

Appendix 8-F

Rationale for the Draft Guidance on Ratios for Compensatory Mitigation to be Used with the Wetland Rating System

The acreage of creation, restoration, or enhancement that is required by regulatory agencies to compensate for impacts to wetlands is usually greater than the acreage of impact. This difference is expressed as a ratio (the mitigation ratio) of the area required for compensation vs. the area of impact. Ecology and Fish and Wildlife are providing guidance on ratios to use for compensatory mitigation that is linked to the *Washington State Wetlands Rating System* (see Appendices 8-C and 8-D). This appendix provides the rationale behind this guidance.

There are two major reasons why the ratios are greater than 1:1. The first is based on risk of mitigation failure and the second on temporal loss of functions. All of the studies done on compensatory mitigation (see Sheldon et al. 2003, Chapter 6) indicate that some percentage of mitigation projects fail to replace the functions lost. Overall, there continues to be a net loss of wetlands and their functions. Thus, more wetlands need to be created or restored than are impacted at a programmatic level to ensure that wetland functions and area are adequately replaced. The second factor is temporal loss. The studies reviewed in Volume 1 also indicate that functions in wetlands may take decades, if not centuries, to develop fully. By requiring a ratio larger than 1:1, we provide for more acreage of mitigation wetland that may not be functioning as well as the impacted wetland during the decades required for functions to fully develop at the mitigation site.

Thus, mitigation ratios are established based on risk of failure and temporal loss of functions. If mitigation is done in advance of impacts and can be demonstrated to be fully successful, it is reasonable to require ratios as low as 1:1. However, higher ratios should be set if there is an increasing risk of not adequately compensating for the functions lost, and as the time needed to establish the lost functions increases. Kusler (2003) has summarized some of the factors that should be considered in establishing the risk of unsuccessful mitigation:

1. **The functions present in the impacted wetland and those proposed for the “replacement” wetlands.** Larger ratios are justified where a replacement wetland will have fewer functions and values or perform the functions at a lower level. The net loss of function per acre of wetland has to be compensated by increasing the area of mitigation required.
2. **The overall ecological conditions of the impacted wetland and the “replacement” wetland.** Larger ratios are justified where a “replacement” wetland will be less persistent, diverse, or have less ecosystem integrity than the

original wetlands. The risk of losing ecological integrity has to be compensated by increasing the area of mitigation required.

3. **The probable success for wetlands of the type proposed as “replacement.”** Larger ratios are justified for wetland types that have proven difficult to restore or create, thereby increasing the risk of failure.
4. **The expertise and experience of the agency or consultant proposing to carry out the project.** Larger ratios are justified for proponents who are less expert and less experienced. Lack of experience increases the risk that the project will not be successful.
5. **Threats to the “replacement” site.** Larger ratios are justified where there are threats to the site such as possible changes to the water regime, sedimentation, or pollution. These threats increase the risk that functions will be impaired in the future (see Chapters 3 and 4 in Volume 1).
6. **Whether the site will be susceptible to “mid-course” corrections.** Larger ratios are justified where the site has little capability for correcting problems as they develop, and smaller ratios are justified where that capability exists. Projects where problems have been corrected tend to be more successful than those that have not (Johnson et al. 2002).

The ratios discussed in this appendix were developed to provide a starting point for further discussions with each proponent of compensatory mitigation. The rationale for the ratios is based on the factors listed above and described in more detail below. **These ratios are based on averaging the observations of mitigation success and risk at a programmatic level and do not represent the specific risk of any individual project.**

Premises Used in Establishing Ratios

Baseline Ratios

The study by Johnson et al. (2002) summarized in Volume 1, Chapter 6, found that projects for compensatory mitigation in Washington State that created or restored wetlands were “moderately successful” or “successful” at replacing the functions lost only about half of the time. This means that overall there is about a 50% risk of failure. Other studies of the success of mitigation projects (summarized in Chapter 6 of Volume 1) suggest the risk of failure is even higher. These data would suggest that a minimum ratio of 2:1 is needed to ensure “no net loss of functions” at a programmatic level.

This ratio also needs to be adjusted to account for the temporal loss of functions described above. There are no scientific studies that have tried to quantify the temporal loss in terms of how many acres of additional wetlands this represents. Trying to

quantify this experimentally is not possible because the data are not compatible: One cannot equate time with area. As a result, the additional area required to compensate for the temporal loss of functions is a value judgment. How highly do we value the loss of some functions for 5 to 10 years, some for 30 years, and others for 100 years or more? As a starting point for discussion, Ecology and Fish and Wildlife suggests that the compensation for the temporal loss of functions be equal to the area of impact. **Thus, the basic 2:1 ratio proposed to compensate for the risk of mitigation failure should be increased to 3:1 to account for the temporal loss of functions.**

If enhancement is used as the only form of compensation, there will always be a net loss of wetland area. Furthermore, only about 10% of the enhancement projects analyzed in Washington State were even moderately successful at replacing the functions lost (Johnson et al. 2002). This means that the risk is significantly higher than for creation or restoration, justifying a higher ratio for enhancement. **The ratios recommended for enhancement are twice that needed for creation or restoration** because the risks of not replacing the functions are much higher using enhancement, and there is a net loss of wetland area.

The basic ratios for creation/restoration and enhancement may be modified if the conditions for the proposed mitigation are different from the “average” condition. The *Washington State Wetlands Rating System* categorizes wetlands, and this information can also be used to increase or reduce the ratio. This information was used to develop the expanded recommendations for mitigation ratios presented in Appendices 8-C and 8-D. The following discussion summarizes the logic that was used to develop the ratios.

Incorporating Wetland Categories into Ratios

The basic mitigation ratio for creation and reestablishment is 3:1 as described above. This ratio is based on the assumption that the impacts are to a Category II wetland and the created or restored site will also become a Category II wetland and provide for full replacement of functions and integrity over time. The ratio for Category I wetlands is higher because it is assumed that it is much more difficult to create or restore a wetland to the high level of function represented by a Category I wetland, and there will be a net loss of function on a per acre basis.

Ratios for impacts to Category III wetlands, on the other hand, are lower because it is assumed that the risks are lower. It is assumed that there is a better chance for a successful creation or restoration of a Category III wetland than a Category II wetland. The ratio for a Category IV wetland is even lower because it is assumed that the replacement wetland will be a Category III wetland with higher levels of functions.

Ratios for Forested Wetlands

Studies of mitigation projects have shown that forested wetlands may take over 100 years to become established. The ratio recommended is designed to compensate for the

additional temporal loss of the functions of a forested wetland during the long time it takes to establish this type of wetland.

Ratios for Wetlands that are Difficult to Create (Natural Heritage, Bogs, Alkali Wetlands, Estuarine Wetlands, Wetlands in Coastal Lagoons)

Ecology and Fish and Wildlife assumes that it is not possible to create Natural Heritage wetlands, bogs, alkali wetlands, estuarine wetlands, or wetlands in coastal lagoons from uplands or to enhance other wetlands to reproduce their characteristics.

No data are available for mitigation projects that involved creating Natural Heritage wetlands, alkali wetlands, estuarine wetlands, or wetlands in coastal lagoons from uplands. Bogs are the only type of wetland for which such information exists, and this information indicates that it is not possible to recreate the necessary physical, hydrologic, and chemical conditions needed to replace a bog through compensatory mitigation (see Chapter 6 in Volume 1). As a result, Ecology and Fish and Wildlife recommends that compensation for impacts to these types of wetlands should involve the rehabilitation of degraded wetlands of a similar type, rather than creation or enhancement.

Although estuarine wetlands are the only type that has been successfully rehabilitated, it is assumed that rehabilitation of the other types is also feasible. It is more feasible, at least, than if the compensation involves creating such a wetland or enhancing a wetland of another type to recreate the necessary ecological conditions. In the absence of any definitive information on the success of such rehabilitation, the ratio for compensation is set at 6:1 to be consistent with the other ratios. Projects that propose enhancement as compensation for impacts to these sensitive wetlands will have to be evaluated on a case-by-case basis. Enhancement would involve a net loss of acreage as well as an extremely high risk that the functions represented by the sensitive wetland types will not be replaced.

References

- Johnson, P., D.L. Mock, A. McMillan, L. Driscoll, and T. Hruby. 2002. *Washington State Wetland Mitigation Evaluation Study Phase 2: Evaluating Success*. Publication No. 02-06-009. Olympia, WA: Washington State Department of Ecology.
- Kusler, J. 2003. *Integrating Wetland Assessment into Regulatory Permitting. Final Report 3: Wetland Assessment for Regulatory Purposes*. Institute for Wetland Science and Public Policy, Association of State Wetland Managers.
- Sheldon, D., T. Hruby, P. Johnson, K. Harper, A. McMillan, S. Stanley, E. Stockdale. August 2003. *Freshwater Wetlands in Washington State, Volume 1: A Synthesis*

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