
Wetland Enhancement and Restoration Evaluation Tool

2016



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Wetland Enhancement and Restoration Evaluation Tool

The Department of Energy and Environment (DOEE) developed this Wetland Enhancement and Restoration Evaluation Tool (WERE) to determine if a wetland is a potential candidate for an enhancement or restoration project. The evaluation tool is intended for use during initial project planning phases to screen wetland areas for enhancement or restoration potential.

DOEE's enhancement and restoration evaluation tool includes two components:

1. A flowchart to approximately determine if a wetland area would benefit from restoration or enhancement, and
2. A score interpretation table that provides potential actions that may restore or enhance the wetland area, based on the unique score.

How to use the WERE Tool:

Use of the WERE Tool will require knowledge and experience with wetland delineations and assessments of wetland conditions and stressors. The WERE Tool is intended for field use, but can be utilized in a desktop setting if sufficient information is available on the current conditions of the area being assessed. The user will need to know the following parameters in order to use this tool successfully:

- if the study area is a current or former (historic) wetland,
- vegetative community type and structure,
- hydrology sources,
- stressors to hydrology,
- if there is fill in the wetland,
- if there are sources of sedimentation onsite or nearby.

Once the above information is known, the flowchart can be utilized. See the Glossary for further information regarding these parameters.

Flowchart Use:

The user must first be familiar with the terms presented in the glossary; and should know if the area is a current or former (historic) wetland. Then, the flowchart (located in Appendix 1) can be used to assess a wetland area in the field. If an area is not, nor ever was, a wetland, DOEE's Wetland Creation Site Suitability Guidelines should be reviewed and this evaluation tool should not be applied.

The flowchart asks a series of questions to guide the user's observations and ultimately obtain a score. Each score is unique and represents the observation of specific wetland stressors and other observed parameters. A score between 0 and 59 is produced. A low score indicates lower effort for restoration/enhancement, while a higher score indicates a

more significant level of effort. However, the scores are based on qualitative assessments and best professional judgment and should not be regarded as an absolute value. The score will fall into one of four categories in terms of the estimated intensity of the enhancement or restoration effort. Once the score is obtained, the user can interpret the score using the Score Interpretation Table (Table 1).

WERE Tool Score Interpretation Table:

In general, scores 1 through 11 (category 1) represent a wetland area that could benefit from varying levels of enhancement. As the scores increase, the level of enhancement needed also increases. Scores 12 through 59 (categories 2 through 4) correspond to a wetland area that could benefit from restoration.

To interpret the resultant score from the flowchart, use Table 1, presented below. Table 1 provides a list of potential actions that may be necessary to restore or enhance the wetland area. As the scores and categories increase in number, the estimated complexity (i.e. cost, labor, project duration) for a restoration or enhancement project increases.

Please note, other independent factors not included in the evaluation, such as land ownership, ease of equipment access, or regulatory approvals, should also be considered before pursuing an enhancement or restoration project.

Table 1: WERE Tool Score Interpretation

Score	Category	Action
0	1	No work is necessary or recommended.
1	1	Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
2	1	Implement control of the invasive species; seed with a native seed mix.
3	1	Implement control of the invasive species; seed with a native seed mix. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
4	1	Implement controls to the sediment/nutrient source, and then implement control of the invasive species; seed with a native seed mix.
5	1	Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
6	1	Implement measures to maintain the wetland hydrology.
7	1	Implement measures to maintain the wetland hydrology. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
8	1	Implement measures to maintain the wetland hydrology, and then implement control of the invasive species; seed with a native seed mix.
9	1	Implement measures to maintain the wetland hydrology, and then implement control of the invasive species. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
10	1	Implement measures to maintain the wetland hydrology, and control the sediment/nutrient source, and then implement control of the invasive species; seed with a native seed mix.
11	1	Implement measures to maintain the wetland hydrology, and control the sediment/nutrient source, and then implement control of the invasive species. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
12	2	Restore the hydrology source.
13	2	Restore the hydrology source. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
14	2	Restore the hydrology source. Implement control of the invasive species.
15	2	Restore the hydrology source. Implement control of the invasive species. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
16	2	Restore the hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species.
17	2	Restore the hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
18	2	Restore the hydrology source; seed with a native seed mix.
19	2	Restore the hydrology source; seed with a native seed mix. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
20	2	Restore the hydrology source. Implement control of the invasive species; seed with a native seed mix.

Score	Category	Action
21	2	Restore the hydrology source. Implement control of the invasive species; seed with a native seed mix. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
22	2	Restore the hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species; seed with a native seed mix.
23	2	Restore the hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species; seed with a native seed mix. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
24	3	Remove the excess fill. Restore the hydrology source. Determine if additional planting/seeding is necessary to supplement seed bank.
25	3	Remove the excess fill. Restore the hydrology source. Determine if additional planting/seeding is necessary to supplement seed bank. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
26	3	Remove the excess fill. Restore the hydrology source. Implement control of the invasive species, if removal of fill has not already addressed this issue. Determine if additional planting/seeding is necessary to supplement seed bank.
27	3	Remove the excess fill. Restore the hydrology source. Implement control of the invasive species, if removal of fill has not already addressed this issue. Determine if additional planting/seeding is necessary to supplement seed bank. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
28	3	Remove the excess fill. Restore the hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Determine if additional planting/seeding is necessary to supplement seed bank.
29	3	Remove the excess fill. Restore the hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Determine if additional planting/seeding is necessary to supplement seed bank. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
30	3	Remove the excess fill. Restore the hydrology source; seed with a native seed mix.
31	3	Remove the excess fill. Restore the hydrology source; seed with a native seed mix. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
32	3	Remove the excess fill. Restore the hydrology source. Implement control of the invasive species if removal of fill has not already addressed this issue; seed with a native seed mix.
33	3	Remove the excess fill. Restore the hydrology source. Implement control of the invasive species if removal of fill has not already addressed this issue; seed with a native seed mix. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
34	3	Remove the excess fill. Restore the hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species; seed with a native seed mix.
35	3	Remove the excess fill. Restore the hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species; seed with a native seed mix. Determine if additional planting/seeding is necessary to supplement seed bank. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).

Score	Category	Action
36	4	Establish new hydrology source. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime.
37	4	Establish new hydrology source. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
38	4	Establish new hydrology source. Implement invasive species control. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime.
39	4	Establish new hydrology source. Implement invasive species control. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
40	4	Establish new hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime.
41	4	Establish new hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
42	4	Establish new hydrology source. Seed/plant with a native seed mix/plantings.
43	4	Establish new hydrology source. Seed/plant with a native seed mix/plantings. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
44	4	Establish new hydrology source. Implement invasive species control. Seed/plant with a native seed mix/plantings.
45	4	Establish new hydrology source. Implement invasive species control. Seed/plant with a native seed mix/plantings. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
46	4	Establish new hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Seed/plant with a native seed mix/plantings.
47	4	Establish new hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Seed/plant with a native seed mix/plantings. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
48	4	Remove the excess fill. Establish new hydrology source. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime.
49	4	Remove the excess fill. Establish new hydrology source. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
50	4	Remove the excess fill. Establish new hydrology source. Implement invasive species control. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime.
51	4	Remove the excess fill. Establish new hydrology source. Implement invasive species control. Determine if planting/seeding is necessary

Score	Category	Action
		to establish a hydrophytic plant community under the new hydrology regime. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
52	4	Remove the excess fill. Establish new hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime.
53	4	Remove the excess fill. Establish new hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Determine if planting/seeding is necessary to establish a hydrophytic plant community under the new hydrology regime. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
54	4	Remove the excess fill. Establish new hydrology source. Seed/plant with a native seed mix/plantings.
55	4	Remove the excess fill. Establish new hydrology source. Seed/plant with a native seed mix/plantings. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
56	4	Remove the excess fill. Establish new hydrology source. Implement invasive species control. Seed/plant with a native seed mix/plantings.
57	4	Remove the excess fill. Establish new hydrology source. Implement invasive species control. Seed/plant with a native seed mix/plantings. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).
58	4	Remove the excess fill. Establish new hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Seed/plant with a native seed mix/plantings.
59	4	Remove the excess fill. Establish new hydrology source. Implement controls to the sediment/nutrient source, and then implement control of the invasive species. Seed/plant with a native seed mix/plantings. Consider vegetative enhancement (planting of woody stems in emergent wetlands) or improvements to habitat (addition of woody debris or bird boxes).

Limitations:

This tool is based on qualitative observations and scores should not be regarded as an absolute value. The score is intended for use during initial project planning phases to screen wetland areas for enhancement or restoration potential. Further and more detailed assessments must be conducted once a wetland area is selected for an enhancement or restoration project.

Project goals must be evaluated before proposing any wetland enhancement or restoration activities. Since a permit is required to conduct any type of wetland enhancement or restoration activities, the project goals will be thoroughly evaluated during the permit review process.

Scores found on the DOEE Wetland Registry and within the 2016 Wetland Conservation Plan will be used solely as baseline data. An applicant must ground-truth conditions prior to submitting a permit application for any type of wetland project.

Glossary:

Enhancement

Enhancement is defined as the augmentation of wetland functions beyond the current natural conditions on a naturally functioning wetland site¹. Note that restoration and enhancement only apply to areas that currently are or formerly were wetlands.

Excess sediment and nutrient sources

Excess sediment and nutrient sources may be natural or anthropogenic. Sediment sources may include flooding from a river, runoff from unstable soil stockpiles, and sediment-rich runoff from construction sites. Nutrient sources may include fertilizer-rich runoff from maintained lawns and landscaped areas, cracked or broken sewer pipes, as well as the sediment sources previously mentioned.

Historic wetland

An area that was once a wetland, but has since been drained, filled or otherwise altered such that it is no longer functioning as a wetland. Relict hydric soils or a wetland plant community may be field indicators that suggest that an area was previously a wetland.

Invasive species

Invasive species generally refer to plant species that are non-native and have the potential to out-compete native plants for nutrients and other resources. Some common invasive plant species include common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), and cattails (*Typha* spp.). These plant species create monocultures or otherwise reduce the overall habitat and functional ability of the area.

Invasive animal species (e.g., nutria (*Myocastor coypus*) and carp) may also be present, but generally pose less of a threat to wetland diversity and function. Native, non-invasive species such as deer, geese, muskrat and beaver may also negatively affect the

¹ Adapted from the Natural Resources Conservation Service, Conservation Practice Standard Code 659.

establishment of a restoration/enhancement project and adequate controls may also need to be considered for such species.

When invasive species are present, the evaluator should understand what forms of control are available for a given species and the related cost/level of effort involved with the associated treatment. Information regarding invasive species can be found at www.invasivespeciesinfo.gov, www.invasive.org, and <http://plants.usda.gov/java/noxiousDriver>.

Restoration

Restoration is defined as the return of a wetland's size, type, and functions to a close approximation of its original conditions as it may have existed prior to anthropogenic, natural disturbance, or impact on a historic or degraded wetland site². Historical records may help to determine the original size, type, or functions of a wetland. If no historical records are available, expected functions of a given wetland type (e.g., a sediment retention function could be expected for a tidal wetland) can be assumed when setting goals for the restoration of the wetland.

Seed bank

Seed banks refer to natural wetland vegetation seed sources in current or former wetland areas. Often, these seed banks will persist, and once hydrology is restored, the seeds will germinate. This does not preclude the need for supplemental and stabilization seeding.

Stressors to hydrology

Threats to hydrology generally refer to anthropogenic threats to hydrology. Examples of these threats include proposed development within the watershed that will divert water away from the wetland, or reduce infiltration to groundwater-fed systems. Natural changes to hydrology such as stream meandering (when not caused by development), beaver activity, or aggradation (i.e., the accumulation of sediments in a riverine system) are not considered because they are part of natural processes.

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² Adapted from the Natural Resources Conservation Service, Conservation Practice Standard Code 657.

Appendix 1: WERE Tool Flowchart

















