From:	Puco ContactOPSB
To:	Puco Docketing
Subject:	comment for Case No. 21-902-GE-BRO
Date:	Monday, October 4, 2021 8:29:12 AM
Attachments:	DCA comments 20211001 OPSB Rule Review Case No 21-902-GE-BRO.pdf DCA comments 20211001 OPSB Rule Review Case No 21-902-GE-BRO.docx image001.png

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From: Darby Creek Association <darbycreeks@aol.com>
Sent: Friday, October 1, 2021 3:19 PM
To: Puco ContactOPSB <contactopsb@puco.ohio.gov>
Cc: jftetzloff@aol.com; asasson@aol.com; darterland@yahoo.com; Butler, Matthew <matthew.butler@puco.ohio.gov>
Subject: Re: Case No. 21-902-GE-BRO. Ohio Power siting Board Review of Ohio Administrative Code Chapters 4906-1, 4906-2, 4906-3, 4906-4, 4906-5, 4906-6, AND 4906-7

Re: Case No. 21-902-GE-BRO. Ohio Power siting Board Review of Ohio Administrative Code Chapters 4906-1, 4906-2, 4906-3, 4906-4, 4906-5, 4906-6, AND 4906-7

Ohio Power Siting Board
180 East Broad Street
Columbus, Ohio 43215
Via email to:
contactOPSB@puco.ohio.gov

October 1, 2021

Dear Ohio Power Siting Board:

The Darby Creek Association (DCA) submits the following comments on Case No. 21-902-GE-BRO, Ohio Power siting Board Review of Ohio Administrative Code Chapters 4906-1, 4906-2, 4906-3, 4906-4, 4906-5, 4906-6, AND 4906-7, in response to the OPSB's announcement at https://opsb.ohio.gov/wps/portal/gov/opsb/events/case-no-21-902-ge-bro-wksp2. The DCA is a volunteer organization that has existed since 1972 with the purpose of protecting the National Scenic River Big Darby Creek and the outstanding natural environment in the watershed.

The comments below apply to utility scale solar facilities and associated transmission lines. Because Ohio's natural features, such as vegetation communities, wetlands and stream are stressed and often degraded and/or sensitive to perturbation, siting of solar facilities and transmission lines must do a better job of protecting their biological integrity. Four utility scale solar facilities are either certified or proposed for the Big Darby creek watershed, potentially affecting roughly 10,000 acres in this National and State Scenic River watershed known for its outstanding biological diversity. This land area is close to the total amount of conservation land set aside for parks and natural areas in the Big Darby Creek watershed in the past 60 or so years.

We also provide our comments in the interest of preserving and improving other Scenic Rivers in Ohio and their outstanding biological features, as well as other areas proposed for the siting of solar facilities

where the natural environment can be protected, including beyond compliance with present OPSB rules, and rules and recommendations of other state agencies. Other streams and associated natural features in those watersheds that are not Scenic Rivers also need improvement and deserve protection.

The following is a summary of areas that DCA feels need improvement to protect the natural features of Ohio's outstanding rivers and their watersheds. This is followed by our full comments.

Thank you for the opportunity to comment.

Sincerely,

/Signed/

John Tetzloff, President
Anthony Sasson
Charlie Staudt

Darby Creek Association
2726 Camden Road
Upper Arlington, Ohio 43221
darbycreeks@aol.com
614 288-0313

Attachment

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Comment Summary – Darby Creek Association

Communication/Published public notices: Maps that are provided in newspapers with the public notice for a proposed solar facility must be easily readable and include all road names.

Aesthetic impacts: All areas along the project's boundary should be required to minimize the aesthetic impacts of the solar facility. For example, it appears that project proposals have some areas that do not appear to have vegetative screening. How will high quality, well-screened, vegetative screens be assured? OPSB should establish criteria that determine that a facility's vegetative screening meets acceptable standards for neighbors and an area's visitors.

Setbacks: In OAC 4906-4-04, Project area selection and site design, this list in (B)(1) also should include setbacks from public parks and natural areas that are large enough not to degrade the park or natural area visitor's experience of those areas.

Fencing: A wildlife-friendly or wildlife permeable fence must be woven wire with openings large enough near the ground to be passable by mammalian predators, such as red foxes and coyotes. Any facility fencing should be "wildlife-permeable" or "wildlife-friendly." We encourage a "wildlife-friendly" fence that has a wider weave at the bottom and allows for mammalian predator passage through the fence (e.g., large enough for foxes to pass through, at least). Chain link fence should be avoided.

Avoid planting non-local or rare/endangered species: Species that are not locally native or where the appropriate habitat does not exist should not be considered for planting at a solar facility or along transmission lines. Endangered and rare species should not be considered for planting (whether along a fence or anywhere within the solar facility property)

Loss of local prairie species genotype through use of seedstock from elsewhere: Solar facilities represent a threat to genetic diversity because they might lead to local genotype loss of native plant species, especially prairie plant species. If seedstock from elsewhere (commonly other states, but could be from within Ohio) is introduced at a solar facility, flowering plants can be expected to cross-pollinate, and grass species could cross-pollinate if close enough. This cross-pollination could be a threat to local genotypes.

Need to include only planting of locally native species: Solar facilities and transmission lines should use locally native genotype prairie species and refer to local, not just statewide, sources for determination of which species are appropriate.

Invasive species management: Because of their size and use of vegetation likely subject to invasion by nonnative species, solar facilities represent a major potential source of invasive species. This is a significant threat to the biological integrity of parks and natural areas nearby. Each facility, prior to certification, should have a complete plan to control invasive and nonnative species on the site that might escape to and affect nearby areas.

Unidentified wetlands: Because Ohio has lost 90% of its wetlands since European settlement, it is important that remaining wetlands be identified and protected. All wetlands within each solar facility's boundaries must be identified and delineated, and then reviewed and confirmed by a third party.

Wetland buffers: Solar facilities will often contain wetlands within their boundaries, and these facilities should protect these wetlands by establishing adequate buffers. All wetlands should have adequate buffers that preserve the biological integrity of the wetlands.

Stream buffers: Concerning OAC 4906-4-04 Project area selection and site design, all streams should have riparian buffers that include trees and shrubs and that are wide enough to provide adequate meander width, floodplain, riparian habitat quality and shade for the streams.

Hydrology: Concerning OAC 4906-4-04 Project area selection and site design, solar facilities should improve hydrology, meaning reducing artificial drainage (tile and surface drainage (ditches and channelized streams)) and allow significantly greater groundwater infiltration of precipitation, helping to restore a more natural stream flow regime.

Monitoring: In order to track and changes and respond to any claims of alteration of natural resources, solar facilities should conduct monitoring of the environment around and within their facilities, during construction and operation, in the following areas. This monitoring should be conducted at a level of sample frequency and spatial density adequate to determine changes in the natural environment.

Transmission lines: Transmission lines often cross or are routed along wetlands and streams, so the potential impacts they represent are comparable to some of those of solar arrays. Meander belt widths, floodplains, riparian corridors with adequately wide forested buffers, and wetlands should be protected in the areas of transmission lines. Transmission lines should allow for stream restorations, as in the use of Natural Channel design to restore stream habitat quality.

Appendix I/ Wetland buffer recommendations for Ohio Power Siting Board applications: This Appendix supplements comments of the Darby Creek Association to the Ohio Power Siting Board concerning wetland buffers for solar facilities applying for certification to the Board. This document offers some of the buffers widths recommended and/or used by others as examples for comparison.

Full Comments of the Darby Creek Association

Communication

Published public notices:

Maps that are provided in newspapers with the public notice for a proposed solar facility must be easily readable. Some that have been published as public notices are hard to read and of low resolution, and lack identifying features that would orient the reader, such as many road names. These maps need to be produced using higher resolution, with more identifying features so that readers readily can easily determine where proposed facilities might be located, including all roads and political boundaries. Links to high resolution maps should be provided in newspaper notices, in addition to better resolution, more readable maps appearing in the newspaper itself.

Additional outreach routes (other than newspapers) should be investigated for use in order to notify more people about proposed facilities.

OAC 4906-4-03 Project description in detail and project schedule in detail.

In addition to published public notices, OAC 4906-4-03, "Project description in detail and project schedule in detail," section (A)(1) needs to require identification of all roads in the project area.

Section (A)(1), in addition to any already required to be identified, needs to require identification of all public parks and trails, natural areas owned by the federal, State of Ohio, local governments and nongovernmental organizations, and State of Ohio Scenic Rivers with a certain distance of the project area. We recommend those within five miles, and within a five mile distance downstream of the site boundaries for aquatic species. We expect aesthetic, vegetation and wildlife impacts from projects. Because vegetation is pollinated across some distance, and wildlife continually moves and migrates, these impacts can or would be realized at a significant distance outside of the projects' fencelines.

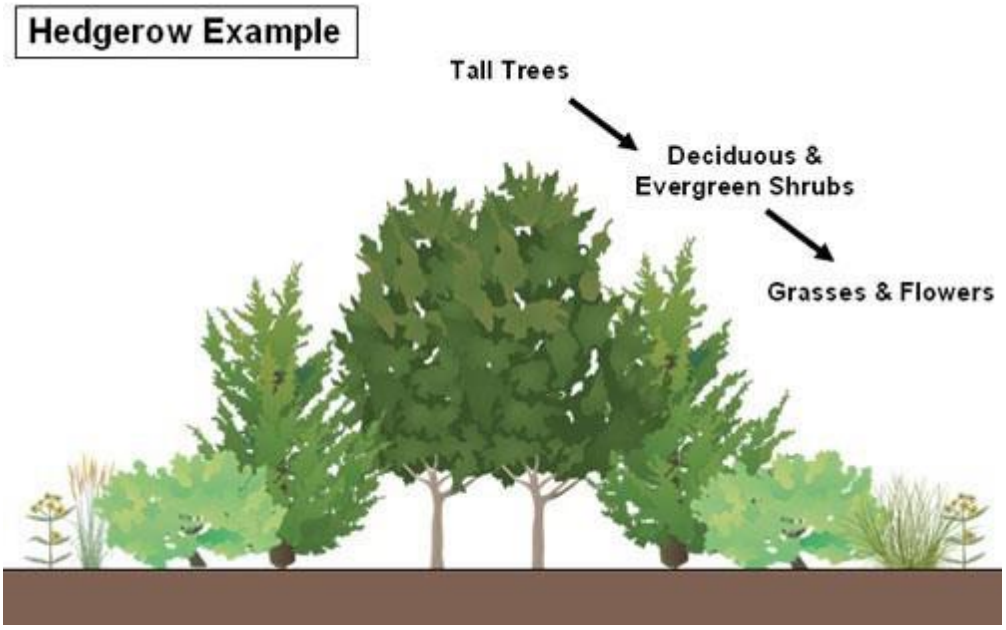
Aesthetic impacts

All areas along the project's boundary should be required to minimize the aesthetic impacts of the solar facility. For example, it appears that project proposals have some areas that do not appear to have vegetative screening.

How will high quality, well-screened, vegetative screens be assured? OPSB should establish criteria that determine that a facility's vegetative screening meets acceptable standards for neighbors and an area's visitors, such as natural area managers and park visitors.

Landscape screening species should be of sufficient thickness and height to block views of panels around the whole facility. "Modules" or collections of species that rely on only low-growing species should be avoided, such as those that employ "native pollinator habitat" mix only (implying low growing "prairie" species, for example). "Modules" for vegetative screening that rely on single rows of plants are not adequate for screening. Vegetative screening should block views of solar arrays. The example below shows <u>multiple rows</u> of trees and tall shrubs forming a vegetative screen (see Hedgerow Example"

graphic).[1] Note: Other than *Juniperus virginiana*, red cedar, most ecosystems in western and central Ohio do not include "evergreen"/coniferous trees or shrubs, so such species would not mimic a natural ecosystem if planted in those areas.



Setbacks

OAC 4906-4-04, Project area selection and site design,

"(B) The applicant shall describe the process of designing the facility layout.

(1) The applicant shall provide a constraint map showing setbacks from residences, property lines, utility corridors, and public rights-of-way, and any other constraints of the site design."

This list in (B)(1) also should include setbacks from public parks and natural areas that are large enough not to degrade the park or natural area visitor's experience of those areas. Solar arrays can be considered aesthetically undesirable by many park and natural area visitors, as well as neighbors. A solar facility can fundamentally change the experience of visiting that park or natural area, as well as the natural conditions within the park or natural area.

Fencing

A wildlife-friendly or wildlife permeable fence must be woven wire with openings large enough near the ground to be passable by mammalian predators, such as red foxes and coyotes. Any facility fencing should be "wildlife-permeable" or "wildlife-friendly." We encourage a "wildlife-friendly" fence that has a wider weave at the bottom and allows for mammalian predator passage through the fence (e.g., large enough for foxes to pass through, at least). Chain link fence should be avoided.

[1] Diagram from http://dnr.maryland.gov/wildlife/Pages/habitat/wahedgerows.aspx Accessed 9/29/21

We also encourage that a fence be no higher than six feet to limit the negative aesthetic impact.

Summary:

- Any facility fencing should be “wildlife-permeable” or “wildlife-friendly,” meaning permeable to mammalian predators.

- We encourage a “wildlife-friendly” fence that has a wider weave at the bottom, with <u>openings in the weave that are large enough and in the right position to allow for mammalian predator passage through the fence</u> (e.g., large enough for foxes to pass through, at least).

- Chain link fence and small-weave fence should be avoided.

- To enhance visual screening and provide more wildlife habitat, vine species planted along fences and allowed to grow on the fence can provide significant screening for fences (see below for an abbreviated list).

- We also encourage that a fence be no higher than six feet to limit the negative aesthetic impact.

Figure 1 Wildlife-friendly fencing c Liz Kalies[2]

We believe that avoidance of chain link fence would be much more aesthetically preferable for area visitors and neighbors by avoiding an “institutional” appearance. A woven wire fence tends to be less visible (examples below) and is a much better match for the agricultural heritage areas. It also might be less costly.

Please note that the Columbus and Franklin County Metro Parks’ bison enclosure, in western Franklin County at Battelle Darby Metro Park, uses an agricultural weave/woven wire fence, presumably closer to the "wildlife-friendly" type described below than a chain-link fence. Photos of this fence are below.

[2] North Carolina Pollinator Conservation Alliance. 2018. North Carolina Technical Guidance for Native Plantings on Solar Sites. http://ncpollinatoralliance.org/north-carolina-solar-technical-guidance-document/ Accessed 9/29/21

The fence pictured above was installed about a decade ago when Metro Parks brought bison to Battelle Darby Metro Park. We recognize that this example if not the preferred configuration of the fence (the weave is too small, the smaller weave is mounted on the bottom - to be "wildlife-friendly," the larger weave should be on the bottom). However, we believe the proposed facility could mount the fence with the adequately-spaced, wider weave as the bottom. A woven wire fence is more aesthetically appealing for neighbors and fits a park or semi-natural setting much better than a chain link fence.

If an applicant proposes "deer fencing," we are concerned that this "deer fencing" is not appropriate and wildlife-permeable (or wildlife friendly). Specifically:

1. The spacing between the wires of the fence must be adequate for predatory mammal passage, such as foxes. These openings need to be larger, such as at least 6 inches (see more specific recommendations below), and the <u>larger openings need to be on the bottom.</u> (Such fence is usually mounted with the smaller opening on the bottom, but that is not appropriate for wildlife permeability – it would not be "wildlife friendly.")

2. The fence should be mounted with the larger wire spaces of the fence wire on the bottom.

The Nature Conservancy in North Carolina has been emphasizing "wildlife-friendly" fencing for solar facilities (personal communication, Liz Kalies, TNC). The dimensions of the wire spaces in the fence they recommend are closer to 8-9" spacing wide and start at about 7" spacing vertically. Again to emphasize the critical and important point, if the fencing is something like 17/75/6 deer mesh, it needs to be installed "upside down." The wildlife-friendly (or "wildlife-permeable") fence has the larger wire spaces at the bottom, and then the "holes" (the wire space openings in the weave) get smaller (vertically) as you go up from the ground. This might be thought of as installing the fence "upside down," but the larger wire spaces are at the bottom allows more wildlife - the mammalian predators - through, thus "wildlife-friendly." Without these predators, the enclosures within the fence might have an overabundance of prey species such as rabbits and rodents.

More details on “wildlife-permeable” or “wildlife-friendly” fencing are provided below.

DCA is concerned that chain link fencing will be detrimental to wildlife, i.e., the chain link is too small to allow animal passage, especially larger predators, such as foxes. Therefore, prey animals, such as mice, voles, rabbits and others, will not be naturally controlled by these excluded predators, potentially encouraging large prey population expansions and a wildlife community out of balance within the enclosure. We strongly encourage a “wildlife-permeable” (or “wildlife-friendly”) fence that has an adequately wide weave at the bottom and allows for mammalian predator passage through the fence. For example, foxes are likely predators in much of Ohio. We recognize that birds and snakes also serve as predators, although we question how birds will successfully prey on wildlife under the solar panels. Therefore, we feel that a wider weave fence is appropriate.

Please note that this request regarding fencing is not referring to a forest fragmentation issue or the exclusion of deer. We believe deer will be able to leap over a 6-7’ fence.

This predator-prey imbalance could be avoided by fencing that has a weave that is large enough to readily allow passage of predators. Please see this item related to solar facilities in North Carolina, where they have installed wildlife-friendly fences that allow predator passage:

https://www.nature.org/en-us/about-us/where-we-work/united-states/north-carolina/stories-in-north-carolina/making-solar-wildlife-friendly/

Also see:

"The quick gray fox jumped through the upside-down solar fence—a photo essay"
https://pv-magazine-usa.com/2019/12/16/the-quick-gray-fox-jumped-through-the-upside-down-solar-fence-a-photo-essay/

This link below is a commercial website of a fencing company that installs fencing for solar facilities, which is an example of what we are referring to. This mention implies no recommendation for this particular product.

Example:

Bekaert Fence Products
https://fencing.bekaert.com/en/rural-and-industrial-fence/solar#:~:text=of%20the%20fence.-,HEIGHT,with%20local%20and%20federal%20regulations

Solar Field Perimeter Fence Needs
“As utilities, municipalities, businesses and residences turn to alternative forms of energy to meet increased energy consumption and demand, the need to protect these investments grows. Solar arrays located in rural areas face perimeter security challenges that are best met with high-tensile woven wire fence solutions. Agricultural style fences also blend more aesthetically with rural environments compared to chain-link fence.

“Bekaert’s exclusion fence designs allow beneficial small animals and pollinators through but deter larger animals like deer and humans. Unlike chain link, which can require poured concrete posts for stability and has a thicker, heavier design, high-tensile wires are lighter and stronger and don’t always require concrete for installation. This flexibility and performance makes high tensile wire products ideal for rural installations. They can be installed quickly and more cost-

effectively while providing less shadowing over the solar panels. They are more tamper-resistant to animals and humans."

Bekaert's brochure on high tensile wire for solar arrays: https://fencing.bekaert.com/-/media/Brands2017/Fencing/Files/BEK-3317_3Fold-Solar-Arrays_LR-netto.pdf?la=en

In addition to enhancing vegetative screening with locally native trees, shrubs and taller forbs and grasses planted in the sites' perimeter, vines planted along fences and allowed to grow on the fence can provide significant screening for fences, including the woven wire fence described above. We encourage planting of species native to the county and habitat in which the facility is found. Appropriate native Ohio species might include, but not be limited to:

Virginia Creeper (*Parthenocissus quinquefolia*)
Trumpet Creeper (*Campsis radicans*)
Virgin's Bower (*Clematis virginiana*)

Again, species should not be grown at a solar facility or along a transmission line if they are not native to the county or habitat. We encourage referring to these references for plants native to each Ohio county:

Braun, Lucy E. 1961. The Woody Plants of Ohio. Ohio State University Press, Columbus. 362 pp. (Reprinted 1989)
Braun, Lucy E. 1967. The Monocotyledoneae (of Ohio), Cat-tails to Orchids. With Gramineae by Clara G. Weishaupt. Ohio State University Press, Columbus. 464 pp.
The Biota of North America Program/North American Vascular Flora, plant species county distribution maps in (http://bonap.net/fieldmaps)
USDA PLANTS Database (https://plants.usda.gov)

Related to fencing, and the spaces between fences, the site should include wildlife travel corridors:

"Travel corridors for movement – Designing solar farms to ensure wildlife connectivity and movement across the landscape ensures that species have increased access to other forage areas, aids in reproduction and increases genetic diversity. If a solar site is large, including unfenced corridors through the facility allows for movement of pollinators and other wildlife species. Additionally, fencing at sites should be installed in a way that allows small mammal and turtle movement."[3]

Avoid planting non-local or rare/endangered species:

- Species that are not locally native or where the appropriate habitat does not exist should not be considered for planting at a solar facility or along transmission lines.

[3] North Carolina Pollinator Conservation Alliance. 2018. North Carolina Technical Guidance for Native Plantings on Solar Sites. http://ncpollinatoralliance.org/wp-content/uploads/2018/10/NC-Solar-Technical-Guidance-Oct-2018.pdf

- Endangered and rare species should not be considered for planting (whether along a fence or anywhere within the solar facility property)

Species that are not locally native (even though they might be found somewhere else in Ohio as native) or where the appropriate habitat does not exist should not be considered for planting at a solar facility or along transmission lines. For example, these species are not appropriate, i.e., not local to, facilities in the Darby Plains (in general, the Big Darby Creek watershed), which currently has four solar facilities certified by OPSB or approved:

Koeleria macrantha (= *Koeleria pyramidata*)	Prairie Junegrass
Bouteloua curtipendula	Sideoats grama
Ratibida columnifera	Lanceleaf coreopsis

However, the above are included in the Ohio Pollinator Habitat Initiative Pollinator list for Habitat Specifications Sheet 3' Solar Wildflower/Legume Seeding,[4] but are inappropriate for the Darby Plains, as one local plant community example. These species would introduce new species into plant and ecological communities that did not include them naturally. This introduction should be avoided.

Species with just a few occurrences in that county should not be considered for planting at a solar facility or along transmission lines, as they might be too habitat-limited or site-specific or just an errant individual or patch of that species. Planting also might be encouraging a species to spread outside of its natural range.

Endangered and rare species should <u>not</u> be considered for planting (whether along a fence or anywhere within the solar facility property) to avoid contamination of the local rare/endangered population's genotype. One rare species that is recommended by the Ohio Pollinator Habitat Initiative is prairie cordgrass, *Sporobolus heterolepsis*). This species is listed as threatened in Ohio. This species is recommended in the Ohio Pollinator Habitat Initiative Pollinator Habitat Specifications Sheet 3' Solar Wildflower/Legume Seeding[5].

Suppliers of prairie seed sometimes market their products with non-native species within a seed mix or "package." These seed mixes should be avoided to prevent non-native species from being planted.

Loss of local prairie species genotype through use of seedstock from elsewhere

Solar facilities represent a threat to genetic diversity because they might lead to local genotype loss of native plant species, especially prairie plant species. While it might be true in other parts of Ohio also, this is particularly true in the Big Darby watershed and Darby Plains, where a local prairie plant species genotypes have been collected and built since 1976. If seedstock from elsewhere (commonly other states, but could be from within Ohio) is introduced at a solar facility, flowering plants can be expected

[4]https://energizeohio.osu.edu/sites/energizeohio/files/imce/OPHI%20Pollinator%20Solar%20Job%20Sheet%202019.pdf Accessed September 2021

[5]https://energizeohio.osu.edu/sites/energizeohio/files/imce/OPHI%20Pollinator%20Solar%20Job%20Sheet%202019.pdf Accessed September 2021

to cross-pollinate, and grass species could cross-pollinate if close enough. This cross-pollination could be a threat to local genotypes.

For example, for the proposed Pleasant Prairie Solar facility in Franklin County, the facility should ensure that the facility's perimeter plantings are Darby Plains native prairie species composed solely of local Darby Plains genotypes. Columbus and Franklin County Metro Parks has spent 45 years very carefully collecting seed locally and managing these prairie plantings with only these local genotype seeds as sources of their prairie plantings. If this facility plants non-Darby Plains genotype vegetation of the same species, this will contaminate the Battelle Darby Metro Parks Darby Plains genotype, and the Darby Plains genotype will be lost as a prairie plant community in adjacent Battelle Darby Metro Park.

Since at least 1976, Metro Parks has worked diligently to establish and expand prairie species plantings native to the Darby Plains using only species grown from carefully collected seed derived only from the Darby Plains. These seeds represent the locally native genotype from thousands of years of local reproduction within the Darby Plains and were not imported from outside of the Darby Plains area. Therefore, they represent local genetic material that is unique to the Darby Plains. This is an example of a highly unusual ecological condition that should be maintained and not degraded by plantings of species at solar facilities that have their origins in other states.

Please see the DCA comments to OPSB on this proposed facility of July 1, 2021, for more on this problem and shortcoming of the application:
http://dis.puc.state.oh.us/DocumentRecord.aspx?DocID=9c74827b-dd3d-4909-aab9-35f12c67380a.

There might be ways to steadily grow locally native genotype species within solar facilities. Getting locally native genotype seedstock and working with the local seed growers and producers who can provide such locally native genotypes will require forethought and planning. However, it can produce a much more natural ecological condition that represents native species and a locally native ecosystem. Seeds and plants that are not locally native genotype do not represent this condition, and could establish a very different ecosystem and spread that to areas that have been maintained by local ecosystem managers. Locally native genotype seed could be planted in stages until areas such as the solar facility perimeter and solar array area are occupied with locally native genotype and noninvasive species. Solar facilities could plant cover crops (annual grasses and others) or noninvasive species that would be replaced as locally native genotype seed becomes available and could be planed. This will avoid genetic contamination from non-local seedstock, and actually could enhance locally native genotypes.

Need to include only planting of locally native species

Because solar facilities and transmission lines discourage tree growth, and forest is the general native plant community type for most of Ohio, prairie plant species are the commonly proposed option. Solar facilities and transmission lines should use locally native genotype prairie species and refer to local, not just statewide, sources for determination of which species are appropriate. The Ohio Prairie Association maintains a list of prairie plant species found in Ohio at http://www.ohioprairie.org/new%20latin%20names.htm. However, many species on this list, or on a statewide prairie plant species list from the Ohio Department of Natural Resources, are not appropriate across the whole state, and each local area should have a specs list that is specific to that area.

From our review of some solar facility applications, we see that solar facilities might claim they are planting "native species" within their facilities. Native species should be local, and not just species found somewhere in Ohio, an adjacent state or a state hundreds of miles away. Plant species that are local are those native to the same county and habitat as cited above (see the above Braun, BONAP and USDA references). For example, the Pleasant Prairie Solar, July 1, 2021, staff report's Recommended Conditions and the application imply that plant species not native to the Darby Plains could be used in the plantings in the perimeter area and landscape screenings. There are references to the "Selected Ohio Native Plants" list in Exhibit E, Landscape Vegetation Management, and Lighting Plan, HGS, LLC, January 2021, Appendix B/Ohio Native tree and Shrub Species List. Instead, species lists should be limited to local species (e.g., see above and DCA's comments of July 1, 2021, to OPSB concerning the list of species that Columbus and Franklin County Metro Parks has compiled for Battelle Darby Metro Park and the list compiled for Darby Plains plant species (for prairie species, see https://ohioplants.org/darby-plains-prairie-plants/)).

For this example, species not native to the above Metro Park and Darby Plains prairie plant lists should not be planted at solar facilities or along transmission lines in the Darby Plains; only species native to the Darby Plains should be planted and maintained. Again, we strongly encourage the locally native genotype. The Pleasant Prairie Solar OPSB staff report Condition 14 refers, for example, "vegetation screening designed to … be in harmony with the existing vegetation … in the area." "In harmony" is not defined, and this statement does not ensure that local plant species are used, and that the Darby Plains genotype is used for prairie species. Again, only Darby Plains species should be used. See DCA's July 1, 2021, comments for more on Darby Plains plant species. Also, see the above discussion about avoidance of the contamination of the locally native genotype for plant communities.

Invasive species management

Because of their size and use of vegetation likely subject to invasion by nonnative species, solar facilities represent a major potential source of invasive species. This is a significant threat to the biological integrity of parks and natural areas nearby. <u>Each facility, prior to certification, should have a complete plan to control invasive and nonnative species on the site that might escape to and affect nearby areas</u>.

The plan should be reviewed by ODNR and local invasive species managers before facility site preparation and operation. The plan should include native and noninvasive plant establishment and invasive plant control goals. It should specify the means of control for expected invasive species in the area, such as cutting and herbicide treatment. To advise and review progress, the plan should name and Include implementation participation of native and invasive plant specialists such as from local parks department and state government. The plan should address management methods and control goals in the solar array, perimeter planting areas, and landscape screening and other areas.

The Ohio Invasive Plants Council's (https://www.oipc.info/) Plant Assessment Results as of December 2020 list known and potentially invasive species is at: https://centralohprism.files.wordpress.com/2021/02/oipcplantlist-educational2019-for-websitepdf.pdf. Management of such species needs to be tailored to the area of the solar facility or transmission line, i.e., focused on invasive species known or likely for the area, and demonstrate that effective means of control are known and will be used.

The OPSB rules and Recommended Conditions of an OPSB staff report and application need enhancement and need to be specific about practices and objectives for attention to invasive species management, particularly among the solar panels and in the perimeter and screening plantings. Invasive plant species and species not native to the local area will threaten the ecological integrity of the native plant habitats at nearby parks and natural areas. Many Ohio plant communities are extensively invaded by nonnative species now. Solar facilities and areas under transmission lines are additional sources of these invasives species. Because controlled burns are not possible among the solar panels, but is a standard practice for control of invasives in prairie habitats, there appears to be a significant shortcoming for invasive species control at solar facilities and we assume under transmission lines. Because the solar panels are a fundamentally different condition than natural areas or parkland, certain invasives species control measures, such as controlled burns, are unlikely to be an option within a solar facility. Therefore, invasive species control is problematic and the issue needs to be more comprehensively addressed, and in more specific detail. A general reference to a Vegetation Management Plan is not adequate because of the situation near and among the solar panels. This industry does not have an extensive track record of invasive species management in Ohio and needs to demonstrate in plans and implementation that they are responsible effective in controlling this threat.

Unidentified wetlands

Because Ohio has lost 90% of its wetlands since European settlement[6], it is important that remaining wetlands be identified and protected. All wetlands within each solar facility's boundaries must be identified and delineated, and then reviewed and confirmed by a third party. Wetlands identified by applicants should compare their identified wetlands to the National Wetland Inventory or other more recent comprehensive inventories of the site not conducted by the applicant or their contractors.

We are concerned that wetlands might not be identified or might be scored in a lower category.

Prior to OPSB certification, presence, absence, delineation and categorization of wetlands reported in applications to the OPSB <u>should be subsequently verified by third parties</u>, such as Ohio EPA/Division of Surface Water, ODNR or a third party person who is a Certified Water Quality Professional under OAC 3745-6. Categorization means, at a minimum, use of the Ohio Rapid Assessment Method (ORAM)[7], listed in paragraph (B)(2) of rule 3745-6-05.

In general, wetlands found at a facility should remain in place, and applicants should avoid filling and draining such wetlands and mitigating them elsewhere.

Wetland buffers

Solar facilities will often contain wetlands within their boundaries, and these facilities should protect these wetlands by establishing adequate buffers. All wetlands should have adequate buffers that preserve the biological integrity of the wetlands.

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[6] Dahl, T.E. 1990. Wetlands losses in the United States, 1780's to 1980's. Report to the Congress.
[7] Ohio EPA. 2001. Ohio Rapid Assessment Method for Wetlands v. 5.0.
https://www.epa.state.oh.us/portals/35/401/oram50um_s.pdf Accessed 9/27/2021.

Wetland buffers need to be wide enough to provide adequate wildlife habitat, protect native vegetation and provide adequate hydrology to maintain a high quality wetland ecosystem. See Appendix I (below), "Wetland buffer recommendations for Ohio Power Siting Board applications" for specifics on the importance of wetland buffers. References are provided for scientifically-based buffers (Semlitsch, R.D. and J.R. Bodie. 2003) and the Ohio Rapid Assessment method (ORAM). Please keep in mind that the wider buffers referred to in ORAM are those that support high quality wetlands, have been shown through analysis to have this higher quality, and ORAM's widest buffers (50 m) should be the goal of any wetland protection. The narrower buffer widths are likely to limit habitat and hydrology, and therefore perpetuate low quality wetlands. Buffer widths included in Ohio EPA's "Rainwater and Land Development: Ohio's Standards for Stormwater Management Land Development and Urban Stream Protection" have not been based on analysis similar to ORAM's and shown to support higher quality wetlands.

Trees that are part of a wetland buffer should not be removed. Such trees provide vegetation and wildlife buffers and shade to the wetland.

Stream buffers

OAC 4906-4-04 Project area selection and site design.

All streams should have riparian buffers that include trees and shrubs and that are wide enough to provide adequate meander width, floodplain, riparian habitat quality and shade for the streams.

For example in the Big Darby Creek watershed, the DCA is concerned that proposed facilities, including solar arrays and transmission lines, will not comply with, or at least meet the intent of, the Ohio EPA's NPDES Construction Storm Water General Permit Renewal (OHC000005) https://epa.ohio.gov/dsw/permits/GP_ConstructionSiteStormWater, including the specific requirements related to the Big Darby Creek watershed, which requires riparian stream buffers with native riparian vegetation (including trees and shrubs) and groundwater recharge goals.

Transmission lines, and supporting towers, must be located so that they minimize any limitations on maintaining natural, high quality habitat conditions (including shade from trees) along streams in their riparian corridors. They should not restrict stream restoration quality by restricting stream riparian shading (by trees) or stream meandering. Transmission lines too often require that vegetation is removed. That vegetation shades streams and provides critical riparian habitat. Towers can limit options for resting meanders in streams.

Floodplains should be preserved in their natural condition, including the meander belt width, plus adequately wide riparian forest.

Transmission lines should be sited to avoid restrictions on trees and shrubs along streams. Such vegetation is critical for stream shading, leaf litter, woody debris stream habitat, tree roots along banks, etc. Such habitat is critical for stream quality as demonstrated by scoring under Ohio's Qualitative Habitat Evaluation Index.[8]

[8] Rankin, E.T. 1989. The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods and Application. https://www.epa.state.oh.us/Portals/35/documents/QHEI_1989.pdf Accessed 9/28/2021

This habitat quality need also applies to stream within solar facilities, which also should have trees and shrubs along the riparian corridor.

Hydrology

OAC 4906-4-04 Project area selection and site design.

Solar facilities should improve hydrology, meaning reducing artificial drainage (tile and surface drainage (ditches and channelized streams)) and allow significantly greater groundwater infiltration of precipitation, helping to restore a more natural stream flow regime.

As with stream buffers, the DCA is concerned that proposed facilities, including solar arrays and transmission lines, will not comply with, or at least meet the intent of, the Ohio EPA's NPDES Construction Storm Water General Permit Renewal (OHC000005) https://epa.ohio.gov/dsw/permits/GP_ConstructionSiteStormWater, including the specific requirements related to the Big Darby Creek watershed, which requires riparian stream buffers with native riparian vegetation and groundwater recharge goals. Solar array need to greatly increase groundwater recharge to help protect stream flow and quality. Altered, usually flashy and diminished in the warmer months, stream hydrology is one of the leading causes of stream quality degradation in Ohio, according to the Ohio EPA's biennial Integrated Report (https://epa.ohio.gov/dsw/tmdl/OhioIntegratedReport).

Solar facilities should improve hydrology, meaning reducing artificial drainage (tile and surface drainage (ditches and channelized streams)) and allowing significantly greater groundwater infiltration of precipitation, creating a more natural stream flow regime. Artificial drainage negatively affects stream health, such as by making stream more flashy, altering the natural flow regime and causing stream scouring and habitat instability and degradation downstream. These impacts make altered hydrology, i.e., hydromodification, or flow alteration, one of the most common causes of stream degradation in Ohio, as measured by aquatic life impairment.[9]

Solar facilities have opportunities to reduce artificial drainage, create a more natural stream flow regime and reduce stream degradation near and downstream of their sites. They can reduce altered hydrology in perimeter areas, vegetative screening areas and among the solar panel arrays. Also, their roadways and other areas should be designed to minimize artificial drainage and restore hydrology through slowing runoff and achieving maximum precipitation infiltration to groundwater.

Monitoring

In order to track and changes and respond to any claims of alteration of natural resources, solar facilities should conduct monitoring of the environment around and within their facilities, during construction and operation, in the following areas. This monitoring should be conducted at a level of sample frequency and spatial density adequate to determine changes in the natural environment.

[9] Ohio EPA. 2020. 2020 Integrated Water Quality Monitoring and Assessment Report. Page A-10. https://epa.ohio.gov/Portals/35/tmdl/2020intreport/2020_SectionA.pdf Accessed 9/29/2021

Steam and wetland quality – including physical habitat, chemical and biological assessments as established by Ohio EPA and other Ohio protocols for fish, macroinvertebrates and mussels.

Groundwater quality – including any potential contaminants from the solar panels, such as toxic substances, metals and per- and polyfluoroalkyl substances (PFAS – which might have been used in coatings or films) that might be components of the solar array. Soil sampling should be included.

Vegetation within solar array - including species composition and extent of ground cover provided.

Invasive species extent - including determining when critical thresholds of invasive species are exceeded, and effectiveness of control measures.

Bird and other wildlife losses or ecosystem imbalances - such as predator and prey imbalances.

Monitoring should be conducted according to Ohio data protocols and by qualified personnel, such as would qualify under the Ohio Credible Data Program (https://epa.ohio.gov/dsw/credibledata/index).

Transmission lines

Transmission lines often cross or are routed along wetlands and streams, so the potential impacts they represent are comparable to some of those of solar arrays. Transmission lines have some flexibility related to the route selected, the placement of towers, and their ability to avoid many steam and wetland impacts.

Meander belt widths, floodplains, riparian corridors with adequately wide forested buffers, and wetlands should be protected in the areas of transmission lines. Transmission lines should allow for stream restorations, as in the use of Natural Channel design to restore stream habitat quality.

Many Ohio stream have been channelized, or have been de-forested along their riparian corridors, which significantly degrades steam habitat and stream biological communities, or have other alterations, such as levees. Without stream restoration, these streams are likely to continue to have low scores as determined by Ohio EPA protocols. Habitat quality is a major determinant of stream quality, as documented by Ohio EPA across Ohio. Stream restoration improves stream habitat quality and aquatic life scores, and transmission lines should be routed and placed so as to minimize restriction on stream habitat (such as allowing an adequate width of trees for stream shading, and minimizing restrictions to stream meandering) and to maximize potential stream restorations.

Transmission lines can limit stream restoration design and important components such as the route and tree shading over these streams. In short, the transmission line route needs to, including but not limited to:

1) minimize the transmission line crossing distance over any streams;
2) maximize the ability of the streams to meander when restored, on these parcels and near the transmission lines (This is best established with planning of the transmission lines in conjunction with stream restoration planning);

3) minimize restrictions that might be created by placement of the transmission line towers or other structures;
4) maximize tree shade over these streams, including an adequate distance in the riparian area along these streams (as wide as possible);
5) maximize infiltration of precipitation to groundwater through establishment of native vegetation in these parcels, which probably is forest in this area (and might include some wetlands), especially within the floodplain;
6) demonstrate coordination for maximizing stream restoration among parcels; and
7) confirmation of the above by a qualified and experienced stream restoration consultant/contractor, and review by the public.

Appendix I
Wetland buffer recommendations
for Ohio Power Siting Board applications

Submitted by the Darby Creek Association

10/1/2021

Purpose
This Appendix supplements comments of the Darby Creek Association to the Ohio Power Siting Board concerning wetland buffers for solar facilities applying for certification to the Board. This document offers some of the buffers widths recommended and/or used by others as examples for comparison.

Recommendations

- All wetlands on the facility's site should remain in place (i.e., not be mitigated off-site).

- The facility should include wetland buffers, which, at a minimum, exceed the buffer distances and meet adequate hydrology protection as stated in the "Ohio Rainwater and Land Development Manual" (https://epa.ohio.gov/dsw/storm/rainwater) and address the buffer widths in the ORAM; see references below.

- At a minimum, these buffers should exceed those in Ohio's Rainwater and Land Development Manual and ensure that a minimum level of biological, physical, and/or chemical integrity is maintained to any preserved wetland under the post-construction condition. The buffers in the manual are[10,11]:

    - Category 1 wetlands: minimum 25 feet
    - Category 2 wetlands: minimum 75 feet
    - Category 3 wetlands: minimum 120 feet

- Wetland buffers should consider the buffer widths provided in ORAM for maintaining high quality wetlands (Category 3)

- Each buffer should be protected in its natural state, with native species predominant and with minimal disturbance (such as removal of invasive, nonnative species).

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[10] A buffer can help with maintaining some hydrology, but it would likely be a small part of a wetland's overall drainage area. These buffers do not necessarily ensure that hydrology is maintained, which is a separate issue from buffer establishment.
[11] Also see the buffers included in the Ohio Rapid Assessment Method (ORAM). Note that the buffer widths in this paragraph are less than that provided in ORAM. ORAM's widest buffer width (50 m) is most likely to protect high quality wetlands.

- Each buffer shall have its boundaries permanently recorded and demarcated with appropriate signage. Each wetland and buffer shall be protected by a legal mechanism, such as coverage by a protective covenant[12] held by a Soil and Water Conservation District, ODNR, Ohio EPA or other government conservation entity, as conservation land to protect these natural resources in perpetuity.

- For all preserved wetlands provide documentation of how the hydrology will be maintained (water budget) or improved to establish and support a high quality wetland, and how that hydrology will not be negatively impacted by the proposed project.

Defining a "wetland buffer"

Several relevant Ohio sources define a wetland buffer. Ohio Administrative Code 3745-1-50 "Wetland definitions and availability of documents" provides the following definition of an upland buffer, pertaining to wetlands:

> "(TT) "Upland buffer" means land surrounding the jurisdictional edge of a wetland that consists of upland prairie, old field, shrub, or forest vegetation that is maintained in a natural state through passive or active management. This does not include lawns, mowed roadsides, fields where crops are grown or animals pastured, and other similar land uses."

The Ohio Rapid Assessment Method manual (Mack 2001), Page 39, states:

> "For the purposes of this question, "buffer" means non-anthropogenic landscape features which have the capability of protecting the biological, physical, and/or chemical integrity of the wetland from effects of human activity. Typically, a buffer could be forested or shrubby margin, prairie, streams or lakes, old fields, and in certain instances more managed landscapes like meadows or hay fields. Intensive human land uses should not be counted as buffers. These include active agricultural row cropping, fenced or unfenced pastures, paved areas, housing developments, golf courses, mowed or highly managed parkland, mining or construction sites, etc. A comprehensive list is not proposed in this manual. The key concept is whether the buffer area, whatever it is, functions to protect the wetland from degradation."

This excerpt from OAC 3745-1-54 (F)(7)(c) is applicable for the desired state of the wetland buffer:

> "The upland buffer consists of native vegetation which is not maintained through mowing, application of herbicide or other means which would result in deleterious effects to either the upland buffer or the adjacent wetland."

The Ohio Interagency Review Team for wetland banking in its Guidelines for Wetland Mitigation Banking and In-Lieu Fee Programs in Ohio v2.0 defines buffers as:

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[12] An example of a protective covenant from Ohio EPA is at "401 Environmental Covenant Template". https://www.epa.ohio.gov/Portals/35/401/401-Environmental-Covenant-Template-FILLABLE.docx (Accessed December 2020).

> "An upland, wetland, and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands, rivers, streams, lakes, marine, and estuarine systems from disturbances associated with adjacent land uses." (Page 4)

And adds:

> "Sites with adjacent land uses that will adversely impact mitigation success are discouraged unless there are means to offset these impacts. Buffers of adequate size (i.e. minimum 100 feet, measured from the boundaries of existing or proposed wetlands) and composition should be included to reduce impacts of adjacent land uses." (Page 16)

A wetland buffer also includes the area necessary to "ensure that adequate hydrology is maintained to any preserved wetland under the post-construction condition" (Big Darby Accord Master Plan, 2006, 4.0 Land Use and Development Policies, Page 4-6). Typically, such determinations are site-specific and are based on factors such as topography/slopes, soil types and determining surface and groundwater sources of water reaching the wetland. For more information, see the ORAM manual and U.S. EPA (2008). The quality of a wetland without adequate hydrology is degraded and is not a protected wetland:

> "Hydrology is probably the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes." (Mitsch and Gosselink, 1996, p.55).

In order to prevent wetland degradation after wetland delineation and buffer establishment, each buffer needs to have its boundaries permanently recorded and marked. Each wetland and buffer needs to be protected by a legal mechanism, such as coverage by a protective covenant held by Franklin County Soil and Water Conservation District, Ohio EPA or other government conservation entity, as protected conservation land to protect these natural resources in perpetuity.

References

Several sources were the key documents consulted for these recommendations. References used and listed in "Attachments" include, but are not limited to:

- Big Darby Accord Watershed Master Plan (https://bigdarbyaccord.org/)
- Rainwater and Land Development: Ohio's Standards for Stormwater Management Land Development and Urban Stream Protection (https://epa.ohio.gov/dsw/storm/rainwater)
- Ohio EPA: Storm Water Discharges from Small and Large Construction Activities - General Permit (https://www.epa.ohio.gov/portals/35/permits/OHC000005/Final_OHC000005.pdf)
- Ohio Administrative Code 3745-1-54 (https://codes.ohio.gov/ohio-administrative-code/rule-3745-1-54)
- Ohio Rapid Assessment Method manual (https://www.epa.state.oh.us/portals/35/401/oram50um_s.pdf)
- Franklin County Zoning Resolution (https://development.franklincountyohio.gov/EDP-website/media/Documents/Planning_Zoning/Zoning/zoning-code.pdf)

Omissions or shortcomings

These recommendations do not consider all other sources covering wetland buffer widths, their protection and hydrology. These sources are extensive. These recommendations do not address, or do not fully address, such points as:

1. If buffer averaging is allowed (allowing an average wetland buffer width in place of a minimum – see the ORAM as an example);
2. The set of factors to include for when "adequate hydrology is maintained;"
3. The adequacy of the buffer widths included in the Rainwater and Land Development Manual; and
4. The specific legal instrument to protect wetlands and their buffers, e.g., Ohio Environmental Covenant template (See https://www.epa.ohio.gov/Portals/35/401/401-Environmental-Covenant-Template-FILLABLE.docx)

Attachments

Attachment 1

References

Big Darby Accord Watershed Master Plan
https://bigdarbyaccord.org/the-plan (Accessed December 2020)

Castelle, A. J., et al. 1994. Wetland and Stream Buffer Size Requirements – A Review. Journal of Environmental Quality, 23:878-882 pp

Franklin County Zoning Resolution
https://development.franklincountyohio.gov/EDP-website/media/Documents/Planning_Zoning/Zoning/zoning-code.pdf (Accessed December 2020)

Mack, John J. 2001. Ohio Rapid Assessment Method for Wetlands v. 5.0, User's Manual and Scoring Forms. Ohio EPA Technical Report WET/2001-1. Ohio Environmental Protection Agency, Division of Surface Water, 401/Wetland Ecology Unit, Columbus, Ohio.
https://epa.ohio.gov/Portals/35/401/ORAM%20Manual%205.0.pdf (Accessed December 2020)

Mitsch, W.J. and J.G. Gosselink. 1986. Wetlands, 2nd Edition. Van Nostrand Reinhold Company, New York, New York.

Ohio EPA. 2014. Rainwater and Land Development: Ohio's Standards for Stormwater Management Land Development and Urban Stream Protection (Accessed December 2020)
Specifically, see:
Chapter 2: Post-Construction Storm Water Practices (Adapted for 4/23/18 CGP Update)
https://epa.ohio.gov/Portals/35/storm/technical_assistance/Ch2_Adapted%20for%20CGP%20changes.pdf

Ohio Administrative Code 3745-1-54 (Includes definitions of wetland categories) (Accessed December 2020)

Ohio Administrative Code 3745-1-54 Wetland antidegradation
https://epa.ohio.gov/Portals/35/rules/01-54_july18.pdf
Includes (excerpts):
(B) Wetland antidegradation requirements.
(C) Wetland categories. (*i.e., Categories 1, 2 and 3*)
(D) Wetland avoidance, minimization, and compensatory mitigation.

Ohio EPA: Storm Water Discharges from Small and Large Construction Activities - General Permit
https://epa.ohio.gov/dsw/permits/GP_ConstructionSiteStormWater (Accessed December 2020)
Specifically, see Appendix A Big Darby Creek Watershed

Ohio EPA. 2014. Rainwater and Land Development: Ohio's Standards for Stormwater Management Land Development and Urban Stream Protection https://epa.ohio.gov/dsw/storm/rainwater (Accessed December 2020)

Specifically, see:

Chapter 2: Post-Construction Storm Water Practices (Adapted for 4/23/18 CGP Update) https://epa.ohio.gov/Portals/35/storm/technical_assistance/Ch2_Adapted%20for%20CGP%20changes.pdf

Ohio Interagency Review Team. 2016. Guidelines for Stream Mitigation Banking and In-Lieu Fee Programs in Ohio Version 1.1 March 2016. 43 pp.

U.S. EPA. 2008. Methods for Evaluating Wetland Condition #20 Wetland Hydrology. Office of Water/Office of Science and Technology, Washington, DC 20460. EPA-822-R-08-024 https://www.epa.gov/sites/production/files/documents/wetlands_20hydrology.pdf (Accessed December 2020)

Additional wetland buffer references:

Chagrin River Watershed Partners, Inc. 2013. Summary of Riparian and Wetland Setback Regulations in Ohio. http://crwp.org/files/Riparian_Wetland_Regulation_summary_November2013.pdf (Accessed December 2020)
Environmental Law Institute. 2008. Planner's Guide to Wetland Buffers for Local Governments. https://www.eli.org/research-report/planners-guide-wetland-buffers-local-governments (Accessed December 2020)
Hruby, T. 2013. Update on Wetland Buffers: The State of the Science, Final Report, October 2013. Washington State Department of Ecology Publication #13-06-11. https://apps.ecology.wa.gov/publications/SummaryPages/1306011.html (Accessed December 2020)
Semlitsch, R.D. and J.R. Bodie. 2003. Biological Criteria for Buffer Zones around Wetlands and Riparian Habitats for Amphibians and Reptiles. Conservation Biology 17(5): 1219-1228. https://www.jstor.org/stable/3588947?seq=1#page_scan_tab_contents (Accessed December 2020)

Below is the Semlitsch and Bodie reference above, and often cited regarding wetland buffer zones. Note their distances for "core terrestrial habitat" surrounding a wetland, necessary to support the reptiles and amphibians, "ranged from 159 to 290 m for amphibians and from 127 to 289 m for reptiles from the edge of the aquatic site."

Abstract:
Terrestrial habitats surrounding wetlands are critical to the management of natural resources. Although the protection of water resources from human activities such as agriculture, silviculture, and urban development is obvious, it is also apparent that terrestrial areas surrounding wetlands are core habitats for many semiaquatic species that depend on mesic ecotones to complete their life cycle. For purposes of conservation and management, it is important to define core habitats used by local breeding populations surrounding wetlands. Our objective was to provide an estimate of the biologically relevant size of core habitats surrounding wetlands for amphibians and reptiles. We summarize data from the literature on the use of terrestrial habitats by amphibians and reptiles associated with wetlands (19 frog and 13 salamander species representing 1363 individuals; 5 snake and 28 turtle species representing more than 2245 individuals). Core terrestrial habitat ranged from 159 to 290 m for amphibians and from 127 to 289 m for reptiles from the edge of the aquatic site. Data from these studies also indicated the importance of terrestrial habitats for feeding, overwintering, and nesting, and, thus, the biological interdependence between aquatic and terrestrial habitats that is essential for the persistence of populations. The minimum and maximum values for core habitats, depending on the level of protection

needed, can be used to set biologically meaningful buffers for wetland and riparian habitats. These results indicate that large areas of terrestrial habitat surrounding wetlands are critical for maintaining biodiversity.

Attachment 2

Background: Importance of wetland buffers

Source for the following quote: Nieber, J.L., C. Arika, C. Lenhart, M. Titov and K. Brooks. 2011. Evaluation of Buffer Width on Hydrologic Function, Water Quality, and Ecological Integrity of Wetlands: Final Report. Minnesota Department of Transportation, St. Paul, Minnesota. 182 pp. http://www.dot.state.mn.us/research/documents/2011-06.pdf Accessed 6/3/2019.

"Human activities including agricultural cultivation, forest harvesting, land development for residential housing, and development for manufacturing and industrial activities can impair the quality of water entering the wetland, thereby detrimentally affecting the natural ecological functions of the wetlands. This can lead to degradation of biota health and biodiversity within the wetland, reduced water quality in the wetland, and increased release of water quality degrading chemicals to receiving waters. Under natural conditions wetlands develop buffer areas that provide some protection from the natural processes occurring on adjacent areas of the landscape. Buffers serve the function of enhancing infiltration of surface runoff generated on adjacent areas, thereby promoting the retention of nutrients in the soil, and retention of sediment suspended in the runoff water, while still allowing runoff water to reach the wetland through subsurface flow routes. To protect wetlands and receiving waters downstream from the wetlands it is important that wetlands in areas disturbed by human activities be provided with sufficient buffer to prevent degradation of wetland biotic integrity as well as degradation of wetland water quality." (emphasis added)

"Runoff generated on areas contributing to wetlands help to sustain the hydrology, nutrient balances and plant life/wildlife of the wetlands. When the runoff generated is affected by human activity it can have a detrimental effect on the natural hydrologic balance of a wetland, and also adversely affect the quality of the wetland water as well as adversely affect the wetland plant and animal ecosystem. Buffers surrounding wetlands have the potential to protect the water quality and ecological quality of the wetlands from the stresses of human activities. Buffers serve to infiltrate excess water, excess nutrients and toxic substances, and also help to provide some shelter to wetland associated plants and animals from direct contact with adjacent human activities."

"Wetlands are an ecosystem formed by the intermittent presence or persistence of water in a depressional, flat or low topographic area. They are distinguished by the low velocity flow of water through them, their water tolerant (hydric) soils, and vegetation that is specifically adapted to grow in water (hydrophytes.) They are also notable for the types of wildlife that depend on these unique habitat characteristics.

"While wetlands are known to play an important hydrologic role in the remediation of sediment runoff and chemicals, they also have a limit to which they can do so effectively. If a wetland is subjected to excessive sedimentation, nutrient input or modification of the hydroperiod, its quality may become compromised and its ability to maintain crucial ecological diversity could be impaired. The upland area immediately adjacent to a wetland, referred to here as a buffer or riparian zone, is critical to wetland health. The dimensions, vegetative characteristics and soil composition, slope of these buffers, and their surrounding land use all determine how well they might assist in mitigation of the various types of runoff or deposition to the wetland."

Attachment 3

ORAM (Ohio Rapid Assessment Method) excerpt

The excerpt below[13] is from the standard reference for determining the quality, or "Category", of a wetland in Ohio under the Clean Water Act. It is the standard used for rating and mitigating wetlands.

7.2 Metric 2: Upland Buffers and Surrounding Land Use.
Wetlands are areas transitional between upland and aquatic environments. Like many natural systems, both terrestrial and aquatic, they are sensitive to human disturbances, both direct and indirect. Nutrient enrichment or eutrophication from stormwater inputs, urban runoff, or agricultural runoff can degrade wetlands just as these disturbances can degrade streams and lakes.

The questions in Metric 2 reflect the fact that wetlands with "buffer" zones between the wetland and human land uses are often less disturbed than wetlands without such buffers. Conversely, wetlands that are located in places where human land use is more intensive are often subject to greater degrees of disturbance. However, it is important to stress that merely because a wetland is located in an area with intensive human land uses does not mean that it is or will become degraded.

Metric 2 is very similar to earlier versions of the ORAM with the exception that the point values have been adjusted. See e.g., Questions 11 and 12 in ORAM v. 4.1.

7.2.1 Question 2a: Average Buffer Width. (emphasis added)
For the purposes of this question, "buffer" means non-anthropogenic landscape features which have the capability of protecting the biological, physical, and/or chemical integrity of the wetland from effects of human activity. Typically, a buffer could be forested or shrubby margin, prairie, streams or lakes, old fields, and in certain instances more managed landscapes like meadows or hay fields. Intensive human land uses should not be counted as buffers. These include active agricultural row cropping, fenced or unfenced pastures, paved areas, housing developments, golf courses, mowed or highly managed parkland, mining or construction sites, etc. A comprehensive list is not proposed in this manual. The key concept is whether the buffer area, whatever it is, functions to protect the wetland from degradation.

In order to calculate the average buffer width, estimate the width of buffer on each side of the wetland to a maximum of 50m and divide by the number of sides, e.g. the average buffer width of a wetland with buffers of 100m, 50m , 0m and 0m would be calculated as follows: abw = (50 + 50 + 0 + 0)/4 = 25. See Figure 6. The wetland in Figure 6 would score 4 points for Question 2a. A wetland with buffers greater than 50m on all sides would have an abw$50m and would score 7 points.

This procedure works well with smaller wetlands. For very large wetlands or wetlands with unusual shapes there may be multiple "sides" and it may be difficult to measure, determine, or obtain access to all of the sides of the wetland. In this situation, the Rater m ay consider this question to provide a buffer continuum from very narrow to wide and assign the points associated with the most appropriate category.

[13] Mack. J. 2001. Ohio Rapid Assessment Method for Wetlands v. 5.0, User's Manual and Scoring Forms. Ohio EPA Technical Report WET/2001-1. Ohio Environmental Protection Agency, Division of Surface Water, 401/Wetland Ecology Unit, Columbus, Ohio. www.epa.state.oh.us/portals/35/401/oram50um_s.pdf

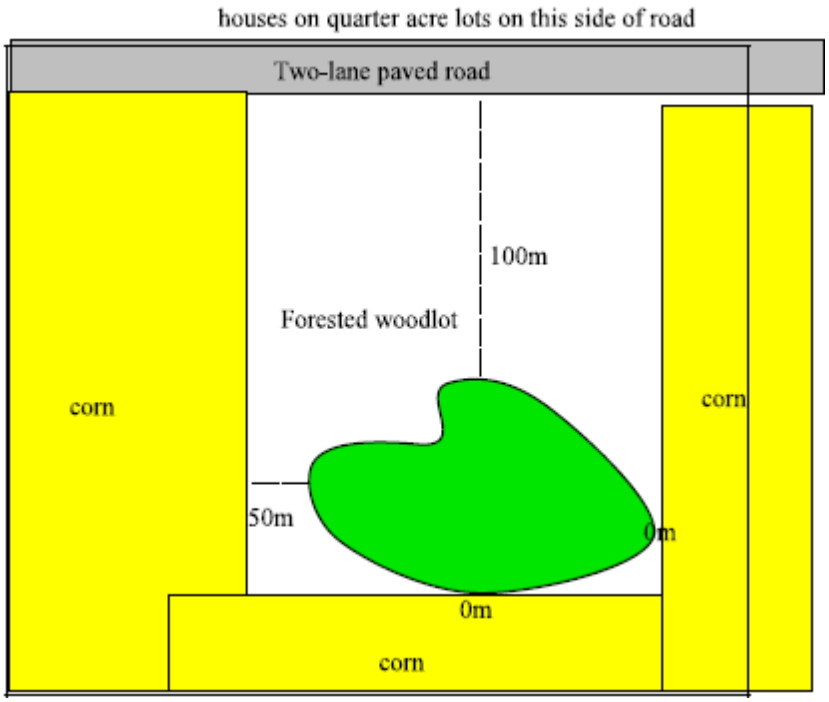

Figure 6 Hypothetical wetland example for estimating average buffer width

ORAM, Metric 2a
Metric 2a. Average Buffer Width. Calculate the buffer width and select only one score. DO NOT DOUBLE CHECK.
7 pts WIDE = >50 meters (>164 ft) around perimeter
4 pts MEDIUM = 25 to < 50 meters (82 – <164 ft) around perimeter
1 pts NARROW = 10 to <25 meters (32 – <82 ft) around perimeter
0 pts VERY NARROW = <10 meters (<32 ft) around perimeter

Note: These ORAM Average Buffer Width distances are mostly based on scoring wetlands for vegetation quality, with some recognition of protecting water quality (personal communication, Mick Micacchion, The Nature Conservancy in Ohio, 6/6/2019). While these buffers might be beneficial to wetland hydrology, factors such as hydrology are not the basis that was considered, and a wetland's hydrology might be dependent on a different width, often wider than proposed above.

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Summary: Public Comment of concerned consumers, via website, electronically filed by Docketing Staff on behalf of Docketing