

The Wetlands Restoration Guidebook

This reference manual is written for use as a guide to help educators and other members of the public, in beginning the process of wetlands restoration. The guidebook covers locating an appropriate site, finding funding sources if needed, and provides information and contacts for obtaining assistance for your project. This manual is organized in a step-by-step approach for beginning the wetlands restoration process and includes answers to common questions along the way.



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Developed by:
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Governor Robert Ehrlich Lt. Governor Michael Steele



Materials

What you will need

There are a few materials that you may wish to have handy before beginning to search for a wetlands restoration site. These items are either used off-site, for reviewing general information about the site, or they are used on-site to help with specific site evaluations.

The two off-site materials you may need are a soil survey, and a USGS topographic map. Soil surveys are books of maps and information about the characteristics of soil in a given area and their uses. The surveys are grouped into books by county and are available at your local library or your local Soil Conservation District (SCD) office.

USGS stands for the United States Geological Survey, a government organization that produces official topographic maps of the US. The USGS publishes several different types of maps, but the kind most useful for this type of activity is the 7.5 minute topographic quadrangle. It is a topographic map, as the name implies. The words "7.5 minute" and "quadrangle" refer to the size and shape of the map. USGS quadrangle maps are organized by location in the state, and named according to a prominent feature on the map.

There are also several on-site materials that you may need. The first is a clipboard and paper for recording observations. When you are considering several sites or evaluating many different features of an individual site, it often helps to be able to take notes, check-off items from the checklists included in this guide, and even to make site sketches. Next, you may need a small shovel or a spade. This will be used in looking for wetland soil indicators and for checking for water beneath the surface of the ground. The last thing you should remember to have with you is a good pair of water-resistant boots! When working in wetlands, things can get to be a bit muddy and messy at times, and it's always a good idea to be prepared.

As an added quick reminder, if you need any of these items to complete a given section of this guide, then a representative picture will appear by the title of the section as follows;



Clipboard



(Topographic map or soil survey).



(Shovel or Spade)



(Water-resistant boots)

Locating Maps and other references

Soil surveys can be found either at your local library, your local Soil Conservation District (SCD) or other environmental governmental office. Libraries usually store these documents in their government documents section. Soil surveys are grouped by county, so it is not too difficult to find the one for your area. If there are several editions of your county's soil survey, be sure to get the latest one as your site may have changed.

You can find a copy of USGS topographic maps for your state at your local library and at many government offices that deal with environmental issues.

However, it is important to note that many of these locations will not supply you with a map. You will have to photocopy it there. Additionally, you may need help from a library (or government) employee in locating the map you need. This is because the maps are not organized by county name, so you may not always know which map is yours by the title alone. However, most holdings of USGS maps have an index sheet that shows, by region, all of the maps available for that state. Perhaps the easiest way of finding and obtaining your own copy of a USGS map, is on the internet at "<http://mapping.usgs.gov/mac/findmaps.html>". This page is run by the USGS and has step-by-step instructions for finding and locating the maps you need.

***Note-** if the land that you are going to examine is on the border of a county line or on the edge of a topographic map, you will need the soil surveys and USGS maps for BOTH sides of the site!

Locating a site

If you are interested in planning a wetland creation or restoration for your school or community, the first step is to find a site! To find a suitable site, you will need to evaluate the characteristics of a given area, which determine whether it is possible, (or how easily it is possible), to create or restore a wetland. There are 5 important characteristics which determine whether a site can support a wetland or not. These categories are; current land use, soils, hydrology, plants, and site surroundings. This guidebook will lead you through evaluating each of these criteria through a series of checklists, to see if you have a possible future wetland nearby!

***Note**– the wetland criteria listed in the checklists for each of the categories are meant to serve as a guide to help you in locating a suitable restoration site. However, these criteria are kept fairly general for easy use. Because of this and factors such as recent rainfall and time of the year, a suitable site may NOT display ALL of the normal “suitable” wetland conditions at any one time. Likewise, if you find one of the “negative” wetland criteria, that alone may not rule out a site as being suitable.

Current land use



Before you decide to restore a site, you should consider the current use of the land. The current land use will affect how easy it will be to physically carry-out the restoration process. Current land use may also help you to first locate sites which have typical land uses for current or former wetlands. Criteria to keep in mind as you look for a future wetlands site, are as follows;



Land use

Quick-Check

Sites most likely to be successful for wetlands restoration or creation are:

- Former wetlands that have been drained for agricultural or other purposes
- Former wetlands now in a degraded condition
- Disturbed areas such as construction sites
- Areas that are accessible to earthmoving equipment
- Open, unbuilt areas or lawns
- Ponds

Sites most likely to be unsuitable for wetlands restoration or creation are:

- Upland forested areas
- Areas identified as important habitat for rare, threatened, and endangered species
- Areas with moderate to steep slopes
- Sites with structures that would definitely flood if the area was restored to wetland

With the above checklist in mind, you can possibly locate a few areas which have potential for wetland creation or restoration. Now you can begin to evaluate the individual characteristics of these sites, to see if any stand out as excellent wetland candidates. This method will also determine if an area that you previously had in mind will qualify as having good restoration or creation potential.

Soil



When most people examine a natural area, they often look for plants, animals, and the layout of the land. However, the soil under your feet also has a lot to tell you about the local ecosystem. For those of you who have never worked with soils before, this won't be as hard as you think. Any more complicated soil analysis that is needed can be done later by a professional. In the field, there are a few simple tests you can do to see if there is or was a high water level on your site. The biggest clue that will tell you if there is (or was) water for any length of time on the ground is the soil color. If the soil has been wet for an extended period, it will be gray or black. If the soil is bright red, chances are it has not been flooded often.

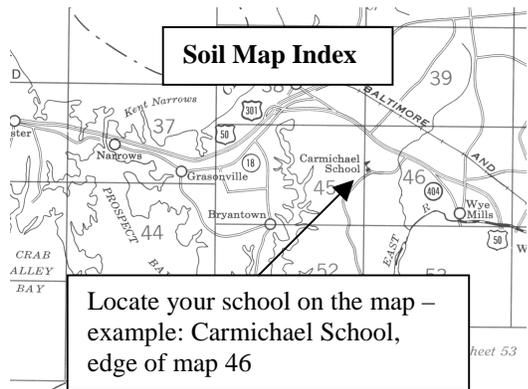
***Note**- soil color is a good guideline, but is not fail-safe! Compare your findings with other site features!

Using a soil survey

Once you have the appropriate soil survey, your work is easy. Use the maps in the back of the survey to locate your site. The maps are aerial photos, so a given place is sometimes hard to find on them. However, the maps do indicate the location of major roads, and an index at the beginning of the map section showing the area that each map covers. Once you've found your area on the map, write down the map abbreviations for the soil

that are on your site. The map abbreviation is made-up of letters or letters and numbers that represent a certain soil type.

Now, turn to the soil legend (at the beginning of the maps) and find which soil names correspond to the abbreviations you found. Now, look in the index and find the page which describes your soil type. In some

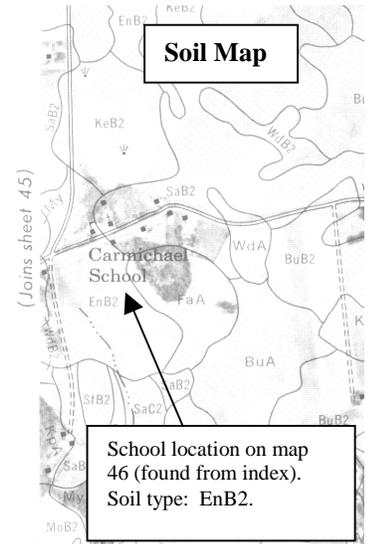


surveys, you may have to first turn to the general section about your soil – the soil type that has the same beginning name as your soil, followed by the word “series.”

Now, turn to the page describing your soil and read the paragraph that immediately follows the name. The text will have many things to say about the soil, but pay special attention to descriptions about “drainage” and the water table. If drainage is poor or very poor or if the water table is at or near the surface for a considerable time, then the chances are good that it can support a

wetland habitat. The text may even have additional useful information such as if the land is prone to flooding and how often. If the text describes your soil as being well-drained or with very steep slopes then that soil will probably not be suited for a wetland habitat.

***Note**- you may also want to read the description of the soil series that your soil is in (it will be listed before your individual soil description).



Soil Quick-Check

Off-site

Indicators of good potential to sustain a wetland habitat (from the soil survey):

- Poorly to very poorly drained soil
- Soil described as having a high water table (or seasonally high), so that the water is at or near the surface.
- Soil stated as being in the floodplain
- A soil described as having flat or nearly level slopes

Indicators of poor potential to sustain a wetland habitat (from soil survey):

- Moderately well to very well drained soil
- Soil with moderate to steep slopes
- Soil described as being located on ridge tops

***Note**- the descriptions of the soils listed in the soil survey are only a general guideline and the exact spot that you are interested in may have some variations.

On-site

Indicators of soils well-suited wetland ecosystems (from field observation):

- Soils that are gray, or mostly gray with red blotches or lines.
- A build-up of organic material (decomposing leaves) on the soil surface

Indicators of soils poorly-suited for wetland ecosystems (from field observation):

- Soils that are bright red in color

Hydrology



Now that you have the information from the soil survey, you probably have a pretty good idea of what general areas would be best suited for supporting a wetland. However, you may need to get more specific information about your site, especially if the soil types covered a large area, or had very irregular edges. The next best reference to use for your site is a USGS topographic (quadrangle) map.

The benefit of a quadrangle map is that it shows the topography of the land and depicts the presence of any streams as well. Using the topographic lines, which usually show changes in the height of land at 10-20 ft. intervals, you can see if the area you are looking at is steeply or moderately sloping. You can also tell if this area appears to be in the floodplain. You can do this by finding the nearest stream and determining whether there is little or no (approximately less than 10 ft) change in elevation between the height of the stream, and the height of your site. Often the floodplain will be visible as a flat area immediately adjacent to both sides of a stream.

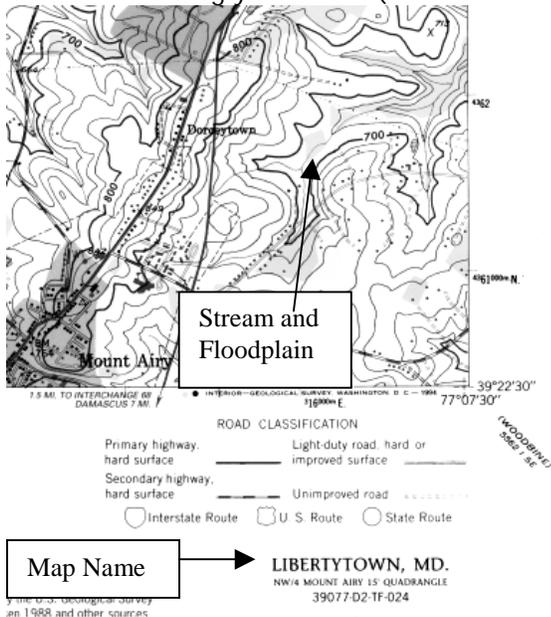
***Note-** not all streams have a large floodplain, so you may not be able to find one on the map!

The next part of checking hydrology is the fun part – going out in the field. Once you have a site that, after having checked the soil survey and topographic map, you think could support a wetland, then it's time to “field test” it. When you are on the site, look for signs of the presence or former presence of water. See if there are any pools of standing water or if the ground is wet and soggy. If you don't see this, try digging in to the ground up to a foot or so. Is the soil very moist? Does water fill the hole?

Here are some ways to check, if you think you are in a floodplain. Look for debris lines from the last flood. These are piles of wood, trash and leaves that will be piled up on the same side of trees or anything else that is stable and sticking out of the ground. The debris would have piled up there as floodwater carried it. Also, look for water marks on trees. You may see a darker stained area on the base of trees, all at the same height. You may even see what looks to be small, dry stream channels which show that water was once flowing, or occasionally still does flow through the site.

Using a USGS Topographic Map

Once you have located the USGS map(s) you need, it is time to put them to good use. Find your school on the map. You can find it by using major roads, and it should be labeled with the school symbol. Examine the area surrounding your school (all the area that you will have access to use), and look for streams (blue straight or dotted lines), or water bodies (solid blue shapes). If any of



these features of water are present, then chances are likely that a wetland could exist adjacent to them. Additionally, if you have located a stream on-site, check the topographic lines (brown solid lines), next to the stream. Are they close together, or far apart? If they are widely spread out from the stream (1/4th inch or more on a standard map), then you probably have a wide floodplain that would be a prime location for a wetland site.

You should keep your topographic map after first using it, as it may come in handy later for helping to determine slope, finding surrounding land use types, and other uses.



Hydrology Quick-Check

Off-site

Signs that your site could have wetland hydrology (from topographic map):

- Site is in the floodplain (within one topographic line of elevation)
- Site has stream (blue straight or dotted line) running through it

Signs that your site probably does not have wetland hydrology (from topographic map):

- Site is more than 10 feet above nearest stream

On-site

Signs that your site could have wetland hydrology (from field observation)

- Debris lines are present on the ground (in wooded areas)
- Soggy ground or pools of water
- Water-stained tree trunks
- Small (flowing or not) stream channels on site (less than one foot deep)
- Water present within 1 foot of ground surface (when a hole is dug)

Signs that your site probably does not have wetland hydrology (from field observation):

- Soil is dry and dusty at the surface
- Soil is dry within the top foot (observed when you dig a hole)

Plants



Sometimes you can not discover much information about the hydrology of a site just by looking for visual signs of water, or the signs can be misleading. Just after a heavy rain event, the ground may be saturated with water but it may only stay like this a short while. Or possibly there are little to no signs of the presence of water, due to drought-like previous weather. In these cases, looking at the plants on the site can be helpful.

If you are not already very familiar with identifying plants, then it may be difficult to tell if your site is often wet, based on the species present. However, you can still learn a lot just by looking at the characteristics of all the plants as a whole. What you will be looking for are signs to show that these plants are adapted to living in wet, sometimes flooded ground. Some plants will try to accommodate for growing in soggy ground by adapting their root structure to be wide and stable. Other plants will use special means to get oxygen in case of high water. And a few plants even have seeds that are specially adapted to float. Some things to look for are listed below.



Plants Quick-Check

If the plants are located in a very wet area, they may show signs of:

- Roots located on the surface of the ground and spreading out far (woody plants)
- “Knees” or nobs of roots projecting out of the ground away from trees
- Seeds that appear to be designed to float on water (try them and see!)

Surrounding Area



Another good method for helping to identify a potentially good restoration site is to examine the surrounding area. This can either be done using maps or by walking around the site itself. Walk the perimeter (or trace the perimeter on the map with your finger), and see what is just beyond it. If you see another area which looks to be a stable wetland already, then there is a good chance that your site will be suitable as well. If you see areas that are very high or steep, chances are you may have difficulty placing a wetland in that location.

Additionally, notice if there are any features that may be adversely impacted by or that may adversely impact your future wetland. For example, are there structures in or around your proposed wetland that could be damaged by high water levels?



Surrounding area Quick-Check

Indicators of good wetland suitability:

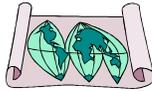
- Stable wetlands in adjacent land
- Close proximity to a stream
- Flat terrain or gently sloping towards the site
- Neighboring land used for agriculture, recreation, aesthetic qualities, or wildlife

Indicators of potential problems for wetland suitability:

- No nearby wetlands or visible water source
- Land slopes down away from site, not allowing for water retention
- Adjacent structures that would easily flood with your wetland



Overall Quick-



Check

Here is one last checklist – a compilation of all of the checklist information already listed, with a few extra items. You can make copies of this list and use them in the field or when looking at maps to help you find potential wetland sites!

Off-site

(Hydrology) – using topographic map

Good wetland restoration potential if the site:

- Site is in the floodplain, (within one topographic line of elevation)
- Site has stream (blue straight or dotted line) running through it

(Soil) – using soil survey

Good wetland restoration potential if the county soil survey says that the soil is:

- seasonally flooded
- has a very high water table
- poorly drained
- in the floodplain

Poor wetland restoration potential is the county soil survey says that the soil is:

- well-drained
- located on ridge-tops
- sandy or gravelly

On-site

(Land use)

Good wetland restoration potential if the site is:

- An agricultural field
- An abandoned field
- A lawn
- Pasture
- Disturbed land (recently cut vegetation, construction site, etc.)
- Woody vegetation mostly less than 5 feet tall

Poor wetland restoration potential if land use is:

- Commercial or industrial
- Forested
- Landscaped
- Woody vegetation mostly over 5 feet tall
- Part of residential lots

(Hydrology)

Good wetland restoration potential if the site:

- has watermarks on trees
- has drift lines around trees, branches, or on the ground (in wooded areas) less than 4 feet above the height of a nearby stream
- is very flat (0-5% slope)
- has water ponded on the ground or the ground is wet to the touch

Poor wetland restoration potential if the site:

- is at the top of any size hill
- is over 4 feet above the height of a nearby stream
- is steep (greater than 5% slope)
- has very dry and dusty soil

(Soil)

Indicators of soils well-suited wetland ecosystems (from field observation):

- Soils that are gray or mostly gray with red blotches or lines
- A build-up of organic material (decomposing leaves) on the soil surface

Indicators of soils poorly-suited for wetland ecosystems (from field observation):

- Soils that are bright red in color

(Plants)

Good wetland restoration potential if the plants on site:

- are primarily grasses or non-woody plants
- have wide-spread surface roots (if woody)
- have knees or knobs jutting up from roots (on trees)
- have seeds that float
- are floating on standing water

Poor wetland restoration potential if the plants on site:

- are woody and don't possess any of the features listed above

(Surrounding area)

Good wetland restoration potential if the neighboring areas contain:

- stable wetlands
- a stream, pond or lake
- a topography gently sloping towards the site
- lands that are used as recreational parks or wildlife reserves.
- unmanaged land or lawns

Poor restoration potential if the neighboring areas contain:

- no wetlands or water source
- a topography that steeply slopes away from the site
- built structures that would definitely flood with the wetland

Finding funding and technical assistance

A companion to this guidebook is "A Guide for Funding Assistance," from the Landowner Stewardship Referral Service. This reference is very comprehensive, and contains descriptions of dozens of programs that provide either technical assistance or funding (or both) for people wanting to conduct restoration or creation conservation projects. The Funding Assistance reference is a valuable tool for a very wide variety of conservation projects. To save you time, this guidebook includes a chart to help you locate the type(s) of assistance best suited for you. (Copies of the funding guide can be obtained through Maryland DNR, at 1-800 989-8852).

Program Name	Focus	Technical Assistance (y/n)	Funding Assistance (y/n)	Page # in Reference
MD Nontidal Wetlands Program	Wetlands creation, restoration, enhancement	Yes	Yes	23
Partners for Fish & Wildlife (USFWS)	Restoring drained or degraded wetlands	Yes	Yes	24
Chesapeake Bay Foundation & Ducks Unlimited "Bay Initiative"	Restoring wildlife habitat and water quality including wetland restoration	Yes	Yes	26
Wildlife Habitat Incentives Program	Improving wildlife habitat, including stream sides	Yes	Yes	30
Chesapeake Bay Trust	Wetland restoration, aquatic vegetation planting in Chesapeake Bay Watershed	Yes	Yes	32
Forest Stewardship Program (USFS)	Reforestation stream sides and wetland buffer areas	Yes	Yes	35
Schoolyard Wildlife Habitat Program (NWF)	Providing wildlife habitat, and using it as an education tool	Yes	No	56

Other Sources of Information

Chesapeake Bay Wetlands: The Vital Link Between the Watershed and the Bay

EPA 903-R-97-002 CBP/TRS-160/97

Order information: 1-800-YOUR-BAY Or US Fish and Wildlife Service (410) 573-4500 www.epa.gov/chesapeake

Field Guide to Nontidal Wetland Identification

Maryland Geological Survey

Order Information: (410) 554-5505

National Wetland Inventory Maps (for Maryland)

Available at:

<http://www.enterprise.nwi.fws.gov/text.html>

<http://www.info.er.usgs.gov/fact-sheets/national-wetland.../national-wetlands-inventory-program.htm>

Soil Surveys (for Maryland Counties)

US Dept. of Agriculture

Order Information: (410) 757-0861 (free)

Wetlands of Maryland

Maryland Department of the Environment

Nontidal Wetlands and Waterways Administration

Contact at: (410) 537-3768

Wetlands Hotline

US Environmental Protection Agency

Contact at: 1-800-832-7828