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Seven Steps to Successful Mitigation

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SEVEN STEPS TO SUCCESSFUL MITIGATION

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I. INTRODUCTION

Habitat mitigation has become an integral aspect of development projects, particularly those affecting wetlands and coastal zones.[1] Despite its frequent application, habitat mitigation remains an uncertain technology. Requirements and standards are evolving, but the outcome or effectiveness of many habitat mitigation projects is often incompletely or inconsistently documented. There is often considerable disagreement over what exactly constitutes meaningful, effective, or even adequate mitigation.[2] For quality results to obtain, a systematic framework is needed.[3]

Although habitat mitigation has evolved into a major industry, there remains this real need for a useful, systematic paradigm, one which is predictable and capable of providing consensus for individual projects and for the discipline of wetlands creation and restoration in general. Mitigation must be carefully planned and faithfully executed. Habitat effectiveness should be documented and analyzed, with necessary corrective actions undertaken to ensure that meaningful biological performance of mitigation habitats is achieved.

Seven proposed planning and evaluation standards can help build consensus and improve the planning and achievement of successful mitigation. Moreover, these seven steps are applicable nationwide. Regional application in Puget Sound, Washington, suggests that

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1. Indeed, the potential effect on wildlife resources that may occur from development projects must be incorporated into the appropriate environmental assessment statement. *See* 40 C.F.R. § 6.302(g) (1992). *See also* 50 C.F.R. § 402.01 (1992).

2. Although the Council on Environmental Quality defines mitigation more broadly, the term is often used to describe actions designed to replace or offset unavoidable habitat losses. This usually entails habitat creation, restoration, or enhancement work that sequentially attempts to first avoid all impacts, followed by measures to minimize or reduce damage. *See* 40 C.F.R. § 1508.20 (1992).

3. *See generally* Bill Halvorson, *Progress in Wetlands*, 9 RESTORATION & MGMT. NOTES, No. 2, at 87 (1992).

improved consensus and performance of habitat mitigation can be achieved. This article will discuss integration of the seven step approach into the regulatory and decision-making process in the context of habitat mitigation for a large marina project in Seattle, Washington.[4]

II. A SEVEN STEP APPROACH TO SUCCESSFUL MITIGATION

Achieving successful habitat mitigation is a complex biological and institutional challenge. Mitigation proposals to offset environmental impacts can be strengthened and better evaluated by adhering to the following essential steps.

1. *Collect Baseline Information.* Potential project impact zones and all candidate mitigation areas should be characterized biologically. Target evaluation species should be selected, and key habitat requirements and pertinent fish and wildlife characteristics should be documented. For example, the documentation may range from a review or synthesis of existing technical data, to application of the Wetland Evaluation Technique,[5] Habitat Evaluation Procedures,[6] or carefully scoped field surveys. Sample data should be gathered in conformance with protocols for mitigation site monitoring.

2. *Set Environmental Goals.* Written goals that fully describe the purpose of the proposed mitigation should be developed and communicated early on to those involved in the planning process. For instance, U.S. Fish and Wildlife Service personnel nationwide rely upon

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4. *See* discussion *infra* part III.

5. *See* Paul R. Adamus et al., Eco-Analysts, Inc., 2 Wetland Evaluation Technique: Methodology (Oct. 1987) (operational draft prepared for the Department of the Army, U.S. Army Corps of Engineers, on file with the *Buffalo Environmental Law Journal*).

6. *See* DIVISION OF ECOLOGICAL SERVICES, U.S. FISH AND WILDLIFE SERVICE, ECOLOGICAL SERVICES MANUAL 101, HABITAT AS A BASIS FOR ENVIRONMENTAL ASSESSMENT (1980); DIVISION OF ECOLOGICAL SERVICES, U.S. FISH AND WILDLIFE SERVICE, ECOLOGICAL SERVICES MANUAL 102, HABITAT EVALUATION PROCEDURES (1980); DIVISION OF ECOLOGICAL SERVICES, U.S. FISH AND WILDLIFE SERVICE, ECOLOGICAL SERVICES MANUAL 104, STANDARDS FOR THE DEVELOPMENT OF HABITAT SUITABILITY INDEX MODELS FOR USE WITH THE HABITAT EVALUATION PROCEDURES (1981) [hereinafter HABITAT SUITABILITY INDEX MODELS]; DIVISION OF BIOLOGICAL SERVICES, U.S. FISH AND WILDLIFE SERVICE, COMPARISON OF THE USE OF THE HABITAT EVALUATION PROCEDURES AND THE INSTREAM FLOW INCREMENTAL METHODOLOGY IN AQUATIC ANALYSES (1984).

the agency's Mitigation Policy[7] to set goals and formulate recommendations. The Mitigation Policy defines four fish and wildlife resource categories and outlines the required mitigation goal for each category.[8] The mitigation goal and guidelines differ for each of the four resource categories, and depend upon the relative value and scarcity of the habitats affected. In order to ensure that the level of mitigation requested is consistent with the fish and wildlife resource values involved,[9] the determination of resource category is made for discrete geographical areas or habitats. If the project is complex or is likely to be of lengthy duration, the goals should be periodically reviewed so as to ensure consensus.

3. *Develop a Detailed Work Plan.* Mitigation plan documents should include written habitat design specifications and diagrams. In addition, proposed mitigation habitat construction timing and task completion dates, as well as quality control inspections, should be set in advance. In cases where complex or technically critical tasks are involved, on-site quality control personnel should be stipulated.

4. *Define Performance Standards.* To ensure that mitigation goals are achieved, specific and measurable field tests and evaluation milestones should be established. In this way, biological performance of replacement habitats can be objectively and conclusively tracked. The frequency and duration of these tests and the threshold conditions or biological circumstances that dictate the need to begin predesignated corrective contingency measures should also be specified.

5. *Conduct Periodic Monitoring.* Monitoring programs should be designed to produce consistent data that help to conclusively establish whether the biological capabilities of replacement habitats achieve

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7. *See* U.S. Fish and Wildlife Service Mitigation Policy; Notice of Final Policy, 46 Fed. Reg. 7644 (Dep't Interior 1981).

8. Resource Category 1, for example, is reserved for unique and irreplaceable habitat. The goal is to achieve no loss of habitat value. Resource Category 2 habitats are of high value and are relatively scarce in the United States or within an eco-region. All potential habitat losses in this category can be offset by using scientifically valid replacement techniques, with the goal of avoiding a net loss of in-kind habitat values. Resource Category 3 habitats are of high to medium value for the target evaluation species, and are relatively abundant. The goal for this category is to fully minimize in-kind losses, but out-of-kind replacement is allowable in order to achieve no overall net loss of habitat values. Resource Category 4 habitats are of medium to low value, and they are abundant. The goal for this category is to minimize the loss of habitat values. *Id.* at 7651-58.

9. *See id.*

predetermined performance standards. Sampling protocols should be consistent with baseline information sampling protocols.

6. *Develop and Execute Contingency Plans.* Remedial measures or courses of action *that may* be undertaken in the event of sub-optimal performance or failure of the habitat (i.e., when monitoring indicates performance standards have not been met) should be formulated at the inception of the project and included in mitigation plan documents.

7. *Guarantee Mitigation Performance with a Bond.* Legally binding financial instruments are advisable for major development actions involving complex mitigation, lengthy performance test periods, and in situations where the risk of habitat failure is certain or potentially high.

III. CASE HISTORY: THE ELLIOTT BAY MARINA

A. *Application of the Seven-Step Approach*

The integration of the seven-step approach into the mitigation planning and regulatory process can be illustrated by its application to the Elliott Bay Marina.[10] The marina was proposed in 1983 to provide 1,200 mooring slips. Construction resulted in ten acres of intertidal fill for parking and buildings, eleven acres of intertidal dredging to provide a sixty-acre moorage basin, and ten acres of fill for an offshore breakwater. The magnitude of the habitat impact and the nature of the mitigation plan for the marina became contentious project issues.[11]

At the outset of project planning, consultants for the marina proposed development of a habitat-value-based system to assess and mitigate the potential aquatic habitat impacts. They convened a series of interagency meetings to develop consensus for the baseline sampling study program and for the aquatic habitat suitability model for juvenile Pacific salmon.[12] The Fish and Wildlife Service and the Washington State Department of Fisheries established a principal mitigation goal of no net loss in near-shore habitat values for juvenile Pacific salmon. Based upon limited sampling, it was found that gravel and boulder/cobble habitats in the middle-to-low intertidal zone had the

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10. The Elliott Bay Marina is a major project sited on the north shoreline of Elliott Bay in Puget Sound, near Seattle, Washington. For more detailed project information, see Army Corps of Engineers, Public Notice 071-0YB-2-008865, Elliott Bay Marina Group (on file with the Army Corps of Engineers, Seattle Corps District) [hereinafter Army Corps Public Notice].

11. *See id.*

12. *See generally* HABITAT SUITABILITY INDEX MODELS, *supra* note 6.

greatest number of juvenile salmon prey taxa and individuals. Consequently, the highest relative value was ascribed to these habitats. Mitigation designs thus emphasized the replacement of these habitat substrate types.

The detailed mitigation work plan for the Elliott Bay marina entailed construction of a sloping, coarse-grained, five-acre intertidal beach between the fill and moorage basin. About seven acres of existing fine-grained intertidal habitat to the east of the marina was subjected to substrate enhancement in the form of imported gravel, cobbles, and boulders to supplant losses of this habitat type due to dredging and filling for the marina.[13] An additional thirteen acres west of the marina was slated for similar treatment, but this enhancement work has been deferred due to the discovery of extensive growth of eelgrass beds within this area.

Whether the plan measures up to expectations will be determined over five years through yearly monitoring of invertebrate production and other evaluation species such as eelgrass and the marine bull kelp. The minimum acceptable performance standard is that there be one net value unit of enhanced habitat provided for every unit of lost habitat value. The habitat mitigation plan, however, was designed to result in the replacement of two units of habitat value for each unit lost. In addition, the proposed contingency plan measures include the provision of more or alternate habitat enhancement work, establishing a fringe emergent marsh at the marina, transplanting eelgrass, and installing salmon rearing pens.

A performance bond sufficient to provide funds for mitigation installation, monitoring, and contingent mitigation was posted by the project developer with the Army Corps of Engineers. The Corps, whose consent must be obtained prior to any construction,[14] conditions its consent so that this bond amount shall be augmented to reflect total costs at the time the habitat mitigation is installed.[15] The Fish and Wildlife Service and Washington Department of Fisheries are beneficiaries of the bond.

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13. Additional information regarding the initial performance of the aquatic mitigation habitats presently in place is presented in Daniel Cheney, *Creation of Rocky Intertidal and Shallow Subtidal Reefs to Mitigate for Construction of a Large Marina in Puget Sound, Washington, in* 53 BULL. MARINE SCI. (forthcoming 1994).

14. The Army Corps of Engineers issues its consent in the form of a permit. *See* 33 C.F.R. § 320.2 (1992).

15. *See* Army Corps Public Notice, *supra* note 10.

B. *Mitigation Status Assessment and Decision-Outcome Process*

At the end of habitat monitoring in the third, fourth, and fifth years, three decisions are possible, and these must be jointly made by the Army Corps of Engineers, Seattle District, the Fish and Wildlife Service, and the Washington Department of Fisheries: (1) mitigation has been successful, (2) mitigation has been ineffective, or (3) mitigation has been unsuccessful. If mitigation has been successful, the performance bond would be reduced by the cost incurred for the first three years of habitat monitoring; a fourth year of monitoring would not be required, and monitoring in year five would occur prior to a mitigation status decision. If, however, mitigation has been ineffective, there would be no partial bond release and a fourth and fifth year of habitat monitoring would occur, with a subsequent mitigation status decision in year five. Under the third alternative, namely, if mitigation has been unsuccessful, there would be no partial bond release and contingent mitigation would be initiated. A fourth and fifth year of monitoring would then occur, with subsequent status decisions in years four and five.

As part of this procedure, at the end of year five, if the habitat mitigation is meeting performance standards, no additional monitoring or enhancement would be required. Any remaining bond would then be returned to the permittee. If, however, mitigation is not up to performance standards, the permittee would have the option of continuing monitoring and improving the habitat mitigation. Any remaining bond amount would not be released until performance standards are met. If, however, the habitat mitigation is deemed a failure, the permittee shall have the option of providing additional or alternate mitigation with a new monitoring program and performance review process. Under these circumstances, no bond amount would be released.

If the revised mitigation program fails to provide sufficient compensation habitat after another two-year period, then the bond would be made available to the Seattle Corps District, in consultation with the two beneficiary agencies, so as to fund other necessary replacement mitigation. At this point, the permittee is under no obligation to continue monitoring. Upon completion of the Corps' directed mitigation program, any remaining bond would be returned to the permittee.

The Elliott Bay Marina project and the technical aspects of the ongoing habitat mitigation program have undergone intense public

scrutiny.[16] There was professional disagreement over the validity of the baseline habitat sampling results, and the habitat value model approach to offsetting losses of intertidal habitat for Pacific salmon. Juvenile salmon prey sampling tools and protocols were continually refined during the course of the marina project. The development of consistently workable wetland habitat mitigation standards remains a continuing national challenge.

This seven-step approach, as applied above, has withstood lengthy review and the test of time. It was initiated during project design and mitigation planning negotiations, and helped structure the habitat mitigation document that became a condition of federal permit issuance by the Army Corps of Engineers.[17] The approach continues as the framework for the evaluation of the habitat mitigation, as well as for discussion by the permittee and involved resource and regulatory agencies. It should be noted that the Elliott Bay and the tributary Duwamish River incurred a ninety-percent loss of estuarine habitats between 1854 and 1986.[18] The marina affected about nine percent of the remaining habitat. Experience shows that any meaningful mitigation cannot be adequately achieved by the efforts of resource agencies working alone. Bay and estuary-wide efforts by interagency coalitions are needed, as is happening in Puget Sound and elsewhere in the nation.

IV. CONCLUSION

The seven-step approach has been formulated for and applied to numerous development projects requiring regulatory reviews for federal

16. Upon the Army Corps of Engineers' approval of the project by issuance of the permit, two Northwest Indian tribes opposed to the marina project contended that their rights to take fish at all usual and accustomed fishing grounds and stations contravened the Elliott Treaty of 1855. Treaty of Point Elliott, Jan. 20, 1855, U.S.-Duwamish, art. 5, 12 Stat. 927. Following a settlement which included a compensation plan, the marina and mitigation construction occurred in 1989 and 1990. *See* Muckleshoot Indian Tribe v. Hall, No. 88-384C (W.D. Wash. 1989) (order of stipulation, settlement agreement, and dismissal).

17. *See* 33 C.F.R. § 320.2 (1992). In addition to being subject to the Army Corps of Engineers' approval, the state also exercised purview over the project under the State Environmental Policy Act. *See* WASH. REV. CODE § 43.21C (1992).

18. *See* Charles Simenstad et al., Puget Sound Water Quality Authority, *Changes in the Duwamish River Estuary Habitat Over the Past 125 Years* (Mar. 18-19, 1988) (Proceedings of the First Annual Meeting on Puget Sound Research, Seattle, Washington).

and state permit authorizations.[19] Not only do the seven steps ensure effectiveness in documentation, planning, and decision-making, they have been proven successful and have been adopted in mitigation planning and evaluation by the Fish and Wildlife Service and other environmental, regulatory, and developmental bodies.

For an evolving discipline like habitat mitigation, potential success can be enhanced by applying and documenting the seven-step approach. The margin of excellence, and indeed the ultimate success of any mitigation project, depend singularly upon the scientific and technical quality of the baseline and monitoring information, the degree to which environmental objectives are properly conceived and articulated, and the clear and precise execution of the habitat mitigation. Prescription of this seven-step approach can help promote a predictable manner of planning sound habitat-mitigation, as well as ensuring that follow-up effectiveness documentation is achieved as a condition of the regulatory permitting process.

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19. *See generally* John W. Cooper, *An Overview of Estuarine Habitat Mitigation Projects in Washington State,* 3 NORTHWEST ENVTL. J. 112 (1987); Marc E. Boule, *Wetland Creation and Enhancement in the Pacific Northwest, in* INCREASING OUR WETLAND RESOURCES 130 (John Zelazny & Jeffery Scott Feiraabend eds., 1988); Kathy Kunz et al., Puget Sound Water Quality Authority, *Assessment of Wetland Mitigation Practices Pursuant to Section 404 Permitting in Washington State,* (Mar. 18-19, 1988) (Proceedings of the First Annual Meeting on Puget Sound Research, Seattle, Washington).