

Observations and Conclusions

As expected, the total percent of the project cost spent on mitigation varies greatly with the project type, location and existing built and natural environments.

One of the interesting findings from this study is how much temporary mitigation efforts contribute to the overall cost, for stormwater in particular. Temporary mitigation primarily pertains to stormwater management during construction, although there are other mitigation categories that include temporary items such as temporary walls to prevent a stream impact. If you break out the temporary mitigation it accounts for 4.4% of the total project costs spent on mitigation and accounts for 40% of the total stormwater mitigation costs.

When you compare all three studies, stormwater mitigation consistently has the highest level of investment by a fairly wide margin. In 2003 stormwater accounted for over 40% of the mitigation costs. In 2006, it was nearly 50% and for this study it accounts for nearly 70%. When you look at stormwater costs with respect to percent of the total project costs for each study year we see a similar result. Stormwater costs were 7.8%, 8.4% and 10.7% of the total project costs for the 2003, 2006 and 2009 studies respectively. These results are somewhat inconclusive due to the variability that comes from the projects selected for evaluation. However, in comparing the range of percentages spent on stormwater it also shows an increase between study years 2003 and 2009. These two study years used a similar approach in project selection. 2006 shows a reduced range compared to 2003 and 2009 which is primarily due to the projects selected for the 2006 study. The larger and more urban type projects tend to have a lower percentage of the total project cost spent on mitigation. This is believed to be associated with the higher costs for construction in urban areas. Based on these results, a general conclusion may be made that stormwater costs have increased over time. Some of these cost increases may be attributed to the changing requirements for stormwater management.

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A majority of the projects in this study followed the 2006 Highway Run-off Manual (HRM) requirements. An update was issued in June 2008 with some additional requirements such as basing the flow control modeling on historic land cover conditions in Western Washington. Another example was the emergence of lower statewide threshold triggers for requiring dissolved metals water quality treatment. In anticipation of the update and due to timing, several of the projects in the study followed the methodology as described in the 2008 HRM. This is one of the primary drivers for increased costs in stormwater management.

Besides stormwater, the other mitigation categories showed no clear trend or pattern from the 3 studies conducted. This is believed to be related to the inherent variability of a given project type and location, as well as the limited number of projects that included a particular type of mitigation. Drawing firm conclusions is difficult because the sample size for each of the studies is small in relation to the total number of projects the agency delivers.

The general consensus with all three studies conducted is that projects west of the Cascades typically have higher levels of mitigation and related costs. As shown in the cross-state comparison, the range of percent spent on mitigation is significantly higher on the west side. The primary drivers for the higher costs are the projects' proximity to streams, wetlands, neighborhoods and a higher general cost for construction services and real estate.

The right-of-way costs associated with mitigation for this study accounted for \$7 million. If you include the purchase of wetland bank credits it is nearly \$8 million. Right-of-way costs associated with mitigation can be a significant cost to a project. Where there were opportunities, the project teams implemented unique and creative solutions in order to reduce these costs. A couple of examples of this are the integration of stormwater treatment facilities within interchange ramp areas or elongated facilities within roadside ditches that have minimal or no impact to real estate. In one project, wetland bank credits were used from a previous related project to compensate for their projects impacts. Considering that the total amount spent on mitigation for this study is over \$105 million, the associated right-of-way costs are a relatively minor portion of that total investment.