A 2006 Pilot Study of Hydraulic Permit Compliance, Implementation, and Effectiveness in Region 6

Timothy Quinn, Stephen Kalinowski, Robert Bicknell, Craig Olds, Margie Schirato,

David Price, Chris Byrnes, David Kloempkin, Robert Barnard

SUMMARY

We conducted a pilot study of the Washington Department of Fish and Wildlife Hydraulic Project Approval (HPA) program compliance, implementation, and effectiveness by reviewing 58 recently completed HPA permits. The review process evaluated projects by measuring the type of provisions in the permit (provision rate); the compliance rate, which measured the type and number of provisions that were followed in the field; and the implementation rate, which measured project outcomes regardless of whether those outcomes were associated with provisions. In addition, we qualitatively judged the effectiveness of projects to meet standards defined in the language of the Hydraulic Code rules (WAC 220-110). Effectiveness was ranked on a scale from 1 (low) to 5 (high) based on three criteria: 1) Ability of the provisions to protect public resources, 2) Ability of provisions to meet no net loss of habitat/function, and 3) Ability of mitigation to compensate impacts beyond avoid and minimize.

We evaluated five project types including 15 fresh water bank protection, 14 from marine bank protection, 14 from culvert installation, 9 from bridge construction, and 6 marine over-water projects. Including process, travel, and evaluation time, a single HPA assessment required approximately seven person hours to complete. 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.

Furthermore, compliance and implementation rates tended to be higher for activities that protected the project proponents' investment than other activity types.

Our 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. Part of our inability to meet "no net loss" is undoubtedly related to the dual nature of the Hydraulic Code (Chapter 77.55 RCW) to protect fish life while allowing for the protection of personal property and human health. We conclude that 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. However, the agency's goal of achieving no net loss of habitat function and values (WDFW POL-M5002) is difficult to attain solely through the HPA permit process. It also appears that the overall effectiveness of projects *could be* improved as indicated by our survey data showing that certain projects of each type currently achieve relatively high effectiveness scores. While making immediate improvements in the provision rates is relatively straightforward, improving compliance and implementation rates as well as project effectiveness may require additional resources or alternative strategies. Additionally, until we institutionalize an adaptive management approach to the HPA program, we will struggle with answering the big questions – How well does the permit process protect public resources at a site? – and, How do we protect public resources from cumulative effects of multiple projects?

While there is a need to better understand how the HPA program works across the state, we propose 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. A large amount of modified shoreline has been permitted by WDFW in accordance with Chapter 77.55 RCW, yet information on compliance and effectiveness of HPA activities in the nearshore, including mitigation associated with projects, is mostly lacking. This new work will measure compliance and effectiveness of the HPA permit program in the Puget Sound nearshore, including the overall performance of mitigation projects, and make recommendations for improvements within an adaptive management framework. The study will recommend practical and immediate ways to improve compliance and effectiveness of HPA permits in Puget Sound, and more effective means of meeting the goals of mitigation programs, and measuring success.

INTRODUCTION

The Revised Code of Washington (RCW) directs the Washington Department of Fish and Wildlife (hereafter Department) to "preserve, protect, perpetuate, and manage" the fish and wildlife species of the state as its paramount responsibility (RCW 77.04.012). To help achieve that goal, the state Legislature passed a law now known as the "Hydraulic Code" (chapter 77.55 RCW) in 1949. This law was designed to protect public fish resources by requiring a Hydraulic Project Approval (HPA) "permit" before conducting activities in fresh and salt waters of the state. Specifically, the Department, which administers the Hydraulic Code, regulates work that "uses, obstructs, diverts or changes the natural flow or bed of state waters for the protection of fish life".

The Department reviews and issues approximately 4,000 HPA permits per year covering a wide range of activities. All permits are issued with provisions designed to meet the intent of policy (POL-M5002) that provides this mitigation sequence, in order of preference: "avoid impacts altogether", "minimize impacts", and "mitigate impacts". These provisions are consistent with Best Available Science as informed by comprehensive literature reviews and by experience gained by Department employees during the course of providing technical assistance, particularly in the area of culvert design.

However, the Department has not had sufficient resources to conduct monitoring and thus there has been no formal adaptive management procedure to guide the HPA program through time. The work described here is the first attempt to develop a formal process to systematically review compliance and effectiveness of the HPA program.

METHODS

Survey Sample

We sorted 260 HPA permits, issued 1 December 2005 and 1 Oct 2006 by the Department's Region 6 (coastal Washington), into five HPA project types including Fresh Water Bank Protection, Marine Bank Protection, Fish Passage Culverts, Bridges, and Marine Over-water Structures. The intent of this pilot study was to evaluate up to 30 permits of each type during November of 2006 to assess permit compliance and effectiveness. Two teams of two biologists conducted evaluations during field visits to the project site. Before visiting project sites, the evaluation team gathered all permit materials (HPA permit, construction plans, correspondence, etc.) and contacted the project proponent to receive permission to visit the site. In many cases, the project proponent met the evaluation team on site.

Assessing Provision, Compliance, and Implementation Rates

We developed survey questionnaires to assess the provision rate, compliance rate, implementation rate, and effectiveness of recent HPA projects (Appendix A). Provision rate was defined as the percent of permits containing a provision considered important to that permit type and is important in understanding how the HPA program works. For example, if a permitted project is deemed ineffective at protecting public resources (see effectiveness measures below), it is useful to know if the permit lacked a necessary provision or if the actions of the project proponent were inadequate. Provision rate was determined for each of several provisions for each of the five project types (Appendix A).

Compliance rate was the percentage of projects that complied with a specific provision in the permit, and was determined by comparing project specifications, measured in the field, with each provision in the permit. A project could only be in compliance for a specific provision if that provision was explicitly written in the permit. Because of the pilot nature of the study, we limited our pilot survey to a subset of the most important provisions that could be assessed in the field during a single visit.

Implementation rate was the percentage of projects that were implemented consistent with the "intent of a provision" regardless of whether the provision was explicitly written into the permit. In other words, implementation rate was determined simply by measuring an outcome in the field as the percentage of all permits as opposed to compliance rate that was based only on permits with a specific provision. Because implementation rate, in contrast to compliance rate, was based on the total number of permits, it *could* be higher or lower than compliance rate. Determining implementation rate separate from compliance rate is important, since high implementation rate is a more meaningful indication of resource protection than compliance rate. In addition, compliance rate may underestimate the overall HPA program success since in some cases provisions may have been excluded from a permit because the permit biologist and the project proponent had a common understanding of what was required, or the parties had a verbal agreement to do construction in a particular way based on past experience with similar projects.

For this study we did not attempt to determine why seemingly appropriate provisions had been excluded from a permit. In addition, we did not attempt to compare compliance and implementation rates for multiple provisions on the same permit. In other words, we did not ask if compliance and implementation rates were correlated by permit, i.e., poor compliance for one provision was related to poor compliance for another provision on the same permit. In the future, it would be useful to know if a small number or select type of projects, or specific kinds of project proponent (e.g., private consultant vs. Public Works Department) are causing the majority of noncompliance and non-implementation issues.

Permit Effectiveness

Measures of effectiveness were based on more qualitative criteria than measures of compliance and implementation, that is, effectiveness was judged against standards defined in the language of the Hydraulic Code rules (WAC 220-110). To assess effectiveness, the evaluation team, who was not associated with issuance of the permit, was asked to judge (as a team) how well completed projects met the goals of *no net loss of fish life, or in the productive capacity of fish and shellfish habitat or functions* (Chapter 220-110 WAC) (hereafter also referred to as *protection of public resources*). Specifically, the evaluation team was asked to rank each implemented project on a scale from 1 (low) to 5 (high) based on three criteria: 1) Ability of the provisions to protect public resources, 2) Ability of provisions to meet no net loss of habitat/function, and 3) Ability of mitigation to compensate impacts beyond avoid and minimize. These effectiveness criteria were paired with a final question related to the overall implementation of the project also ranked on a scale of 1 (low) to 5 (high; See Appendix A). The intent of this last question was to gauge how overall implementation of the project might be related to the overall ability of the project to protect public resources. We were interested in determining if high (good) implementation was necessarily related to relatively good resource protection.

Field assessments were conducted within one year of the HPA approval and thus reflected the applicant's construction activities as well as stochastic activities (e.g., storms or floods) that might have affected the project since the time of construction. Five different types of HPA projects were included in the assessment including culvert, bridges, fresh water bank protection, saltwater bank protection, and marine over-water structures. Each of these project types had a specific set of assessment questions (Appendix A).

We did not statistically analyze the data for several reasons. First, this study was a pilot designed to assess logistics and other key issues for conducting a more comprehensive and meaningful study in the future. Second, the sample sizes by permit type were small. Finally, it was clear from our preliminary analysis that the study suffered from quality control issues: 1) Some HPA permits lacked documents describing specifications for construction and mitigation; 2) Some survey questions may have been ambiguously worded leading to a lack of common understanding about the intent of that question among the evaluation team; 3) HPA effectiveness is best assessed by measuring actual changes in the environment pre and post projects as opposed to being measured by visual inspection only after the project was complete as it was in this study; 4) Effectiveness measures used in the survey were not standardized to measured changes in resource conditions; 5) Sample sites may have been biased to where we could obtain permission in a short period of time to visit the site; 6) In some cases, the evaluation team lacked adequate survey equipment training.

RESULTS

Field Review

After excluding sites where work was not yet completed, sites at which we could not coordinate visits with landowners, and sites that were otherwise unavailable (e.g., could not arrange a time to meet landowner on site), we attempted to collect data from 66 projects permitted under the Department's HPA program. We spent a total of 460 person hours assessing 66 permits for an average of ~7 person hours per site. Coordinating with the landowner (i.e., contacting, consulting, and arranging meeting times) was the most time consuming process (process time), followed by travel time, and then assessment time. Some time spent on minor activities including administrative, managerial, and logistic tasks (e.g., collecting, copying HPA) was not quantified. The time needed to assess the project on site starting from time of arrival to completion ranged from 15 – 60 minutes per site.

We completed surveys of 58 of the 66 projects that were included in the preliminary scoping. Some projects (n = 8) were eliminated from the survey only after spending a significant amount of process time, and in some cases travel time. Of the 58 projects, 15 came from fresh water bank protection, 14 from marine bank protection, 14 from culvert installation, 9 from bridge construction, and 6 from marine over-water projects. Because we had very small samples for bridges and marine over-water structures, we did not analyze these types of projects separately like we did for fresh water bank protection, marine bank protection, and culvert installation. However, data from bridges and over-water structures were combined with data from other project types to summarize overall implementation and project effectiveness.

Fresh Water Bank Protection

Provision rates for fresh water bank protection varied by type: with 57% of the permits containing the *do not constrict bankfull width* (BFW) provision, 69% containing *prevent sedimentation* provision, and 67% containing *mitigate project effects by the placement of boulders or large woody debris* provision (Fig. 1). Field assessments demonstrated that compliance rates were 50% for constriction of BFW, 89% for preventing sedimentation, and 80% for the placement of wood and boulders (Fig 1.). Implementation rates were higher than compliance rate for constriction of BFW and for preventing sedimentation but not for placement of wood and boulders (Fig. 1).

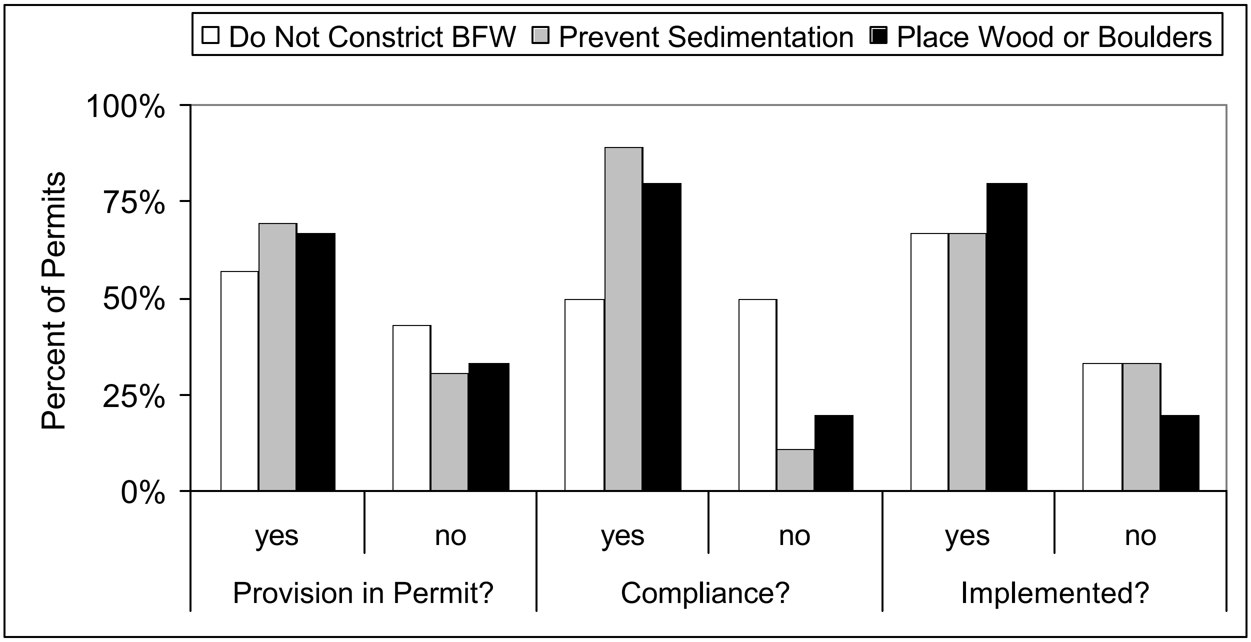

Figure 1. The percentage of Fresh Water Bank Protection Hydraulic Permits that contained provisions, the percentage of permitted projects that complied with those provisions, and the percentage of permitted projects that implemented or met the intent of those provisions regardless of whether those provisions was included in the permit.

In other words, the outcomes for two of three provisions as measured by implementation were better than expected based on the provisions rate. Re-vegetation provisions were uncommon in freshwater bank protection permits, occurring in only 33% of the permits (Fig. 2). Implementation rates for re-vegetation efforts were largely judged as inadequate (Fig. 2).

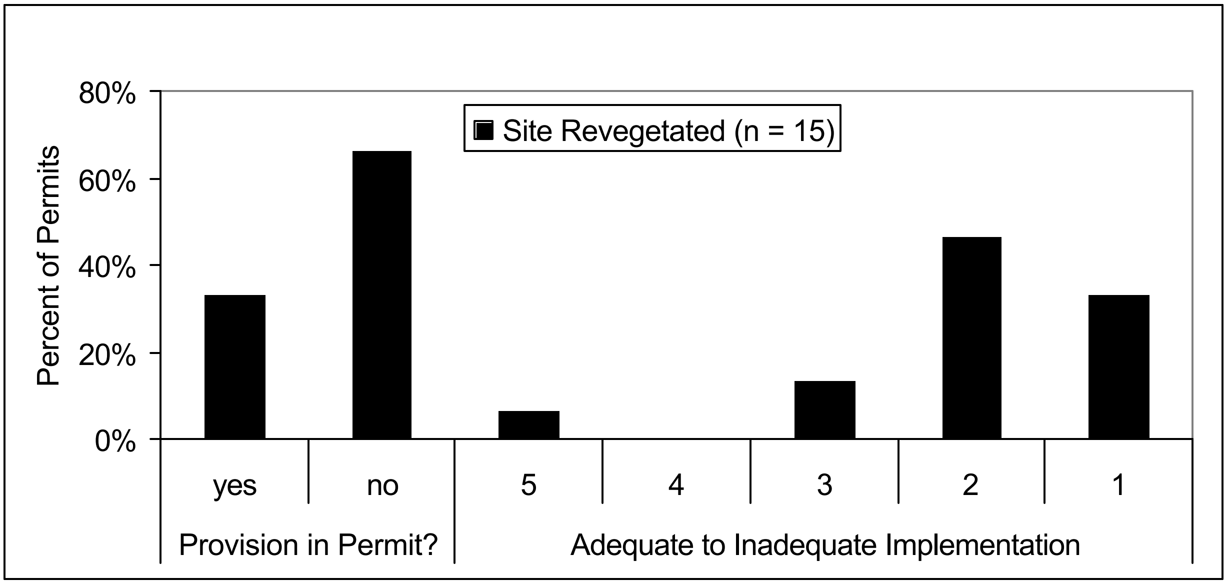

Figure 2. The percentage of Hydraulic Permits for Fresh Water Bank Protection containing re-vegetation provisions and implementation adequacy of re-vegetation as determined by field assessments.

It is interesting to note that overall permit compliance was judged mostly adequate to highly adequate when considering all types of provisions for freshwater bank protection (Fig. 3). This may be related to project age, that is, a lack of exposure to high flow events or other disturbances, and the inability of the evaluation team to determine compliance in some cases (e.g., it was difficult to determine if filter fabric was properly installed). Importantly, the judgment on overall compliance was often in contrast to project effectiveness as judged by the three summary effectiveness indicators (Fig.3). Most striking was the apparent disparity between overall compliance and the ability of the project to meet “no net loss” benchmark (Fig. 3).

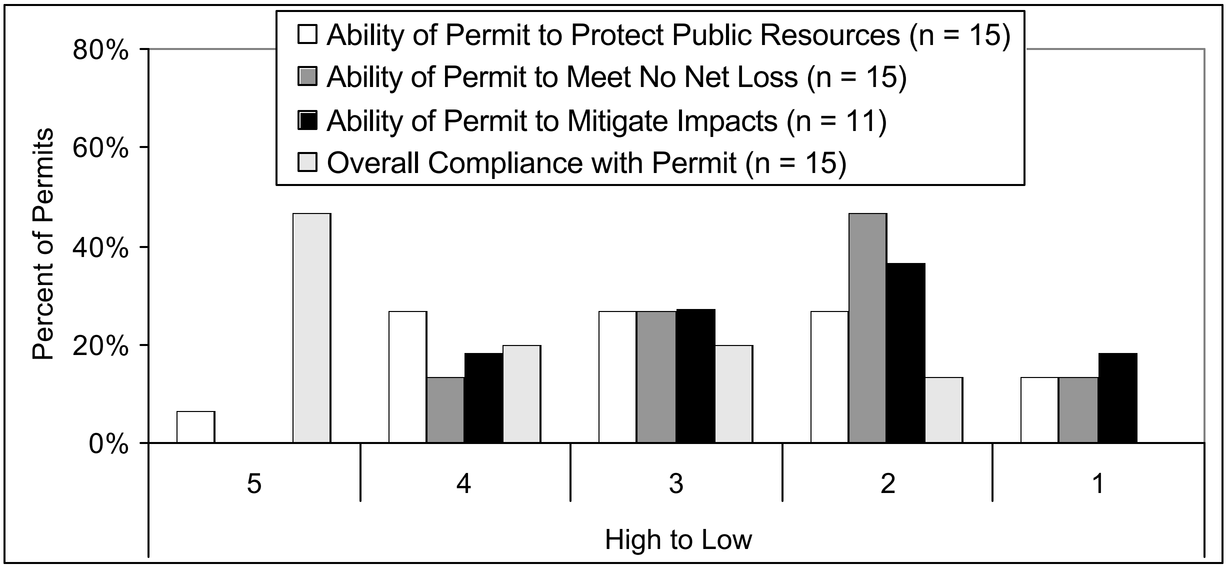

Figure 3. Three measures of permit effectiveness to protect public resources and overall permit compliance for Fresh Water Bank Protection.

Marine Water Bank Protection

Marine water bank protection permits had relatively high provision rates for *location of the bulkhead* (93%), *construction material for the bulkhead* (100%), *removal of material below the ordinary high water line* (OHWL; 86%), and *filling of depressions below the OHWL* (86%). The exception to high provision rate was the rate for placement of pea gravel (at 50%; Fig. 4), which likely reflects the perception on the part of the permitting biologist that this provision was unnecessary in certain cases.

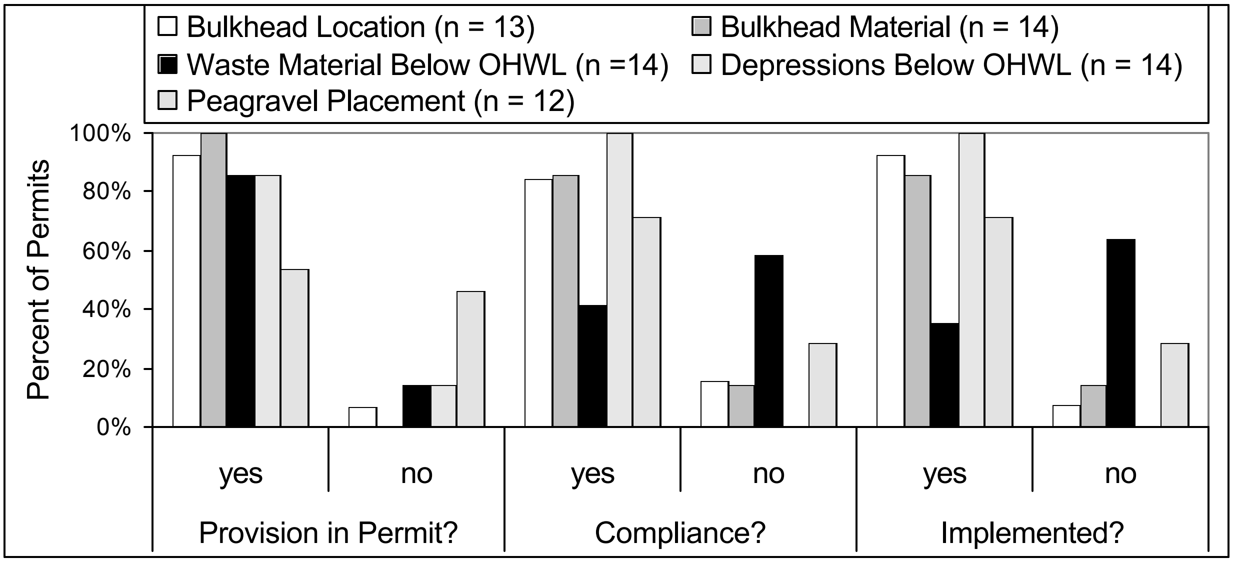

Figure 4. The percentage of Marine Bank Protection Hydraulic Permits that contained provisions, the percentage of permitted projects that complied with those provisions, and the percentage of permitted projects that implemented or met the intent of those provisions regardless of whether those provisions were included in the permit.

Compliance rates were relatively high (compared to other project types) for bulkhead location (85%), bulkhead material (86%) and for filling depressions below the OHWL (100%) but lower for pea gravel placement (54%) and very low for leaving waste material below the OHWL (42%). Implementation rates were equal to or slightly higher than compliance rates (Fig. 4) except for waste material below the OHWL (Fig. 4). Re-vegetation provisions were rare, occurring in only 7% of the marine bank protection permits, and implementation rates for re-vegetation efforts were largely judged as inadequate (Fig. 5).

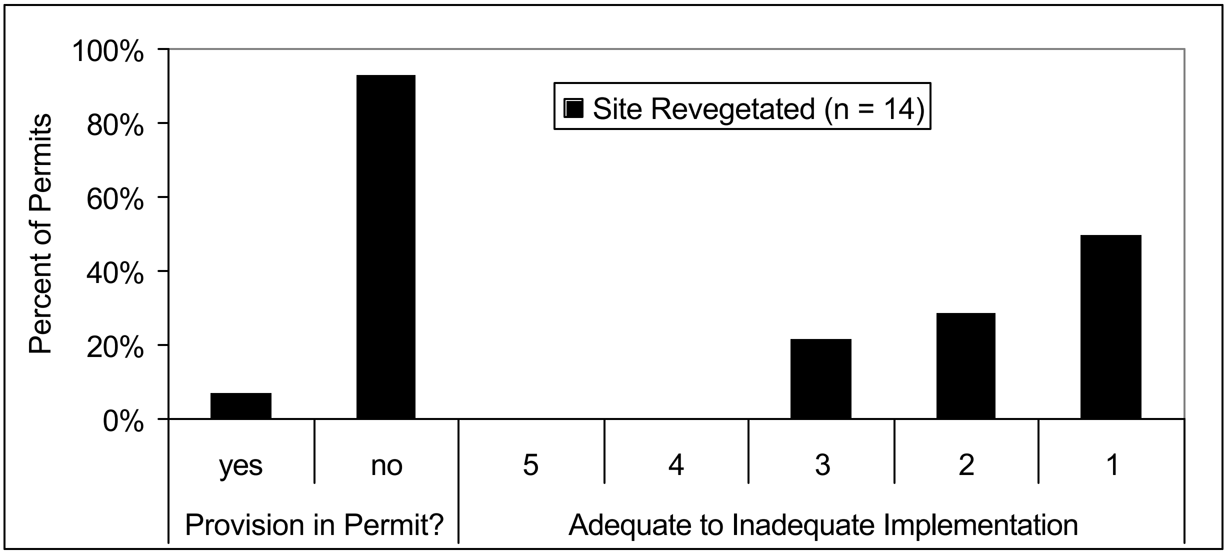

Figure 5. The percentage of Hydraulic Permits for Marine Bank protection containing re-vegetation provisions and implementation adequacy of re-vegetation as determined by field assessments.

Similar to fresh water bank permits, the overall compliance of marine bank permits was largely judged as highly adequate when measured across all categories for that permit (Fig. 6). However, this overall effectiveness was in sharp contrast to project effectiveness as measured by the three summary effectiveness indicators (Fig.6). Again the most striking finding was the apparent disparity between overall compliance and the ability of the project to meet the no net loss benchmark with over 50% of the projects getting a less than medium adequacy score (Fig. 6).

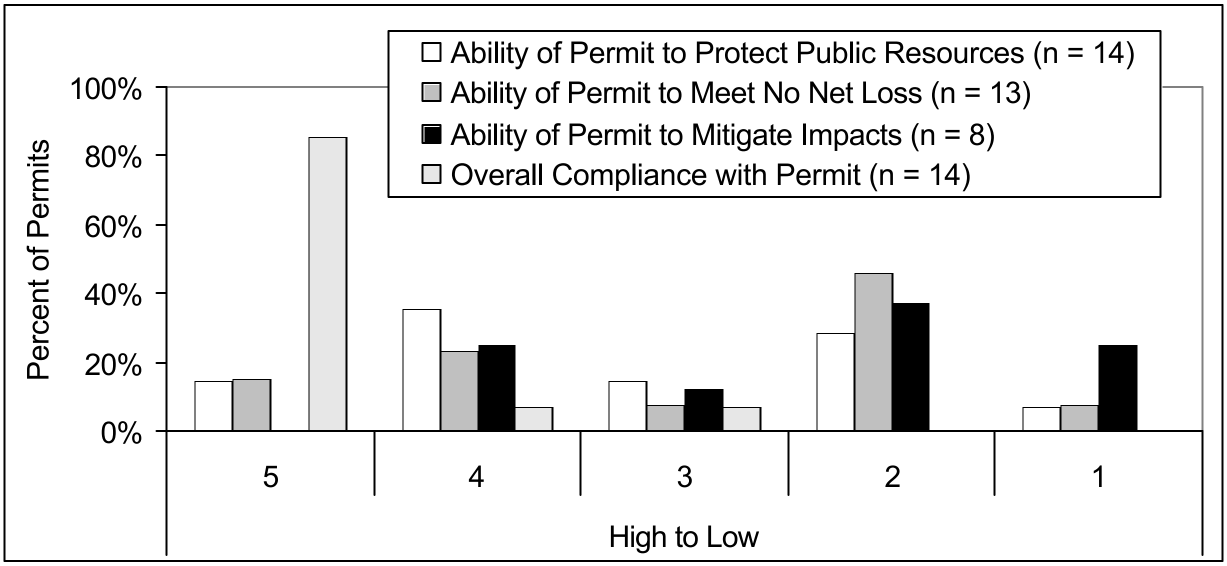

Figure 6. Three measures of permit effectiveness to protect public resources and overall permit compliance for Marine Bank Protection.

Culverts

Culvert permits had relatively high provision rates for *culvert size* (91%), moderate provision rates for the *burial of the culvert outlet* and *culvert slope* (both at 64%), and low provision rates for *substrate in the culvert* (20%; Fig. 7). Compliance rates were 38% for culvert size, 71% for burial of the culvert outlet, 57% for culvert slope, and 100% for substrate in the culvert (Fig. 7). Implementation rates across all culvert projects were approximately 50%.

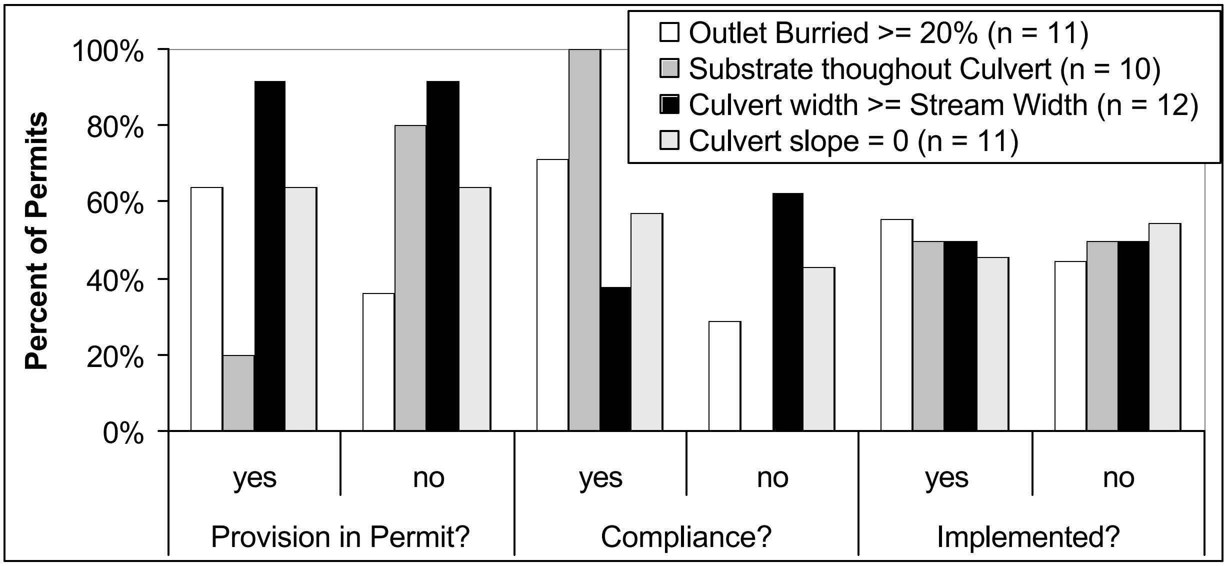

Figure 7. The percentage of Fish Passage Culverts Hydraulic Permits that contained provisions, the percentage of permitted projects that complied with those provisions, and the percentage of permitted projects that implemented or met the intent of those provisions regardless of whether those provisions were included in the permit.

Provision rates for inlet armoring and site revegetation were relatively high but implementation rate was much greater for inlet armoring than for site revegetation (Fig. 8). In addition, the majority of projects for inlet armoring were judged as adequate whereas the majority of revegetation efforts tended to be less than adequate (Fig. 8).

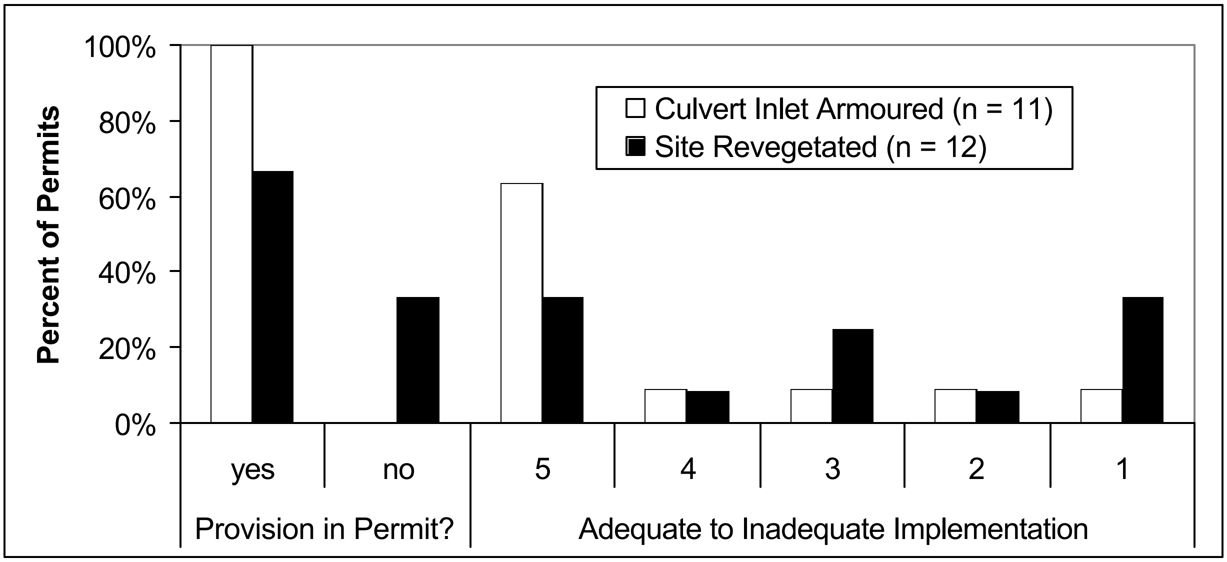

Figure 8. The percentage of Hydraulic Permits for Fish Passage Culverts containing re-vegetation and inlet armoring provisions, and implementation adequacy of those provisions as determined by field assessments.

Overall compliance scores were distributed more uniformly across ability categories for culverts than other permit types with the highest number of permits (4) receiving the worst rank (Fig. 9). Similar to other permit types, the *ability of culvert permits to protect public resources* was high relative to their *ability to mitigate impacts* or to *achieve no net loss*.

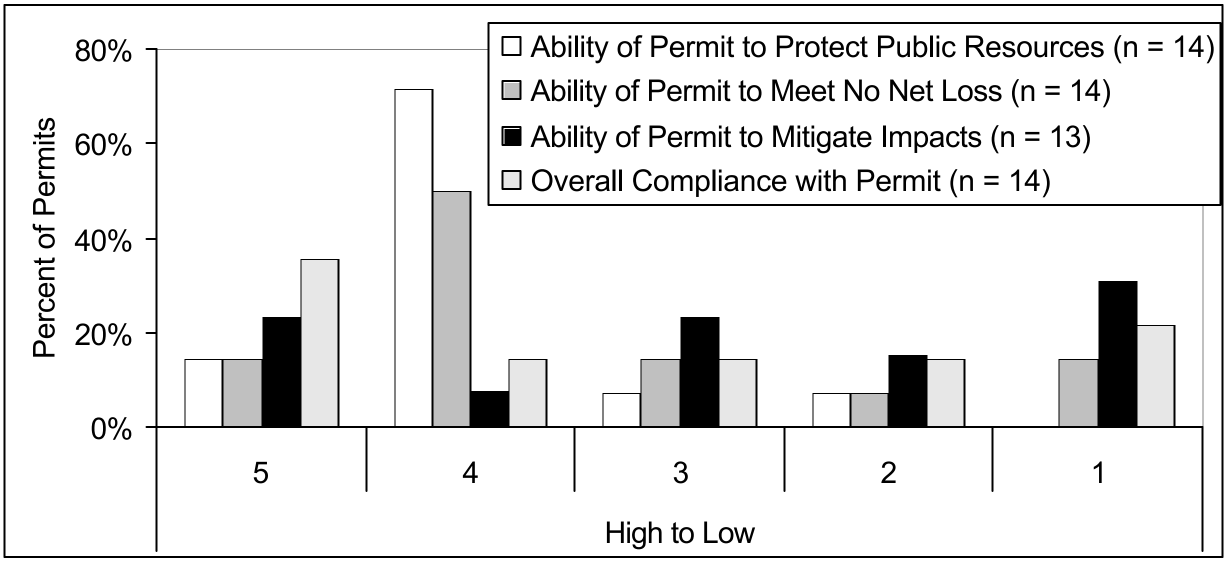

Figure 9. Three measures of permit effectiveness to protect public resources and overall permit compliance for Fish Passage Culverts.

Effectiveness Across All Project Types Combined

The weighted mean score for overall compliance on a scale of 5 (high) to 1 (low) across 58 projects was 4.1, where a score of 3.0 represents a medium ranking. The majority of projects, 34 of 58 (59%), received the highest score possible with the remaining 41% of the projects distributed relatively evenly across the remaining categories (Fig 10).

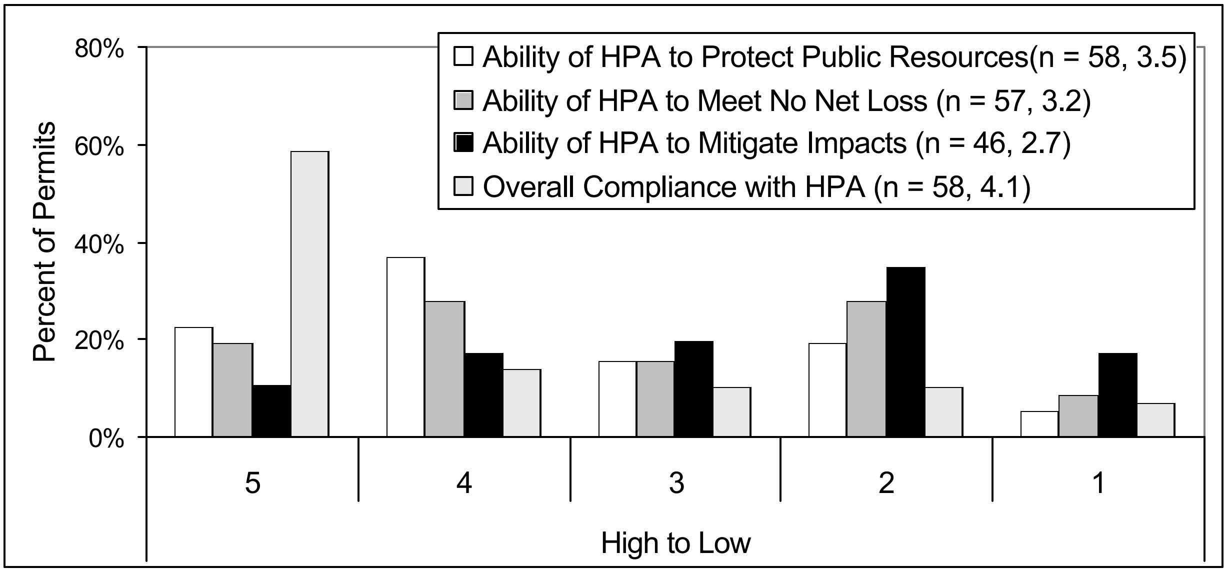

Figure 10. Three measures of permit effectiveness to protect public resources and overall permit compliance for Fresh Water Bank Protection, Marine Bank Protection, Fish Passage Culverts, Bridges, and Marine Over-water Structures. The numbers following the sample sizes in the legend are the weighted mean scores for those metrics.

The weighted mean scores of effectiveness measures on a scale of 5 (high) to 1 (low) ranged from 2.7 for the ability of the implemented project to mitigate impacts to public resources to a high of 3.5 for the ability of implemented projects to protect public resources (Figure 10). The ability of projects to meet no net loss (3.2) and to mitigate impacts (2.7) was clearly the most difficult effectiveness measure to achieve even when overall compliance was judged relatively highly (4.1). While some projects types were more capable of reaching the highest standards for overall effectiveness than other types, the distribution of scores suggested that high levels of effectiveness for all projects were difficult to attain in practice.

DISCUSSION

We assessed provision, compliance, and implementation rates, and effectiveness of five types of Region 6 hydraulic permits based on an examination of the HPA permit and field visits to completed projects. In general, permits contained approximately 75% of important and applicable provisions for each permit type with marine bank protection tending to have the highest and culvert projects the lowest provision rates. Clearly not all provisions were viewed as equally important or as pertinent to each project type by permitting biologists, although we did not attempt to determine why some provisions that were theoretically applicable were excluded from the permit in this study.

Compliance rates varied by provision and permit type, with marine bank protection having the highest overall compliance rate for four of five common provisions. Bulkhead location, bulkhead materials, elimination of depressions below the OHWL, and placement of pea gravel each had a high compliance rate. Removing waste material below the OHWL was a common provision with poor compliance. Culverts tended to have the lowest compliance rate among projects types but again the reason for this is unclear. It appears that the most important provisions (i.e., most important for protection of public resources as judged by the authors) for each project type tended to have the highest provision and compliance rates, although this pattern was less apparent for fish passage culverts than other project types. It also appeared that compliance rates and measures of effectiveness were higher for activities that protected the project proponent's investment than activities unrelated to investments. For example, inlet armoring, which protects the culvert from washing away during high water was rated as relatively high in terms of adequacy, whereas vegetation adequacy for culvert permits was low, although a low provision rate for revegetation may also help explain this pattern.

One interesting finding was related to the relationship between provision and implementation rate. On average, implementation rate was higher than compliance rate across all project types. This result may be related to the fact that certain provisions were simply not considered necessary by permitting biologists to protect public resources due to the scope of the project. In these cases, field assessments would not be able to distinguish successful implementation from "unaffected public resources". Alternatively, project proponents may have met the intent of provisions despite the fact that those provisions were not explicitly written on the permit. One might expect such behavior with project proponents that have completed similar projects in the past, have a vested interest in the feature functioning well (armor at the culvert inlet), or that have some training in aquatic science.

Provision, compliance, and implementation rates are indirect measures of HPA program effectiveness and thus provide only a glimpse of what is occurring on the ground. A better measure of HPA program effectiveness is related to how well public resources are protected during the construction of a project and through time. We measured effectiveness indirectly by asking the evaluation team to rate projects in terms of their ability to cause *no net loss of fish life, or in the productive capacity of fish and shellfish habitat or functions* (Chapter 220-110 WAC). Two findings were notable from this effectiveness assessment. First, the ability of the permit process to protect public resources, to meet the no net loss standard, and to a lesser degree, to fully mitigate the impacts of HPA projects was relatively low. That is, nearly 50% of all projects received a medium to low score on these measures. Second, despite the low effectiveness scores, field evaluations also indicated that overall compliance with permits was judged as relatively high. These findings seem to suggest that while permits may be doing an adequate job overall, they cannot entirely mitigate the negative effects of a project. It is important to distinguish our qualitative assessment of effectiveness from the overall effectiveness of the HPA program, which was not addressed in this pilot study. While some projects were judged to inadequately meet the no net loss standard, in the absence of the HPA program, ***every*** project could have resulted in dramatically more and greater negative impacts to public resources.

Clearly marine bank protection projects tended to have higher provision, compliance, and implementation rates than fresh water bank protection or fish passage culverts projects. While it is not entirely clear why this was the case, we believe that it may be related to two issues: 1) Natural resource agencies, including WDFW, and Tribes have highlighted the need for better protection in this environment, which has come under extreme development pressure. This heightened level of scrutiny may result in better overall provision, compliance, and implementation rates from both permit biologists and project proponents, and 2) Construction of marine bank protection is a specialized field limited to relatively few contractors, who complete the majority of these projects. It may be that these contractors better understand and thus better implement important HPA guideline by virtue of their experience. Despite the fact that these rates were relatively high for marine bank permits, measures of effectiveness for marine bank protection were similar to other project types.

Assessments of HPA permits were based on single visits to the project site and thus could not be used to compare condition immediately after project completion against a consistent benchmark (i.e., undisturbed conditions). Some permits were designed to improve an already disturbed site (e.g., an undersized or failing culvert), whereas other permits were located in relatively undisturbed areas. In the case where a permit was issued to repair a failing culvert, the replacement culvert may have been viewed by the evaluation team as a net benefit in terms of effectiveness. Thus, it was not always clear what reference condition the evaluation team was using to assess effectiveness. Further, because we sampled only recently completed projects, we mostly judged the effectiveness of projects before they were subjected to major disturbance events, which are relatively common in the Pacific Northwest. If problems associated with the permit surface only after a disturbance event, then we probably overestimated the project effectiveness in this study. It is important to note that these potential problems (inconsistent benchmarks and predisturbance conditions) only serve to inflate effectiveness scores. In other words, effectiveness scores should be considered conservative until we can control for confounding effects.

The ability of projects to meet no net loss and to mitigate impacts is clearly the most difficult to achieve even as the overall compliance (mean weighted score of 4.1) was judged relatively highly. Again, the pattern here could change if we were able to distinguish between permits for new versus repair activities or between projects that have or have not experienced a major storm event.

Survey questionnaires are notoriously subject to personal interpretation and bias and therefore often include multiple questions phrased in different ways that address similar information. The inclusion of three different effectiveness questions, which have similar but slightly different meanings, was our attempt to get an overall impression of HPA project effectiveness. Based on our results, we suggest that the "ability of project to mitigate impacts " was considered the most difficult outcome to achieve, followed by the "ability to meet a no net loss outcome", and then the "ability to protect public resources". Regardless of the way these questions were worded, the pattern of answers appeared to be remarkably similar across project types. While individual projects can achieve very good outcomes by any of our measures of effectiveness, the overall outcomes to protect public resources at the program level appear to be relatively low as judged by our four evaluation team members. Part of our inability to meet "no net loss" is undoubtedly related to the dual nature of the Hydraulic Code (Chapter 77.55 RCW) to protect fish life and to allow for the protection of personal property and human health.

Our results suggest that it is possible to make immediate improvements to the HPA program by ensuring that all pertinent provisions are included on each permit. Judging from survey results of marine bank protection permits; it also appears that we *can* attain high compliance and implementation rates under the right circumstances, although we did not investigate what constitutes the right circumstance in this study. Parenthetically, we suspect that the Department as well as other entities subjected marine bank protection permits to more scrutiny and that this probably contributed to higher compliance rates. Improving levels of success in achieving *no net loss* is a more complex enterprise. Notwithstanding issues of different baseline conditions or subjectivity in effectiveness ratings, it appears that each project type *can* at least meet a high standard of resource protection despite the fact the vast majority did not. Even if we come to believe that no project can be completely mitigated during the permitting process, judging from results of the effectiveness questions, there is room for improvement. To that end, it might be useful to study projects that met the highest levels of effectiveness so that we can apply similar processes to other projects.

The HPA survey process requires improvements as well. The HPA database should readily accommodate queries for audits and effectiveness surveys. This means that the Olympia office has copies of all permit documents, all information is included in those documents, and information is readily accessible by query. We need to better define survey questions related to effectiveness so that subjectivity is minimized and better train and equip field staff so that surveys become more accurate and repeatable. Despite the problems we encountered in conducting the pilot study, we learned a good deal about the capabilities of the existing program to accommodate critical review. We can make immediate small-scale improvement to the HPA process based on this study. However, until we institutionalize an adaptive management approach to the HPA program, we will struggle with answering the big questions – Does the permit process adequately protect public resources at a single site? – and, How do we protect public resources from cumulative effects of multiple projects?

Plans for the Immediate Future

Effective regulatory programs, including the HPA program, are critical components of efforts to protect and restore aquatic habitats in Washington State. While there is a need to better understand how the HPA program works across the state, we propose 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. A large amount of modified shoreline has been permitted by WDFW, yet compliance and effectiveness information for HPA activities in the nearshore, including mitigation associated with projects, is mostly lacking. This project will measure compliance and effectiveness of the HPA permit program, including the overall performance of mitigation projects, and make recommendations for improvements within an adaptive management framework.

This program will fund 1 full time and 4 seasonal field biologists to review recent HPAs to determine if proponents implemented provisions of the permit, and whether those provisions were effective in protecting habitat. This activity will focus first on the most important activities (as measured by number of permits) including shoreline modifications and over-water structures. Additionally, an analysis of mitigation effectiveness will also be conducted.

WDFW will produce study results describing the compliance rate among HPA applicants, measures of effectiveness of the HPA provisions and mitigation activities. The study will recommend practical and immediate ways to improve compliance and effectiveness of HPA permits in Puget Sound, and more effective means of meeting the goals of mitigation programs, and measuring success

Appendix A

Field Review Forms for HPA project

Date of field review: *Date HPA was issued:.*

INSTRUCTIONS:

1. Evaluate only one of each type of project for multiple – project type/site HPA. Make note at end of Section 4 evaluation (Reviewers Note) if project has not been exposed to high flow events previously, or if unknown.

2. Go as far as necessary to obtain reasonable measurements of bank full width. Low impact area and low variability in channel width mean that you can stay close to the project site. High impact and high variability mean that you may have to move further upstream to obtain reasonable estimates of channel width.

3. For the purpose of this survey; HPA provisions includes all HPA elements: Project specifications and plans that are part of the HPA, as well as numbered provisions in the HPA.

Fish Passage Projects - Culverts

Is ≥ 20% of the vertical rise of the culvert below the level of the streambed at the outlet? Yes ☐ No ☐ Actual value:

Was this a provision in the HPA? Yes ☐ No ☐

Substrate covers culvert length? Yes ☐ No ☐
If no, ocular estimate of length with substrate (%):

Culvert streambed width at least equal to streambed width? Yes ☐ No ☐
If no, actual culvert width: ________. Actual streambed width: ______________.
Actual BFW:

Was this a provision in the HPA? Yes ☐ No ☐
Does the culvert length meet HPA specifications? Yes ☐ No ☐
Was this a provision in the HPA? Yes ☐ No ☐
If the culvert is not a stream simulation design, is it placed at zero slope? Yes ☐ No ☐
Actual slope value:

Was this a provision in the HPA? Yes ☐ No ☐

Is the inlet armored to protect against flood scour? Well> 1 2 3 4 5> Not Well
Was this a provision in the HPA? Yes ☐ No ☐

Is the site revegetated? Well> 1 2 3 4 5> Not Well
Was this a provision in the HPA? Yes ☐ No ☐

Of the assessable provisions, (not covered above), describe apparent non-compliance.

Does the HPA specify mitigation actions beyond Avoid and Minimize? Yes ☐ No ☐
If yes, did applicant conduct the mitigation action? Yes ☐ No ☐
In your professional opinion, does the HPA provide and accomplish mitigation resulting in no-net loss of habitat/function? Yes ☐ No ☐

Based on site conditions, what provisions could WDFW have included in the HPA to improve the protection of fish life? What new or additional provisions are needed to improve protection of fish life?

Example: Work window conflicts with Olympic Mud Minnow hibernation life stage. Change window to 7/4 and no work shall occur after sunset.

Was the project completed as described in the approved applicant plans? Yes ☐ No ☐
Describe apparent differences and potential resource effects:

Is it apparent that the applicant went beyond the minimum requirements as called for in the HPA and plans/specifications to protect fish and water? Yes ☐ No ☐
Describe activities and potential resource benefits:

1) Ability of the provisions to protect public resources: (High) 1 2 3 4 5 (low)
2) Ability of provisions to meet no net loss of habitat/function: (high) 1 2 3 4 5 (low)
3) Ability of mitigation to compensate impacts beyond Avoid and Minimize: (high) 1 2 3 4 5 (low) 4) The applicant's compliance with HPA provisions: (high) 1 2 3 4 5 (low)

Section 4 Field review of HPA project

Date of field review: *Date HPA was issued:.*

INSTRUCTIONS:

1. Evaluate only one of each type of project for multiple – project type/site HPA. Make note at end of Section 4 evaluation (Reviewers Note) if project has not been exposed to high flow events previously, or if unknown.

2. Go as far as necessary to obtain reasonable measurements of bank full width. Low impact area and low variability in channel width mean that you can stay close to the project site. High impact and high variability mean that you may have to move further upstream to obtain reasonable estimates of channel width.

3. For the purpose of this survey; HPA provisions includes all HPA elements: Project specifications and plans that are part of the HPA, as well as numbered provisions in the HPA.

Freshwater Bank Protection

Does material constrict BFW to less than what existed prior to the construction? Yes☐ No ☐
If no, what was BFW prior________; and after__________?
Was this a provision in the HPA? Yes ☐ No ☐

Does the HPA contain a provision for wood or boulder placement for mitigation? Yes☐ No ☐
Does mitigation comply with HPA provisions? N/A ☐ Yes ☐ No ☐

Is the site revegetated? (Very well to not very well) 1 2 3 4 5
Was this a provision in the HPA? Yes ☐ No ☐

Do the materials and construction techniques prevent soil from reaching the water? Yes ☐ No ☐
Was this a provision in the HPA? Yes ☐ No ☐

At what estimated perpendicular distance from the OHWL does the structure prevent riparian tree presence/growth?

Does the HPA specify mitigation actions beyond Avoid and Minimize? Yes ☐ No ☐
If yes, did applicant conduct the mitigation action? Yes ☐ No ☐
In your professional opinion, does the HPA provide and accomplish mitigation resulting in no-net loss of habitat/function? Yes ☐ No ☐
ased on site conditions, what provisions could WDFW have included in the HPA to improve the protection of fish life?

Was the project completed as described in the approved applicant plans? Yes ☐ No ☐
Describe differences and potential resource effects:

Did the applicant go beyond provisions of the HPA to protect fish and water? Yes ☐ No ☐
Describe activities and potential resource benefits:

Based on your best professional judgment how would you rate:

1) Ability of the provisions to protect public resources. (Very high to very low) 1 2 3 4 5
2) Ability of provisions to meet no net loss of habitat/function (Very high to very low) 1 2 3 4 5
3) Ability of mitigation (where it exists) to compensate impacts to habitat/function 1 2 3 4 5
4) The applicant's compliance with HPA provisions (Very high to very low) 1 2 3 4 5

Section 4 Field review of HPA project

Date of field review: *Date HPA was issued:.*

INSTRUCTIONS:

1. Evaluate only one of each type of project for multiple – project type/site HPA. Make note at end of Section 4 evaluation (Reviewers Note) if project has not been exposed to high flow events previously, or if unknown.

2. Go as far as necessary to obtain reasonable measurements of bank full width. Low impact area and low variability in channel width mean that you can stay close to the project site. High impact and high variability mean that you may have to move further upstream to obtain reasonable estimates of channel width.

3. For the purpose of this survey; HPA provisions includes all HPA elements: Project specifications and plans that are part of the HPA, as well as numbered provisions in the HPA.

Marine Bank Protection

Is the bulkhead no further waterward than specified in the HPA? Yes ☐ No ☐
Was this a provision in the HPA? Yes ☐ No ☐

Is the bulkhead composed of material that is specified in the HPA? Yes ☐ No ☐
Was this a provision in the HPA? Yes ☐ No ☐

Are construction materials or replacement remnants below the OHWL? Yes ☐ No ☐

Was this a provision in the HPA? Yes ☐ No ☐

Do construction-related depressions exist in the substrate below the OHWL? Yes ☐ No ☐
Was this a provision in the HPA? Yes ☐ No ☐
If required in the HPA, is there evidence of pea gravel placement? N/A ☐ Yes ☐ No ☐

Is the site revegetated? (Very well to not very well) 1 2 3 4 5
Was this a provision in the HPA? Yes ☐ No ☐

Does the structure appear to prevent the conveyance of terrestrial sediments to the beach?
Yes ☐ No ☐
Does the HPA specify mitigation actions beyond Avoid and Minimize? Yes ☐ No ☐
If yes, did applicant conduct the mitigation action? Yes ☐ No ☐
In your professional opinion, does the HPA provide and accomplish mitigation resulting in no-net loss of habitat/function? Yes ☐ No ☐

Based on site conditions, what provisions could WDFW have included in the HPA to improve the protection of fish life?

Was the project completed as described in the approved plans? Yes ☐ No ☐
Describe differences and potential resource effects:

Did the applicant go beyond provisions of the HPA to protect fish and water? Yes ☐ No ☐
Describe activities and potential resource benefits:

Based on your best professional judgment how would you rate:
1) Ability of the provisions to protect public resources. (Very high to very low) 1 2 3 4 5
2) Ability of provisions to meet no net loss of habitat/function (Very high to very low) 1 2 3 4 5
3) Ability of mitigation (where it exists) to compensate impacts to habitat/function 1 2 3 4 5

4) The applicant's compliance with HPA provisions (Very high to very low) 1 2 3 4 5

Section 4 Field review of HPA project

Date of field review: *Date HPA was issued:.*

INSTRUCTIONS:

1. Evaluate only one of each type of project for multiple – project type/site HPA. Make note at end of Section 4 evaluation (Reviewers Note) if project has not been exposed to high flow events previously, or if unknown.

2. Go as far as necessary to obtain reasonable measurements of bank full width. Low impact area and low variability in channel width mean that you can stay close to the project site. High impact and high variability mean that you may have to move further upstream to obtain reasonable estimates of channel width.

3. For the purpose of this survey; HPA provisions includes all HPA elements: Project specifications and plans that are part of the HPA, as well as numbered provisions in the HPA.

Marine Over water Structures (piers, docks, and floats)

Does the length of the structure exceed the maximum allowed under the HPA? ***Yes*** ☐ ***No*** ☐

Was length a provision in the HPA? Yes ☐ No ☐

Does the width of the structure exceed the maximum allowed under the HPA? ***Yes*** ☐ ***No*** ☐

Was width a provision in the HPA? ***Yes*** ☐ ***No*** ☐

Is the structure grated as described in the HPA? ***Yes*** ☐ ***No*** ☐

Was grating a provision in the HPA? Yes ☐ No ☐
If grating is used, does stored material block sunlight? Yes ☐ No ☐
Was the storage of material on the grating a restriction in the HPA? Yes ☐ No ☐

Does the HPA prohibit grounding on critical habitats (e.g., eelgrass)? Yes ☐ No ☐
Was this a provision in the HPA? Yes ☐ No ☐
Does the structure ground on macroalgae or eelgrass? Yes ☐ No ☐
Does the structure ground on known forage fish spawning beaches? Yes ☐ No ☐

Is floatation fully enclosed as to prevent the breakup of material into the water? Yes ☐ No ☐
Was this a provision in the HPA? Yes ☐ No ☐

Does the HPA include a provision to prevent anchor damage to the bed? Yes ☐ No ☐
Does the anchor system prevent damage to the bed beyond the footprint? N/A ☐ Yes ☐ No ☐

Where eelgrass is present, does the HPA include a provision to prevent shading? Yes ☐ No ☐
Does the structure shade eelgrass? N/A ☐ Yes ☐ No ☐
Does the HPA specify mitigation actions beyond Avoid and Minimize? Yes ☐ No ☐
If yes, did applicant conduct the mitigation action? Yes ☐ No ☐
In your professional opinion, does the HPA provide and accomplish mitigation resulting in no-net loss of habitat/function? Yes ☐ No ☐

Based on site conditions, what provisions could WDFW have included in the HPA to improve the protection of fish life?

Was the project completed as described in the approved plans? Yes ☐ No ☐
Describe differences and potential resource effects:

Did the applicant go beyond provisions of the HPA to protect fish and water? Yes ☐ No ☐
Describe activities and potential resource benefits:

Based on your best professional judgment how would you rate:
1) Ability of the provisions to protect public resources. (Very high to very low) 1 2 3 4 5
2) Ability of provisions to meet no net loss of habitat/function (Very high to very low) 1 2 3 4 5
3) Ability of mitigation (where it exists) to compensate impacts to habitat/function 1 2 3 4 5
4) The applicant’s compliance with HPA provisions (Very high to very low) 1 2 3 4 5

Permitting Biologist (AHB) observations and comments on this HPA Audit Evaluation:

Example: "As-built" damaged in earthquake – currently repair in design stage.

Reviewing Team Observations and Notes

(may continue on back of this page and provide attachments: Idea is to describe observations unique to this HPA, especially regarding "No" answers and different than average, or expected ranking in field evaluation):