California Regional Water Quality Control Board
San Francisco Bay Region

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SUBJECT: Web-Based Wetland Tracker Staff Report

Introduction

The San Francisco Bay Water Board (Water Board) requires that attempts be made to avoid, minimize, and -- only as a last resort -- mitigate for projects proposing to impact wetland and riparian systems in the Region. A study commissioned by the State Board to review wetland and riparian mitigation project compliance and function was released in 2006 with recommendations to improve wetland permitting state-wide (Ambrose, Callaway, & Lee 2006). The study found that permittees were largely meeting their mitigation obligations, but that wetland mitigation projects designed to reproduce ecological functions were not completely successful. Recommendations from the study included improving the following: mitigation requirements, information management, permit clarity, mitigation project assessments, and coordination with other agencies.

In a related study to evaluate wetland mitigation project compliance, Water Board staff found many of the mitigation project records incomplete and sometimes difficult to locate. Consequently, Water Board staff has been working with the San Francisco Estuary Institute (SFEI) to develop Wetland Tracker, a GIS-based permit-tracking system designed to provide detailed, standardized information that can be submitted by permit applicants and reviewed by regulatory agencies and the public. Information posted on this GIS web-based system allows anyone to locate the project site, access the mitigation project's location, type, size, performance criteria, monitoring requirements, and ultimately the success or failure of the mitigation project. Regulators can use Wetland Tracker to track wetland losses and gains by habitat type, and to enforce permit conditions when mitigation projects fail to produce self-sustaining wetland systems. Planners and project proponents can use Wetland Tracker to plan for habitat creation, restoration, and conservation within a watershed context.

Project Status

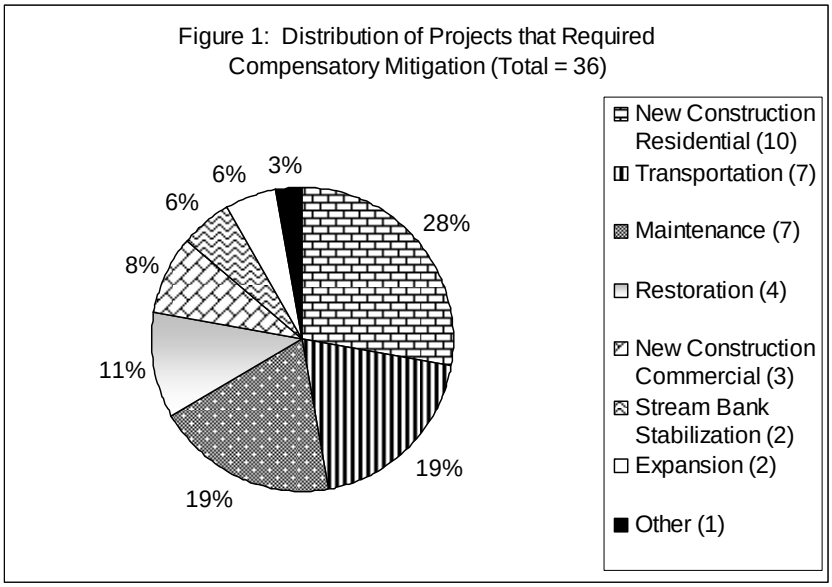
Using Wetland Tracker, Water Board staff was able to readily review the status of mitigation for projects recently certified. Between August 2006 and December 2007, 68 projects that received a Clean Water Act Section 401 certification from the Water Board included a condition requiring permittees to complete a Wetland Tracker form and send it, preferably in electronic form, to the Water Board and SFEI. The form includes: (a) project location; (b) type and amount of habitats impacted and to be enhanced, created and/or restored as compensation for the impacts; (c) performance criteria to be monitored and achieved; and (d) other important information required to determine mitigation success. As of September 23, 2008, the Water Board has received 45 completed Wetland Tracker forms. All statistics and graphs included in this review pertain only to these 45 projects certified between August 2006 and December 2007 for which the Wetland Tracker form was submitted.

Of the remaining 23 projects that did not submit Wetland Tracker forms, 6 projects were delayed, leaving 17 that are being investigated based on the following priorities:

- High Priority for follow-up: Large compensatory mitigation projects
- Medium: Other compensatory mitigation projects
- Low: Small compensatory mitigation projects, restoration projects self-mitigating, and temporary impacts such as stream bank stabilization projects to control erosion adjacent to private property

Project Characteristics

Of the 45 projects, 36 required compensatory mitigation. Figure 1 depicts these projects by impact type.



New residential construction had the most projects, followed by transportation and maintenance.[1] The transportation category includes expansion or building highways, roads, and bridges. The maintenance category includes activities such as routine sediment removal operations by flood control districts and water utilities. Of the four restoration projects, three were created by water agencies, and the remaining project was undertaken by a private resort facility. Both expansion projects of existing facilities were conducted at water utilities. The project in the "Other" category was for natural gas exploration. Table 1 shows the distribution of habitat losses for the 36 compensatory mitigation projects by county.

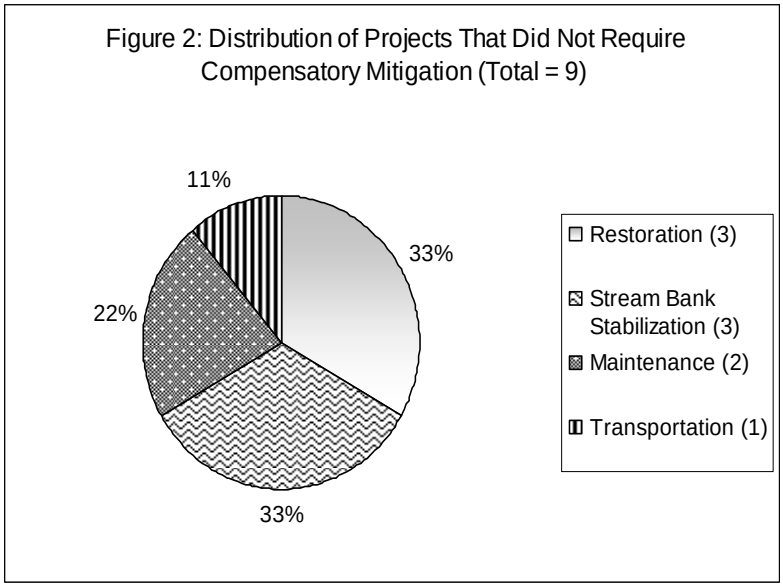
Table 1: Distribution of wetland impacts by County -- Mitigation only (36 Projects)

	Riparian		Estuarine		Depressional		Vernal Pool		Seeps and Springs		All habitats	
	#	%	#	%	#	%	#	%	#	%	#	%
Alameda	4	27%	2	50%	1	13%	1	14%	0	0%	8	22%
Contra Costa	4	27%	1	25%	2	25%	0	0%	1	50%	8	22%
Marin	1	7%	0	0%	1	13%	0	0%	0	0%	2	6%
Napa	1	7%	0	0%	1	13%	1	14%	0	0%	3	8%
San Mateo	3	20%	0	0%	0	0%	1	14%	0	0%	4	11%
Santa Clara	1	7%	0	0%	0	0%	0	0%	0	0%	1	3%
Solano	1	7%	1	25%	3	38%	4	57%	1	50%	10	28%
San Francisco	[1]N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sonoma	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	15	100%	4	100%	8	100%	7	100%	2	100%	36	100%

1. N/A means not applicable. There were no projects that required the wetland tracker condition in these counties in 2006-2007.

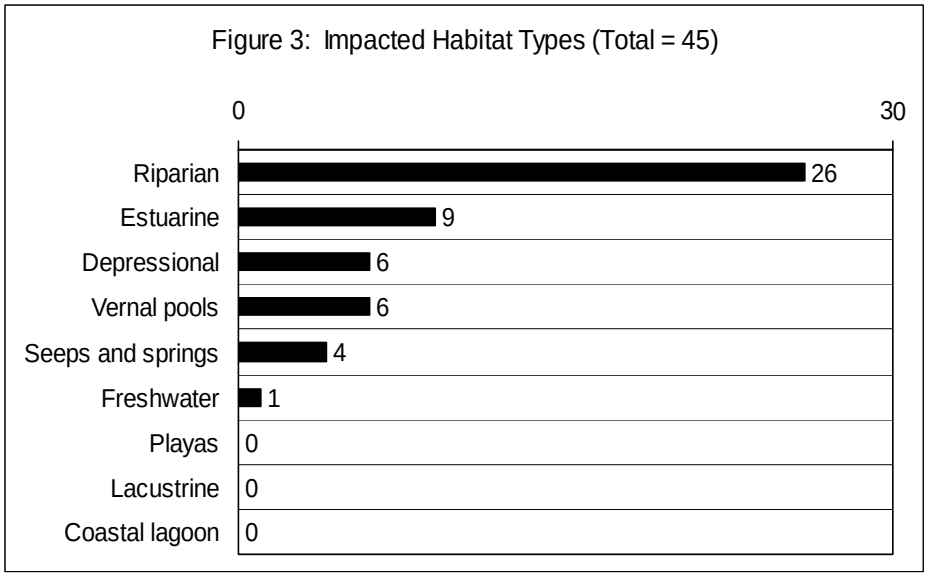
The remaining nine projects that did not require compensatory mitigation are shown below in Figure 2.

[1] The total acreage impacted by the project type categories in Figure 1 followed the same pattern as the distribution of projects with the following impact sizes, respectively, for the 3 largest categories:
-- New Construction Residential: a total impact of 3.5 acres;
-- Transportation: a total impact of 0.55 acres (Note that most transportation project impacts were reported in linear feet, with a total reported impact of 1,044 linear feet); and
-- Maintenance: a total impact of 3.2 acres.



These nine non-mitigation projects consisted primarily of restoration and stream bank stabilization projects, with a few maintenance and transportation projects. Some category types, namely restoration, stream bank stabilization, transportation, and maintenance appear in both graphs because mitigation is required if the impacts are long term, permanent, and result in the loss of wetland or riparian functions. However, no mitigation is required if the three following conditions apply to the project: (i) impacts are temporary; (ii) impacts are self-mitigating (meaning that vegetation will quickly reestablish or with additional replanting effort); and (iii) the project's impacts are intended to improve wetland or riparian function. The maintenance category includes infrastructure improvement projects undertaken by agencies to improve wetland function. The single transportation project consists of the rebuilding of a pedestrian and vehicle bridge, removal of several culverts to restore a channel and wetlands, and restoration of the shores of Oakland's Lake Merritt.

Figure 3 shows the habitat types impacted by all projects. Totals are greater than 45 since some projects impacted more than one habitat type.



Impacts were almost three times more numerous in riparian habitats than in other habitat types, followed by estuarine, depressional wetlands, and vernal pools.

Table 2 summarizes habitat losses and gains and mitigation ratios by habitat type for the 45 projects. Losses and gains are in acres with the exception of linear feet where it is noted on the table. The number of impacted areas is greater than 45 since some projects included more than one type of habitat

Table 2: Gains and Losses by Habitat Type (45 Projects)*

1	2	3	4	5	6	7	8	9
			Total Gains		Additional Improvements		Net Gain and Improvement	
Habitat Type (units are acres unless otherwise indicated)	Number of impacted habitat areas	Total lost	[3]Restoration Total	Creation Total	Enhancement Total	Preservation Total	Net gain--includes Cols. 4 & 5, minus loss	[4]Additional improvements--includes Cols. 6 & 7
							Mitigation ratio (col 4 + 5) /col 3	Mitigation ratio (col 6+7) /col 3
[1]Estuarine	7 (16%)	2.52	8.04	0	140.59	0	5.52	140.59
	Mitigation ratio						3.19	55.79
Depressional	8 (18%)	1.91	0.47	5.41	0	1.53	3.97	1.53
	Mitigation ratio						3.08	0.80
Vernal pools	7 (16%)	3.72	0.40	3.48	0	5.02	0.16	5.02
	Mitigation ratio						1.04	1.35
Seeps and springs	6 (14%)	1.27	2.26	0	0.25	3.37	0.99	3.62
	Mitigation ratio						1.78	2.86
[2]Riparian (linear feet l.f.)	18 (41%)	6,125	17,082	1,089	8,663	1,203	12,046	9,866.00
	Mitigation ratio						2.97	1.61
Riparian	11 (25%)	2.09	0.90	0.65	4.42	0	-0.54	4.42
	Mitigation ratio						0.74	2.12

*The 45 projects impact more than 45 habitat areas because some projects impact more than one habitat type.

[1]Excludes one project that had only temporary impacts

[2] Future riparian projects should be required to provide impacts in linear feet (l.f.) and acres; those riparian projects that reported only acres appear separately here.

[3]Restoration and creation are considered gains; while enhancement and preservation are desirable, they do not add more wetlands to the existing watershed system.

[4] Note that when net gain has already accounted for the loss by subtracting it from restoration and creation, the loss is not subtracted again here. However, in those rare instances when preservation and enhancement are used for mitigation without restoration or creation, care should be taken to subtract the loss from enhancement or preservation to determine appropriate mitigation ratios.

Net gains are determined by mitigation ratios that represent the sum of acres gained (except for one riparian analysis in linear feet) by adding restoration and creation, and dividing the sum by the acres lost. As seen in Table 2, approximately 3 acres were gained (i.e., restored or created) for each acre lost for estuarine, depressional wetland, and riparian (calculated by linear feet) habitats, but much lower net gains were reported for vernal pools, seeps and springs or riparian projects calculated by acres (1.04, 1.78. 0.74 respectively). Enhancement and preservation are sometimes allowed as partial mitigation and are included separately in Table 2. While enhancement and preservation do not contribute to net gains of wetlands or riparian systems on

an acre-per-acre basis, they can contribute substantially to the improvement of watershed beneficial uses by increasing upland area for water quality improvement, storing water above and below ground, and providing crucial habitat for special status and all biological species for feeding, resting, breeding, hiding from predators, and migrating. Restoration and creation are usually required as mitigation, but credit can sometimes be given for preservation or mitigation if higher ratios are used, and if significant ecological, hydrological, or water quality benefits are expected to result in the watershed.

Table 2 indicates that the 45 projects certified in 2006-07 were replacing habitat area -- though not necessarily their functions -- in the following ways:

- Estuarine and depressional habitats had the highest gain to loss ratios for restoration and creation indicating a potential increase in these habitats.
- Vernal pools had the highest impacts to existing habitats and the lowest replacement ratios indicating a potential decrease in this habitat type unless the mitigation projects were completely successful, which they often are not.
- Seeps and springs had a mid-range gain to loss ratio for restoration and creation.
- Net gains in riparian habitats measured in linear feet ranked third while those measured in acres produced a much lower mitigation ratio, which may be because riparian systems are very difficult to restore/create or because acres do not accurately reflect impacts. Linear feet are generally preferred to acres as an appropriate measure of impact and mitigation for riparian projects and both should be tracked.

In conclusion, estuarine and depressional wetlands were generally replaced at higher ratios than riparian systems, which were replaced at higher ratios than vernal pools. If these trends continue, then avoiding impacts to vernal pools and riparian systems should be a high priority in Region 2.

Discussion

This review using Wetland Tracker has allowed us to identify trends and set priorities for our wetland and stream program. It is assumed that adverse impacts to wetlands and riparian projects are being avoided to the maximum extent practicable since this has been Region 2's long-term wetland and riparian policy. For projects requiring compensatory mitigation, most are required to replace wetland and riparian functions at ratios higher than their impacts. Based on this review, particular attention should be paid to vernal pools and riparian habitats to ensure that impacts are avoided or minimized and important functions are replaced in compensatory mitigation projects.

Two-thirds of the 45 projects reviewed included impacts to riparian habitat, which was the single most affected habitat type in Region 2. There are several reasons for this. Higher land prices in urbanized counties drive greenfield development in Solano, Contra Costa, San Mateo, and parts of Alameda counties and in some cases, streams pass through these parcels of land. Development on hillsides has resulted in large losses of headwater creeks. Pressure on riparian corridors in relatively undeveloped areas in the flatlands around the Bay is associated with commercial and residential developments. In less urbanized areas, large amounts of wetlands are also threatened by this development pattern. In developed areas, surviving riparian habitats are threatened by bank stabilization projects. Many buildings and residences were developed in close proximity to creeks. As the Region has developed, its resulting

hydromodification has resulted in bank erosion and increased flooding. Projects that attempt to stabilize failing banks often result in the loss of riparian habitat as a consequence of bank armoring. Flood control projects in developed areas often result in widening of the channel to the maximum extent allowed by existing creekside structures; these projects often leave little or no room for restoring riparian habitat along the widened channel.

To streamline riparian project permitting, recordkeeping, and monitoring, we are continuing to require the Wetland Tracker form for stream bank stabilizations, and for vegetation and sediment removal projects that improve flood conveyance. Permittees for stream bank stabilizations are usually private property owners or city/county road maintenance crews that are repairing eroding stream banks. Permittees for sediment removal and flood control are most often county flood control districts performing regular sediment and vegetation removal or repair of stream channels to maintain flood conveyance capacity. These projects tend to have relatively short useful life spans. Bank stabilization projects are eventually undermined by the erosive forces that created the original bank instability, and sediment and vegetation inevitably return to cleared areas. In addition, the forces that create bank instability and generate sediment in a watershed can be exacerbated by new development of buildings or roads. Wetland Tracker can help identify locations where these projects are implemented repeatedly and identify the need for a reach-wide or watershed scale solution to bank instability or flood conveyance.

Next Steps

One potential significant benefit of the Wetland Tracker database developed by our partner, SFEI, is the ability to see on a map where riparian and wetland impacts are occurring. This will be important both for planning future restoration projects and developing wetland and riparian area protection policies. To date, most of the 45 projects reviewed in this report can be viewed online. We are working with SFEI on several improvements to the Wetland Tracker database including the following:

1) automated data population from the Wetland Tracker form;
2) reporting riparian impacts in linear feet as well as acres;
3) inclusion of all riparian impacts on the regional map, regardless of size, by means of a point and brief project information;
4) SFEI's improved instructions for on-line mapping tools using Google Maps (see http://www.wetlandtracker.org/about.htm#mapping)[2]
5) automatic e-mail reminders sent to Water Board staff and permittees when tasks or reports are due.

In conclusion, the Wetland Tracker has the potential to be useful in this Region and across the State to evaluate proposed projects that would impact wetlands and riparian areas and to plan wetland and riparian mitigation and restoration projects. Information gathered by Wetland Tracker can inform policy development, assist program management, track net habitat losses and gains, determine regulatory compliance, and prioritize enforcement. Given the 2006-2007 trend observed, Water Board staff will closely scrutinize Section 401 certification applications to ensure impacts are avoided and minimized to the maximum extent practicable, particularly for

[2] Maps can be viewed directly on Google maps or applicants can create maps in ArcMap and save them as "tif", "jpeg", or "emf" files.

vernal pools and riparian systems. Staff also plans to develop a general permit for maintenance activities to streamline the permitting process given the number of applications, the amount of impacts, the common best practices, and the relatively well-defined regulated community.

References:

Ambrose, R., J.Callaway, S.Lee. 2006. *An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Quality Control Board, 1991 – 2002*. Prepared for the State Water Resources Control Board. http://www.waterboards.ca.gov/cwa401/docs/wetlandmitstudy_rpt.pdf

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