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Post Construction Compliance Monitoring Results of Projects Authorized Under the State of Oregon Removal-Fill Law (ORS 196.795-990)

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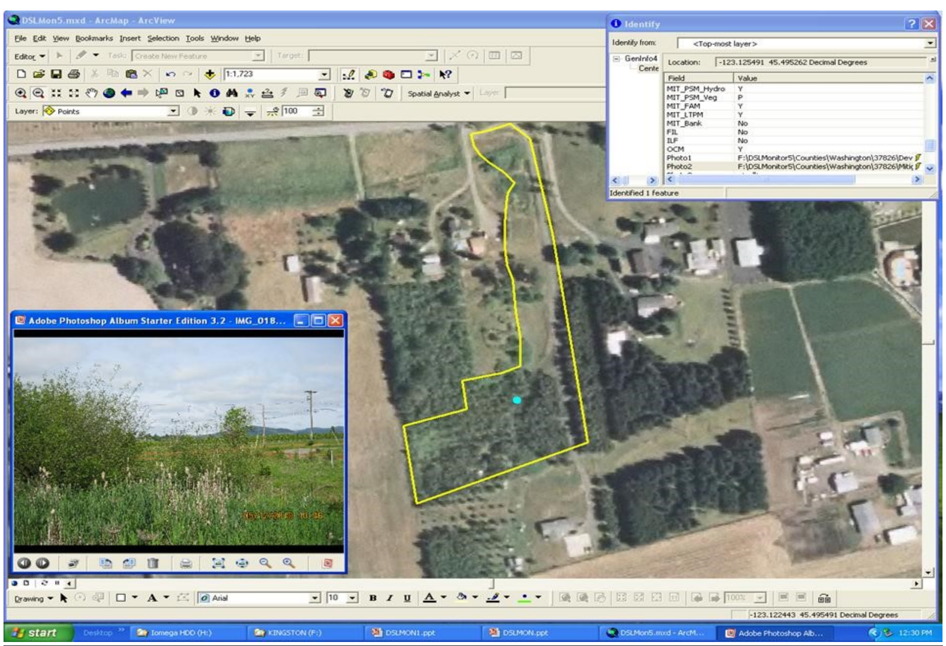

Introduction

Aquatic environments contain sensitive natural resources afforded protection under State and Federal statutes. These statutes are exercised primarily through State and Federal permit programs. The National Academy of Sciences (NAS 2001) found evidence of alarming weaknesses in the mitigation compliance oversight responsibilities of both State and Federal regulatory permit programs charged with protecting aquatic resources. In Oregon the primary permitting authorities are the Federal Clean Water Act (administered jointly be the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (Corps), and the Oregon Department of Environmental Quality (DEQ)) and the State Removal-Fill Law (administered by the Oregon Department of State Lands (DSL)).

DSL continues to make attempts to provide transparency and accountability per its Removal-Fill-Law authorities (ORS 196.795-990). The Environmental Protection Agency (EPA) provided the funding for this project to aid DSL's ongoing permit compliance monitoring efforts and overall regulatory program development. By sampling permit compliance statewide, DSL hopes to gain better insight into strategies that will help facilitate program wide regulatory improvements.

Where appropriate, compensatory mitigation site permit compliance was evaluated during site visits. The National Academy of Science (NAS 2001) provides guidance reinforcing the necessity for regulatory authorities to apply reasonable and enforceable compensatory mitigation performance standards. The 2001 NAS report was a primary catalyst for the National Wetland Mitigation Action Plan (NWMAP) (http://www.mitigationactionplan.gov/). Regulatory compliance monitoring is consistent with and supported by the NWMAP.

This effort is a coarse review of regulatory compliance. The sampling does not use statistically verifiable methods nor a set of peer reviewed field data collection protocols. It provides a framework of broad categories (key performance standards) for use in focusing best professional judgment to evaluate permit condition and design compliance. Project size criteria were probably the least subjective but in most cases size and area footprint matches were ocular estimates not verified through field or aerial photograph measurements.

The intent of this monitoring evaluation was not to make a final decision on regulatory compliance for any given project but to give DSL regulatory program and project coordinators an updated report on an estimated compliance status for each of the permit projects visited and evaluated. It provides a list of "red-flag" sites that may warrant further investigation and a limited amount of information to help facilitate the initiation of further inquiry if deemed necessary by DSL staff. It also provides suggestions for improving compliance monitoring effectiveness.

A finding on compliance for the purposes of this monitoring report should not be interpreted as a determination that the conditions present at the permitted site are properly functioning or vice versa, that a determination of noncompliance means the site conditions are not properly functioning. Findings on compliance in this report should only be read as the author's determination on how closely the conditions observed at a given permitted project site match the conditions required by the associated DSL permit.

Goals

- Develop and conduct a field and office file based study to help determine Removal-Fill Law "red-flag" permit compliance for selected DSL authorized projects;

- Develop a GIS-framework to help archive and report the information collected in the study;

- Use ArcGIS query and model builders to display specialized sample queries that can assist in the prioritization of permitted project compliance follow-up; and

- Provide a summary of lessons learned and suggestions for regulatory program modifications to improve overall permit compliance.

Methods

Site Selection. The DSL Northern Region Manager, informed by staff recommendations, approved the selection of 84 permitted project sites for use in this compliance study. Due to a mid-project staff change, Michael Cartmill conducted the first twenty site visits during January through February 2010 and the author conducted the remaining sixty-four site visits during March through late July 2010. Twenty of the eighty-four sites selected were in Washington County because of particular compliance interests in that area and a desire to have a larger compensatory mitigation compliance component in the project. At least thirty sites were selected from the LAS database after using ArcMap to put a 3-mile buffer around State Highways and selecting and clipping a subset from the sites that were inside the 6-mile wide highway corridors and relatively close to routes of existing study sites. Figure 1 displays the spatial distribution of the study permit sites targeted for review in each Oregon County.

Post Construction Monitoring Protocols. Standard classification conventions were used to document wetland resources (Adamus 2001 and Cowardin 1979) observed in the field. Plant community performance was reviewed at the sample plot level on a number of the mitigation sites generally following a truncated version of the sampling protocols outlined in Marshall 2007. Species moisture tolerance determinations were informed by the Fish and Wildlife Service wetland indicator species plant list (US Fish and Wildlife Service 1996) and supplemented by the VEMA 2.0 software moisture index calculator for species not on the list.

Key Performance Standards (Development). The following criteria are considered key performance standards and were applied in the field as guidance to help make "red-flag"

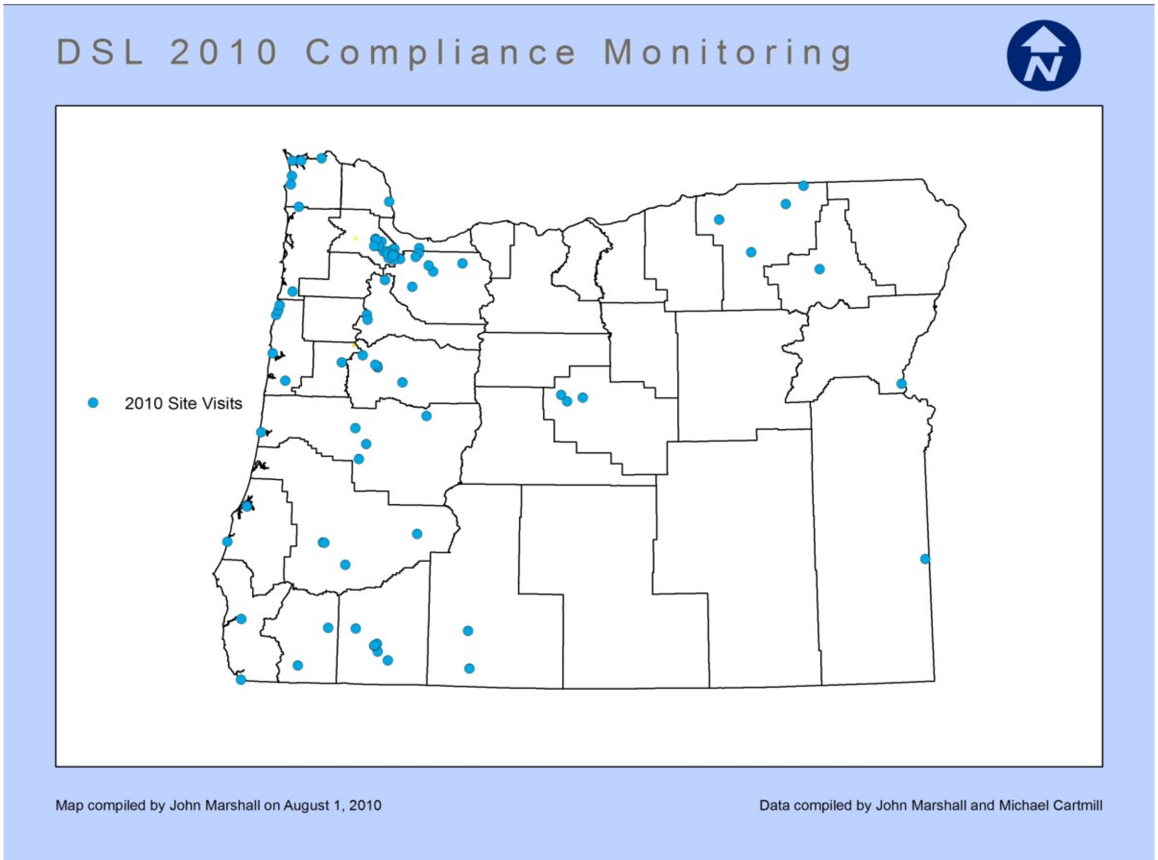

Figure 1. DSL 2010 permits compliance monitoring site locations.

compliance decisions on permitted sites in the study. To the degree possible given the limitations of the documents available and field review time constraints, the following were conducted:

1. Determinations on whether projects were <u>constructed as designed</u> were made by comparing site plans and permit conditions with the project observed on the ground in terms of types of uses, size and location of structures, road configuration, stormwater detention and swale arrangement, etc.

2. Determinations on whether the size and the shape of the <u>project footprints</u> matched the plans and permit specifications were made by comparing the specifications to actual ground observations of the project (e.g., road intersections, parking lots, stream crossings, bike trails, etc.). Discernable reference points were used to help determine ground position when available. In some cases ground measurements were also matched to plan specifications. Special attention was directed to areal overlap with the regulated resource.

3. Determinations on whether the projects <u>minimized impact</u> to the areas proposed for development. Special attention was given to any extended adverse effects to sensitive

areas outside of the designated project footprint or sensitive areas inside the project footprint that were designated and marked in the field for impact avoidance.

4. Determinations on whether post construction erosion control measures specified in the site plans and permit conditions (e.g., vegetation plantings (species and quantity), streambank protection structures, slope regrades, etc.) had been applied as stipulated.

5. Determinations on whether plan or permit specified site restoration plantings of vegetation had been done and if it had, whether it met permit performance standards (e.g., percent native cover over a replaced pipeline).

6. Determinations regarding project compliance with any other permit conditions specified that were not covered in the categories above (e.g., fencing, signage, etc.).

Key Performance Standards (Compensatory Mitigation). The following criteria are considered key performance standards and were used as guidance to help make "red-flag" mitigation compliance decisions on permitted sites in the study. To the degree possible given the limitations of the documents available and field review time constraints, the following were conducted:

1. Determinations on whether work proposed to alter the elevations of land surfaces by grading for the establishment of wetland hydrology had been done as specified by the mitigation plan and project permit conditions. Inventory level[1] hydrology presence or absence was also evaluated on all mitigation sites visited regardless of the site preparation methods used (e.g., grading, diking, diversion, drain tile breaking, ditch filling etc). Surface water and hydrophytic plants (Fish and Wildlife Service 1996) were used along with elevation and landform to help inform hydrology determine-ations (Corps 1987, Corps 2010). Soils were generally not examined. Therefore, considering the unusually wet field season (http://www.kgw.com/news/A-months-rain-in-4-days-for-Metro-95627354.html), hydrology coverage is likely over-estimated.

2. Determinations on whether proposed vegetation plantings had been done and, if it had, whether the vegetation was meeting the performance standards (e.g. the percent cover of native and nonnative invasive species, native woody plant cover, etc.) stipulated in the mitigation plans and permit conditions.

Office Preparation and Data Management. A GIS framework comprised of layer files informed by a Microsoft Access database was created to archive, query, and help report the information collected on each of the 84 sites. Attribute data entered in the Microsoft Access database were extracted from the DSL LAS database, the physical permit files, and documented observations during the field visits. Attribute field names and their definitions are in Appendix 1.

[1] The hydrology determinations made for this study cannot be interpreted as jurisdictional determinations.

In preparation for field site visits, site project and mitigation layers were exported and saved as shapefiles. These shapefiles were added to an ArcMap project and then checked out to a Personal Computer file folder using ArcPad Data Manager. Microsoft ActiveSync software was used to copy the shapefiles from the PC file folder and paste them into a file folder contained on a Trimble Geo XH 2005 series GPS device. ArcPad 8.0 software enabled the shapefiles to be edited in the field. Editing consisted of updating and/or adding point, line, and polygon vertex positions and recording field observations in the shapefile attribute tables. Clipped geo-referenced digital ortho-photographs (rasters) were checked out with the shapefiles and were used as base maps on the GPS device.

Field Work. Project applicants, or their representatives, accompanied DSL staff during most of the site visits. All of the site visits were conducted at the locations of the permitted actions. The site visits served two goals: 1) Assessment of the sites for permit compliance and 2) identification of lessons learned during the evaluations. Only observable criteria were used to determine project compliance. Compliance characteristics that could not be observed after project completion (e.g., water quality, in-water timing, and erosion control) were not evaluated. Project compliance is given a preliminary evaluation at the time of the site visit and then reevaluated and finalized in discussions with the respective permit project coordinators. Each compliance characteristic observed and assessed is tallied to determine overall project compliance. Data were collected in shapefile attribute tables on a Trimble GEO XH 2005 Series GPS device running ArcPAD 8.0 and VEMA 2.0 software.

Preliminary Results

Of the 84 sites initially selected for the study, site visits were planned and completed on 80 of the sites. Two Individual Permit sites were reported to have abandoned their project plans before the groundwork had started, one emergency authorization was not visited because it was determined that there would likely not be any discernible impacts remaining to observe, and a fourth project was not visited because the private landowner could not be contacted. One project site was eliminated from the study altogether during a site visit because it was determined to no longer be under a regulatory obligation to meet its performance standards, effectively leaving only 83 permitted projects in the study.

Overall Compliance. Project overall compliance (OCM) is displayed in Table 1 and Figure 2. Both the number and percentage of sites that were deemed fully compliant (Y), partially compliant (P), and Not Compliant (N) are compared to the total number of completed compliance evaluations over the 2010 data collection time period.

Full Compliance. In project cases where there were only one or two minor infractions of permit conditions, the project was also usually deemed to be in full compliance. Fifty-three of the eighty-three permit projects evaluated were found to have full overall compliance. Seventy-eight percent of projects that could be evaluated (Y, P, N) for their key performance standards for project development were found to be in full compliance.

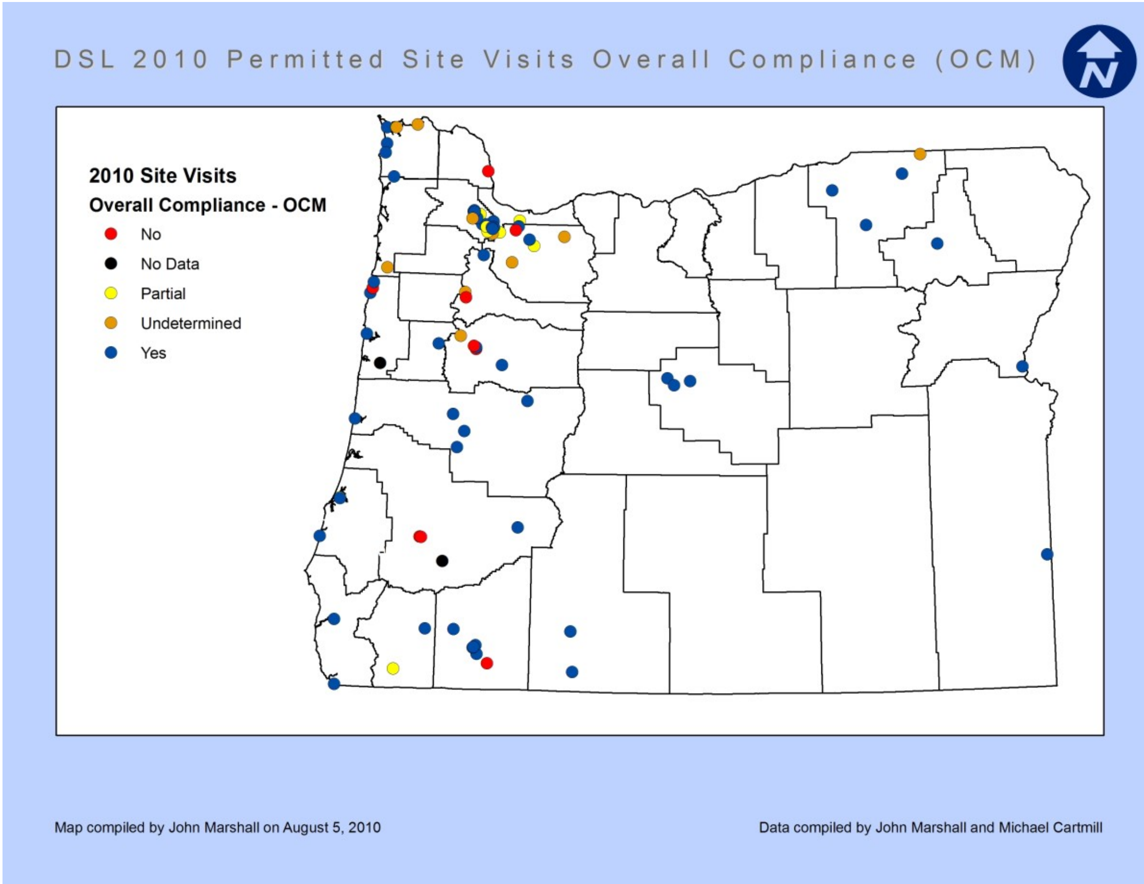

Figure 2. DLS 2010 Permit sampled overall compliance statewide.

Table 1. Overall Compliance (OCM) by Permit Type.

Permit Type	Fully Comp. (Y)	Partially Comp. (P)	Not Compliant (N)	Undetermined Compliance (U)	No Data (ND)	Total Number of Permits Evaluated
Individual (IP)	43	5	8	7	1	64
General Authorization (GA)	2	0	1	2	1	6
Emergency Authorization (EA)	8	1	0	4	0	13
Total	53	6	9	13	2	83
Percent Total	64	7	11	16	2	100
Percent (Y, P, or N)	**78**	**9**	**13**			**100**

Partial Compliance. Cases with multiple minor infractions but that generally met the size, design, and avoidance criteria were determined to be in partial compliance (OCM = P). A project with a compensatory mitigation component that met some but not all of the mitigation performance standards could also be ranked as being in partial compliance. Six of the eighty-three permit projects evaluated were found to have partial overall compliance. Nine percent of projects that could be evaluated (Y, P, N) for their key performance standards for project development were found to be in partial compliance.

Not Compliant. Projects where one or more key performance criteria were not met were considered to not be in compliance with their permit conditions (OCM = N). Nine of the eighty-three permit projects evaluated were found to not be in compliance. Thirteen percent of projects that could be evaluated (Y, P, N) for their key performance standards for project development were found to not be in compliance. Of the 9 non-compliant permits, 1 was a general authorization, 0 were emergency authorizations and 8 were individual permits.

No Data. Projects that had been abandoned before any groundwork was started were entered into the GIS framework project as having no data (OCM = ND). A total of two projects fit this category.

Undetermined Compliance. Projects that were: 1) understood to be moving forward but that had not yet started the groundwork, 2) had been started but that were unobservable during the site visit (e.g., a bank stabilization project completely under water), 3) were not accessible to make observations during the site visits, and 4) had unresolved interpretations of permit conditions by DSL staff and project applicants were assigned a compliance status of undetermined (OCM = U). Thirteen projects are considered to have undetermined compliance.

Compliance by GA Type. Table 1 shows the distribution of permit compliance by permit type and Table 2 further differentiates the compliance categories among the general authorizations. Two out of the three general authorizations evaluated were in full compliance and the remaining one was not in compliance.

Table 2. Overall Compliance (OCM) by General Authorization Type.

General Authorization Type	Fully Comp. (Y)	Partially Comp. (P)	Not Compliant (N)	Undetermined Compliance (U)	No Data (ND)	Total Number of Permits Evaluated
Fish Enhancement	0	0	0	1	0	1
Shoreline Stabilization	1	0	1	0	0	2
Transportation	1	0	0	1	0	2
Piling	0	0	0	0	1	1
Total	2	0	1	2	1	6
Percent Total	33	0	17	33	17	100
Percent (Y, P, or N)	**67**	**0**	**33**			**100**

Development Mitigation Compliance

Oregon Administrative Rules recognize two types of mitigation (OAR 141-085-0510(49)), impact mitigation (a-d) and compensatory mitigation (e). Impact mitigation includes project impact avoidance, minimization, and rectification mitigation actions (e.g., replanting native vegetation over replaced sewer pipes, utility cables, or rip-rap).

Compensatory mitigation actions are those that cannot be avoided, minimized, or rectified on-site commensurate with the project footprint. Table 3 displays the key development mitigation performance standard outcomes for the permitted projects in the study.

Table 3. Development Site Compliance by Key Performance Standard.					
Key Development Mitigation Performance Standards	Fully Comp. (Y)	Partially Comp. (P)	Not Compliant (N):	Undetermined Compliance (U):	Number Permits
Size	66	0	5	10	81
Design	66	1	4	10	81
Vegetation	54	11	6	10	81
Percent (Y, P, N) Size	**93**	**0**	**7**		
Percent (Y, P, N) Design	**93**	**1**	**6**		
Percent (Y, P, N) Vegetation	**76**	**15**	**8**		

Size. Sixty-six projects (93%) are determined to be in full compliance with their key development performance standards limiting their sizes. Five projects (7%) were not in compliance with their size limits and ten projects remain undetermined on size compliance.

Design. Sixty-six projects (93%) are determined to be in full compliance with their key development standards on meeting design specifications. One project (1%) is considered to be in partial compliance with its design performance standard and four projects (7%) are considered to not be in compliance. Ten projects remain undetermined on design compliance.

Vegetation. Fifty-four projects (76%) are determined to be in full compliance with their key development performance standards on meeting vegetation specifications (e.g., percent native species, number of shrubs per acre, limit on on-native invasive species, etc.). Eleven projects (15%) are considered to be in partial compliance and six projects (8%) are considered to not be in compliance. Ten projects remain undetermined on vegetation compliance.

Compensatory Mitigation Compliance

Compensatory mitigation sites are represented in the database by geographic coordinates and are mapped as points (Figure 3). Several mitigation site boundaries were collected as polygons using a Trimble Geo XH 2005 series GPS device but due to time constraints, this could only be done for a few mitigation sites.

Out of the 83 permitted actions in the 2010 compliance study, 39 were off-set by compensatory mitigation actions, some on-site and some off-site (Figure 3). Several permitted projects are associated with more than one compensatory mitigation site so there are a total of 45 mitigation sites overall in the study.

Table 4. Compensatory Mitigation Compliance by Key Performance Standard.					
Key Mitigation Performance Standards	Fully Comp. (Y): #/%	Partially Comp. (P): #/%	Not Compliant (N): #/%	Undetermined Compliance (U): #/%	Number CMR Permits
Size	20	4	3	12	39
Design	23	2	3	11	39
Hydro	21	5	3	10	39
Vegetation	13	11	3	12	39
Percent (Y, P, N) Size	**74**	**15**	**11**		
Percent (Y, P, N) Design	**82**	**7**	**10**		
Percent (Y, P, N) Hydro	**72**	**17**	**10**		
Percent (Y, P, N) Vegetation	**48**	**41**	**11**		

Table 4 displays permit compliance of projects with evaluated compensatory mitigation requirements (CMRs) and their key mitigation performance standards. Ten of the 39 permitted projects with compensation requirements (CMRs) do not have compensatory mitigation actions that can be evaluated for meeting performance standards. Two of these are permittee provided mitigation projects that have not started and eight are in-lieu-fee "like" (in-lieu-fee, fee-in-lieu, or payment-to-provide) mitigation actions that have not been tracked by this study. One permitted project has both an on-

Table 5. Compensatory Mitigation by Mitigation Bank and In-Lieu-Fee Like Projects.			
Mitigation Type	# CMR Projects	Percent	Total # CMR Permits
Mitigation Bank	7	**18**	39
In-Lieu-Fee or Payment-to-Provide or Fee-in-lieu	8	**21**	39

site compensatory mitigation requirement, for which performance standards have been tracked, and an in-lieu-fee like compensatory mitigation requirement, which has not been tracked. Of the twenty-nine remaining permitted projects with an on or off-site compensatory mitigation obligation, seven were off-set by purchasing credits from a mitigation bank (Table 5). Since mitigation bank credits generally cannot be sold or traded unless adequate portion of the mitigation bank is meeting performance standards (see OAR 141-085-0725(10) (H)), for the purposes of this study all mitigation performance standards are assumed as being met upon confirmation of the mitigation bank credit purchase.

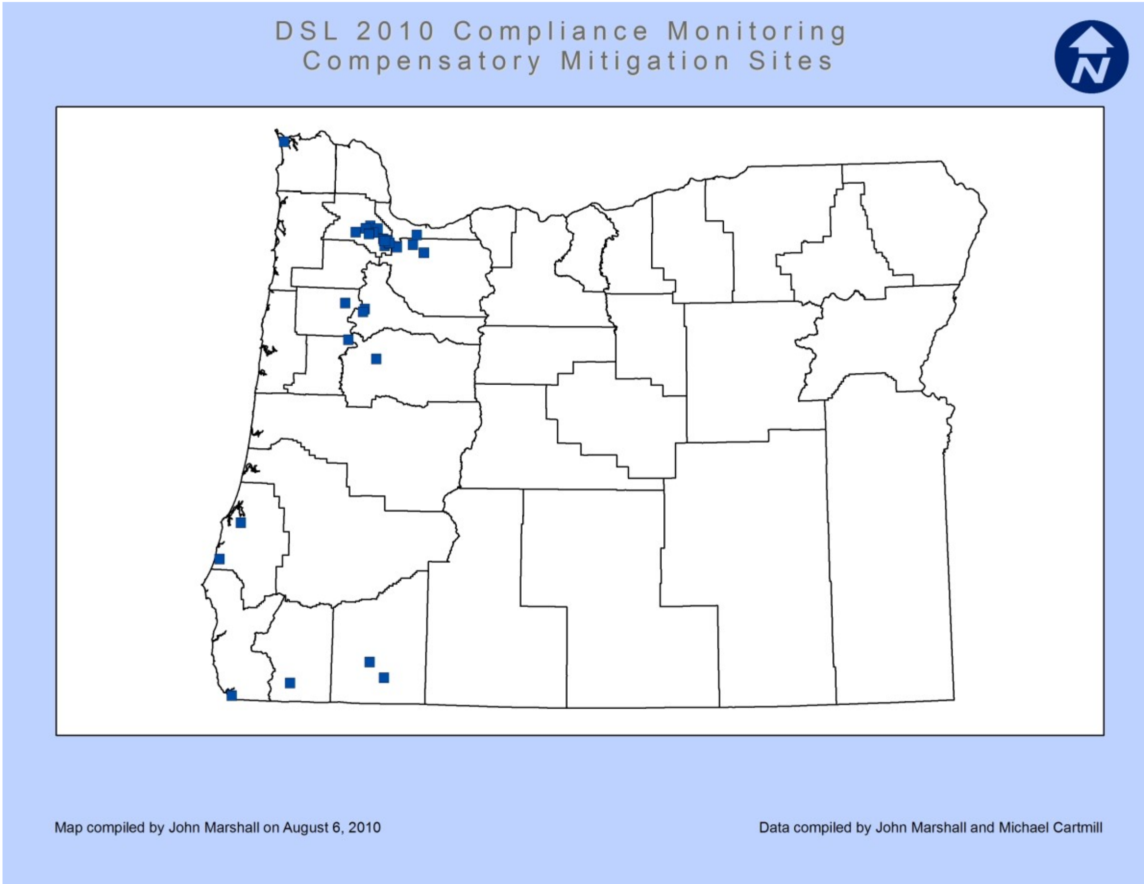

Figure 3. DSL 2010 compliance monitoring compensatory mitigation sites.

Prioritizing Compliance Monitoring Follow-up

Data queries aimed at prioritizing monitoring follow-up can be run through the database query builder in ArcMap. Examples are listed below:

1) Compliance follow-up priority based on size of aquatic resource impact and low or uncertain compliance status: [JDI_Acres] >= 1.0 AND ([OCM] = 'N' OR [OCM] = 'U').

   Two permitted project sites were selected: 1) Hillsboro Landfill (21.9-acres) and BOLDR LLC, (2.14-acre).

2) Compliance follow-up priority based on the combination of resources affected by the action and the compliance status: [OCM] = 'N' AND ([Stream] = 'Yes' OR [River] = 'Yes' AND [Riparian] = 'Yes').

   Two permitted sites were selected: 1) Gentry Homes and 2) Medinger.

3) Compliance follow-up priority based on noncompliance with development size (project footprint): [PRJ_PSM_Size] = 'N' OR [PRJ_PSM_Design] = 'N'.

   Six sites that were selected: 1) Travis Townes Construction, 2) City of Winston, 3) City of Albany, 4) North Bend Broadway Bridge, 5) City of Lebanon, and 6) Devils Lake Road Southside Rock Creek.

4) Compliance follow-up priority based on projects with a compensatory mitigation requirement (CMR) and that are considered to not be in compliance or to have an uncertain compliance rank: [CMR] = 'Yes' AND ([OCM] = 'N' OR [OCM] = 'U').

   Nine sites were identified using this query: 1) City of Salem bridge repair, 2) Gentry Homes LLC, 3) Medinger, 4) Hanna Estates (a residential subdivision in Albany), 5) CHH Enterprise (a residential subdivision in Salem), 6) BOLDR LLC, 7) Hayden Meadows, 8) Briar Creek Townhomes, and 9) Hillsboro Landfill.

5) Compliance follow-up priority based on not meeting a key performance standard (e.g., hydrology): [MIT_PSM_Hydro] = 'N' OR [MIT_PSM_Hydro] = 'P'.

   Eight permit records are selected: 1) Gentry Homes LLC, 2) Medinger, 3) Little Elm Ranch, 4) CHH Enterprises Inc., 5) Port of Portland – 23613, 6) Port of Portland – 40015, 7) Hillsboro Landfill, and 8) Tri-County Metropolitan Commuter Rail.

6) Compliance investigators will likely want to track the spatial relationships of permitted developments and their respective mitigation actions. This will help inform which watersheds are being impoverished by development and which ones are being enriched by mitigation and restoration actions and should help inform concerns about cumulative impacts. The database created for this project allows efficient access to this kind of information. To answer the question of which permitted projects were mitigated outside of the 5^{th} Field HUC that they are contained, users can apply the following two related queries:

   1. Definition query to screen irrelevant records from the selection query: [HUC5_MIT1] <> '0' OR [HUC5_MIT2] <> '0' OR [HUC5_MIT3] <>'0' OR [HUC5_MIT4] <>'0'

   2. Select by attribute query: ([HUC5_PROJ1] <> [HUC5_MIT1] OR [HUC5_PROJ1] <> [HUC5_MIT2] OR [HUC5_PROJ1] <> [HUC5_MIT3] OR [HUC5_PROJ1] <> [HUC5_MIT4])

   The permits selected included: 1) City of Lake Oswego park, 2) Linn County boat ramp, 3) Centex Homes subdivision, 4) City of Donald Sewage Treatment maintenance facility, 5) Hanna Estates subdivision, and 6) Quadrat Homes subdivision. Four of the six permits are associated with mitigation banks and two are single permittee provided mitigation efforts. Interestingly one is off-site mitigation and the other is an on-site mitigation. The on-site mitigation project just happens to occur immediately across the watershed boundary from the permitted development site.

If the same permitted project comes up repeatedly under different query criteria, that in of itself should be considered an additional indicator that the project warrants further compliance investigation.

There is also another less quantitative way to prioritize follow up permit compliance efforts. The perceptions of need by the regulated public and/or resource agencies and watchdog environmental groups may help drive agency compliance monitoring and follow-up decisions. There were two issues the author encountered this summer that seem to be especially high on the people's radar, emergency dredging for flood control and shoreline bank protection. There are no two likelier candidates for natural resource issues to come into conflict with property values and economic livelihoods.

Conclusion

There were too few samples to represent the full DSL Removal-Fill Law permit program and the sampling was biased to represent primarily small-regulated resource impact projects. There are permitted activities covered by the DSL regulatory program that were poorly represented in the suite of sampled sites, e.g., in-stream and floodplain gravel extraction. Overall, the sample selection was not random and therefore none of the statistics derived can be considered inferential to the total population of DSL authorized permits. Consequently this report should not be used to represent overall program effectiveness in achieving permit compliance or to display program level spatial or temporal trends in permit compliance. However, the compliance status of specific permitted projects monitored and displayed in this report can be tracked spatially and temporally.

This report and the associated GIS/GPS framework used to support it should help resource coordinators prioritize compliance efforts within the suite of permitted projects evaluated and possibly provide a partial template for use in designing future compliance monitoring efforts. New projects can be added to the GIS/GPS framework at any time. In addition, many of the lessons learned from monitoring at the permitted project level can be extrapolated to the regulatory program level.

Lessons Learned

Permits. One of the most difficult parts of compliance monitoring is sifting through the permit language and the supporting documents to determine the precise terms that are linked to the permit projects compliance and accountability. During preparations for the site visits, it soon became evident that permits are often produced from older "boiler plate" documents and that screening sometimes does not catch words, phrases, and numbers that are inappropriate for the projects they are being modified to represent. A related issue is the often poor quality of the designs, maps, and aerial photographs representing the projects in the permit applications but subsequently cross-referenced by permit conditions for use in judging compliance. Also, some of the projects reviewed had been informally revised by DSL in cooperation with the applicant but with little to no documentation of the agreed upon revisions. Any one or combination of these factors can impede accurate compliance decisions.

Data Management. Upfront training in the protocols for extracting data from the existing DSL LAS database would have been time well spent and would likely have resulted in a smoother and more time efficient workflow.

In working with mobile geographic information systems and global positioning systems, there will invariably be situations in the field when the equipment and/or the software malfunction. To some degree, having adequate training in the use of the equipment and software along with rigorous periodic maintenance can minimize the frequency of these events, but it is best to never be left without a back-up plan (e.g., extra devices, pencil and notebook, etc).

Compliance Monitoring Program. While it is apparent DSL has taken a serious interest in meeting it obligations related to permit compliance monitoring and follow-up, there is still a sense of being in the initial stage of program development. The organization of the program still has a sense of being a work in progress. Implementing a compliance monitoring study at this stage has advantages and disadvantages. The advantage is there appears to be a greater allowance for flexibility and creativity. However expectations on work performance also seem a bit fluid at times. As the effort progresses there may be a need to build more structure into the program, but hopefully not to the degree to stifle creativity and appropriate flexibility.

Suggestions

Permits. DSL Removal-Fill Law Permits should contain, within the limits of practicality, all the information a compliance monitoring staff person needs to make a determination on permit project compliance. Permit conditions including mitigation performance standards should be itemized in the main body of the permit, be measurable, and be linked to overall management objectives. If cross-referencing other documents, the permit should include direct electronic enabled links to the specific sections and pages of the documents containing the information of interest. If the permit is reauthorized and supporting documents are modified or replaced, the reauthorized permit should be updated to reflect the changes.

As long as there is a perception by the regulated public that it is easier to get forgiveness than permission and as long as there is a reinforced understanding that accountability follow-up is unlikely, there will be chronic egregious violations of environmental protection laws. DSL appears to be on the correct path toward remedying the current apathy surrounding permit compliance.

Data Management. A Microsoft Access database was used to contain and report on the compliance data acquired for this project. A similar but modified database specific to permit compliance monitoring should be developed and/or integrated into the larger DSL LAS database. At a minimum the database should be normalized to the "third normal form." Normalization is the process of organizing data in a database. This includes creating tables and establishing relationships between those tables according to rules designed both to protect the data and to make the database more flexible by eliminating redundancy and inconsistent dependency (http://support.microsoft.com/kb/283878).

A geographic information system (GIS) framework (e.g., database informed layer files) was developed by the author to spatially and temporally display and access the data collected for use in this report. Global Positioning System (GPS) technology was integrated into the GIS framework. DSL should either develop a similar GIS/GPS framework or make the necessary modifications to the GIS/GPS framework used in this compliance study for regulatory program use in future compliance monitoring efforts (geodatabase feature classes or shapefiles may be preferred over database informed layer files). A GIS/GPS set of workflow protocols should be developed and staff should be trained to use the software and hardware necessary to follow and implement them. If possible, and if supervised well, an enterprise GIS framework should improve overall DSL regulatory program consistency and efficiency.

Once an agency GIS framework is established, permit applicants should be encouraged to send in their geographic information (e.g., shapefiles, geodatabases, CAD files, etc.) and associated attributes to DSL in data model formats compatible with the DSL GIS framework. Standardization of projected coordinate systems, attribute table schema, symbology, etc will help make workflow faster and more efficient. Their may be other data fields DSL would like to employ to track specialized data in the GIS-framework/database (e.g., HGM or OWRAP scores).

Program Compliance Monitoring. Dedicated compliance monitoring personnel are needed to assist project coordinators in identifying and resolving permit compliance issues. This is especially critical during periods of heavy workloads requiring time sensitive responses to permit applications. This requires a close working relationship between the compliance monitoring staff and the project coordinators. Routine audits of permits should be organized and implemented by DSL staff. Once identified, out of compliance permittees should be contacted and an appointment should be arranged to begin resolving the non-compliance issue(s). Penalties should be applied if warranted.

Most if not all emergency authorizations should be followed up with a site visit after the emergency has passed. Provisions in the emergency authorization that allow remedial or supplemental actions necessary to bring the project into compliance with DSL statutes and administrative rules should be engaged and carried through to completion.

Proof of payment for fee-in-lieu like and mitigation bank compensatory mitigation requirements (e.g., debit/credit ledgers) should be provided to the author and/or EPA in order to verify that those compensatory mitigation obligations have been satisfied for the purpose of judging compliance in this study.

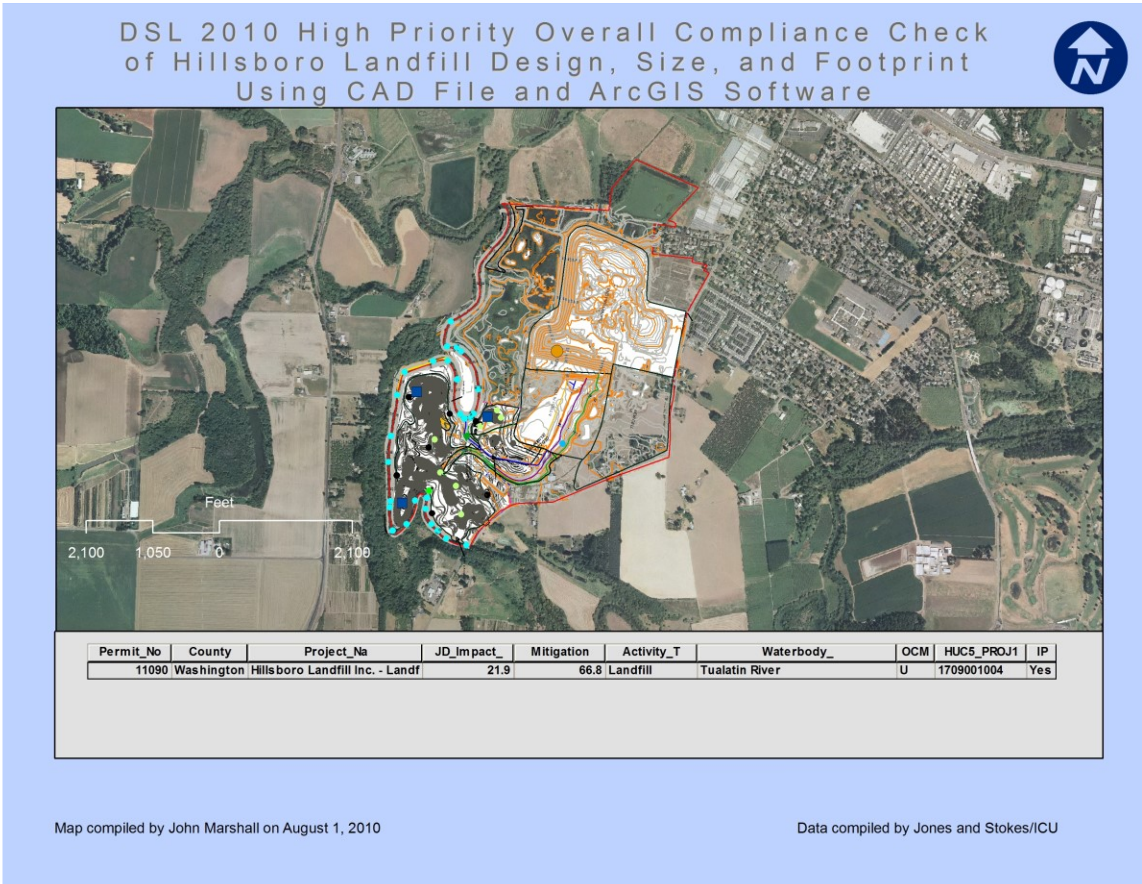

Figure 4. Use of CAD project design overlays on digital orthophotographs to determine compliance with development project Key Performance Standards.

<u>*Key Performance Standards – Development* (Figure 4).</u> For many mid to large size development projects, the use of engineering designs in the form of Computer Automated Drafting (CAD) files added as layers on digital orthophotos could greatly enhance agency confidence in compliance determinations regarding project design, size, and footprint. For example, the CAD files can be projected into an ArcGIS ArcMap project and then subsequently checked out and pasted onto a mobile GPS device running ArcPad. This would allow the DSL compliance representative to walk the proposed design parameters in the field during pre and post project construction field trips and verify compliance with a relatively high degree of precision. Of course both linear and areal measurements are easily calculated with the data in this format. In order to make this workflow go smoothly, CAD files should be provided to the agency with the projected coordinate systems they were created in. Otherwise projecting them into ARCMap can be problematic and time consuming.

<u>*Key Performance Standards – Mitigation* (Figure 5).</u> For many mid to large size mitigation projects, the use of engineering designs in the form of Computer Automated Drafting (CAD) files added as layers on digital orthophotos could greatly enhance agency confidence in compliance determinations regarding mitigation design, size, and footprint. For example, the CAD files can be projected into an ArcGIS ArcMap project and then

subsequently checked out and pasted onto a mobile GPS device running ArcPad. This would allow the DSL compliance representative to walk the proposed design parameters in the field during pre and post project mitigation field trips and subsequently

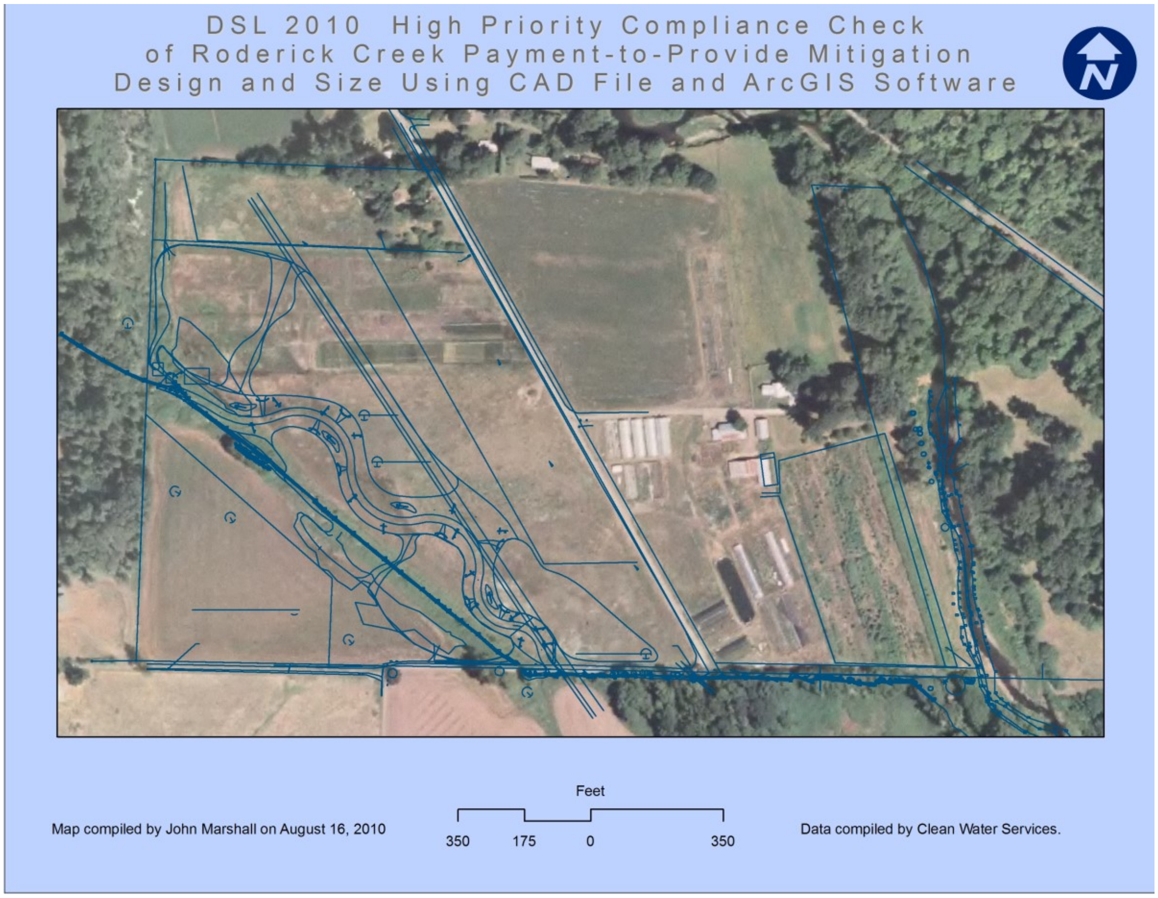

Figure 5. Use of CAD project design overlays on digital orthophotographs to determine compliance with mitigation project Key Performance Standards.

verify compliance parameters with a relatively high degree of precision. Of course both linear and areal measurements are easily calculated with the data in this format. In order to make this workflow go smoothly, CAD files should be provided to the agency with the projected coordinate systems they were created in. Otherwise projecting them into ARCMap can be problematic and time consuming.

<u>Potential Regulatory Program Issues</u>. DSL may want to reconsider its decision to designate OHW as the jurisdictional boundary for streams and rivers and possibly think about going back to a top-of-bank or something like an "area of dynamic aquatic influence." Large bank protection structures are being placed along a number of major rivers in Oregon that look like minor projects on paper because of the OHW jurisdictional limit. At first glance it appears that in order to avoid higher jurisdictional scrutiny, applicants are not keying their bank protection structures to their respective river and stream beds. Consequently these structures are likely unstable and possibly subject to

becoming the catalysts of streambank avulsions. In other words they may exacerbate the very problem they are intended to prevent. Even more importantly, they are likely individually and cumulatively responsible for the loss of fish and riparian wildlife habitat, exportation of erosive waters to downstream areas, and channel degradation leading to significant floodplain disassociation. These projects are probably falling under the radar of resource agencies and environmental groups because applicants are only being held accountable to those portions of the projects below OHW and, therefore, permits display an illusion that the projects are much smaller than they actually are.

DSL may want to amplify education and outreach toward helping the regulated public better understand the project design options that, if applied properly, will help them to avoid delays in project approvals and to maintain their permit compliance. Part of this outreach may be to explore incentivized programmatic means for people to complete their project objectives in the most environmentally benign or beneficial way possible. For example, if someone moves his or her barn out of the 3-year floodplain and fences out their cows from the riparian fringe (instead of channelizing the stream every year and running cattle right up to the creek), maybe they could earn and sell riparian/floodplain credits to unavoidable upstream bank stabilization projects that exacerbate downstream flooding. Jurisdictional justifications would likely require linking the benefits accrued to waters of the state, including beneficial uses.

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Appendix I. Attribute Table Field Definitions

OBJECTID	Attribute table record number
Permit_No.	Permit authorization number
File_Location	Person using file or DSL File Room location of permit authorization file
County	County where permit was authorized
Project_Name	May contain name of applicant, project, or permitted activity or any combination, preferably at least two of the above
JD_Impact_Acres	Acreage of project footprint overlapping with jurisdictional waters of the state, including wetlands
Mitigation_Acres	Acreage of area used to compensate the loss of jurisdictional waters of the state by removal and/or fill activities under DSL jurisdiction
Plat	Project latitude (Decimal Degrees)
Plon	Project longitude (Decimal Degrees)
MLat1, 2, 3, 4	Mitigation site latitude (Decimal Degrees)
MLon1, 2, 3, 4	Mitigation site longitude (Decimal Degrees)
Completed	During survey – notes whether the site visit has been completed Post survey – notes whether the permitted project has been completed
Date_Site_Visit	Date of site visit
DSLRep	DSL personnel conducting the site visit
Activity_Type	Regulated activity (List to be added)
Applicant	Person, organization, or agency to which the permit is issued
Waterbody_Name	Name of jurisdictional water immediately proximate to regulated activity
Wetland	Indication of presence or absence of wetlands on project site affected by the project
DEV_WETClass	Cowardin classification of wetlands affected
Stream	Indication of presence or absence of stream(s) on project site affected by the project
River	Indication of presence or absence of river(s) on project site affected by the project
Riparian	Indication of presence or absence of riparian areas on project site affected by the project
Lake_Reservoir	Indication of presence or absence of lake or reservoir on project site affected by the project
JDI_Acres	Acreage of project footprint overlapping with jurisdictional waters of the state, including wetlands
JDI_CUYDs	Cubic yards of material filled and/or removed to create the project footprint overlapping with jurisdictional waters of the state, including wetlands
JDI_LINFT	Linear feet of project footprint overlapping with jurisdictional waters of the state, including wetlands

Appendix I. Attribute Table Field Definitions (Cont.)

MIT_Type	Type of mitigation action(s) employed to compensate for unavoidable losses of jurisdictional state waters: E- Enhancement, C- Creation, R- Restoration, P – Protection
MIT_WETClass	Cowardin wetland classes targeted at compensatory mitigation site(s): PEM – Palustrine Emergent, PSS – Palustrine Scrub-shrub, PFO – Palustrine Forested, AB – Aquatic Bed, UB – Unconsolidated Bottom
MIT_Acres	Acreage of area used to compensate the loss of jurisdictional waters of the state by removal and/or fill activities under DSL jurisdiction
MIT_LNFT	Linear feet of mitigation project
PRJ_PSM_Size	Project performance standards met on size of footprint – Y (Yes) N (No)
PRJ_PSM_Design	Project performance standards met on design specifications– Y (Yes) N (No)
PRJ_PSM_VEG	Project performance standards met on vegetation planting and/or response – Y (Yes) N (No)
EC_PSM	Erosion control performance standards met – Y (Yes) N (No)
CMIT_SITELoc	Compensatory mitigation site location - (On) on-site, (Off) off-site
MIT_PSM_Size	Mitigation site performance standards met on size of mitigation area – Y (Yes) N (No)
MIT_PSM_Design	Mitigation site performance standards met on design specifications – Y (Yes) N (No)
MIT_PSM_Hydro	Mitigation site performance standards met on hydrology specifications – Y (Yes), P (Partially), N (No)
MIT_PSM_Veg	Mitigation site performance standards met on vegetation planting and/or response – Y (Yes), P (Partially), N (No)
MIT_FAM	Mitigation site financial assurances met – Y (Yes), P (Partially), N (No) U (Undetermined), ND (No data)
MIT_LTPM	Mitigation long-term protection met – Y (Yes), N (No)
MIT_Bank	Mitigation bank credits purchased to compensate unavoidable jurisdictional losses – Y (Yes), N (No)
FIL	Fee-in-lieu monies provided to off-set unavoidable jurisdictional losses – Y (Yes), N (No)
ILF	In-lieu-fee or payment-to-provide monies provided to off-set unavoidable jurisdictional losses – Y (Yes), N (No)
OCM	Overall compliance – Y (Yes), N (No)
Photo 1, 2, 3. 4, 5	Windows explorer addresses used to hyperlink all jpg files (date/time stamped photographs and documents) representing the development and mitigation aspects of the permitted project
HUC5_PROJ1	Fifth-field hydrologic unit code for project locations
HUC5_MIT1, 2, 3, 4	Fifth-field hydrologic unit code for mitigation site locations
Public	Applicant is a public entity Y (Yes) N (No)

Appendix I. Attribute Table Field Definitions (Cont.)

Private	Applicant is a private entity Y (Yes) N (No)
ProjStarted	Work on the project has started
IP	Permit issued is an Individual Permit
GA	Permit issued is a General Authorization
EM	Permit issued is an Emergency Authorization
CMR	Compensatory mitigation requirement Y (Yes) N (No)

Appendix 2. Software Links

Activesync:

http://www.microsoft.com/windowsmobile/en-us/downloads/microsoft/activesync-download.mspx)

Vegetation Manager (VEMA)

http://nwhi.org/index/publications