

# WSDOT Guidance on Compensatory Mitigation Area Calculation

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Mitigation measures are typically required at the local, state, and federal level for impacts to wetlands and their buffers that would occur due to proposed WSDOT projects. Wetland impact and avoidance strategies are the first level of mitigation measures employed as identified in the Governor's Executive Order 90-04. Compensatory mitigation is required when unavoidable wetland impacts occur following impact avoidance and minimization.

The State of Washington Governor's Executive Order 89-10 stipulates that there will be no overall net loss of wetland area or function, so that wetlands that will be lost must be replaced at least functionally elsewhere. This guidance discusses compensatory mitigation for unavoidable impacts and provides examples of how mitigation is typically calculated based on local jurisdiction regulations and replacement of lost functions.

The Washington State Department of Ecology (Ecology) guidance on wetland mitigation, *Wetland Mitigation in Washington State, Part 1: Agency Policies and Guidance* (Ecology 2006) and most local jurisdictions require the following mitigation sequencing avoidance, minimization, rectification, and compensatory mitigation for impacts that are unavoidable. This document addresses compensatory mitigation and provides hypothetical examples of calculating required mitigation based on regulatory requirements. The State of Washington Governor's Executive Order 90-04 identifies the mitigation preference as avoidance, minimization, rectification, reduction, compensation, and monitoring. WSDOT and the Ecology (2006) guidance promote replacement of lost wetland functions with the same level of functions in mitigation wetlands.

Types of wetland and buffer impacts are defined in the WSDOT Impact Assessment Guidance and are grouped into two categories: permanent and temporary. Compensatory mitigation only applies to permanent impacts to wetlands and their buffers. Temporary impacts will be mitigated by on-site, in-kind restoration of the affected areas and are not treated as compensatory mitigation in mitigation plans.

Ecology (2006) guidance defines the following types of compensatory mitigation in order of preference. Most mitigation entails one or more of these actions. For example, restoring a wetland only, or a combination of restoration and enhancement would compensate wetland impacts.

- *Restoring* wetland acreage and functions to an area where those functions formerly occurred. Restoration is split into two types *re-establishment and rehabilitation*

- *Creating* new wetland area and functions in an area where they did not previously occur.
- *Enhancing* functions at an existing wetland.
- *Preserving* an existing high-quality wetland to protect it from future loss or degradation.

WSDOT determines compensatory mitigation requirements based on local jurisdiction regulations. While local jurisdictions generally follow the Ecology (2006) guidance compensatory mitigation actions described, the names they apply to the types of mitigation may differ from that above. Before calculating required compensatory mitigation for a proposed project, local critical areas regulations regarding compensatory mitigation (including definitions of the mitigation types) should be reviewed and understood.

WSDOT's goal for compensatory mitigation is to replace lost wetland area and function with equivalent wetland area and functions in the mitigation wetland. The first step in determining appropriate mitigation for the lost wetland area and functions is to determine the functions of the affected wetlands. Local jurisdictions typically require the use of the Ecology (2004) Wetland Rating System to rate potentially affected wetlands based on functions. The Ecology (2004) wetland rating system assigns wetlands to categories based on a combination of functions and values. Wetlands are placed into a category based on rarity, irreplaceability, sensitivity to disturbance, and habitat functions. As such, Category I wetlands have the highest level of functioning and Category IV the least. Local jurisdictions have established replacement ratios for compensatory wetland mitigation based on wetland category. The replacement ratios vary by wetland category, with higher ratios required for higher rated wetlands. For example, Whatcom County specifies a 3:1 ratio (wetland creation area required: permanent wetland impact area) for Category II wetlands. Therefore, 3 acres of wetland creation would be required to compensate for one acre of permanent wetland impact of a Category II wetland. Impacts to Category III wetland require a replacement ratio of 2:1 if the mitigation is being accomplished by wetland creation. Also, higher risk mitigation or mitigation providing a lower level of functional lift (e.g., wetland rehabilitation, wetland enhancement, and wetland preservation) requires higher mitigation ratios (Table 1). Calculating compensatory mitigation will be further illustrated in the following examples.

Typically, WSDOT compensates for wetland impacts through off-site mitigation. Off-site mitigation is potentially more ecologically successful compared to smaller on-site mitigation areas or sites constructed within the highway right-of-way. The local jurisdiction may have special, specific requirements for off-site mitigation sites.

## **Compensatory Mitigation Example – Whatcom County**

For this hypothetical example, a proposed WSDOT project in Whatcom County would permanently impact wetland and buffer areas. The goal of the mitigation would be to replace lost area and functions of the impacted wetlands and buffer through compensatory mitigation. The first step to determining proper compensatory mitigation is to determine the correct wetland and buffer impacts as described in the Wetland Impact Assessment Guidance. Then, functional ratings of the affected wetlands are determined. Whatcom County requires the use of the Ecology (2004) Wetland Rating System to identify wetland functions. The size of the mitigation area(s) are calculated based on the Whatcom County's wetland mitigation ratios provided in their critical areas ordinance (CAO).

### Whatcom County Wetland Compensatory Mitigation Regulations

Compensatory mitigation for these wetland impacts is stipulated by Whatcom County Code Chapter 16.16 (CAO). Whatcom County CAO states that “compensatory mitigation projects shall restore, create, rehabilitate, enhance, and/or preserve equivalent wetland functions and values. Compensation for wetland alterations shall occur in the following order of preference:

1. Re-establishing (also referred to as restoring) wetlands on upland sites that were formerly wetlands.
2. Creating wetlands on disturbed upland sites such as those consisting primarily of nonnative, invasive plant species.
3. Rehabilitation of wetlands for the purposes of repairing or restoring natural and/or historic functions.
4. Enhancing significantly degraded wetlands.
5. Preserving Category I or II wetlands that are under imminent threat; provided that preservation shall only be allowed in combination with other forms of mitigation and when the technical administrator determines that the overall mitigation package fully replaces the functions and values lost due to development.

Whatcom County CAO specifies the mitigation ratios shown in Table 1. The replacement ratio shall be determined according to the ratios provided in Table 1, provided, that the replacement ratio for preservation shall be 10 times the ratio for re-establishment or creation. The created, re-established, rehabilitated, or enhanced wetland area shall, at a minimum, provide a level of function equivalent to the wetland being altered and shall be located in an appropriate landscape setting.

**Table 1. Whatcom County wetland mitigation ratios.**

Wetland Category	Replacement Ratio <sup>a</sup>		
	Re-establishment or Creation <sup>b</sup>	Rehabilitation	Enhancement Only
Category I	No alteration allowed		
Category II	3:1	6:1	12:1
Category III	2:1	4:1	8:1
Category IV	1.5:1	3:1	6:1

<sup>a</sup> **Ratio is the replacement area: impact area**

<sup>b</sup> **Wetland creation and re-establishment are calculated at the same ratio**

Whatcom County adjusts the replacement ratios when a combination of mitigation approaches is proposed (e.g., creation and enhancement). The Whatcom County CAO specifies mitigation ratios for the combined approach as follows:

“When a combination of mitigation approaches is proposed. In such cases, the area of altered wetland shall be replaced at a 1:1 ratio through reestablishment or creation, and the remainder of the area needed to meet the ratio can be replaced by enhancement at a 2:1 ratio.” For example, a one acre impact to a Category II wetland requires wetland creation at a ratio of 3:1 totaling 3 acres. If one acre of wetland creation is proposed, the remaining mitigation requirement (2 acres) can be met with wetland enhancement at a 2:1 ratio or 4 acres. Instead of 3 acres of wetland creation, the mitigation proposal would be 1 acre of wetland creation and 4 acres of wetland enhancement.

Whatcom County also requires compensatory mitigation for impacts to wetland buffers. Compensation for wetland buffer impacts shall occur at a minimum 1:1 ratio. The Whatcom County CAO also states the compensatory mitigation for buffer impacts shall include enhancement of degraded buffers by planting native species, removing structures and impervious surfaces within buffers, and other measures to achieve equivalent or greater buffer functions.

Wetland and Buffer Impacts

Wetland impacts for the hypothetical example are provided in this section. Permanent project impacts occur to freshwater wetlands and include impacts to 1.0 acre of Category II wetland, 1.5 acres of Category III wetland and 2.5 acres of Category IV wetland for a total of 5.0 acres (Table 2). Buffer impacts for the hypothetical example are 2.0 acres.

**Table 2. Permanent wetland impact types and areas by wetland rating.**

Wetlands Rating (Ecology 2004)	Permanent Wetland Impacts (acres)
Category II	1
Category III	1.5
Category IV	2.5
<b>Totals</b>	<b>5</b>

Calculating Compensatory Mitigation for Wetlands and Buffers

For this example, a wetland mitigation site is available and has the potential to provide both wetland creation and wetland enhancement. The mitigation site has the opportunity to provide 5.95 acres of wetland creation area and 34 acres of wetland enhancement area. Since the mitigation site discussed can only provide wetland creation area, wetland re-establishment will not be discussed and their ratios not identified, however, their ratios are identical.

According to the Whatcom County CAO, the area of altered wetland shall be replaced at a 1:1 ratio through creation and the remainder of the area needed to meet the ratio can be replaced by enhancement at a 2:1 ratio. For impacts to Category II wetlands, the mitigation ratio for creation is 3:1. So our hypothetical project will need 3 acres of wetland creation (Table 3). Similarly, for the Category II impacts compensatory mitigation needs to occur at a 2:1 ratio and would require 3.00 acres of wetland creation for the one acre of impact. The 2.5 acre impact to the Category IV wetlands are mitigated at a 1.5:1 ratio requiring 3.75 acres of wetland creation. The total amount of wetland creation required for the 5.00 acres of impact totals 9.75 acres.

**Table 3. Mitigation requirements for wetland creation per Whatcom County CAO (2005).**

Wetland Rating	Impact Area (ac)	Mitigation Ratio for Wetland Creation	Mitigation Area Required for Creation (ac)
Category II	1.00	3:1	3.00
Category III	1.50	2:1	3.00
Category IV	2.50	1.5:1	3.75
<b>Totals</b>	<b>5.00</b>		<b>9.75</b>

Since the mitigation site is able to support only 5.95 acres of wetland creation, wetland enhancement will be required. To determine the amount of wetland enhancement required, the amount of wetland creation area available is subtracted from the total mitigation area required by the CAO. In this case, 5.95 acres of wetland creation area available on the site is subtracted from the mitigation area requirement, or 9.75 acres. This results in a shortfall of 3.80 acres (Table 4). Whatcom County CAO permits wetland enhancement to be used to satisfy the remaining mitigation requirement at a 2:1 ratio that would result in an enhancement area of 7.60 acres.

**Table 4. Wetland enhancement area calculations per Whatcom County CAO (2005).**

Wetland Creation Area Required per CAO (ac)	Wetland Creation Area (ac)	Wetland Creation Area Shortfall (ac)	Wetland Enhancement Ratio	Wetland Enhancement Area Required (ac)
9.75	5.95	3.80	2:1	7.60

The mitigation proposal for this project includes 5.95 acres of wetland creation and 7.60 acres of wetland enhancement for a mitigation total of 13.55 acres (Table 5).

**Table 5. Wetland mitigation summary.**

Wetland Impact Area (ac)	Wetland Creation Area Required (ac)	Wetland Mitigation Proposed		
		Wetland Creation (ac)	Wetland Enhancement (ac)	Total Mitigation Area (ac)
5.00	9.75	5.95	7.60	13.55

Description of Hypothetical Mitigation Site

As previously stated, WSDOT typically mitigates for lost wetlands at off-site locations. Since impacts to wetlands under this example will be calculated off-site, a functional replacement for lost functions would be determined. Wetland impacts include impacts to Category II, Category III, and Category IV wetlands, which provide a high, moderate and low level of functions, respectively. WSDOT generally determines the functional category of the mitigation site as the average of the functional categories that were lost. For example, a Category III wetland would be used to mitigate for impacts to a combination of Category II, III and IV wetlands. However, the selection of the appropriate category of the mitigation wetland is selected on a case-by-case basis and is dependent on the acreage and type of functions that would be lost for each category of impacted wetland. For this hypothetical example, the mitigation wetland would be a Category III wetland.

Buffer impacts are compensated at a 1:1 ratio of replacement to lost buffer (Whatcom County 2005). The hypothetical project will impact 2.0 acres of wetland buffer. Therefore, a minimum of 2 acres of buffer would be required for buffer impacts. However, the mitigation site for this hypothetical project is located off-site and buffers will be assigned based on the proposed category of the mitigation wetland and Whatcom County’s regulations. Whatcom County assigns buffers for each functional category of wetland (Categories I through IV) based on the surrounding land use (high, moderate, or low intensity land use) and the habitat functional value of the wetland. The mitigation site for this hypothetical example will be a Category III wetland that has moderate habitat functions (Ecology [2004] rating between 20 and 28), and is surrounded by agricultural and residential land uses (moderate intensity land uses).

Whatcom County would require a 100-foot buffer at a wetland mitigation site with the above characteristics.

**Compensatory Mitigation Example – Ecology (2006)**

WSDOT projects must also comply with Ecology wetland mitigation guidance, specifically, *Wetland Mitigation in Washington State, Part 1 – Agency Policies and Guidance* (Ecology 2006). The following example presents the mitigation requirements recommended by Ecology for the same project in Whatcom County.

Calculating Mitigation for Wetlands and Buffers

Similar to Whatcom County, Ecology bases its mitigation ratios by wetland rating category. For Category II wetlands that are relevant to this example, the ratios are based on Category II wetlands; for Category III and IV wetlands, the ratios listed as ‘All Category III’ and ‘All Category IV’ will be used for each wetland impact type, respectively. These mitigation ratios will be used to calculate the required mitigation for a hypothetical project.

Establishing a mitigation ratio is straightforward when compensation projects involve one type of compensation and replace the wetland area lost (e.g., re-establishment, creation). However, when a proposal for compensation includes re-establishment or creation along with enhancement, two ratios are used to determine the total amount of compensation required. For our Whatcom County project, the amount of mitigation recommended per Ecology (2006) would total 9.75 acres if wetland creation were proposed (Table 6). The amount of wetland creation area available on the site totals 5.95 acres. Ecology guidance permits wetland enhancement to satisfy the remaining mitigation requirement, but at a higher ratio. Ecology (2006) states, “The ratio of using enhancement as compensation is four times that for using R/C (re-establishment/creation) (4 acres of enhancement are equivalent to 1 acre of R/C).”

**Table 6. Mitigation requirements for wetland creation per Ecology (2006).**

Wetland Rating	Impact Area (ac)	Mitigation Ratio for Wetland Creation	Mitigation Area Required for Creation (ac)
Category II	1.00	3:1	3.00
Category III	1.50	2:1	3.00
Category IV	2.50	1.5:1	3.75
<b>Totals</b>	<b>5.00</b>		<b>9.75</b>

As previously stated, the example project will provide 5.95 acres of wetland creation and 34 acres of wetland enhancement area. Subtracting 5.95 acres of wetland creation area available from the mitigation area requirement of 9.75 acres results in a shortfall of 3.80 acres. Using wetland enhancement to satisfy the remaining mitigation obligation requires a mitigation ratio of 4:1 or 15.20 acres (Table 7).

Ecology guidance also stipulates that the proposed compensatory mitigation ratios are based on the assumption that the category and HGM of the mitigation is the same as the impacted wetlands. Our example project impacts Category II, III, and IV wetland and proposes a Category III rated wetland mitigation site as compensation. Given the variability of the wetland impacts, this may seem a reasonable proposal, however Ecology reserves the right to review these types of proposals on a case-by-case basis and may request higher mitigation ratios.

**Table 7. Wetland enhancement area calculations per Ecology (2006).**

Wetland Creation Area Required per CAO (ac)	Wetland Creation Area Available (ac)	Wetland Creation Area Shortfall (ac)	Wetland Enhancement Ratio	Wetland Enhancement Area Required (ac)
9.75	5.95	3.80	4:1	<b>15.20</b>

Ecology (2006) provides buffer width recommendations for mitigation sites. However, WSDOT defers to local area CAO for appropriate buffer widths for both buffer impact quantification and mitigation area. If local CAO does not specify a buffer width, refer to the buffer width guidance in Ecology (2006).