturbed ground with sufficient force to cause erosion. The power of water and its ability to cause damage should never be underestimated.

The degree to which these types of problems occur may be directly correlated to the type of restoration project. Generally, the greater the amount of water and the more complex the project, the higher the probability of post-construction problems. For example, if your site involves a shallow, gently sloped excavation in the middle of a 40-acre field, the potential for problems is less than if you built an above-ground berm to impound water. The good news about post-construction problems is that as time goes by the site heals. Bare soil becomes re-vegetated and water flow becomes somewhat predictable. As the site stabilizes, the chance for problems on a well-constructed site diminishes by the day. However, poor construction or a poor site plan can result in a project that becomes a source of never ending problems.

What Happens When Water Meets Soil?

Sloped, disturbed ground is especially susceptible to erosion. If you have stabilized all disturbed soil areas on a slope during construction, erosion should not be a problem. You have a legal responsibility to control erosion on your site, especially if it could contaminate a waterway. Standard soil stabilization methods that are very useful include planting a fast growing cover crop overlain with mulch, and use of straw erosion-control matting (for more detail see planting techniques highlighted in Chapter 5 and "Construction Terms" in Chapter 9). Be attentive to areas where water has begun to erode soil. If you spot an erosion channel forming, determine whether it is occurring in a designed discharge feature (e.g., a spillway), or if it is occurring where water is not supposed to flow.

If erosion is occurring in a designed feature, it usually means that the ground around this area was not properly stabilized prior to introducing water, or you have underestimated the amount of flow in your site. If erosion is occurring where there shouldn't be any water flowing, it may require more work to stabilize the area. Act as quickly as possible to stabilize the area of concern. There are several methods you can use to quickly prevent further damage. The key to all these methods, regardless of the exact problem, is to cause the water to lose energy and flow over stabilized soils.

If the problem is an eroding spillway and the water is flowing slowly and still controllable, you can place straw bales between the flowing water and the erosion channel. If bales are placed properly, water will hit them and seep through and underneath the straw slowly before entering the channel. If the water is flowing quickly in the eroded area, drive wooden stakes through the bales to hold them

Seeding of dike to immediately stabilize fresh soil surfaces.

Photos: Art Kitchen

Art Kitchen

Stabilizing freshly seeded slopes with erosion control matting.

in place. Another technique is to place the straw bales in two rows, one behind the other, with the second row offset by half a bale to ensure overlap with the seams of the first row. The bales can be staked, or weighed down with large rocks, sandbags, or other heavy objects. Adding a small section of silt fence in front or behind the bales will further slow water.

Once the flow has dissipated, you can begin to stabilize the eroded area. In most cases, it will probably be too late to plant a fast growing seed and expect success. The simplest way to deal with the problem area is to create a spillway using geo-textile fabric and stone. Decide what the final elevation of the spillway should be, take into account the diameter of the stone you will lay on top, and excavate the area to a slightly lower depth to end up at your intended elevation. Lay the fabric at least 2 feet wider on both sides of the channel. Use a shovel to dig a blade width trench along the front edge of the fabric. Pack the edge of the fabric into the trench and tap the soil back into place. The goal is to make sure water does not get around or under the fabric. Finally, cover the exposed fabric with stone. Any type of stone will work as long as it is large enough to remain in place against flowing water and small enough that you can place it by hand if need be. Leave the straw bales in place and let them decompose as the site stabilizes.

"Hey, I Didn't Think Water Was Supposed to Go There!"

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A potentially serious post-construction problem occurs when water appears where it was not supposed to be. For example, you may have constructed an above-ground berm that was built to hold back water but is leaking, or you may have constructed a ditch plug but it is not holding back what appears to be flowing water. These are the kinds of problems that will almost never resolve themselves without some corrective measure. Left alone, what starts as a small controllable problem can quickly turn into a disaster.

If you have a problem like this, don't panic! A call to your contractor telling them that your site is falling apart and that water is flowing everywhere will get an instant and expensive response in the form of a semi-truck and a big piece of equipment. Instead, assess the problem carefully and ask yourself these 4 questions:

- ☑ Where is the water coming from?
- ☑ Where is it going?
- ☑ Is it a torrent or a trickle?
- ☑ What will be the likely result of continued flow?

Identify the source of water by following the flow back to where it originates. Walk the entire length of the flow on the site. Do not assume that two areas of flow are connected. Once you find the source, flag it. Follow the channel or water back to where it is leaking and flag that area. Is it a meandering channel or a straight cut? The source of the water may be very evident, but more often than not it will take some investigation.

Assess what the water is doing. Is it running over disturbed ground causing erosion channels, or is it flowing over a vegetated surface? If the flow is allowed to continue unabated, is the outcome detrimental to your site? Flowing water does not always indicate a disaster. In some cases it is very desirable. If water is running over bare soil, the potential for damage is higher than if it is flowing over vegetation. It is not uncommon in a restoration site for water to seek out and find an old stream channel that was not noticed during the site survey. A historic stream bed will have a meandering channel while a straight channel indicates it is something man-made. Whether it is a historic, man-made, or erosion cut channel, if the water flow is discharging at a point that is threatening the integrity of the construction or impacting a neighbor off your site, it needs to be dealt with.

If the water is running someplace unplanned, you need to understand why. While the cause may be elusive, there is always a "why". For example, maybe your site design included a rock spillway to handle the overflow. You notice that the water is not going through the spillway, but is discharging somewhere else. In this case, there is a good chance that either the elevation on the spillway was set too high or the area with the unplanned flow is too low. To get the water to discharge over the stable spillway, either lower the spillway or fill in the low spot.

Water running down the edge or center of a ditch plug can result in real problems. If you observe this happening on your site it is likely the result of a construction problem and you will need to call your contractor. The ditch plug should have been constructed to encourage water to take a path other than across your newly constructed plug. A solution in this situation is to divert the water away from the ditch plug or fill as close to the source as possible. You need to create a circumstance where the water's path of least resistance is somewhere other than through your ditch plug. Once the water is properly diverted, determine if the damage to the plug or fill is significant. If it is, you need to repair, compact, and stabilize the damaged area. Monitor the diversion for any new changes.

If the problem is occurring in an above-ground structure (e.g., a berm), there can be many causes. If it is determined that it is not a design problem, then you have to suspect it may be a construction problem. First assure yourself that the spillway is functioning properly and that there are no inadvertent mistakes (e.g., a low spot in the berm or a small, unfinished area). Berm failures can occur for a variety of reasons. For example, the soil used to construct the berm may not be suitable or the soil may not have been thoroughly compacted. The structure may have been built on top of existing vegetation instead of bare soil, thereby causing leakage, or the berm may not have been constructed to the designed height or width. If it appears that you have a berm failure your contractor and other qualified professionals should evaluate it. There is really no easy cure for poor planning and construction; a berm made out of substandard material may be in constant need of repair.

Saturated Soil

Some projects involve the excavation of very wet, saturated soil. When saturated soil is graded or mounded on a site, water will drain from it. This can look deceptively like a water flow problem but in most cases the excess water will drain away fairly rapidly. If it is discharging enough water that it is causing other problems, the stabilization techniques previously mentioned should be used.

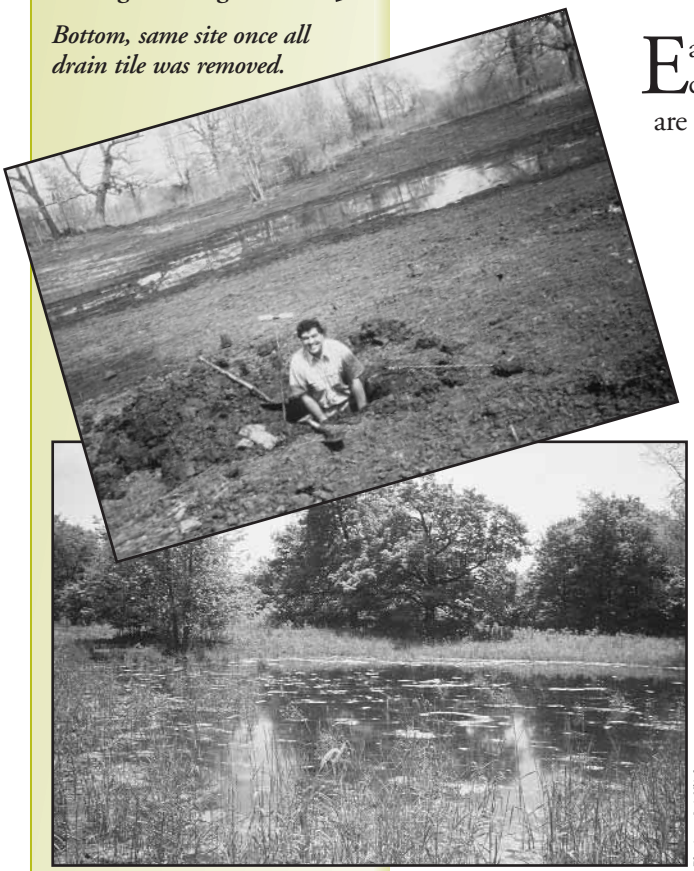
Algae

Some sites will have a noticeable algae bloom a short time after the project is complete. As soils are disturbed and nutrients are released during construction, algal growth is triggered. One way of dealing with algae blooms is the use of specific aquatic herbicides. However, the application of herbicides is not recommended if you are interested in encouraging emergent plants. As the site stabilizes the algae bloom will likely dissipate unless there is an ongoing problem with high nutrients on your site. If you want to try a technique that has worked well on some sites, acquire bales of barley straw. Set the bales in the water so just the bottom inch of the bale is wet. Let them decompose; in some cases the algae bloom is reduced.

Site Mysteries

Top, Stephan Gonzales locating a missing tile line.

Bottom, same site once all drain tile was removed.



Photos: Art Kitchen

Each restoration project has its own unique set of circumstances, problems, and occasional mysteries! Here are a few typical issues that may occur on you site:

- you have water flowing within your site and cannot find its source,
- everything appears to be as planned but the site is not holding water, or
- water is bubbling up in the middle of your ditch plug or elsewhere on your site.

Each site is different, but if your site is experiencing any of these problems it may be that during planning or construction an underground drain tile was left intact. A single tile line can disrupt your restoration and drain your site. It is easy to overlook an old tile line, since some sites have several layers of tile due to generations of farmers improving the drainage. Sometimes a tile line that was not draining and lay unnoticed because it was located above the water level, will start working as soon as groundwater is raised to its level. You should thoroughly search for any intact tile lines and disable or remove them to the extent possible.

The HoChunk Nation has recently completed a significant wetland restoration northwest of Wisconsin Dells, aided by Wisconsin Waterfowl Association and various agencies.

HoChunk President Troy Swallow (left) greets State Senator Dale Schultz (next to Pres. Swallow) at the site. Jeff Nania, project director for Wisconsin Waterfowl Association (far right) facilitated the restoration.

Charlie Luthin

If you observe water bubbling up in the site, it may be an indication of groundwater discharge (water flowing from an underground source). A landscape setting for this can be a wetland located at the base of a hill. Groundwater is advantageous to your site, as it will give you a steady source of clean, low nutrient water. Anything you can do to allow this water to flow freely over the site will contribute to the success of your project. Attempting to block or stop groundwater flow is not only counter-productive but will likely be impossible.

I Should Have Thought of That!

Hindsight is always "20/20" and this is certainly true for wetland restoration projects. You can easily look out on your site, after the construction is done, and say "I should have excavated soil just a little deeper", or "I should have set the spillway a little higher", or " I should have filled the whole ditch", etc.

If you have taken the time to develop and implement a good plan, stick with it. Give the site a chance to stabilize after you are done with the construction. Deviating from the plan or second guessing your site shortly after restoration is not recommended. This is not to say that you should be hesitant. As the restoration unfolds, it is okay to make corrections as needed to improve the quality of the project. But when you are done with construction, give the site time to become established.

If you are plagued with "I shouldas", evaluate each concern in the context of the entire restoration project. For example, a missed tile line can really cause problems on the site, but a deeper excavation rarely improves the restoration. When you evaluate your post-restoration site, be clear as to what benefits you will gain later in the process. If the desired change is important to the site, make the correction as soon as possible before the site settles. If it is not, use the money saved to buy a lawn chair and a pair of binoculars and enjoy your restored wetland!

CASE STUDY: HO CHUNK NATION-HURLEY PROPERTY, JUNEAU COUNTY.

The Ho Chunk Nation and Wisconsin Waterfowl Association (with support from United States Fish and Wildlife) planned the restoration of an apparently dry site with a large drainage ditch cut through the middle of the property. Prior to restoration the ditch averaged 40 feet in width and 4 feet in depth but was bone dry. The assumption was that the site, when restored, would support seasonal wetlands. After approximately 250 feet of the ditch was filled, the contractor hit what appeared to be an underground water discharge point. Water began to flow slowly in the old ditch, but within two hours the flow was 15 feet wide and 4 inches deep. Within twenty-four hours the force of the water had cut a channel through the entire ditch plug.

The solution, in this case, was to divert the water away from freshly disturbed ground in the ditch by excavating a small channel to what turned out to be a heavily impacted, but natural stream course that was overlooked during the initial site review. With the water diverted elsewhere, the contractor was able to complete filling the ditch and stabilize the site. This unknown and unplanned source of groundwater became a real asset to the site; there are areas of soil saturated with water at an elevation 8 feet upslope of the elevation of the top of the ditch! The resulting wetland is considerably more extensive than originally planned.

The lesson that was learned here is that there is no such thing as farmers practicing recreational ditch digging! The width and depth of the ditch or extent of the drainage usually correlates to the amount of water present at the time it was dug. Impressive ditches that are dry should alert you to be on the lookout for less obvious sources of water.