

The Way of the Warriors

by Kevin Scheiwiller, Restoration Manager for Citizens For Conservation in Barrington, Illinois

Frustrated by failed wetland restorations and plantings over the years, Tom Vanderpoel of Citizens for Conservation was determined to find a way to reclaim our wetlands from the wetland thugs; Reed Canary Grass (*Phalaris arundinacea*), Non-native and hybrid cattails (*Typha spp.*), and Common Reed or Phragmites (*Phragmites australis*). He carefully studied all types of wetlands in the areas, noting the native *Carex* species that he saw still holding their own amongst the wetland invaders. Why were these species able to hold on while so many others disappeared? It became readily apparent that the one characteristic all these sedges had in common was that they all spread primarily by vegetative rhizomes.

A thought occurred. If these sedges are strong enough to hang on in unmanaged wetlands, what if we were to reintroduce them into a wetland where the wetland thugs have been treated with herbicide? How would these sedges hold up against the looming wetland seed bank that was sure to express itself in the years after planting? By using the technique outlined here, Tom was able to start reclaiming many wetlands in the area. This method is now about a decade old and has withstood the constant influx of wetland invasive seeds, but time will be the true test as to if this approach is solid enough to keep the wetland thugs at bay.

Before we get started, let's meet the Warrior Sedges. These species were selected based on remnant wetlands in the Northwest suburbs of Chicago, specifically within the "Fox River Hill and Fen" section. Most of these species are ubiquitous to the Midwest, but certain localized species can fill the same role. The key is the rhizomatous nature of these sedge species.

The Warriors

The Warriors are separated into three main categories of wetness within a wetland ecosystem:

- The Emergent Warriors – *Carex* that prefer to be in areas that hold water throughout most of the growing season (i.e. deep kettle wetlands, in/along streams and rivers)
 - *Carex aquatilis* – Long-Bracted Tussock Sedge
 - *Carex lacustris* – Common Lake Sedge
 - *Carex stricta* – Common Tussock Sedge
 - *Carex utriculata* – Common Yellow Lake Sedge
- The Seasonally Inundated Warriors – *Carex* species that can tolerate early season flooding, but can also tolerate drying out in the warmest parts of summer (i.e. prairie pothole wetlands, vernal wetlands)
 - *Carex atherodes* – Hairy-Leaved Lake Sedge
 - *Carex emoryii* – Riverbank Sedge
 - *Carex sartwellii* – Marsh Running Sedge
 - *Carex trichocarpa* – Hairy-Fruited Lake Sedge
- The Sedge Meadow Warriors – *Carex* that occur in hydric soil and can tolerate flooding, these species are typically associated with the ecotone from where the wetland starts to transition to wet prairie. (i.e. sedge meadows, fens)
 - *Carex buxbaumii* – Dark Scaled Sedge

- *Carex pellita* – Prairie Woolly Sedge

Site Prep

To make way for the Warriors, we will typically start to prepare a site starting the summer before we plan to introduce the sedges. During the spring and summer months, we pay attention to the moisture regime of the targeted work area. Does it stay wet all year? Does it dry out in late-July/August? This will inform our decision on which category of warriors to select for the next year.

If reed canary grass is the main invader, then we will start spraying it once the temperature starts to cool and the plant becomes active again. Mid to late September typically produces great results, but we have had success spraying it as late as November. A 3% aquatic safe Glyphosate (Aquaneat, RoundUp Custom, etc.) typically does the trick.

For cattails and phragmites, we have the best results using a 5% aquatic safe Glyphosate throughout August.

The next step is to attempt to burn off all the dead plant material during the Fall or the Spring. The idea behind this step is to clean the work area of debris, while also stimulating any reed canary grass that did not get sprayed the year before. This also allows for easy reed canary follow up all throughout the month of April, again using 3% glyphosate.

After, we feel confident that we have the existing weeds under control, we will then introduce the Warrior sedges. If we do not feel confident in our weed control, then we delay planting for later in the year or the following year.

Introducing the Warriors

After the site has been managed for the existing wetland thugs, then we will start planting the Warrior sedges. Again, we should know what category of sedge to choose as we paid attention to the moisture levels the year before. Species selection is more of an art and steward preference. Don't stress too much about getting the right sedge in the right place. After all, these are all wetland sedges and they have the tendency to move towards where they will be happiest over time.

We have found that planting sedges on a 3-foot center is the most economical approach. This distance allows us to cover a good amount of area and typically will only take about 2 years for the sedges to fill in enough to touch each. If you plant much further than 3 feet, then you allow large gaps of bare soil which allows the resurgence of the wetland thugs. If budget allows, then you can plant these sedges closer together to fill out the matrix quicker.

May and early-June tend to be the best months to plant as you can typically count on good rainfall and water retention in the wetland you are restoring. If you have the means to water these plants, then you can plant all growing season until about the end of September.

Within as little as the first month, we will typically already notice new volunteers coming up from these plants as they start to send their rhizomes laterally; the matrix is starting to take form.

Starting that Fall, we will already start to broadcast our "sedge meadow" seed mix, making sure to keep out any wetland grasses.

Great work, you got all the warriors planted. Time to kick back right? Wrong. The follow up work, especially in years one and two, is the most critical step to this process.

The Follow Up

To ensure the integrity of your planting, you must be vigilant to not allow new invasions by the wetland thugs. The invasive seed bank always comes back with a vengeance. Once we start to see new sprigs of reed canary grass starting to poke through our planting, we attack it with the best weapon we have in our arsenal: grass-specific herbicide. Even though sedges look a lot like grasses to the undiscerning eye, they are not grass and therefore are not effected by grass specific herbicide. By keeping grasses out of our planting and seed mixes, it allows for quick and easy follow up to the pestilent reed canary grass. There are different formulations and brands on the market. We have found the chemical Clethodim (Trade names: Intensity, Volunteer, Clethodim 2EC) to be the most effective as it does not break down under ultraviolet light like Poast. DISCLAIMER! There are no grass specific herbicides that can be sprayed in or near any standing water. Always make sure to read and understand the herbicide label before applying this or any herbicides. If the wetland thugs are making a comeback in an area that never dries out, then we will often hand wick the plants with aquatic approved glyphosate at a solution of 20%. Cattail and Phragmites do not seem to be as resilient but be assured they will be back. For these two species we will again hand wick using a 20% glyphosate solution.

The first year of follow up is often very intensive. We will go through every inch of the site about once every other week, knocking out any new invaders. By year two, the amount of maintenance time typically drops to about half of that from the first year. And if done correctly, by year three the Warriors have filled out their matrix and have made new invasions harder to come by. It is important to note that this project is never fully complete. It must constantly be searched for new invasions year after year. This may sound tedious, but if done properly the amount of maintenance time in years 5+ is negligible.

Once the matrix is filled in with sedges and wildflowers, then we will start to reintroduce the native wetland grasses like *Calamagrostis canadensis* and *Spartina pectinata*.

The Upshot

Using this technique has allowed us to push our restoration efforts into new areas that once seemed too large of a burden to take on. After a decade of plantings, these warriors have been holding their own. Only time will tell if the warriors will be able to truly protect our wetlands as they continue to be bombarded with excess nutrients, water runoff, and invasive species.

In 2009, when we first started work along Flint Creek, we would count a handful of Bronze Coppers (a wetland obligated butterfly) every year. On an August day in 2019, I was delighted to see no less than 20 of these butterflies using the critical habitat they need all thanks to the Warrior sedges!

Photos

The following photos were all taken on the same day along the stretch of Flint Creek where we have been actively using the warrior sedges to rebuild the streambank. Each photo is representative of the different stages of the process.



The state of the streambank prior to any treatment. A majority of the Flint Creek corridor is a monoculture of reed canary grass with cattails and phragmites interspersed the closer you get to the creek.



*Year one: This section had received a fall and spring reed canary treatment with 3% glyphosate. It was then planted using *Cx lacustris* in an oxbow that stays wet for most the year and *Cx pellita* in the higher portions that dry out for all of August. *Verbena hasta*, *Cyperus spp.* and *Setaria spp.* are typical annual native “weeds” indicating that the stronghold of the perennial reed canary grass has loosened.*



*Year two: On the left, you can see where the *Cx frankii* (an experimental warrior) has filled in over the course of just a year! There are diminishing native weeds, with new more conservative native wildflower such as *Helenium autumnale*. The discerning eye will notice that there are new populations of reed canary grass poking through the matrix. The reed canary monoculture on the right was left intentionally for erosion control concerns (maybe the topic of another blog post).*



Year two: Close up of reed canary reinvading the matrix; a perfect opportunity to use the grass specific herbicide.



Year three: Continued expansion of the more conservative wetland species. Wetland thugs almost not present, but still occurring throughout making follow up imperative.



Year four and beyond: The wetland starts to balance out with a nice assemblage of other graminoids and wetland forbs. Though the matrix is tight here, it is not completely impervious to new invasions and must be monitored and followed up on accordingly.