MITIGATION THAT WORKS

Past Efforts Summary – Washington State Wetland Mitigation Evaluation Study - Phase 1: Compliance

Name of Effort:	*Date of Final Report:*
Wetland Mitigation Evaluation Study – Phase 1	June, 2000 Publication No. 00-06-016
Sponsor(s):	*Participants:*
Department of Ecology	Authors: Patricia A. Johnson[1], Dana L. Mock, Emily J. Teachout, and Andy McMillan. Participants: numerous.

The purpose/objective/goal of the effort or the problem being solved:

Part 1 of a two-phase study to investigate the level of permit compliance and ecological functioning of a representative random sample of compensatory wetland mitigation projects in Washington. Phase 1 focused on the degree of compliance with permit requirements for compensatory wetland mitigation projects; specifically assessing the following:

- Was the compensatory mitigation project implemented?
- Was it implemented to plan?
- Was it meeting its performance standards (those assessable by the methods of this study)?

The study used projects with permit applications submitted between 1992 and 1997. This study did not evaluate WSDOT projects. Tidal wetlands were not included. The study included field assessment of vegetation, hydrology, surrounding land use, wildlife presence and other features. A total of 45 projects were assessed including eastern and western Washington mitigation projects.

Description of the findings, recommendations, actions planned, etc.:

Findings:

Forty-two projects (93%) were implemented, and of those, 23 (55%) were implemented according to plan (8 more projects had implemented at least one applicable element of the plan). Of the 34 projects that had performance standards that could be evaluated, 12 (35%) were meeting all performance standards assessable by this study.

Only 13 projects (29%) were in full compliance with all three questions (implemented, implemented to plan and meeting performance standards)

Some elements of mitigation plans tended to implemented more successfully than others. The mitigation plan elements most often implemented incorrectly were determined based on the number of projects for which: 1) a plan element was applicable; 2) information was available on a plan element; and 3) it could be determined if the element was done to plan. Overall 16 projects were not implemented to plan. Of these:
- 13 projects (81%) did not implement planting according to plan.
- 8 projects (50%) did not implement grading according to plan.
- 4 projects (25%) did not implement the “other” element according to what was indicated in the mitigation plan.

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Some types of mitigation were more successfully implemented than others:
- 1 out of 10 creation projects (10%) was implemented to plan.
- 1 out of 3 restoration projects (33%) was implemented to plan.
- 3 out of 8 enhancement projects (38%) were implemented to plan.
- 4 out of 4 preservation projects (100%) were implemented to plan.
- 14 out of 19 mixed activity projects (74%) were implemented to plan.

Project types varied in terms of meeting Performance Standards.
Creation - 30% met assessed performance standards.
Restoration - 33% met assessed performance standards.
Enhancement - 13% met assessed performance standards.
Preservation - No performance standards to assess.
Mixed - 37% met assessed performance standards.

The study assessed the degree to which the mitigation projects replaced the permitted wetland losses and found that there were 577.94 acres of mitigation for 98.5 acres of permitted wetland impact. However, after subtracting for projects that were not implemented, subtracting buffers, and applying ratios to account for risk of failure and temporal wetland losses, the estimate of replacement area was reduced to 105.6 acres, yielding 1.07 acres of replacement wetland for every acre of wetland loss.

The study noted that it did not attempt to assess the ecological functioning or ecological "success" of the mitigation projects. The authors acknowledge that projects failing to meet performance standards could still be providing significant ecological functions. Likewise, it is possible that projects meeting all performance standards could be failing to provide significant ecological functions. This was mostly due to the fact that site visits occurred during late fall when the water regime could not be accurately verified.

Recommendations:
The study recommended specific actions for permit applicants to follow to improve mitigation success:
1) Implement the plan;
2) Submit as-builts;
3) Write clear, meaningful and measurable performance standard; and
4) Submit monitoring reports.

The study also recommended that Ecology and other permitting agencies take the following actions to improve compliance:
1) Prioritize permit follow-up;
2) Consistently require project applicants to submit as-builts and monitoring reports;
3) Develop an effective permit/compensatory mitigation tracking system;
4) Create a comprehensive project filing system;
5) Maintain the files; and
6) Commit to enforcing permit compliance.

The authors also recommended further study to evaluate the following:
1) How many of the permitted "below threshold" impacts occurred?
2) How many "below threshold" impacts were required to perform compensatory wetland mitigation by local governments?

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3) How much acreage is being lost as a result of unmitigated "below threshold" wetland impacts?
4) Whether certain wetland types or certain wetland functions are disproportionately affected by "below threshold" impacts?

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

Many local governments have strengthened their mitigation planning, reporting and monitoring requirements during the latest round of CAO updates. Also Ecology published additional technical guidance documents to inform applicants on steps to increasing compliance and mitigation effectiveness. Part 2 of this study was completed and published. Action on developing a tracking and filing system or acquiring additional data on below threshold impacts is unknown. It is not known to what degree DOE or other agencies have prioritized permit follow-up.

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Past Efforts Summary – Washington State Wetland Mitigation Evaluation Study - Phase 2: Evaluating Success

Name of Effort:	*Date of Final Report:*
Wetland Mitigation Evaluation Study – Phase 2	January, 2002 Publication No. 02-06-009
Sponsor(s):	*Participants:*
Department of Ecology	Authors: Patricia Johnson, Dana L. Mock, Andy McMillan, Lauren Driscoll, and Tom Hruby. Participants: numerous.

The purpose/objective/goal of the effort or the problem being solved:

Phase 2 of the Wetland Mitigation Evaluation Study attempted to determine the success of wetland mitigation projects from an ecological perspective. The overall success of mitigation projects in Phase 2 was evaluated based:

1. How well the projects achieved ecologically relevant measures:
   - Have mitigation efforts established the required acreage of mitigation?
   - How well did projects attain their ecologically significant performance standards?
   - How well did projects fulfill their goals/objectives?

2. How effectively the projects compensated for wetland losses:
   - How much of a contribution to wetland functions did the mitigation project provide?
   - Did the mitigation project provide the same functions as those lost or did it exchange functions?

In addition, the Phase 2 study also examined:

- Wetland resource trade-offs (e.g., in-kind/out-of-kind, on-site/off-site, etc.).
- Ecological condition (e.g., surrounding land uses, buffer condition, extent of invasive species, etc.).
- Factors that were associated with project success (or lack of success).

The study included 1 to 2-day site visits to 24 mitigation projects across the state (6 sites in eastern WA and 18 in western WA). All of the sites evaluated were at least 2 years past construction. No WSDOT projects were included.

For each of the projects evaluated, Ecology assessment teams evaluated wetland functions using 3 different and generally accepted assessment methods. Information on each project was also solicited from the project applicant and/or consultant. Functions assessed included:

- Removing Sediment
- Removing Nutrients
- Removing Metals and Toxic Organics
- Reducing Peak Flows
- Decreasing Downstream Erosion
- General Habitat Suitability

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- *Invertebrate Habitat Suitability
- *Amphibian Habitat Suitability
- Anadromous Fish Habitat Suitability
- *Resident Fish Habitat Suitability
- *Habitat Suitability for Wetland Associated Birds
- *Habitat Suitability for Wetland Associated Mammals
- *Native Plant Richness
- *Primary Production and Organic Export

(*Methods for Assessing Wetland Functions (Hruby et al., 1999) does not rate the opportunity for these functions; therefore, opportunity for the functions was not rated.)

The evaluation team assessed the potential of the wetland to perform each function and the opportunity of the wetland to perform each function. The team also qualitatively rated how much the mitigation activity contributed to the potential of a site to perform functions. Contribution was deemed to include how much the mitigation activity increased or affected the potential of the site to perform wetland functions.

The assessment team measured how well the sites met the performance standards, but only ecologically relevant performance standards were considered.

To determine how well the project compensated for the impacts to wetlands, the evaluation team determined what functions were likely to have been lost, and then determined whether the same functions were provided by the mitigation.

Description of the findings, recommendations, actions planned, etc.:

Overall seven projects achieved all ecologically relevant performance measures; 12 projects achieved some measures, and five projects did not achieve any measures. This means that only 29 percent of the projects evaluated in this study achieved all of the ecologically relevant measures required by their permits.

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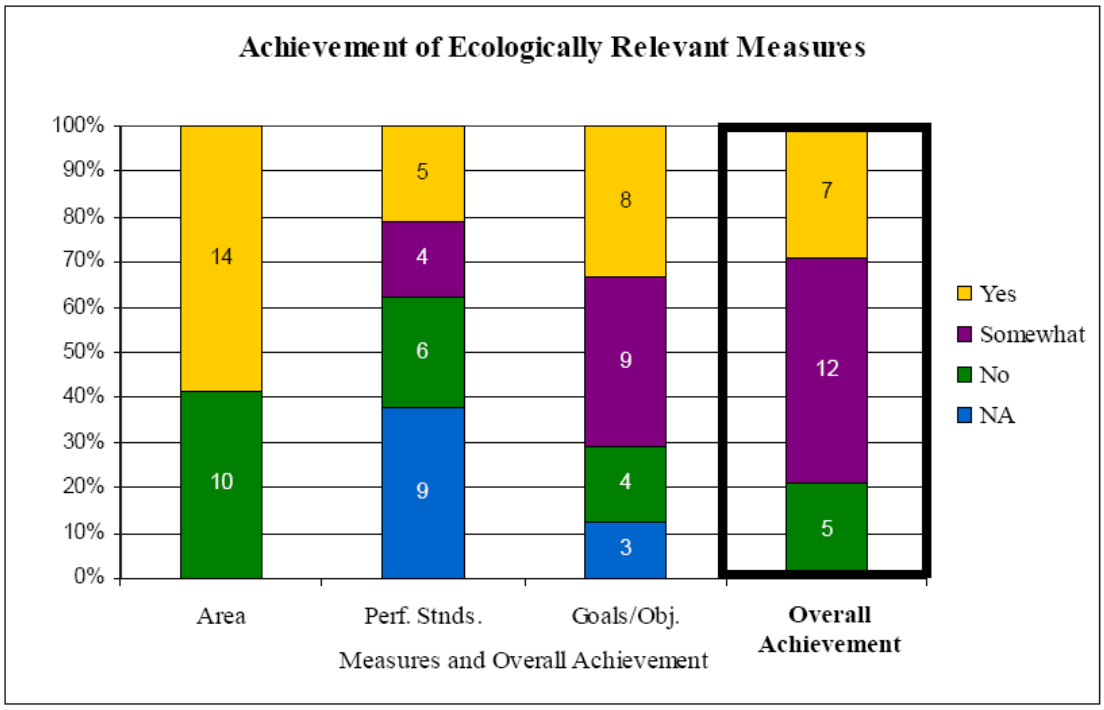

Figure 3.1. Percentage of projects achieving each measure: 1) establishing required acreage of mitigation; 2) attaining significant PS; 3) fulfilling appropriate G/O; and 4) overall achievement of measures. This analysis included all 24 projects.

Statewide, mitigation projects established 84 percent of the desired mitigation acreage.

When looking at replacement by the type of mitigation activity, the study found only 65 percent of the total acreage of wetland losses was replaced by creating or restoring new wetland area, thereby resulting in a net loss of 24.188 acres of wetland area. More specifically:

- 89 percent of the acreage required to be created or restored was established:
- 81 percent of the acreage required to be enhanced was established.

This means that on 16.29 acres, enhancement actions failed either because none of the required plantings were established, or wetland acreage was actually lost as a result of enhancement. Nearly two-thirds (65%) of the total established acreage of mitigation resulted from enhancement activities.

The study drew the following conclusions from the results of the established acreage analysis:

- There was not a statistically significant difference between the four categories of mitigation activity (creation, restoration, enhancement, mixed) in establishing their required acreage of mitigation.
- Created wetlands did a relatively good job of establishing the required acreage (87% of acreage and 70% of projects). One of the biggest concerns regarding the use of creation is its purported high risk of failure. However, only one of the created wetlands considered in this study failed to create wetland conditions.
- Despite the regulatory agencies' stated preference for restoration as the mitigation

activity of choice, this study did not find restoration to be a common form of mitigation. This could be due to the fact that the projects selected for this study were permitted before restoration was as rigorously promoted or that restoration activities are generally not suitable for small-scale projects like most of those evaluated.

- Since enhancement activities occurred in an existing wetland, the site to be enhanced should have had the same wetland acreage after enhancement activities were performed, but four of the nine enhancement projects did not establish the required acreage of mitigation. Two main reasons for enhancement failure were that plants failed to establish or sites were graded improperly.

The study assessed whether the age or size of the mitigation site was a factor in its success and found that older sites were slightly more successful but size was not a factor. Also western Washington projects were more successful than eastern Washington projects, but the reasons are not well understood and the difference was not statistically significant.

In general, projects did a better job of fulfilling mitigation goals and objectives than attaining significant performance standards. Stated reasons included the fact that performance standards frequently did not represent the goals and objectives of a mitigation project. For example, a project could fulfill its goals/objectives to create a scrub/shrub wetland and provide habitat for passerine birds, and either not have significant performance standards or not attain any of them. Also, there is a wide range of on-the-ground scenarios that could fulfill the same goal or objective. The example of a goal to establish scrub/shrub wetland and provide habitat for passerine birds would be fulfilled by any mitigation site that had scrub/shrub vegetation covering greater than 30 percent of the wetland.

In general, the projects evaluated did better achieving ecologically relevant measures than compensating for impacts. Only 63 percent of mitigation projects were even partially compensating for impacts while 79 percent of projects at least partially achieved their measures. This implies that though projects may be doing a better job of achieving measures, these measures may not indicate whether mitigation projects adequately compensate for the wetland impacts.

The results also suggest that wetland creation projects provided a significantly higher contribution to water quality functions than enhancement projects. Creation projects also provided a high contribution to water quantity functions and at least a moderate contribution to wildlife habitat. Since creation areas were not wetlands prior to mitigation actions, it is not surprising that these projects could do a relatively good job of contributing to wetland functions.
Wetland enhancement was generally not effective in contributing to functions. Less than 10 percent of the enhancement areas provided a high contribution to the potential performance of functions, while 25 percent of enhancement areas provided no contribution to any functions. Enhancement areas generally provided little or no contribution to the General Habitat functions.

Mitigation project were most successful at contributing to water quality functions. Water quality functions are often not targeted in the goals or objectives of a mitigation project, they are crucial functions to provide since they are generally the most common and important functions lost as a result of impacts to wetlands (based on available delineation reports and function assessment information in mitigation plans). Wildlife functions are generally the most common functions targeted in the goals/objectives of mitigation projects. However, the mitigation sites did not do as well contributing to wildlife functions. It appears that, in general, the projects evaluated in this

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study had a higher opportunity to provide water quality functions than to provide wildlife habitat functions, largely as a result of their location in urban or urbanizing areas. Study results echo results were obtained in a recent Massachusetts study by Brown and Veneman, 2001.

The study revealed that there was a net loss of emergent wetlands (51.80 acres), and there was also a significant net loss of wetland area; 24.18 acres of net wetland area has been lost as a result of the 24 permitted projects evaluated in this study. The net loss of emergent wetlands (51.8 acres) is due to wetland impacts ant to mitigation projects converting existing emergent wetlands to forested/scrub-shrub (FO/SS) or open water/aquatic bed (OW/AB) wetlands. The vast majority of the emergent acreage lost to impacts or conversion was degraded pasture, dominated by non-native species (90%).

The results indicate that there has been a net gain of 12.3 acres of forest and scrub-shrub wetlands. Though some of this area was created or restored (~4 acres), the gain in FO/SS acreage is primarily due to the conversion of emergent wetlands. Since many of the areas probably were historically FO/SS wetlands prior to conversion for agricultural uses, the wetland mitigation projects may be contributing to regional efforts to re-establish historic vegetation communities. The net gain in OW/AB wetland areas (16.2 acres) was also primarily a result of converted emergent areas.

The results indicate that fully and moderately successful projects received more follow up from regulatory agencies than minimally and not successful projects. This implies that follow-up by regulatory agencies results in a more successful mitigation project.

The study identified the Top Ten Factors that Contributed to the Lack of Success of Projects as follows:

- No irrigation of planted material
- Poor site location
- Lack of maintenance (e.g., invasive species control) or a poor job of maintaining planted material (mowed over)
- Poor design
- Poor planning and a lack of prior hydrologic monitoring
- Lack of follow-up by applicant and regulatory agencies
- Compacted soil or lack of soil amendments creating a poor substrate for plant growth
- A buffer that was too small or unvegetated
- Lack of consistency between project goals and mitigation plan (e.g., not enough planted material to provide the required shrub cover)
- Lack of experience by heavy equipment operators and/or planting crew

The study compared the compliance finding from Phase 1 with the success findings from Phase 2 and found that being “in compliance” is not a primary factor that correlates with success. The results suggest that if a project is “in compliance,” it is not completely unsuccessful ecologically. However, since all of the projects that were evaluated as “not successful” in Phase 2 were also “not in compliance” in Phase 1, a lack of compliance may be a factor correlated with a lack of success.

The study made the following recommendation for improving success: Recommendations

- Improve mitigation follow-up

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- Develop new guidance for all steps in the mitigation process
- Develop new guidance for using enhancement
- Support mitigation banking and other forms of advance mitigation
- Conduct additional studies of wetland mitigation in Washington

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

Many of the recommendations for future actions have been address including developing comprehensive guidance materials, supporting banking and other pilot efforts, and conducting the Phase 2 study of ecological effectiveness.

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Past Efforts Summary – WDFW Region 6 HPA Compliance Pilot Study

Name of Effort:	*Date of Final Report:*
A 2006 Pilot Study of Hydraulic Permit Compliance, Implementation, and Effectiveness in Region 6	2006
Sponsor(s):	*Participants:*
Not listed	WDFW

The purpose/objective/goal of the effort or the problem being solved:

To conduct a pilot study of the WDFW HPA Program compliance, implementation and effectiveness.

Description of the findings, recommendations, actions planned, etc.:

Results:

- In general, permits contained approximately 75% of the important and applicable provisions for each permit type with marine bank protection tending to have the highest and culvert projects the lowest provision rates.
- Provision, compliance, and implementation rates were highest for marine bank protection followed by fresh water bank protection and then culverts.
- Compliance and implementation rates tended to be higher for activities that protected the project proponents' investment than other activity types.
- Judgment of permit effectiveness suggested that achieving "no net loss" standards was difficult probably because of the nature of HPA projects. Even when well-implemented (high provision, compliance, and implementation rates) projects were often judged to decrease fish habitat function, albeit in small quantities.
- The HPA program currently protects fish and fish habitat in large measure, and without the HPA program, we would see substantially more loss of fish life or habitat associated with the 4,000 projects permitted annually.
- The overall effectiveness of projects could be improved as indicated by survey data showing that certain projects of each type currently achieve relatively high effectiveness scores.

Recommendations:

- Make immediate improvements to the HPA program by ensuring that all pertinent provisions are included on each permit.
- Study projects that met the highest levels of effectiveness so that we can apply similar processes to other projects

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

Next steps:

- Report proposes to expand the HPA compliance and effectiveness monitoring to Puget Sound nearshore as part of the Governor's focus on recovering Puget Sound by 2020 to gather information regarding HPA effectiveness and mitigation success in nearshore environments.

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Past Efforts Summary – King County Wetland and Stream Mitigation Monitoring Study

Name of Effort:	*Date of Final Report:*
Results of Monitoring King County Wetland and Stream Mitigations	1998 (Mockler et al.)
Sponsor(s):	*Participants:*
King County DDES	King County

The purpose/objective/goal of the effort or the problem being solved:

Present results of mitigation site evaluations.

Description of the findings, recommendations, actions planned, etc.:

The study involved monitoring 29 mitigation sites in King County in 1997.

Findings:

- Within the study group, 6 sites (21%) were successful by then-current performance standards, 23 (79%) were not. One site (3%) replaced functions of impacted wetlands, 28 (97%) did not.
- Causes of failure included: design, installation, and maintenance.
    - Design flaws include: hydrology inputs not as represented in design; plants inappropriately specified; and slopes steeper than 3:1.
    - Installation flaws include: not installed as designed; soil compacted (especially where steep slopes required compaction for stability); and no organics, i.e., soil not amended as designed.
    - Maintenance flaws include: mowed; not weeded; and not mulched or irrigated during establishment year.
- Monitoring forms had not been designed to note the following common ingredients of failure:
    - Inappropriate design, including insufficient hydrology as a result of design or construction oversights;
    - Slopes steeper than 20%, and plants specified for inappropriate habitat;
    - Compacted soil without organics; and
    - Lack of maintenance.

A useful mnemonic for causes of mitigation failure is: Sun, slope, soil, specifications, stewardship.

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

Proposals to increase mitigation success should include new requirements and guidelines for mitigation plans, and new inspection procedures:

- New design requirements include: demonstrated hydrologic calculations; plants specified for micro-habitat, guided by new habitat worksheet; no slope in wetland steeper than 10%, and no buffer steeper than 20%; soils on all sites to be deconsolidated and amended with organic matter; and specific limits on exotic plants.
- Design errors could be corrected by requiring more information in mitigation plans, and by more stringent requirements for such plans, based on new knowledge.
- New installation requirements include: elevations and soil preparation must be inspected before plants are installed, and plant installation must also be inspected.

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- New maintenance requirements include: signed monitoring and maintenance contracts over a five-year monitoring period that follow new maintenance and monitoring guidelines, or similar sureties.
- New inspection schedule calls for inspections before installation (pre-construction); after soil decompaction and amendment, or grading if called for (construction); and after plant installation (installation), as well as yearly inspections to verify monitoring reports.

Many of the recommended actions have been incorporated in agency guidance documents and are more widely required by many regulatory agencies.

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Past Efforts Summary – Mitigation Optimization

Name of Effort:	*Date of Final Report:*
Mitigation Optimization	April 15, 2005 – Mitigation Optimization – A Vision for Improving the Performance of Environmental Permitting Programs *(Represents culmination of Stage One of the process)*

Sponsor(s):	*Participants:*
The Washington State Legislature directed the Department of Fish and Wildlife through the 2004 Capital Budget* to identify environmental permitting program reforms that implement mitigation principles (embodied in the work of the Transportation Permit Efficiency and Accountability Committee and the Department of Fish and Wildlife's 2003 Wind Power Guidelines) and address watershed and nearshore priorities and other habitat **Pursuant to Section 232, Chapter 277, Laws of 2004*	• WA Department of Fish and Wildlife • WA Department of Ecology • WA Department of Transportation • Governor's Salmon Recovery Office • Office of Regulatory Assistance

The purpose/objective/goal of the effort or the problem being solved:

To identify environmental permitting program reforms that implement mitigation principles (embodied in the work of the TPEAC and the Department of Fish and Wildlife's 2003 Wind Power Guidelines) and address watershed and nearshore priorities and other habitat. Effort is looking to maximize the efficiency and effectiveness of mitigation decisions by implementing a process that synchronizes and integrates permitting programs and watershed-based planning efforts.

The first stage of the effort reviewed key concepts and mitigation principles, and set forth a vision of how these elements could best be implemented across environmental permitting programs.

Specific goals associated with Mitigation Optimization include:

- maximizing environmental benefits of mitigation actions;
- implementing watershed and nearshore restoration priorities; and
- streamlining environmental permitting and mitigation processes.

Description of the findings, recommendations, actions planned, etc.:

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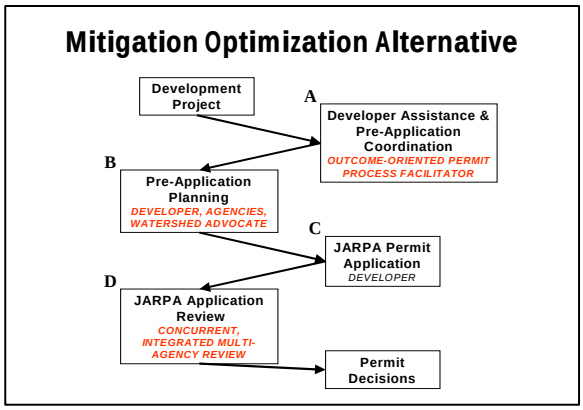
MITIGATION THAT WORKS

The Mitigation Optimization vision is a performance-based approach founded on the following **principles**:

- Offers optional track
- Ensures superior ecological performance
- Preserves functional connection to impacts
- Incorporates science-based planning
- Uses existing processes and authority
- Promotes early collaboration
- Provides streamlined and efficient permitting
- Creates a transparent process



The Mitigation Optimization envisions a process with the following **steps**:

A. *Developer Assistance. A*s a developer assembles information for the JARPA submittal, the developer works with a recognized outcome-oriented permit process facilitator.

B. *Pre-Application Planning. T*o examine the proposed development and collaboratively determine the development impacts and the suite of mitigation actions that maximizes benefits to the environment.

C. *Application Submittal.* The developer is responsible for submitting the Joint Aquatic Resources Permit Application (JARPA). However, the contents of the application (including impacts and mitigation actions) now represent collaborative problem solving among the regulators, developer, and designated watershed advocate(s).

D. *Application Review.* The JARPA paperwork is still submitted independently to each regulatory agency, but the regulators now conduct a joint review of that application through a multi-disciplined body like a Multi Agency Permit (MAP) Team.

Benefits of the Mitigation Optimization process and guidance as described:

- Enables regulators, developer, and designated watershed advocate(s) to collaborate, share information, and conduct planning *prior* to submitting permit applications.
- Uses watershed-based science and plans to assess development project impacts and choose appropriate mitigation actions.
- Decreases permitting costs in time, money, and conflict.
- Helps to ensure a better chance of success because they are coordinated with the prioritized needs of the watershed.
- Offers efficiency, expediency, and a higher level of coordination among regulatory agencies.

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Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

MITIGATION THAT WORKS

The April 2005 report is the culmination of the first stage of Mitigation Optimization efforts. Four additional stages are necessary for appropriate development and vetting of the Mitigation Optimization concept and process.

- Stage two objectives are to increase stakeholder involvement, maintain and expand the current level of state agency involvement, expand federal and local agency participation, and develop a proposal for implementing one or more pilot projects.
- Stage three consists of the implementation and monitoring of Mitigation Optimization pilot projects.
- Stage four calls for the development of a proposal for full implementation of the Mitigation Optimization process and related improvements.
- The fifth, and final, stage secures the funding and authority to carry out the implementation proposal.

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Past Efforts Summary – Shared Strategy for Puget Sound, Mitigation Advisory Group

Name of Effort:	*Date of Final Report:*
Compensatory Mitigation in Puget Sound: Problems and Opportunities	August 2006 Cascadia Law Group and Evergreen Funding Consultants
Sponsor(s):	*Participants:*
Shared Strategy for Puget Sound	(Advisory Group members unknown)

The purpose/objective/goal of the effort or the problem being solved:

Assessed three (3) main problems in compensatory mitigation effectiveness noted by the Mitigation Advisory Group:

1) Permitting inefficiency
2) Ecological ineffectiveness
3) Lack of enforcement for small projects

Description of the findings, recommendations, actions planned, etc.:

Findings:

Key findings of this study are largely items extracted from other studies of mitigation effectiveness. In other words, this effort did not include an independent evaluation of mitigation success. Key findings are summarizes as follows:

- Current permitting process keeps high quality projects from being considered. Process is reactionary and does not anticipate impacts and mitigation alternatives. Projects that leverage value by fully considering watershed and nearshore priorities are not being pursued.

- Previous studies looking at mitigation success in other states have documented failure rates between 20 and 55% (they cite the following MA: Brown, 2001; CA: Sudol & Ambrose, 2002; IN: Robb, 2002).

- Past studies in WA also indicate low success rates (they cite 21% ecological success in King County from Mockler, 1998 and 45% success statewide (Johnson et al., 2002). The reasons for lack of success are listed as follows:
    - Lack of oversight and follow-through
    - Poor planning and implementation
    - Poor site selection

- Mitigation for impacts to individual resources is not achieving goals and the focus on "one resource at a time" prevents multiple ecological benefits from being achieved.

In addition to highlighting factors inhibiting compensatory mitigation success, the study suggests that there are many small projects that do not typically require compensatory mitigation (for example, residential bulkheads) that are contributing to habitat degradation.

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Recommendations:

Three main strategies are recommended for addressing the problem of mitigation ineffectiveness:

1) A watershed approach – the authors cite the 2001 National Research Council document that called for a watershed approach to mitigation planning. They note that Washington has several examples of watershed-based planning efforts (WRIA watershed management plans per HB 2514, Salmon Recovery Plan, etc) but that none is specifically geared toward addressing compensatory mitigation. The lack of a clear strategy for how these plans can be used to improve mitigation success is identified as a significant barrier to achieving success. They support development of a multi-agency watershed task force responsible for identifying salmon restoration projects can address compensatory mitigation needs.

2) Coordinated permitting – They cite the Multi Agency Permit (MAP) Team as a good model for improving permitting efficiency.

3) Alternative mitigation – Tools such as in lieu fees, mitigation banking, conservation banks and advanced mitigation are identified as key components of the solution to the problem. The authors notes these tools incorporate watershed concepts, create market incentives, and can consolidate small impacts.

The study notes an IAC effort to fund mitigation banks capable of compensating for impacts to multiple species and habitats (possible effort for the Forum to investigate).
In addition, the authors offer several principles for judging whether a statewide solution would be effective in achieving mitigation success, which they call *Principles and Criteria for Considering Mitigation Alternatives in Permitting*:

- Getting to scale by encouraging program use – encourage up-front identification of mitigation sites, match permittees with sites and credit opportunities.
- Multi-resource – sites that can benefit more than one resource should be encouraged.
- Integration of watershed planning – Mitigation should draw on the science developed via watershed plans.
- Meeting regulatory mandates with high performance – When determining environmental benefits, consider project characteristics, site characteristics and the management regime.

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Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

Unknown.

MITIGATION THAT WORKS

Past Efforts Summary - Washington Department of Transportation Evaluation of Wetland Mitigation Site Compliance

Name of Effort:	*Date of Final Report:*
An Evaluation of Wetland Mitigation Site Compliance at the Washington Department of Transportation	2004 (?)
Sponsor(s):	*Participants:*
WSDOT	WSDOT Wetland Assessment and Monitoring Program

The purpose/objective/goal of the effort or the problem being solved:

To evaluate the effectiveness of the Department's wetland mitigation sites. Specifically, this study evaluated WSDOT's success in meeting wetland acreage requirements, achieving site success standards (also known as performance measures or success criteria), and replacing wetland functions using wetland ratings as a surrogate for function evaluation. Information from the report is intended to inform and improve the Department's mitigation efforts statewide. Results from this study will provide a complement to the Department's goals of consolidating information and tracking environmental compliance.

Description of the findings, recommendations, actions planned, etc.:

Net wetland acreage gain for the 30 WSDOT mitigation sites (constructed in the mid to late 1990s) was determined by comparing results from wetland delineations conducted on the impact sites prior to project construction to delineation results completed on the mitigation sites after the final monitoring year. In addition, as required by regulatory permits or the mitigation plan, 173 final year success standards were evaluated for 29 of 30 sites included in this study. Standards included plant cover, plant diversity, habitat and species diversity, and water regime. WSDOT also qualitatively evaluated wetland functions at all 30 sites.

Findings – Replacement Acreage:

- WSDOT successfully provided 91.5 percent of required compensatory mitigation area. Evaluated on a project-by-project basis, 46.7 percent of 30 mitigation sites attained or exceeded their required wetland mitigation acreage.
- Site construction did not conform entirely to plan for 13 of the 16 sites that did not meet acreage requirements. For three sites, inadequate wetland design appears to be primarily responsible for the lack of sufficient wetland acreage.
- Wetland buffers are present on all sites included in this study, and they appear to conform closely to the plan sheets.
- Overall reasons for shortcomings include poor site selection, improper site design, poor site preparation, inadequate site management practices, and insufficient follow-through.

Findings – Performance Standards:

- 55.5 percent of success standards were achieved, while 44.5 percent were not

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achieved at the end of the intended monitoring periods. Success standards and permit requirements that cannot reasonably be achieved within a specified timeframe are common reasons for not meeting site success standards. A stronger link should be made between site goals, objectives, and success standards.

- Vegetative cover targets (primarily tree and shrub cover standards) and invasive species cover thresholds appear to be the most difficult standards to achieve. Standards for plant species diversity, wildlife habitat, water regime, and site development consistent with the mitigation plan were achieved in most cases. However, only the standard for soils achieved 100 percent success.

Other Findings:

- For many projects, the Department has effectively replaced lower rated wetlands with wetlands of higher value (using the 1993 Washington State Wetlands Rating System). This study determined the Department's mitigation efforts provided a net gain in higher quality Category II wetlands in exchange for a net loss in lower value Category III and Category IV wetlands.
- Documentation and planning for many of the older projects evaluated were insufficient by present standards.
- Lack of consistent methods and vocabulary made comparison of pre-impact and post-construction wetlands assessment data difficult to analyze.
- Final mitigation plans were not always clearly marked to distinguish them from draft plans. In addition, permits and mitigation plans often contained unclear or conflicting wetland impact and mitigation acreage information. Simple mathematical errors were responsible for confusion in several of the mitigation plans. Some mitigation plans did not separate planned wetland enhancement from creation or restoration acreages.
- Lack of consistent methods and vocabulary made comparison of pre-impact and post-construction wetlands assessment data difficult to analyze. Pre-impact functions assessment techniques were sometimes poorly or incompletely described.
- Site selection a crucial factor in determining success.
- In general, watershed-level needs have not been considered during the site selection process at WSDOT. This has been due, in part, to a lack of coordination between regulatory staff, watershed planners, and WSDOT mitigation site designers. Transportation project costs and timelines sometimes make establishing these relationships difficult.
- Success standards that require 70 to 80 percent woody plant cover in the wetland five years after plant establishment may not be reasonable and achievable based on findings from this and other studies.
- High levels of invasive species cover did not necessarily prevent mitigation projects from meeting other site goals, objectives, and success standards.
- The Department could increase habitat functions and values for many of its wetland mitigation sites by looking beyond the immediate project area.

Recommendations:

- A comprehensive set of design standards should be developed that will address all

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aspects of wetland mitigation.

- A careful site selection process that is based on ecological as well as fiscal and property ownership considerations will undoubtedly improve the Department's mitigation site success. Some environmental offices at WSDOT now prohibit use of the highway right-of-way for wetland mitigation.
- Roles and responsibilities of WSDOT wetlands staff should be clearly defined to assure that those with the necessary technical expertise have the authority to make decisions.
- Open discussions with regulatory staff should occur to establish functions-based success standards that are reasonable and achievable within the designated monitoring period.

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

No methods of implementation or timeline for actions planned were given.

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MITIGATION THAT WORKS

Past Efforts Summary – Transportation Permit Efficiency and Accountability Committee (TPEAC)

Name of Effort:	*Date of Final Report:*
Transportation Permit Efficiency and Accountability Committee – Watershed Mitigation Based Subcommittee.	March 22, 2006 – Report on the Watershed Mitigation Committee
Sponsor(s):	*Participants:*
The TPEAC was established in May of 2001 with the passage of the Environmental Permit Streamlining Act (RCW 47.06 C). The act was reauthorized by the Legislature in 2003, extending TPEAC through March 2006	• WA Department of Fish and Wildlife • WA Department of Transportation • WA Department of Ecology • WS Department of Natural Resource • Governor's Salmon Recovery Office • Office of Community Development • NOAA Fisheries • US Fish and Wildlife Service • US Army Corps of Engineers • US Environmental Protection Agency • Northwest Indian Fisheries Commission • Columbia River Intertribal Fisheries Commission: • Upper Columbia United Tribes • Association of Washington Cities: • Association of General Contractors • Washington State Association of Counties

The purpose/objective/goal of the effort or the problem being solved:

TPEAC was created to achieve transportation permit reform, defined as including 2 components:

- reducing the time and/or cost of environmental permits for transportation projects, and
- Increasing the environmental value of mitigation investments made to offset the environmental impacts of transportation projects.

A Watershed Mitigation Subcommittee was created to:

- facilitate development of a watershed-based approach to environmental mitigation for transportation projects with potential applicability to other processes;
- develop methodologies for mitigation on a watershed basis at appropriate scales that meets multiple agency criteria for permitting.

The Subcommittee was tasked with creating a watershed approach to environmental mitigation. Legislation directed the Subcommittee to:

- develop technical tools that use a watershed approach to expedite mitigation;
- develop multi-agency watershed-based mitigation policy guidance to expedite environmental permitting;
- complete a test of the policy and technical tools; and
- develop a schedule to integrate watershed tools, policies, and procedures.

Description of the findings, recommendations, actions planned, etc.:

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The Subcommittee identified two products for a watershed approach:

- a set of several new tools that provide better and timelier information, and
- a structured process that allows agencies to make better use of information

The Subcommittee also developed the following:

Technical tools:

- Watershed characterization method - to characterize the ecological health of the watershed and to use that information to identify areas that would provide the greatest environmental benefit for impacts caused by transportation projects
- Mitigation screening tool - to identify transportation projects that are located near landscape features that have a high likelihood of affecting WSDOT's ability to cost-effectively mitigate for environmental impacts – can use existing map products (such as local GMA critical area maps) or those created during watershed planning – has 3 products:
    - a list of risk factors that can adversely impact the ability of a project to mitigate its impacts economically and without inhibiting project delivery;
    - a mitigation risk index that uses the key factors and mapping analysis to identify large projects with complex environmental impacts that are candidates for watershed characterization;
    - a mathematical model to estimate project stormwater treatment costs at the planning stage.

Policy tools:

- Integrated mitigation guidance – intended to integrate the mitigation policies of WA Dept of Fish and Wildlife, Dept of Ecology , and the Dept of Transportation – this framework has 6 components:
    - unified schedule for both DOT and the resource agencies;
    - decision report – structured approach to document how and why decisions are made;
    - team approach – interagency team structure;
    - watershed characterization (a less rigorous approach then that described above – uses existing local watershed plans and related info to identify suitable mitigation options);
    - common permit process – decisions to include an evaluation of both on-site and off-site mitigation opportunities;
    - performance based approach – uses adaptive management.

Road Map:

- A detailed set of directions to meet the subcommittee's overall charge to institutionalize a watershed based approach to mitigation – purpose of this is to take the watershed approach beyond the field testing stage. Proposed actions to implement the road map are divided into 3 main areas:

    1. Actions to provide WSDOT with new tools:
        - Action Item #1—Automate project screening tool and use to evaluate each transportation project's need for watershed-based alternative mitigation.
        - Action Item #2—Use existing watershed characterization results to identify a conceptual network of advanced mitigation sites.
        - Action Item #3—Identify ways to integrate watershed based mitigation into the WSDOT culture.
        - Action Item #4—Work cooperatively with a WSDOT project office, Alternative Mitigation Program, and the Department of Ecology to pilot and evaluate the use of wetland restoration as an alternative stormwater flow control Best Management

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Practice.

- Action Item #5—Work cooperatively with representatives of Shared Strategy for Puget Sound and equivalent regional entities across the state to facilitate WSDOT's use of locally developed natural resource restoration site lists for identifying candidate mitigation sites.
- Action Item #6—Pilot a training effort as appropriate to facilitate the integration of watershed characterization and other tools created by the Watershed Mitigation Subcommittee to benefit both WSDOT and local governments.
- Action Item # 7—Work with WSDOT Regional Office and Alternative Mitigation Program to select a mitigation site using the recently completed SR 167 watershed characterization to demonstrate that the watershed process can effectively produce successful mitigation projects.

2. Actions to support local efforts:
   - Action Item #8—Support development of local infrastructure for the creation and maintenance of restoration and recovery databases.
   - Action Item #9—Support and actively participate in interagency efforts that seek to match mitigation needs with watershed recovery and other priorities.
   - Action Item #10—Use watershed characterization methods and results to support monitoring of landscape-forming processes such as that coordinated though the Governor's Forum on Monitoring Salmon Recovery and Watershed Health.
   - Action Item #11—Include tribal priorities, restoration opportunities and objectives, and other information into local, state, or regional restoration datasets.
   - Action Item #12—The Department of Ecology, WSDOT, WDFW, and tribes will work to integrate watershed characterization technical tools and information into existing watershed planning efforts.
   - Action Item #13—Include the early identification of environmental mitigation needs in land use and transportation planning.
   - Action Item #14—Facilitate and expedite the development and permitting of new innovative mitigation approaches through the use of watershed characterization results.
3. Actions that facilitate use of subcommitee skills and knowledge:
   - Action Item #15—Use the expertise of Watershed Mitigation Subcommittee members when developing watershed-based strategies and plans and evaluating relevant mitigation options.

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Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

- Watershed Characterization methods completed, tested, updated.
- Completed four watershed characterizations covering various parts of the SR-522, I-405, SR-520, and SR-167 corridors, with conditions characterized for more than 700 square miles and producing prioritized lists of approximately 1,500 potential mitigation sites. See http://www.wsdot.wa.gov/environment/watershed/technical_report.htm.
- Completed Integrated Mitigation Guidance. Developed Mitigation Screening Tool to help select areas where watershed characterization is the best tool.
- Developed "Road map" to fully implement watershed characterization.

MITIGATION THAT WORKS

Past Efforts Summary – Transportation Performance Board Audit Review of Environmental Permitting

Name of Effort:	*Date of Final Report:*
Overview of Environmental Permitting for Transportation Projects, Report 05-4 (Letter to Governor Gregoire, Senate Transportation Committee and House Transportation Committee from Doug Hurley, Chair - January 17, 2006)	Overview of Environmental Permitting for Transportation Projects, Report 05-4 - January 21, 2006
Sponsor(s):	*Participants:*
Transportation Performance Audit Board (TPAB), Joint Legislative Audit and Review Committee (JLARC)	TPAB

The purpose/objective/goal of the effort or the problem being solved:

The review emphasizes successful initiatives to increase the speed and reduce the cost associated with the permitting process while maintaining environmental standards. It did not specifically address mitigation success or permit compliance.

Purposes were to:

- Review of the environmental permitting issues related to capital construction projects delivered by the Washington State Department of Transportation (WSDOT).
- Analyze the environmental documentation and permitting process to identify key contributors to delays, prioritize streamlining efforts, and assess recent changes in regulations of drainage ditches and storm water runoff.

Description of the findings, recommendations, actions planned, etc.:

Examples of successful efforts to streamline the permitting process in Washington include:

- Northwest Region Multi-Agency Permitting (MAP) Team to improve agency coordination and speed permitting;
- Development of on-line applications for multi-agency aquatic permits;
- Creation of common environmental standards across agencies for many routine maintenance and operations activities, allowing broad multi-year ("programmatic") permits to replace project-specific permits;
- WSDOT liaison program to fund natural resource agency staff dedicated to processing permits for transportation projects; and
- Transportation Permitting Efficiency and Accountability Committee (TPEAC) activities which encourage individual agencies to start additional streamlining initiatives.

Two common themes emerged from the analysis of management-related success factors and the successful strategies of other states:

- The importance of creating a cultural change to encourage creativity and non-traditional methods of efficiently solving permitting issues; and
- The value of information technology to create efficiencies through integrated databases and geographic information systems.

Based on the comparison of permit streamlining programs in Washington State and 24 other state DOTs, there are two sets of recommendations:

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1. Suggested management recommendations to the streamlining process that could be implemented or investigated without additional TPAB research and
2. Options for future TPAB audit/study topics

Management Recommendations:

1. WSDOT should investigate the types of project delivery designs being implemented in Florida and Minnesota. WSDOT staff has been in contact with the Florida DOT to obtain information on their process.
2. WSDOT and the natural resource agencies should consider standardizing geographic information system (GIS) and other relevant electronic data so that they can be easily exchanged within and across agencies and among external stakeholders. WSDOT has requested funding for a critical systems assessment which could help address this area.
3. WSDOT and the natural resource agencies should investigate the use of the best available scientific information as a substitute for project field survey work.
4. WSDOT, Ecology and the WDFW should examine the scientific literature to determine areas in which current research could credibly replace field work. WSDOT and the natural resource agencies should define a work plan for environmental regulatory process improvement.

Findings:

- A primary cause of environmental delays are interruptions in funding. The effects of interrupted funding are:
  - Changes in regulations require duplication of effort as projects stop and start.
  - Failure to fund proposed initiatives such as two of the three TPEAC pilot projects
  - Inconsistent funding for the wetlands banking program.
  - "Shelving" of transportation projects and their associated environmental documents.
  - Staff turnover due to salary disparities and/or low job satisfaction caused by funding uncertainty.
- The complex maze of planning and decision making processes, environmental and permit processes, right of way acquisition processes, design requirements, as well as basic project management and staffing arrangements causes project delays.

Recommendations:

Funding:

- WSDOT should develop guidelines for suspending environmental documentation activities on projects where construction funding is not provided, perhaps setting a percentage limit of the estimated budget for a transportation project that could be spent on planning design, and environmental analysis and permitting without having dedicated construction funding or a high probability of such funding.
- The Legislature should recognize partial funding of projects is not cost efficient and focus funding on those projects where funding can be fully implemented to minimize funding interruptions whenever possible.

Storm Water

- Ecology should conduct some analysis of the relative costs and benefits of various levels of storm water runoff management, particularly related to comparing the differences between practices that meet pre-development conditions versus existing site conditions (i.e. what are the benefits and are they commiserative with projected costs).

Expand Programmatic Permitting, Decrease Regulatory Overlap:

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- TPAB encourages WSDOT to examine other Departmental activities where collective permitting could be achieved either around common practices or around geographic proximate projects.
- The Office of Regulatory Assistance is encouraged to examine ways to consolidate the various policies, requirements and procedures, minimizing overlap and duplication.

Communications

- Early and continuous communications between all interested parties relative to the permitting process was emphasized

Cost Effectiveness Analysis of Section 404 Delegation

- Further consideration should include examining, which, if any, areas or aspects of permit authority delegation under Section 404 of the Clean Water Act may prove most fruitful, relative to successful delegation authority in other states.

IT and Accounting

- Modify and/or update IT systems and Accounting practices to allow the collection of information regarding staff time and costs of resources required to complete and process environmental documentation and permitting.

Paperwork Streamlining

- Pull interagency groups together to review and to identify common mistakes and omissions in applications
- Continue efforts to formally document standardized processes for certain aspects of environmental documentation and permitting.

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

No methods of implementation or timeline for establishing recommendations were given.

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MITIGATION THAT WORKS

Past Efforts Summary – Transportation Research Board Guidelines for Compensatory Mitigation Options

Name of Effort:	*Date of Final Report:*
Guidelines for Selecting Compensatory Mitigation Options	2002
Sponsor(s):	*Participants:*
American Association of State Highway and Transportation Officials, Federal Highway Administration	Transportation Research Board, National Cooperative Highway Research Program

The purpose/objective/goal of the effort or the problem being solved:

- Provide guidance to state DOTs interested in expanding their mitigation programs to include consolidated mitigation options;
- Encourage DOTs to become more proactive in addressing their mitigation needs, to invest in consensus building among agencies, and to ultimately produce functional wetland mitigation projects whose benefits are maintained for the long term.

Description of the findings, recommendations, actions planned, etc.:

Findings:

- Many state DOTs lack mitigation options.
- Inconsistencies in the quality and type of monitoring information collected by state DOTs make it impossible to determine whether the mitigation sites were actually successful.
- There is a perception that the success of project-specific and consolidated mitigation sites depends on better site selection, better coordination between designers and contractors, and more appropriate vegetation selection and planting techniques.
- There is a perception that consolidated mitigation offers more favorable results.

Results: Success of Wetland Mitigation Types and Classes:

- Wetland Types:
  - The survey and subsequent interviews indicated that restoration mitigation was most often encouraged and resulted in the greatest likelihood of success.
- Wetland Classes:
  - Emergent and openwater wetlands were most successfully mitigated in palustrine, estuarine, and lacustrine systems. With palustrine and estuarine systems, forested wetlands were the least successfully mitigated. No conclusive statement can be made for marine and tidally influenced wetlands because of the scarcity of responses for these classes.
  - HGM: Many of these responses (i.e., 43%, or 13 of 30) indicated that mitigation with depressional (e.g., pothole) wetlands was most successful. Riverine and estuarine fringe wetlands were also indicated as being viable mitigation options.

Solutions for Developing Consolidated Mitigation Options:

- The ability to develop an estimate of future impacts: forecasting wetland mitigation needs.
- A funding schedule that includes monies for mitigation site selection and construction as well as sub-sequent wetland monitoring and remediation tasks after the roadway project has been completed.
- The ability to manage wetland sites in perpetuity or to transfer this responsibility to another entity.

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Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

Next Steps:

- Presentation of mitigation options and their implementation at annual meetings and relevant conferences.
- Training workshops.
- Coordination with other transportation research entities.
- Development of a web-based information center for mitigation options.

No timeline given.

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MITIGATION THAT WORKS

Past Efforts Summary – AASHTO Early Mitigation

Name of Effort:	*Date of Final Report:*
Early Mitigation for Net Environmental Benefit: Meaningful Off-Setting Measures for Unavoidable Impacts	September 30, 2005
Sponsor(s):	*Participants:*
American Association of State Highway and Transportation Officials (AASHTO)	National Cooperative Highway Research Program, Transportation Research Board

The purpose/objective/goal of the effort or the problem being solved:

The objective of this National Cooperative Highway Research Program (NCHRP) project is to develop guidance on the development and implementation of successful alternative/early mitigation strategies to address environmental goals.

Description of the findings, recommendations, actions planned, etc.:

To support integrated planning and advance mitigation, the U.S. Army Corps of Engineers, EPA, Federal Highways Administration (FHWA), U.S. Fish and Wildlife Service ((FWS), and NOAA Fisheries have outlined solutions within their own agencies to ensure ecologically significant mitigation in the context of an efficient permitting and consultation process:

- Corps: using regulatory flexibility and new information to work cooperatively with agencies to implement more effective approaches to mitigation in a watershed and landscape context.
- EPA: supporting efforts to establish clear, reasonable performance expectations for all parties involved, and where mitigation is required, working with the lead agency and its partners to identify opportunities to build on existing conservation efforts and establish landscape-level conservation areas with long-term ecological value.
- FWS: using regulatory flexibility to manage wildlife resources on a landscape and population basis, rather than an individual basis.
- NOAA Fisheries is committed to identifying areas that have the necessary attributes of ecosystem conservation areas and determine how to place those areas in that role.
- FHWA is committed to using regulatory flexibility to move beyond the project-by-project approach. Planning focuses on the entire surface transportation system, rather than single improvements and facilities.

A number of shortcomings and 'lessons learned' have been identified with initial implementation of consolidated mitigation, which current, successful advance mitigation initiatives address:

- Location and Consistency with Watershed Plan: Most mitigation bank locations have been chosen by the bank creator or sponsor for practical purposes. Less than one percent of all wetland banking instruments specifically reference consistency with a watershed management plan.
- Shortcomings in delivering promised functions. Though DOTs performed better than most, wetland creation and restoration projects have fallen short in delivering the desired functions, including replacement of occupied natural habitat and over-reliance on easier to construct wetland types (open water, emergent).
- Failure to provide mitigation in advance: early credit release is a common occurrence

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with traditional wetland mitigation banking. Early in-lieu fee (ILF) programs accumulated funds from impacts before plans could be developed and preservation or restoration implemented.

Indicators or criteria for successful advance mitigation efforts:

- Locate mitigation/conservation according to watershed plans/priorities;
- Increase ecological predictability, success, and delivery of desired functions;
- Provide mitigation/conservation in advance.

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

Regulatory Agency Communications Opportunities & Strategies: An Implementation Plan:

- Clarify legal interpretations and regulatory flexibility;
- Utilize existing communications channels;
- Increase familiarity with successful approaches and provide technical support;
- Leverage existing data and conservation plans.

Addressing Localized Issues in Collaborative Fashion: An Implementation Plan:

- Identify goals and a common vision of what may be accomplished together, generating net benefits for the environment and meeting the streamlining and stewardship needs of the agencies involved.
- Use best available scientific data, to save public resources and act sooner rather than later on opportunities for conservation, restoration, and recovery that may otherwise vanish.
- Estimate potential mitigation needs associated with transportation improvements. This planning step is now being undertaken by a number of leading DOTs, who in some cases are being assisted by conservation partners at universities or state Natural Heritage Programs.
- Identify priority areas for conservation or restoration. Resource agencies and their partners have generated most of the key plans in this area, though environmental screening tools developed by or with DOTs have also been used.
- Identify how transportation funds may be used ahead of projects, in keeping with the transportation planning and project development process in the given state. Planning should include management as well as on-the-ground mitigation and conservation investments.
- Develop a strategy for providing the DOTs with regulatory credit for conservation and mitigation investments, under ESA section 7(a)(2), Section 404 of the Clean Water Act, and other pertinent sections and environmental laws.
- Given advance mitigation and conservation investments, agencies must decide how individual projects will be reviewed and fit into the whole, ensuring continued avoidance and minimization on the project level and adequate streamlining to maintain initial agreements and incentives.
- Ensure adequate communication with *all* levels of staff who will be involved in implementation of such cooperative conservation efforts, clarifying how new processes may entail change from previous approaches and expectations.
- Plan for and design performance measures for doable, adaptive management, in perpetuity.

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MITIGATION THAT WORKS

Past Efforts Summary – New England Corps-required Mitigation

Name of Effort:	*Date of Final Report:*
Success of Corps-required Wetland Mitigation In New England (Paul Minkin & Ruth Ladd)	April 3, 2003

Sponsor(s):	*Participants:*
New England District Corps of Engineers	

The purpose/objective/goal of the effort or the problem being solved:

This study was designed to determine the effectiveness of compensatory mitigation (creation and restoration) for permitted impacts in New England, and to provide a basis for making programmatic improvements as warranted. The study considered two principal questions for addressing mitigation success:

- does the mitigation meet the standards stated in the permit?
- does the mitigation compensate for the lost functions from the permitted activities?

Description of the findings, recommendations, actions planned, etc.:

- The study looked at 60 mitigation sites from each of the six New England states. Sites covered the range of time periods from those just recently constructed to those that were several years old.
- Mitigation comprised of preservation or enhancement was not included in this study. Each site was visited and a variety of data collected, including wetland delineations, functions assessments, site photographs, species diversity, and site problems.

Findings:

- Forty of the mitigation projects (67%) were determined to meet permit conditions and would be considered successful by that standard. However, only ten (17%) were considered to be adequate functional replacements for the impacted wetlands.
- Information on permit conditions was missing for seven projects (12%) and information on functions and values or types of impacted wetlands was missing for six projects(10%), making it impossible to determine success for those projects.
- Even where a specific function may have been replaced, it was often at a different or lower level than had been lost.
- While 177.69 acres of forested wetlands were impacted by the 60 study projects, only 24.74 acres of mitigation were proposed to be forested. Few forested wetlands were proposed as mitigation for a variety of reasons, including focus on only a few functions, fear of failure, difficulty to establish, and non-specific information on impacted functions to be replaced. Of these 24.74 acres, only approximately 17 acres appear to be reasonable precursors to forested wetland.
- There were impacts to 6.81 acres of palustrine open water systems, but 47.41 acres of proposed open water systems as compensatory mitigation. This study found approximately 56 acres of palustrine open water systems as actual mitigation. Since there was considerable out-of-kind mitigation, there were increased losses in the more complex

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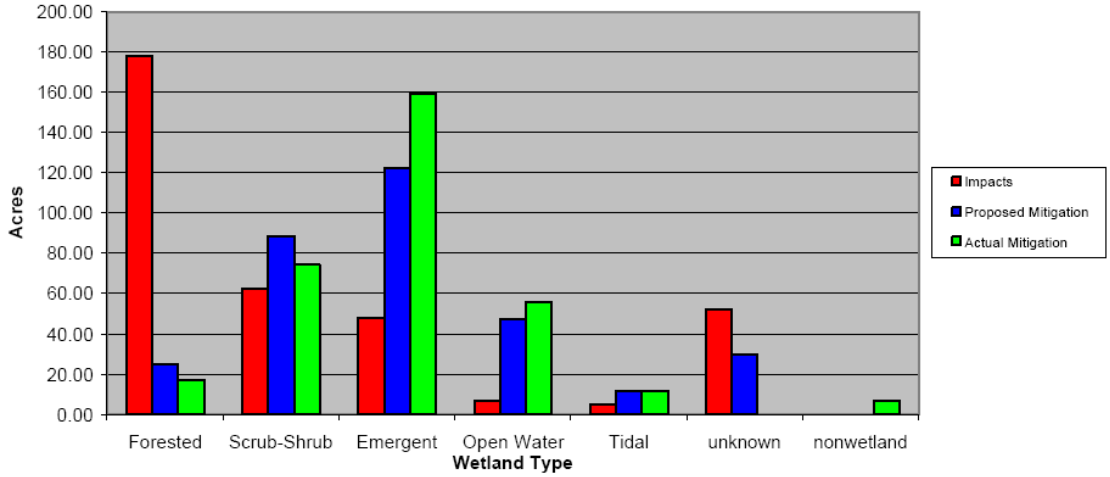
wetland types.

- The general replacement of forested wetlands with open water and emergent systems has resulted in considerable loss of function, particularly for wildlife habitat and water quality.
- Insufficient compensatory mitigation has been required to offset project impacts on both an acreage and functional basis. With impacts to 352.31 acres of wetlands and proposed compensatory mitigation of 324.12 acres, of which no more than 317.65 acres are wetland, there is an overall net loss in acreage of wetlands.
- Enhancement and preservation had been part of the mitigation for some of the projects, however, this was not evaluated in this study
- While there is a net loss in wetland function and acreage, over 300 acres of wetlands and waters have been restored or created as part of these mitigation projects and they do provide a variety of functions. The overall net loss of function is much less than the 352.31 impacted acres and on an individual project basis, there were some cases of net functional gain for the project where the impacts had been to highly degraded systems.
- Causes of degradation of mitigation site functions resulted from adjacent land uses, improper hydrology, use of cultivars, inadequate maintenance and protective measures, and invasive plant species.
- Finally, development and approval of compensatory mitigation should concentrate on identifying and replacing the functions proposed to be impacted. In order to truly replace lost functions, increased quality or quantity efforts should be considered, especially for forested habitat replacement.

The following graphs depict some of the results concerning impacts and types of mitigation:

Figure 4 - Impacts and Mitigation by Wetland Type



Recommendations:

- Compensatory mitigation should concentrate on replacing functions of lost wetlands; need better baseline information of function of impacted wetlands.

- Need to have accurate maps and location information so that follow studies can be conducted.

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- Use of the “block transplant” method is effective.
- Stronger emphasis on permit compliance and enforcement needed to achieve No Net Loss.

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

- Unknown.

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Past Efforts Summary – ELI Stakeholder Forum on Federal Wetland Mitigation

Name of Effort:	*Date of Final Report:*
Fifth Stakeholder Forum on Federal Wetlands Mitigation	May 2006
Sponsor(s):	*Participants:*
Federal Highway Administration, NOAA, Army Corps of Engineers, EPA, USFWS	Environmental Law Institute, Representatives from EPA, Corps, state governments, etc.

The purpose/objective/goal of the effort or the problem being solved:

The 2-day meeting was designed to achieve the following objectives:
• Review and solicit input on recent developments in federal mitigation regulations and policy;
• Discuss recent findings on the character and performance of mitigation; and
• Discuss future research priorities for the direction of federal aquatic resource mitigation.

Description of the findings, recommendations, actions planned, etc.:

The forum provided an opportunity for stakeholders to discuss the proposed rule on compensatory mitigation for losses of aquatic resources that was released on March 28, 2006, compensatory mitigation and the watershed approach, and future research priorities for the direction of federal aquatic resource mitigation.

Findings:

- Participants supported the proposed rule's provisions to raise standards, ensure equivalency, and improve the success of all types of mitigation. The rule needs clarification on the length of the required monitoring period, long-term management responsibilities, requirements related to financial assurances, the use of preservation for compensation, and natural catastrophe provisions. Also suggested that the proposed rule includes too many "may" statements and too few "must" statements, which may lead to inconsistent application of the principles outlined.
- Issues concerning third-party mitigation under the proposed rule. The proposed rule needs clarification on the determination of service areas, and several stated that ecological rather than economic considerations should drive the definition of service areas. Participants also suggested that the rule should clarify the use of a functional assessment for determining credits and impacts.
- Several participants felt that in-lieu-fee programs should not be phased-out under the proposed rule. Overall, participants agreed that in-lieu-fee programs, and any mitigation approaches, should be held to standards that are equivalent to those required of mitigation banks. The North Carolina Ecosystem Enhancement Program was repeatedly presented as a good example of a successful hybrid between in-lieu-fee mitigation and mitigation banking.
- Participants emphasized the important role of states and state programs in relation to the watershed approach and watershed planning, the third-party Mitigation Banking Review Team process, data collection and tracking, and compensatory mitigation compliance inspections.
- Participants expressed support for the watershed approach to compensatory mitigation and other wetlands restoration projects. Raised issues about the role federal and state regulatory agencies may play in developing watershed plans; the quality and depth of the

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required assessments and the minimum information requirements necessary to implement a watershed approach in the absence of watershed plans; and the clarity of the scale of a watershed, particularly as it relates to service area size. Also concerned about how mitigation decisions will be made using the watershed approach in the absence of a formal watershed plan. Several participants expressed support for using regional general permits as a programmatic tool to implement a watershed approach.

- Participants stressed the need for adequate funding to support the watershed approach and watershed planning, the G-ORM/WORM database and associated data tracking efforts, and the Corps' compliance efforts for compensatory mitigation.
- Several participants suggested that better data management and dissemination is needed in order to make existing published and unpublished data more readily available and useable. Several participants also suggested that monitoring reports could be standardized and utilized for collecting data. Some members of the banking industry suggested that bankers should formalize their site-selection processes and share their data in a watershed context.
- Participants expressed an interest in incorporating wetland delineation, National Wetland Inventory data, and data associated with other restoration projects in the Corps' new ORM database. However, participants stressed that standard procedures need to be developed to incorporate these data.
- Participants suggested that mitigation providers that fail to submit monitoring reports in a timely manner should be assessed penalties. Corps representatives stressed that compliance issues will improve with the roll-out of the new ORM database.
- Participants suggested a number of options for studies that would help increase the knowledge base on the success and quality of wetland mitigation sites. Several participants stressed the need to conduct studies that explicitly compare the ecological performance of mitigation sites, particularly banks, based on the type of mitigation provider. Participants also suggested that developing strong, enforceable, equivalent performance standards will improve mitigation success.

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Past Efforts Summary – Environmental Law Institute In-Lieu Fee (ILF) Mitigation

Name of Effort:	*Date of Final Report:*
The Status and Character of In-Lieu Fee Mitigation in the United States (*144 pages*)	June 2006
Sponsor(s):	*Participants:*
Environmental Law Institute Authors: Jessica Wilkinson, Roxanne Thomas, and Jared Thompson	Funding: USEPA, Doris Duke Charitable Foundation Information: US Army Corps of Engineers Review: USACE, NOAH Marine Fisheries, USEPA, Institute for Water Resources

The purpose/objective/goal of the effort or the problem being solved:

The study's stated purposes are:

1) Characterize the 38 approved, active in-lieu fee programs in the country identified as of October 2005; [none is in Washington State] and

2) Assess the degree to which these programs have addressed the concerns and recommendations issued by the federal wetland regulatory agencies, as well as the National Research Council (NRC), Government Accountability Office (GAO), and other researchers over the past 15 years

In particular this study considers the Corps In-Lieu Fee (ILF) Mitigation Guidance document issued in 2000 and compares the organization and performance of the 38 programs reviewed to the 23 "standards" offered by the 2000 Guidance.

In fulfilling its purposes, the Environmental Law Institute study also provides substantial background on in-lieu fee mitigation, the successes and shortcomings of such programs, and issues opportunities that surround ILF mitigation. It does not propose solutions or set action agendas.

Description of the findings, recommendations, actions planned, etc.:

<u>Quoting from the study's Executive Summary:</u>

"The Corps has 23 "standards" (in the 2000 ILF Guidance document) to be met by ILF programs. Only 6 of these standards are met by half or more of the 38 programs reviewed."

<u>Quoting from the study's Conclusions:</u>

"All three forms of compensatory mitigation [*permittee implemented, banking, ILF*] carry with them certain inherent risks and offer their own benefits. ELI's study finds that in the vast majority of cases, in-lieu fee mitigation is not being carried out in a manner that fully addresses the recommendations offered by existing studies and guidance. The shortcomings of in-lieu fee mitigation offered here may be a product of the structure of the existing programs and in lieu fee mitigation policy, rather than the mitigation method itself.

"If in-lieu fee mitigation is to be a viable, effective third-party mitigation option, the

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shortcomings highlighted here may need to be addressed. Although many solutions could be devised, the challenge is to identify approaches that ensure that lost aquatic resources are replaced, while maintaining the flexible aspects of the approach that differentiate it from mitigation banking. This may lead to a higher barrier to entry for potential in-lieu fee providers due to requirements to pre-capitalize some costs, such as advanced site identification and the development of adequate and accurate cost estimates. Such improvements would necessitate the development of federal or state policy with more regulatory force than guidance. In addition, oversight and enforcement would be critical for ensuring that these standards are carried out in a meaningful way.

"Since no existing ecological, empirical, field-based research has demonstrated whether or not in-lieu fee mitigation is inherently unable to replace lost aquatic resource functions, the fundamental questions for in lieu fee mitigation are whether the risks can be adequately managed and whether the risks that remain are outweighed by the potentially significant benefits of in-lieu fee mitigation."

The following tables and charts from "The Status and Character of In-Lieu Fee Mitigation in the United States" provide an overview of the basis for the findings.

Table 1. Comparison of Recommended Standards to In-Lieu Fee Programs Reviewed. The table below lists 23 standards – recommendations or guidance – provided by several sources, including the Government Accountability Office (formerly the General Accounting Office), National Research Council, and the 2000 ILF Guidance on the structure, operation, and oversight of in-lieu fee mitigation programs. References for each of the standards are provided in the endnotes. The statistics provided can all be found in the sections indicated. The last column indicates whether or not a minimum of 50 percent of the 38 in-lieu fee programs studied conform to the standard. Although 50 percent is a low threshold against which to measure the success of any program, it was chosen with the acknowledgement that 22 of the 38 in-lieu fee programs reviewed (58%) operate under authorizing instruments that were established prior to the release of the 2000 ILF Guidance (*see below:* § III.3. Pre-/Post-Guidance Comparisons).

	Recommended Standard	Programs that meet standard	Programs that do not meet standard	Programs that somewhat meet standard	Report section with additional details	At least 50% meet the standard
1.	Programs should provide mitigation in advance of project impacts.[1]	3 of 38 do or are committed to doing so (8%)[2]	35 of 38 (92%)		IV.20. Completing Mitigation in a Timely Manner	No
2.	Agreement should specify potential sites.[3]	1 of 38 (3%)	34 of 38 (89%)	3 of 38 (8%)	IV.8. Site Identification	No
3.	Program sponsors should supply the Corps with information in advance on the schedule for implementation of mitigation projects.[4]	18 of 38 (47%)	20 of 38 (53%)		IV.20. Completing Mitigation in a Timely Manner	No
4.	Program sponsors should plan and develop in-lieu fee mitigation projects to address the specific resource needs of the watershed;[5] In-lieu fee programs should provide "watershed integration."[6]	13 of 38[7] (34%)	25 of 38 (66%)		IV.8. Site Identification	No
5.	Program sponsors should give careful consideration to the ecological suitability of sites for achieving the goal and objectives of compensatory mitigation.[8]	19 of 38[9] (50%)	19 of 38 (50%)		IV.8. Site Identification	=
6.	Programs should use preservation of existing wetlands only in exceptional circumstances.[10]				IV.1. Credit Sales and Mitigation Activities Undertaken	No (see 6.a. and 6.b. below)
6.a.	Wetlands	Of 18 responding programs, 33% of the mitigation is provided through restoration, 13% through enhancement, and 2% through creation	Of 18 responding programs, 52% of the mitigation is provided through preservation		IV.1. Credit Sales and Mitigation Activities Undertaken	No
6.b.	Streams	Of 7 responding programs, 49% is provided through restoration and 6% through enhancement	Of 7 responding programs, 45% is provided through preservation		IV.1. Credit Sales and Mitigation Activities Undertaken	No[11]
7.	Programs should use funds collected for replacing wetland functions and values and not to finance non-mitigation programs and priorities, such as upland preservation, research, or education.[12]	15 of 38 (39%)	20 of 38 (53%)	3 of 38 (8%)	IV.9. Replacing Lost Aquatic Resource Functions	No
8.	Funds collected should ensure a minimum of one-for-one acreage replacement.[13]	14 of 38 (37%)[14]	24 of 38 (63%)		IV.11. Requirements to Achieve One-to-One Replacement	No

	Recommended Standard	Programs that meet standard	Programs that do not meet standard	Programs that somewhat meet standard	Report section with additional details	At least 50% meet the standard
13.	Agreement should specify requirements for monitoring (i.e., specific parameters to be monitored).[21]	24 of 38[22] (63%)	14 of 38 (37%)		IV.17. Monitoring Requirements	Yes
14.	Agreement should specify the geographic service area.[23]	29 of 38 (76%)	9 of 38 (247%)		IV.6. Service Areas	Yes
15.	Agreement should outline method for determining fees.[24]	14 of 38 (37%)	24 of 38 (63%)		IV.12. Determining Fees	No
16.	Agreement should outline method for determining credits.[25]	3 of 38 (8%)	35 of 38 (92%)		IV.10. Method of Determining Credits	No
17.	Agreement should specify performance standards for determining ecological success of mitigation sites, or require inclusion in individual project plan.[26]	18 of 38 (47%)	14 of 38 (37%)	6 of 38[27] (16%)	IV.18. Performance Standards	No
18.	Agreement should "contain distinct provisions that clearly state that the legal responsibility for ensuring mitigation terms are satisfied fully rests with the organization accepting the in-lieu-fee."[28]	12 of 38 (32%)	26 of 38 (68%)		IV.14. Remedial Action Provisions and Contingency Funds	No
19.	Agreement should include "provisions for remedial actions and responsibilities (e.g., contingency fund)"[29]	19 of 38 (50%)	19 of 38 (50%)		IV.14. Remedial Action Provisions and Contingency Funds	=
20.	Agreement should include financial, technical and legal provisions for long-term management and maintenance.[30]	22 of 38 (58%)	16 of 38 (42%)		IV.15. Long-Term Management and Maintenance Provisions	Yes

	Recommended Standard	Programs that meet standard	Programs that do not meet standard	Programs that somewhat meet standard	Report section with additional details	At least 50% meet the standard
21.	Agreement should specify the long-term management provisions to provide "assurances of long-term sustainability and stewardship...", or require inclusion in individual project plan [31]	13 of 38 (34%)	16 of 38[32] (42%)	9 of 38[33] (24%)	IV.15. Long-Term Management and Maintenance Provisions	No
22.	Agreement should specify financial and legal provisions for long-term management and maintenance (e.g., trust).[34]	2 of 38 (5%)	36 of 38 (95%)		IV.15. Long-Term Management and Maintenance Provisions	No
23.	Program sponsors should utilize accounting procedures to track payments received from permittees.[35]	35 of 38[36] (92%)	3 of 38 (8%)		IV.19. Managing Program Data	Yes
	logical improvements should be completed by the first full growing season and no later than the second full growing season following collection of the initial funds.[17]				tion in a Timely Manner	
10.	Agreements should require mitigation sites to be protected in perpetuity.[18]	19 of 38 (50%)	19 of 38 (50%)		IV.13. Protection in Perpetuity	=
11.	Site protection should be accomplished using an appropriate real estate arrangement (e.g., conservation easement, transfer of title to a Federal or State resource agency or non-profit conservation agency).[19]	15 of 38 specify one or more of the following: fee title acquisition, conservation easements, deed restrictions, or restrictive covenants (40%)	19 of 38 do not require protection in perpetuity, nor do they specify how the sites should be protected (50%)	4 of 38 require protection in perpetuity but do not specify the type of site protection mechanisms (3%)	IV.13. Protection in Perpetuity	No
12.	Agreement should include a schedule for a regular monitoring report to document funds received, impacts permitted, how funds are disbursed, types of projects funded, etc.[20]	34 of 38 (89%)	4 of 38 (11%)		IV.16. Administrative Reporting	Yes

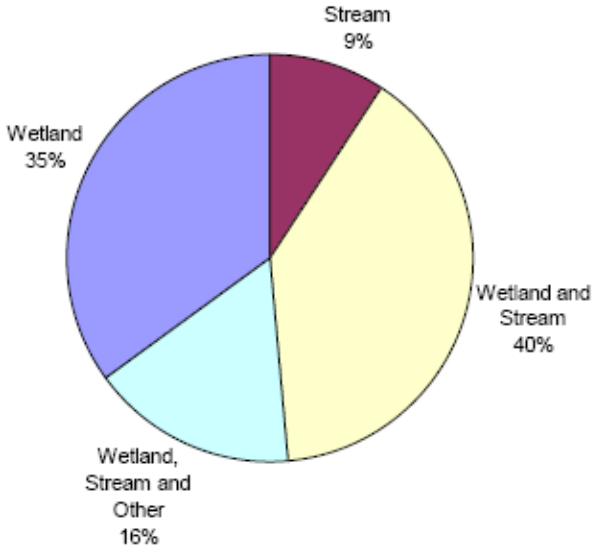

Figure 3. In-Lieu Fee Program Credit Types: Proportion of 43 approved, active in-lieu fee programs (as of October 2005) that sell: only wetland credits; only stream credits; both wetland and stream credits; and wetland, stream, and other credits. Approved credit type data were provided by the Corps districts and were not available for three programs.

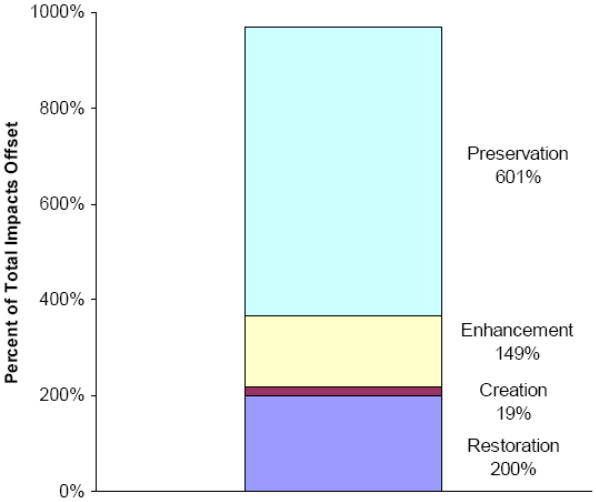

Figure 6. Wetland Mitigation Types Relative to Impacts Offset: Proportion of wetland mitigation accomplished by some in-lieu fee programs through restoration, creation, enhancement and preservation, calculated as percentages of the total amount of wetland impacts being offset by these programs. These data were reported by only 11 of the 38 programs covered in this study; these 11 programs have conducted a total of 4,553 acres of wetland mitigation to offset 470 acres of wetland impacts.

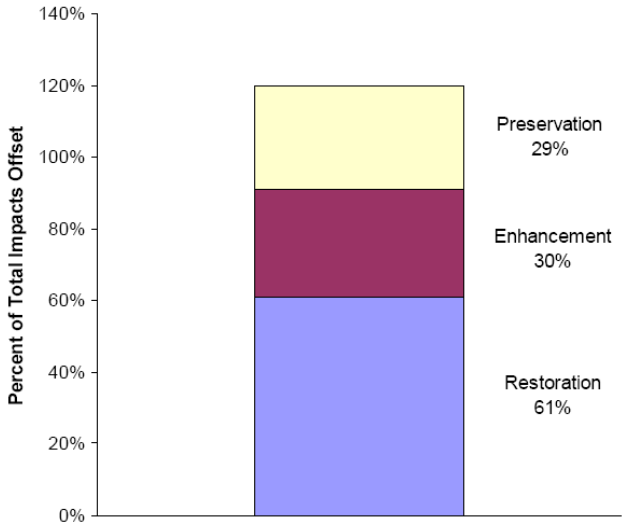

Figure 8. Stream Mitigation Types Relative to Impacts Offset: Proportion of stream mitigation accomplished by some in-lieu fee programs through restoration, creation, enhancement and preservation, calculated as percentages of the total amount of stream impacts being offset by these programs. These data were reported by only 3 of the 38 programs covered in this study; these 3 programs have conducted a total of 206,283 linear feet of stream mitigation to offset 173,149 linear feet of stream impacts.

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Table 3. Comparison of replacement ratios with percentage of funds expended or allocated for nine programs.

In-Lieu Fee Program	Percent of Funds Expended or Allocated	Replacement Ratio Achieved (measurement type)
California Coastal Conservancy, Calleguas Creek Watershed Aquatic Resource In-Lieu Fee Compensatory Mitigation Program, California (2003)	48%	2:1 (wetland acres)
Georgia Land Trust Service Center, Georgia Wetlands Trust Fund, Georgia (1997)	51% (all for preservation)	0:1 (wetland acres) 0:1 (linear feet of streams)
Kachemak Heritage Land Trust, Kachemak Heritage Land Trust In-Lieu Fee Program, Alaska (1999)	0%	0:1 (wetland acres)
Mission Resource Conservation District, Santa Margarita Arundo Control Fund, California (1999)	71%	1:1 (acres of invasive species removal)
Mountains Restoration Trust, Mountains Restoration Trust In-Lieu-Fee Program, California (2004)	0%	0:1 (wetland acres)
National Fish and Wildlife Foundation, Pennsylvania Wetlands Replacement Project, Pennsylvania (1996)	99%	1.2:1 (wetland acres)
New Jersey Wetland Mitigation Council, Land Use Regulation Program, New Jersey (1988)	95%	3.2:1 (wetland acres)
The Nature Conservancy, Virginia Aquatic Resources Trust Fund, Virginia (1995)	35%	3.8:1 (wetland acres) 0.3:1 (linear feet of streams)
Tucson Audubon Society, Tucson Audubon Society Conservation Account, Arizona (2004)	100%	1:1 (wetland acres)

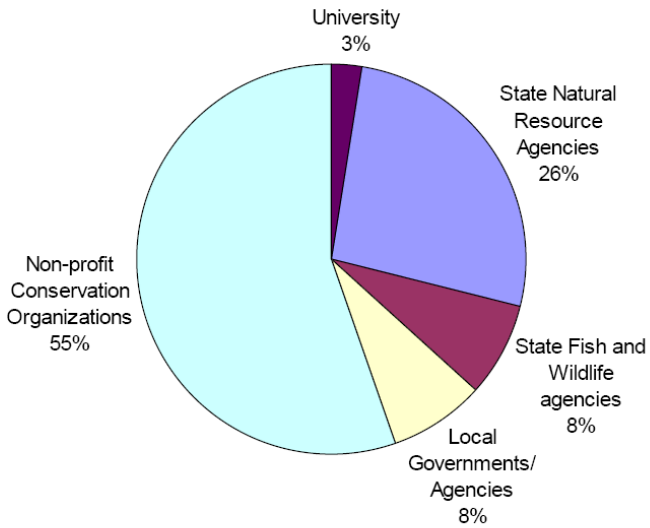

Figure 9. In-Lieu Fee Program Sponsors: Proportion of the 38 in-lieu fee programs covered in this study that are sponsored by non-profit conservation organizations, state natural resource agencies, state fish and wildlife agencies, local governments or agencies, and universities.

The study has several observations concerning financial aspects of ILF programs. Some of these are as follows:

- Some may only use fees to fund mitigation projects while others can use other sources of funding as well. This may create confusion concerning actual costs of projects.
- 58% of the programs reviewed mention long-term maintenance of mitigation projects in their foundational documents, but only 13% outline specific and required long-term maintenance actions (such as invasive species removal) and specific funding arrangements.
- Frequently there are not requirements for ILFs to spend fees received from developers within certain time limits. Quoting the study, "It is interesting to note that least seven of the program agreements reviewed (18 percent) include language specifically providing the program sponsor the discretion to wait to allocate funds until an adequate amount of funds have been collected to meet the costs necessary to 'result in an environmentally meaningful project' or 'so as to maximize the size and/or quality of mitigation sites.'

Overall successes and shortcomings as viewed by ILF program sponsors and regulators are summarized in the following table from the study:

Table 6. Successes and shortcomings of ILF programs, as reported anecdotally by program sponsors and regulators.

Reported successes	*Reported shortcomings*
• Program is a general success; also, examples of successful individual ILF projects described • ILF allows mitigation to be better targeted, thereby increasing efficiency and effectiveness of projects • ILF funds can be leveraged against other conservation funds (may be used as a match to other grants) • ILF provides a networking and/or partnership opportunity for conservation organizations and local, state, and federal government agencies • 2000 ILF Guidance helpful in creating and administering ILF programs, increasing Corps oversight/communication, and improving accounting practices • ILF projects have provided educational opportunities, both to the public and to consultants with respect to restoration techniques	• Examples of unsuccessful individual ILF projects described • ILF often underutilized; program may not collect enough funds to conduct meaningful projects in a timely fashion • Communication between Corps and program sponsor lacking; disconnect between Corps priorities and program sponsor priorities • ILF sponsors do not always have the expertise or resources to identify/prioritize projects, to conduct mitigation, or to correctly estimate mitigation project costs • Difficulty conforming to 2000 ILF Guidance; concerns over ILF agreement terms, including single sponsor agreement (i.e., would prefer to have funds distributed to many groups) and required uses of collected funds • Difficulty with accounting

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

The "Status and Character of In-Lieu Fee Mitigation in the United States" does not set forth recommendations or action plans. It is a status report as of June, 2006.

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MITIGATION THAT WORKS

Past Efforts Summary – ELI Status Report on Compensatory Mitigation

Name of Effort:	*Date of Final Report:*
2005 Status Report on Compensatory Mitigation in the US	2005 (Jessica Wilkinson and Jared Thompson)
Sponsor(s):	*Participants:*
Environmental Law Institute (ELI)	U.S. Army Corps of Engineers

The purpose/objective/goal of the effort or the problem being solved:

To present survey results on the nature of the compensatory mitigation being conducted in Corps districts and to update ELI's database of mitigation banks, in-lieu-fee mitigation programs, and umbrella banking agreements.

Description of the findings, recommendations, actions planned, etc.:

Mitigation banks:

- Active banks: the Corps districts reported that, as of September 2005, there were 405 approved mitigation banks in the country. Of these approved banks, 330 are currently active and 75 are sold-out. This represents an 85 percent increase in the number of approved banks in four years and a 780 percent increase in the number of banks in fourteen years. The districts also reported an additional 169 banks pending approval.
- There are currently approved banks in 31 states and 18 states have more than 5 banks within their borders (see figure 2c). Of the 197 banks that were active in 2001, 164 (83.2%) remained active in 2005, while 33 (16.8%) were sold-out, reclassified or inactive for another reason.
- Inactive banks: 24 mitigation banks were inactive as of 2005, 5 of the 24 inactive banks were suspended
- Credit types: Of the 405 active banks identified by the Corps districts, the credit types were specified for 380 banks. Of these, 332 (87%) sell only wetland credits, 41 (11%) sell both wetland and stream credits, 5 (1%) sell only stream credits, and 2 (<1%) sell wetland credits and are working to get approval to sell habitat conservation credits under a federal or state endangered species statute
- Bank types: Of these 291 banks, 205 (70%) are private commercial banks, 12 (4%) are public commercial banks, and 74 (25%) are single client banks
- Sponsor types: 218 (72%) are sponsored by private entities, 15 (5%) are sponsored by non-profit conservation organizations, 5 (2%) are sponsored by Federal agencies, 43 (14%) are sponsored by state agencies, and 21 (7%) are sponsored by local government agencies

Umbrella banking agreements:

- 33 active umbrella banking agreements, with nine new agreements pending. In the 2005 survey, the Corps districts did not provide complete information on the number of individual sites or total acreage of all 33 approved umbrella agreements. The data that were provided indicated that at least 204 mitigation sites had been approved through 28 of the 33 umbrella agreements and that at least 8,695 acres of wetlands had been mitigated through 26 of the umbrella programs.
- Credit Types: Of the 33 active, Corps-approved umbrella banking agreements identified by the Corps districts, 30 (91%) sell only wetland credits, one (3%) sells both wetland and stream credits,35 and two (6%) sell only stream credits.

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- Bank Types: Of the 33 active agreements, 11 (33%) are private commercial banks, 8 (24%) are public commercial banks, and 14 (42%) are single client banks
- Sponsor Types: Of the 33 active, Corps-approved umbrella banks, 13 (39%) are sponsored by state agencies, 9 (27%) are sponsored by private entities, 8 (24%) are sponsored by local government agencies, 1 (3%) is sponsored by a Federal agency, 1 (3%) is sponsored by a Tribal nation, and 1 (3%) is sponsored by a non-profit conservation organization.

In-Lieu-Fee Programs:

- Active programs: In our 2005 survey, the Corps districts identified a total of 42 approved, active in-lieu-fee programs. These programs are active in 23 states.
- Credit Types: 15 (37%) sell only wetland credits, 16 (39%) sell both wetland and stream credits, 4 (10%) sell only stream credits, and 6 (15%) sell wetland, stream, and other credit types.
- Sponsor Types: Of the 42 approved, active ILF programs, 25 (60%) are sponsored by private, non-profit conservation organizations, 10 (24%) are sponsored by state agencies, 6 (14%) are sponsored by local government level agencies and 1 (2%) is sponsored by a public university. Two of the 25 non-profit ILF programs are sponsored by private, non-profit arms of state wildlife or conservation agencies.

Alternative Compensatory Mitigation Mechanisms:

- Of the 27 districts that responded, 23 (85%) reported that they do not allow compensatory mitigation requirements to be satisfied outside of these three traditional means. Four of the responding districts (15%), however, reported that they may authorize permittees to satisfy their compensatory mitigation requirements through alternative means.

Mitigation Guidance

- Thirty-three out of the 38 Corps districts reported having general mitigation guidance covering some or all of their districts.
- Twelve of the Corps districts and the Michigan Department of Environmental Quality (DEQ) reported having guidance specific to mitigation banking within their jurisdiction and four of the Corps districts reported having guidance specific to in-lieu fee mitigation.
- Twelve Corps districts, the Michigan DEQ, and the New Jersey Department of Environmental Protection reported having a stand-alone mitigation checklist for use in their jurisdiction.
- Seven districts and the Michigan DEQ offer templates of banking and/or in-lieu-fee instruments, eight districts and the Michigan DEQ offer templates of conservation easements or other restrictive covenants for use with mitigation projects, and only one district (Baltimore) and the Michigan DEQ reported offering templates or models of financial assurances to be used with mitigation projects.

Types of Mitigation Used:

- Wetland Mitigation: Overall, the districts reported that restoration is the most common form of mitigation, followed by enhancement, creation, and reservation, in that order.
- Stream Mitigation: Overall, it appears that enhancement is the most commonly used type of stream mitigation, followed by preservation, restoration and creation, in that order.

Methods of Satisfying Mitigation Requirements

- Wetland Mitigation: Overall, permittee-responsible mitigation accounts for more than half of all wetland mitigation conducted nationwide and mitigation banking accounts for

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nearly a third of all mitigation. In-lieu-fee programs and other alternative forms of mitigation account for only a small percentage of the wetland mitigation conducted nationwide

- Stream Mitigation: Permittee-responsible was by far the most prevalent, accounting for over 80 percent of all stream mitigation, and was followed by in-lieu-fee programs, mitigation banks and alternative mitigation methods, in that order.

Cost Estimates for Different Mitigation Types

- Wetland Mitigation: The lowest estimated costs were $3,000 to $4,000 per acre plus land costs for non-tidal wetland restoration in the Baltimore district and $4,050 per acre in rural Minnesota counties in the St. Paul district. Other low end cost estimates included about $13,000 per acre for non-riparian wetlands in the Wilmington district and several districts cited low-end costs of $15,000 to $16,000 per acre. At the upper end of estimated costs, the Norfolk district estimated that estuarine wetland mitigation bank prices average about $350,000 per credit (acre). Several districts cited upper-end costs of $100,000 to $150,000 per acre, especially for wetland creation, and several other districts cited upper-end costs of $60,000 to $80,000 per acre.
- Stream Mitigation: Most of the responding districts track stream mitigation by linear feet, and the costs estimated by these seven districts range from about $100 to $250 per linear foot. For upper and lower limits, the Norfolk district reported that costs may be up to $400 per linear foot in certain watersheds and the Buffalo district estimated that costs may be as low as $75 per linear foot in some cases. The other two districts that estimated stream mitigation costs track stream mitigation by acreage or require riparian buffer acreage as part of their stream mitigation projects. The Kansas City district reported that a stream in-lieu-fee program in the district was collecting about $68,000 per acre of stream impacts. The Walla Walla district reported that a project involving the creation of 600 feet of stream channel and 0.1 acres of wetland cost $57,000, including land acquisition costs

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

Data only.

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Past Efforts Summary – California Evaluation of Compensatory Mitigation Projects

Name of Effort:	*Date of Final Report:*
An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Quality Control Board, 1991-2002.	August 2006
Sponsor(s):	*Participants:*
California EPA, California State Water Resources Control Board	UCLA, Univ. of San Francisco

The purpose/objective/goal of the effort or the problem being solved:

To evaluate the compliance and wetland condition of compensatory wetland mitigation projects associated with Clean Water Act Section 401 Water Quality Certifications throughout California.

Description of the findings, recommendations, actions planned, etc.:

Findings:

- Of the 129 projects evaluated in the field, 62% had onsite mitigation with the rest offsite. Of these projects, 75% had file-specific mitigation, while 25% had mitigation that was competed at mitigation banks, were part of other larger projects, or were completed through in-lieu fee payments
- 46% of the files fully complied with all permit conditions and the average percent-met score was 73%. Only 16% of the files fully complied with all mitigation plan conditions; however, 42% had scores of 90% or greater.
- Permittees usually complied with acreage requirements and third party acreage credit purchases, but there was much lower compliance with monitoring and submission requirements
- Despite relatively high permit compliance, most mitigation sites were not optimally functioning wetlands. Mitigation sites scored lower than reference wetlands, with an overall mean score of 59% compared to 79% for reference sites. On average, sites scored better for biotic structure (e.g., plant community metrics) than for hydrology metrics.
- Section 401 orders that were evaluated authorized approximately 217 acres of impacts (including temporary impacts) and required that 445 acres of mitigation. 417 acres of actual mitigation acreage was obtained; 72% of files met or exceeded their acreage requirements, resulting in an overall mitigation ratio of 1.9:1. When considering permanent impacts (true losses) to “creation” mitigation, our results showed that “no net loss” of acreage is being achieved (1) overall, (2) for jurisdictional “waters of the US” acreage, and (3) for wetlands themselves.
- However, 39% of individual files resulted in net acreage losses overall, 47% resulted in a net loss of jurisdictional “waters” acreage, and 28% had net wetland losses.
- Permittees are meeting their mitigation obligations, but the ecological condition of the resulting mitigation projects is not optimal. This is partly due to regulatory agencies approving mitigation projects too heavily focused on vegetative components of wetland function, with inadequate emphasis on hydrologic and biogeochemical processes and their services.

Recommendations:

- Improve mitigation requirements: emphasis on improving permit conditions, but also

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locations of mitigation projects and how gains/losses affect habitat conditions.

- Information management: improvements to permit archiving and to tracking the progress of mitigation projects.
- Improve clarity of permits: permit conditions need to be written as clearly assessable criteria, with individual conditions for each specific criterion.
- Compliance monitoring: need to evaluate the compliance of mitigation projects with their permits. Mitigation monitoring reports should be streamlined and focused around demonstrating compliance with an established list of permit conditions. Regulatory agencies should establish a multi-agency cooperative to monitor compliance and track wetland losses and mitigation success.
- Goal of "no net loss" be assessed more effectively: more studies tracking changes in wetland function pre- and post-construction.
- Agency coordination: improved information management to ease coordination.

Methods of implementation and current status of the findings, recommendations, actions planned, etc.:

Methods of implementation and time-line for accomplishing recommendations were not given.

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