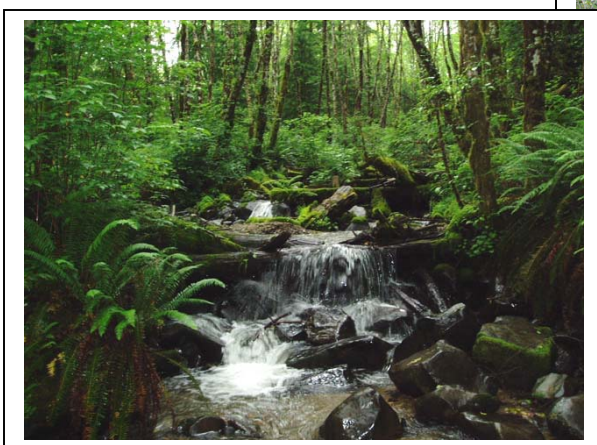


# Washington State Department of Natural Resources Habitat Conservation Plan 2003 - Implementation Monitoring



**Washington State Department of Natural Resources  
Habitat Conservation Plan  
2003 - Implementation Monitoring**

Table of Contents

|   |    |
|---|----|
| Introduction.....                                 | 3  |
| FY 2002 Implementation Monitoring Objectives..... | 4  |
| Methods.....                                      | 4  |
| Sample Selection.....                             | 4  |
| Compliance Determination.....                     | 6  |
| Field Inspections.....                            | 7  |
| Statistical Analysis.....                         | 8  |
| Monitoring Results.....                           | 10 |
| Timber Management Activities.....                 | 10 |
| Silvicultural Management Activities.....          | 13 |
| Non-Timber Management Activities.....             | 13 |
| Observations and Findings.....                    | 14 |
| Observations.....                                 | 14 |
| Findings.....                                     | 16 |
| Recommendations.....                              | 17 |
| Acknowledgments.....                              | 18 |
| References.....                                   | 19 |
| Appendix A.....                                   | 20 |
| Appendix B.....                                   | 25 |

**Washington State Department of Natural Resources  
Habitat Conservation Plan  
2003 - Implementation Monitoring  
Data Analysis and Observations**

March 25, 2004

Zdenek Donda, James Ryan, Bruce Livingston, Simon Kihia, Heather Cole and Angela Cahill

Washington State Department of Natural Resources  
Land Management Division

## **Introduction**

The Washington State Department of Natural Resources (DNR) developed a multi-species Habitat Conservation Plan (HCP) to comply with the federal Endangered Species Act (ESA) for management of state trust lands (DNR 1997). The HCP includes several main conservation strategies for the northern spotted owl, marbled murrelet, western Washington runs of several salmonids, and other federal and state listed, unlisted, and candidate species. In addition, the incidental take permit covers seven other upland species listed by the federal government as endangered or threatened. The plan covers approximately 1.6 million acres of state trust lands within the range of the northern spotted owl. All DNR management activities are covered. The DNR has a contractual agreement with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to implement the HCP. The DNR has also agreed to monitor this HCP on DNR-managed lands according to the following objectives for all planning units:

- To determine whether the HCP conservation strategies are implemented as written;
- To determine whether implementation of the conservation strategies results in anticipated habitat conditions; and
- To evaluate cause-and-effect relationships between habitat conditions resulting from implementation of the conservation strategies and the animal populations these strategies are intended to benefit.

The first objective can be referred to as implementation monitoring (U.S. Department of Agriculture et al. 1994). In order to meet our commitment under the HCP to document the types, amounts, and locations of forest management activities carried out on DNR-managed lands in each HCP planning unit, the DNR established an HCP implementation monitoring section in 2001, responsible for compiling the data necessary to document compliance with the conservation strategies. In the future, implementation monitoring will (in addition to determining strategy compliance), periodically describe changes in landscape-level habitat conditions in areas managed to provide spotted owl and marbled murrelet habitat, and statistically valid sampling will be conducted in order to evaluate the reliability of information stored in DNR databases (DNR 1997).

In 2002, HCP implementation monitoring section staff conducted a pilot project, which was the first centralized, comprehensive, on-the-ground review of the department's management activities conducted since full implementation of the HCP began in 1999. Information gained from the pilot project was used in the development of the monitoring approach used to conduct this year's review.

In February 2003, we proposed a revised monitoring concept for the 2003 HCP review and began preparing for field monitoring. The primary change from the pilot project is that we are reviewing selected conservation strategies or HCP components (stratifying our sample), rather than reviewing activities and all of the HCP conservation strategies that were implemented with those activities. By using this approach, we can make better statistical inferences regarding how well the conservation strategies are being implemented. Information from the 2003 implementation monitoring review should help us meet the primary objective of implementation monitoring outlined in the HCP, which is to provide information regarding strategy compliance in our HCP planning units.

## **Implementation Monitoring Objectives**

The main objective for the 2003 implementation monitoring was to determine whether the selected conservation strategies were implemented as written. Some of the other objectives of the review were:

- To determine the overall level of compliance for the monitored conservation strategies;
- To develop field data forms for the northern spotted owl and riparian strategies;
- To test and refine technical aspects of monitoring and methods of measurements for the owl and riparian conservation strategies within the OESF Planning Unit;
- To determine the educational and training needs of division and region staff in regards to proper implementation of the HCP; and
- To prepare a compliance report for monitored strategies in all DNR HCP Planning Units

## **Methods**

### **Sample Selection**

Implementation monitoring encompasses the department's management activities in all nine HCP planning units. HCP implementation monitoring for 2003 was conducted within all HCP planning units and encompassed all DNR regions except Northeast Region. As with the pilot project, the HCP Conservation Strategies selected for monitoring were taken from three general categories of management activities: timber, silvicultural, and non-timber. Two major conservation strategies of the HCP were selected for monitoring for the 2003 review, Riparian (only the buffer width and water typing elements) and Northern Spotted Owl. The spotted owl strategy was applicable in west-side, east-side and OESF planning units, but the riparian strategy was only applicable in west-side planning units and the OESF. During the sample selection process, two additional, less-frequently implemented strategies (the balds and mineral springs strategies of the uncommon habitats component) were found to have been implemented in the timber management activities sample, and were also selected for review. Within the three classifications, we calculated compliance for each of the strategies we reviewed (expressed as percent compliance) and included the 95% confidence interval. Only activities that implemented the targeted conservation strategies, and were initiated after January 1999 and completed between July 1, 2001 and June 30, 2002 (FY2002) were considered for our sample. Selected conservation strategies were evaluated to determine if they were properly identified and implemented.

To establish our monitoring samples, we went through a stratification process. Our first step was to look at all FY 2002 activities for a given category. We next stratified these samples to include only those where filling out an HCP checklist was required. Finally,

we further stratified those samples to include only those where the HCP strategy of interest was actually applied. Tables 1, 2, and 3 provide details on sample size for each classification; more detailed information on the sampled activities is on file at DNR.

Sample size and the method for selection varied with strategy and activity type. The silvicultural activity sample was selected from a 10 percent random sample of all silvicultural activities that is taken annually by another monitoring program. From this sample, 28 activities applied one or both of the targeted strategies; all 28 were included in the sample. All 16 of the non-timber activities completed in fiscal year 2002 that required application of one or both of the targeted strategies were reviewed. The northern spotted owl strategy was applied in 26 timber harvest activities, all of which were reviewed. Where overlap occurred and both the riparian strategy and spotted owl strategy were implemented in an activity, we selected them as part of the riparian sample. The remainder of the riparian sample was randomly selected to make up a total sample size of 31.

**Table 1. Timber Management Activities – Sample Details**

| <b>HCP Strategy Selected for Monitoring</b> | <b>Activities Triggering Positive Response for HCP Strategy Selected for Monitoring</b> | <b>Total Activities Sampled</b> | <b>% Activity Sample Size</b> |
|---|---|---------------------------------|-------------------------------|
| Riparian (buffer widths and stream typing)  | 114   | 31                              | 27.2                          |
| Northern spotted owl                        | 26  | 26                              | 100                           |
| Balds                                       | 1   | 1                               | 100                           |
| Mineral springs                             | 1   | 1                               | 100                           |

**Table 2. Silvicultural Activities - Sample Details**

| <b>HCP Strategy Selected for Monitoring</b> | <b>Activities Triggering Positive Response for HCP Strategy Selected for Monitoring*</b> | <b>Total Activities Sampled</b> | <b>% Activity Sample Size</b> |
|---|--|---------------------------------|-------------------------------|
| Riparian (buffer widths and stream typing)  | 28   | 28                              | 100                           |
| Northern spotted owl                        | 0  | 0                               | NONE SAMPLED                  |

\*Activities sampled include: ground and aerial application of herbicides.

**Table 3. Non-Timber Activities - Sample Details**

| <b>HCP Strategy Selected for Monitoring</b> | <b>Activities Triggering Positive Response for HCP Strategy Selected for Monitoring*</b> | <b>Total Activities Sampled</b> | <b>% Activity Sample Size</b> |
|---|--|---------------------------------|-------------------------------|
| Riparian (buffer widths and stream typing)  | 16   | 16                              | 100                           |
| Northern Spotted Owl                        | 0  | 0                               | NONE SAMPLED                  |

\*Activities sampled include: rights-of-way; recreation; mineral, rock, sand and gravel; land transactions; and special land use leases.

### **Compliance Determination**

HCP implementation procedures described in the Forestry Handbook (DNR online) and in the Final Habitat Conservation Plan were used as the primary sources for determining required protection measures and verification of conservation strategies. Only those procedures pertaining to HCP strategies and components were used. Where the HCP requires compliance with Forest Practices Rules, or where Forest Practices Rules do not allow substitution by HCP strategy, Washington Forest Practices Rules (Washington Forest Practices Board 2001) were also used.

#### ***Balds***

Activities implementing the balds strategy were considered compliant if no roads were constructed through the balds (DNR 1997).

#### ***Mineral Springs***

For the mineral springs strategy, an activity was considered compliant if it met the objectives laid out in the HCP. This meant that management activities within 200 feet of the mineral spring should have been designed to both retain adequate trees for perching and to maintain berry, fruit, and mast producing shrubs and trees. In addition, harvested trees must have been felled away from the spring, yarding equipment kept away from the spring, herbicide use minimized, and residual green trees and snags left within 25 feet of the mineral spring (DNR 1997).

#### ***Riparian***

Compliance with the riparian conservation strategy was evaluated in terms of the number of stream segments properly typed and adequately protected. A stream segment was identified as a reach that continuously remained the same water type classification. For HCP compliance purposes, Types 1-3 waters all contain fish; Type 4 waters do not contain fish, are greater than 2 feet average width and may be either seasonal or perennial. In all, 205 stream segments were examined for proper stream typing and, when applicable, proper buffer width.

For the west-side planning units, buffer widths for type 1, 2, and 3 streams are defined by the HCP as being "equal to the site potential height of trees in a mature conifer stand or 100 feet, whichever is greater" (DNR 1997 p. IV. 56) and are applied to each side of the stream. The site potential tree height is derived from standard site index tables (King 1966), using 100 years as the age at breast height of a mature conifer stand. When determining the width of the buffer, the site productivity used... "will be that occurring in the upland portions of the riparian ecosystem for that particular site" (DNR 1997 p. IV.

56). All Type 4 streams require a 100-foot horizontal distance buffer on each side of the stream.

In the OESF, a riparian strategy was determined compliant if interior core buffers were placed on all Type 1-4 streams and the protection measures met the following objectives:

1. aid in the restoration of the composition, structure and function of aquatic, riparian and associated wetland systems;
2. maintain physical integrity of the stream channel and floodplain;
3. maintain and aid restoration of water to the quantity, quality and timing with which the streams evolved;
4. maintain and aid restoration of natural sediment regime; and
5. protect hill slope areas susceptible to mass wasting.

Each stream segment where a riparian buffer was required was first evaluated for correct stream typing, and then checked to ensure that appropriate protection was applied. Three width samples were taken and averaged for each spot measured. For longer streams, buffer width was verified in multiple places. A stream segment was considered out of compliance if it was mistyped or if the average buffer width was below the minimum required width. After the field visits were concluded, we verified the site index that was determined by the region staff. This prevented us from knowing the buffer width that should have been applied to streams beforehand, possibly biasing our measurements.

The data for individual stream segment compliance is documented in Field Data Compilation forms on file at DNR.

### ***Northern Spotted Owl***

Northern spotted owl compliance was determined by evaluating activities that were conducted in designated Nesting Roosting and Foraging (NRF), Dispersal, and OESF landscapes as well as those activities where disturbance to an active nest site could have occurred. To help us determine compliance, a decision tree was completed for each of the applicable sales. Two decision trees were used; one for the east- and west-side planning units, and one for the OESF because the OESF has different HCP requirements than the east- and west-side planning units (Appendix A).

### **Field Inspections**

Prior to field inspections, a field packet was prepared to help us in the review. This packet consisted of a topographic map, hydrology and water type map, soils map and soils information, and a Planning and Tracking (P&T) "info-pack", which provides information about designated NRF habitat, designated dispersal habitat, owl nest patch/buffers, owl circle information, slope stability, and hydrologic maturity for a given site.

Additional parameters necessary to evaluate HCP implementation compliance were added to existing silvicultural monitoring program data forms. This enabled the silvicultural monitoring staff to share collected data with the implementation monitoring staff, saving time and money.

All measurements of horizontal distance utilized one of the following three methods: (1) taped, and adjusted for horizontal distance using a clinometer; (2) paced, and adjusted

for horizontal distance using a clinometer; or (3) measured with a laser rangefinder (Laser Technology Inc., Centennial, CO) set in the horizontal distance (HD) mode. To rectify measurement errors, correction factors were calculated (Appendix B) using a taped distance on level ground as the control. For analysis purposes, all original measurements were adjusted using the appropriate correction factor.

### Statistical Analysis

The purpose of the 2003 HCP implementation monitoring was to determine the compliance levels for the strategies that were reviewed. Compliance levels are the number of correct applications of the strategy expressed as a percentage of the total sample. The sampling populations are the number of times that the targeted strategies were actually applied (by category of activity).

Because the populations are relatively small and sampling with replacement cannot be assumed, sampling probabilities were based on hypergeometric distributions (Steel and Torrie 1960). The percent compliance ( $P_{i,j,k}$ ) for each combination of planning unit  $i$ , activity type  $j$ , and strategy  $k$  was estimated by the expression:

$$P_{i,j,k} = (X_{i,j,k}/n) \times 100$$

where  $X$  is the number of sampled activities that are compliant, and  $n$  is the sample size.

The reliability of the activity estimates was determined by estimating the 95 percent confidence intervals. This means there is a 95 percent chance that the true compliance level for the population is included within the interval. A wide interval is less precise than a narrower range. The estimates were based on binomial approximations from published tables (Beyer 1976). Because the sample size  $n$  is a relatively high proportion of the population size  $N$  (greater than 20%), the confidence intervals were corrected by the factor  $(1-n/N)^{1/2}$  (Cochran 1963).

The 95 percent confidence interval was used to determine the sample size that would provide a reliable estimate. A reliable estimate was defined as being within approximately 10 percent of the true compliance level 95 percent of the time. It was assumed that activities would be close to full compliance. Based on this definition and assumption, a minimum sample size of 30 was determined to be adequate. It was not feasible to sample 30 activities in each of the planning units. Therefore, only the combined estimate for all planning units could be considered reliable.

The compliance level of stream segments was computed in the same manner as for the other strategies. However, the reliability of the estimates was determined differently because of sampling method as well as the size of the sample and population. With a relatively large sample size (205) and population, the normal approximation can be used (Cochran 1963). Because the sample is selected on an activity basis, stream segments are not selected as an independent random sample. Instead, they are associated with the randomly selected activities. Therefore, the stream segment sampling was treated as cluster sampling for proportions (Cochran 1963), where the activities are the clusters and stream segments are elements within a cluster. The standard error of the estimate was estimated by the expression:

$$s.e.(p) = [((1-f)/nm^2) * (\sum a_i^2 - 2p\sum a_i m_i + p^2 \sum m_i^2) / (n-1)]^{1/2}$$

where:



$p$  = the proportion of all stream segments that are in compliance;

$f$  = finite population correction factor (the value of  $f$  was assumed to be insignificant);

$n$  = the total number of activities;

$m$  = the average number of stream segments per activity;

$a_i$  = the number of compliant stream segments in activity  $i$ ; and

$m_i$  = the total number of stream segments in activity  $i$ .

The value of  $s.e.(p)$  was used with the student's  $t$  statistic to estimate the 95% confidence interval.

In addition to determining overall stream segment compliance (stream typing and buffer widths combined), we determined discrete compliance levels for stream typing and buffer widths. The question that we wanted to answer for stream buffer compliance is: "when a stream was correctly typed, a buffer was required and the proper width buffer was known, how well were buffers applied"? The compliance level of stream buffers was computed from the subset of streams that require specific width buffers; therefore, Type 5 streams and streams in the OESF were not considered for this analysis.

## Monitoring Results

### Timber Management Activities

Since all of the timber harvest activities that implemented the spotted owl, bald and mineral spring strategies were reviewed, the results are the actual compliance levels and not an estimate; therefore statistical inferences are not required. The bald and mineral spring strategies were 100% compliant in the activities where they were applied and are not shown in the results tables below.

### Riparian Strategy

Compliance levels for the RMZ component of the riparian strategy (applied to timber management activities) were analyzed for the HCP planning units. These estimates, which combine stream typing and buffer widths, are shown in Table 4.

**Table 4. Timber Management Activities (Riparian Strategy)**

| <b>MONITORING RESULTS<br/>FOR THE RIPARIAN MANAGEMENT ZONE COMPONENT<br/>OF THE RIPARIAN CONSERVATION STRATEGY<br/>APPLIED TO STREAM SEGMENTS</b> |                                     |                                 |                                      |                            |
|---|-------------------------------------|---------------------------------|--------------------------------------|----------------------------|
| PLANNING UNIT   | STREAM<br>SEGMENT<br>SAMPLE<br>SIZE | STREAM<br>SEGMENTS<br>COMPLIANT | PERCENT STREAM SEGMENT<br>COMPLIANCE |                            |
|   |                                     |                                 | PERCENT                              | 95% CONFIDENCE<br>INTERVAL |
| <b>Columbia</b>   | 92                                  | 73                              | 79%                                  | 70% - 89%                  |
| <b>North Puget</b>  | 32                                  | 29                              | 91%                                  | 75% - 98%                  |
| <b>OESF</b>   | 25                                  | 17                              | 68%                                  | 46% - 85%                  |
| <b>South Coast</b>  | 40                                  | 27                              | 68%                                  | 48% - 87%                  |
| <b>South Puget</b>  | 14                                  | 12                              | 86%                                  | 57% - 98%                  |
| <b>Straits</b>  | 2                                   | 2                               | 100%                                 | N/A*                       |
| <b>ALL PLANNING UNITS</b>   | 205                                 | 160                             | 78%                                  | 72% - 84%                  |

\*A realistic confidence interval cannot be determined from such a small sample

Of the 205 stream segments sampled in all planning units, 160 were compliant for both stream typing and proper buffer width (78% mean compliance level). The stream segments found to be non-compliant could have been non-compliant for proper typing, buffer application, or both.

Stream segment compliance for stream typing and buffer widths were also analyzed separately and the analyses are shown in Figures 1 and 2. Of the 205 stream segments sampled, only 14 were mistyped (93% compliance). Twelve were incorrectly field-classified as Type 5, but we field verified them to be Type 4; one was field-classified as Type 5, but we verified it to be Type 3; and one was field-classified as Type 4, but we verified it to be Type 3.

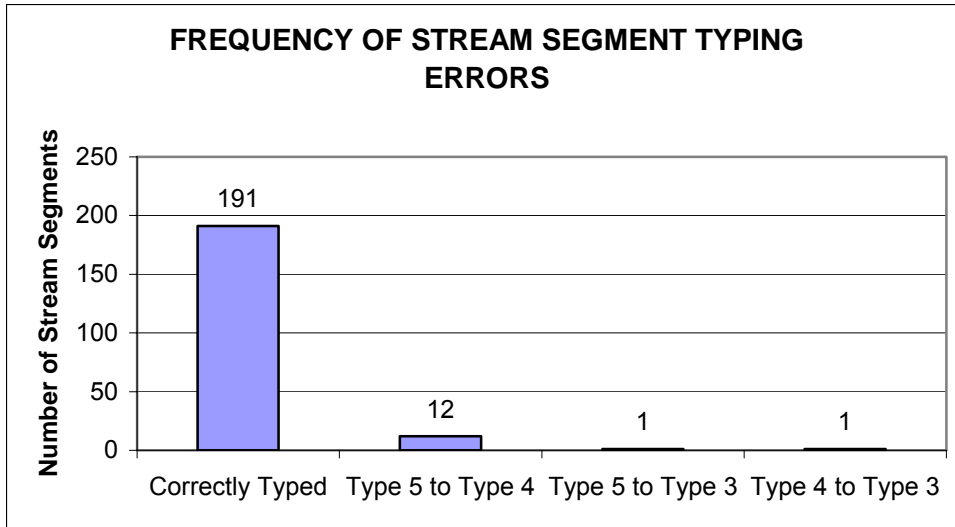


Figure 1. Stream Typing

Since 13 of the 14 mistyped stream segments were originally field-classified as Type 5, we decided to look at the compliance levels of Type 5 streams separately from the field-classified Types 1 – 4 streams. Ninety-seven out of the 205 segments were field-classified as Type 5; 13 were mistyped for a compliance rate of 87%. The compliance rate of all other types is 99% and the overall compliance rate for all streams is 93% (Table 5).

Table 5. Stream Typing Compliance Comparisons

| MONITORING RESULTS<br>STREAM TYPING COMPLIANCE COMPARISONS |                      |            |                      |
|--|----------------------|------------|----------------------|
| FIELD-CLASSIFIED<br>STREAM TYPE                            | # STREAM<br>SEGMENTS | #COMPLIANT | PERCENT<br>COMPLIANT |
| Type 5   | 97                   | 84         | 87%                  |
| Types 1 – 4  | 108                  | 107        | 99%                  |
| <b>TOTALS</b>  | <b>205</b>           | <b>191</b> | <b>93%</b>           |

Of the 85 correctly typed streams that required a specific width buffer be applied, only 59 (69%) had buffer widths that met the minimum required (Figure 2). Fourteen (16%) were within 90% of the required width, but 12 (14%) were below 90% of the required width and four were less than 80% of the required width.

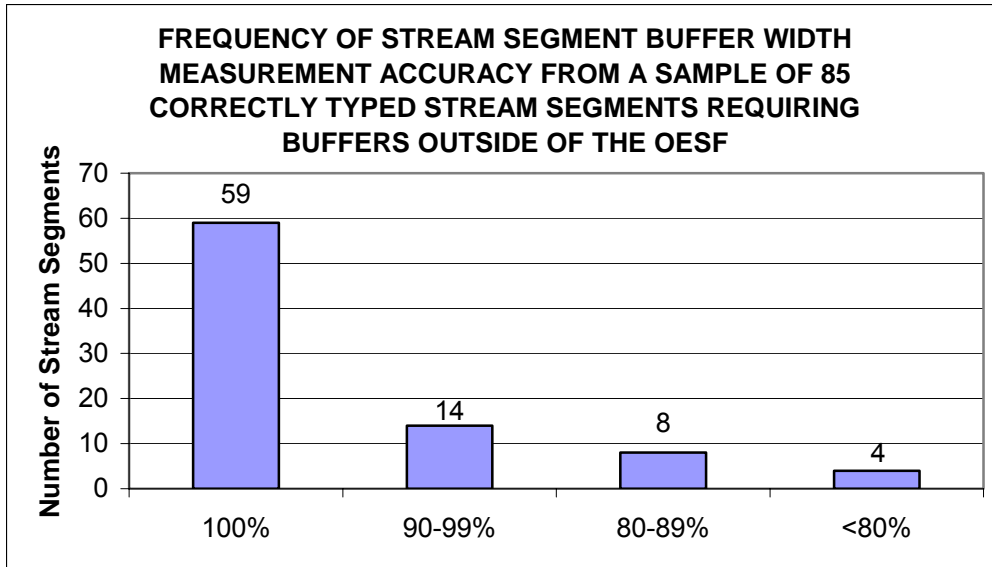


Figure 2. Stream Buffer Widths

These results indicate that we are doing a pretty good job of properly typing Type 1 – 4 streams, but highlight the need for a better understanding of Type 5 stream identification and more diligence in applying buffer widths (more discussion in the Observations and Findings section).

In the OESF, we found a Type 3 stream segment that did not meet the HCP criterion of maintaining the physical integrity of the stream channel and floodplain. Thinning had been conducted in the riparian management zone and many trees from the stream bank and from overhanging portions of a highly avulsing stream channel had been harvested.

**Northern Spotted Owl Strategy**

The spotted owl strategy was applied in 26 timber management activities and all were selected for review. Since all of the activities were reviewed, compliance levels shown in Table 6 are actual levels and not estimates. We were able to determine compliance in all planning units except for the OESF, where documentation of spotted owl habitat types and habitat removals in 5 of the 15 timber management activities was not adequate for us to determine compliance. Outside of the OESF, the spotted owl strategy was 100% compliant.

**Table 6. Timber Management Activities (Owl Strategy)**

| <b>MONITORING RESULTS<br/>NORTHERN SPOTTED OWL STRATEGY</b> |                    |                              |
|---|--------------------|------------------------------|
| <b>PLANNING UNIT</b>  | <b>SAMPLE SIZE</b> | <b>PERCENT COMPLIANCE</b>    |
| Columbia  | 1                  | 100%                         |
| Klickitat   | 4                  | 100%                         |
| North Puget   | 2                  | 100%                         |
| OESF  | 15                 | NOT ABLE TO DETERMINE*       |
| South Coast   | 1                  | 100%                         |
| South Puget   | 3                  | 100%                         |
| <b>ALL PLANNING UNITS</b>                                   | <b>26</b>          | <b>NOT ABLE TO DETERMINE</b> |

\*Documentation in 5 of the 15 sales in the OESF was not adequate to determine compliance.

### **Silvicultural Management Activities**

A total of 1340 silvicultural management activities were completed during FY2002. The silviculture program annually draws a 10% sample for monitoring. Only 28 activities from the 10% sample applied either of the targeted strategies (all applied the riparian strategy), and all were selected for HCP review. The riparian strategy was compliant in all 28 sampled activities (Table 7).

**Table 7. Silvicultural Management Activities (only Riparian strategy was applied)**

| <b>MONITORING RESULTS<br/>FOR THE RIPARIAN MANAGEMENT ZONE COMPONENT<br/>OF THE RIPARIAN CONSERVATION STRATEGY<br/>APPLIED TO SILVICULTURAL ACTIVITIES*</b> |                    |                           |                                |
|---|--------------------|---------------------------|--------------------------------|
| <b>PLANNING UNIT</b>  | <b>SAMPLE SIZE</b> | <b>PERCENT COMPLIANCE</b> | <b>95% CONFIDENCE INTERVAL</b> |
| Columbia  | 9                  | 100%                      | 66% - 100%                     |
| Klickitat   | 2                  | 100%                      | 16% - 100%                     |
| North Puget   | 7                  | 100%                      | 59% - 100%                     |
| OESF  | 1                  | 100%                      | N/A ONLY ONE SAMPLED           |
| South Coast   | 5                  | 100%                      | 48% - 100%                     |
| South Puget   | 0                  | NONE SAMPLED              | NONE SAMPLED                   |
| Straits   | 3                  | 100%                      | 29% - 100%                     |
| Yakima  | 1                  | 100%                      | N/A ONLY ONE SAMPLED           |
| <b>ALL PLANNING UNITS</b>   | <b>28</b>          | <b>100%</b>               | <b>88% - 100%</b>              |

\*Activities sampled include: ground and aerial application of herbicides

### **Non-Timber Management Activities**

The non-timber activities that applied either of the targeted strategies were all sampled; therefore, the compliance levels are actual levels, not estimates, and statistical inferences are not required. None of the 16 activities that were sampled applied the spotted owl strategy; all applied the riparian strategy and were 100% compliant (Table 8).

**Table 8. Non-Timber Management Activities (only Riparian strategy was applied)**

| <b>MONITORING RESULTS<br/>FOR THE RIPARIAN MANAGEMENT ZONE COMPONENT<br/>OF THE RIPARIAN STRATEGY<br/>APPLIED TO NON-TIMBER ACTIVITIES*</b> |                     |                           |
|---|---------------------|---------------------------|
| <b>PLANNING UNIT</b>  | <b>SAMPLE SIZE*</b> | <b>PERCENT COMPLIANCE</b> |
| <b>Columbia</b>   | 3                   | 100%                      |
| <b>Klickitat</b>  | 1                   | 100%                      |
| <b>North Puget</b>  | 1                   | 100%                      |
| <b>South Coast</b>  | 1                   | 100%                      |
| <b>South Puget</b>  | 8                   | 100%                      |
| <b>Straits</b>  | 2                   | 100%                      |
| <b>ALL PLANNING UNITS</b>   | 16                  | 100%                      |

\*Activities sampled include: rights-of-way; recreation; mineral, rock, sand and gravel; land transactions; and special land use leases.

## Observations and Findings

### Observations

Implementation monitoring simply (maybe not so *simply*) determines whether or not a management plan (e.g., a HCP) is implemented properly. The Department has made specific commitments to provide habitat and protections for listed and unlisted species, as well as protection for some uncommon habitats. If we fail to meet those commitments, we also fail to be in compliance with our HCP. Two years of implementation monitoring has shown us that implementation of HCP strategies has not been 100% compliant. The purpose of implementation monitoring is to provide feedback on existing procedures and implementation performance, which is crucial for evaluating whether adjustments or training are needed. Implementation monitoring needs to identify those things that we are doing well, but also provide us with information to support decisions in the adaptive management process.

Implementation monitoring also provides an opportunity for interaction and understanding between region and division staffs; an understanding of the thought process behind the development of the management activities, and an understanding of the criteria used to determine HCP compliance. During the past year's field reviews, not all regions involved their staffs in the monitoring field visits, mostly due to fire season conflicts. For us to fully understand the goals and objectives of the management activities, interaction between monitoring staff and region biologists and field foresters responsible for designing or complying with the activities is crucial.

Non-timber activities, at the levels of occurrence in 1996, were determined to have a de-minimus impact on the HCP. To date, we have not assessed levels of occurrence in our monitoring; however, we are currently examining whether changes in our approach to monitoring non-timber activities would provide us information better suited to determine HCP compliance. One approach under consideration is utilizing information currently being assembled in Region Inventory and Assessments (RIA's) under the *Statewide Public Use Inventory and Assessment* process. The *Statewide Public Use Inventory and Assessment* is a detailed inventory and assessment of public use and recreation on

state-owned trust lands and natural areas. This inventory and assessment will be reviewed and updated during biennial budget preparations.

The amount and level of detail documented in non-timber activities has been less than in timber management activities. For instance, if a new recreation trail is built, does it replace a section in a worse location? How many miles/feet of roads/trails have been decommissioned and restored to natural conditions? This type of information has not been consistently collected or documented. We have been working with recreation program staffs to receive the grant records on recreation projects, and to identify information, valuable for both documenting and reporting non-timber activities, that they might include in their documentation.

For silvicultural activities, most of the activities occur in the “footprint” of a previously completed timber management activity. If a timber management activity is compliant with the HCP, there is a higher likelihood that a subsequent silvicultural activity will also be compliant. The opposite is also true. If, for example, a timber management activity is not compliant and did not provide a wide enough riparian buffer, an application of herbicide could be applied unknowingly within the riparian area. We are also assessing whether changes in our approach to monitoring silvicultural activities is warranted.

Some logistic problems were encountered that we will attempt to resolve before the next field reviews. They included 1) scheduling of visits (even though the field visits were scheduled several months in advance, a busier than normal fire season hampered the availability of region and division staff); 2) the initial requests for activity documentation were not always responded to in a timely manner; and 3) some sites could only be accessed through locked gates, requiring region staff to provide safe and timely entry.

### ***Documentation***

**Proper documentation is essential in making a determination of successful implementation of the HCP conservation strategies. Thorough information provides a more complete picture regarding strategy implementation.** The following example illustrates why documentation is so important in determining compliance with the HCP. We found stream-shocking documentation in two instances that supported a finding of “no fish” in streams that otherwise met the physical criteria for fish-bearing streams. During the field review we found fish to be present in one of the streams, however, we did not make a determination of non-compliance in either case because documentation was found substantiating that the typing protocol had been followed and “due diligence” had been exercised in meeting the stream typing requirements. Upgrading the stream that we found to have fish presence was required after our review.

Incomplete written documentation was the main reason for our inability to determine strategy compliance. In some situations, even after our follow-ups with regions and allowing additional time to provide documentation, information was not provided to us. In several sites where leave trees were left along type 5 streams, no documentation was provided regarding whether the trees were left to protect unstable slopes or some other function. Information that could provide us with valuable insights on HCP implementation that we found to be often lacking included: letters and memos from biologists and other specialists, documentation of the thought process for determining the need or lack of need for wind buffers, written documentation on stream shocking, and NRF, Dispersal, and OESF Landscape Planning Unit habitat thresholds.

## **Findings**

Based on the results of this year's field review, and from discussions with region staffs regarding implementation of the HCP, the following items are determined to be "findings" and are discussed in detail here. If there is a common theme we have encountered during this year's monitoring (as well as during the pilot project), it is a need for good documentation. Lack of documentation was the single biggest reason for our inability to determine strategy compliance and in some cases to even determine whether any HCP strategies were applied.

### ***Riparian***

From this year's monitoring as well as the pilot project in 2002, we found that many riparian buffers are short of the required widths. In this year's sample, only 69% of the riparian buffers met the minimum required width. From talking with field staffs in some regions, it appears that a common method of measuring riparian buffers is to measure out the required distance, and if there is no tree there, apply the tag on the first tree closer to the stream. When we measure a riparian buffer for compliance, we measure out to the tagged trees to determine the riparian width. We found buffer widths to be deficient by as much as 30 feet when consistently tagging the next tree closer to the stream. It has been suggested that for compliance purposes, we measure our buffer widths out to the first cut tree in the unit (stump). The question then becomes: is the area between the last cut tree in the unit and the tree tagged to delineate the riparian buffer part of the cut unit, or part of the riparian buffer? From an ecological perspective (since there are no trees there), it is more closely related to the cut unit than the buffer. In addition, we interpret the intent of the HCP to be that buffers should provide shade, large woody debris, and habitat for other aquatic and riparian obligate species. The area between the last cut trees in the unit and the tagged trees delineating the riparian buffer likely would not meet those requirements.

Stream typing accuracy for streams field-classified as Types 1 – 4 was extremely good during this field review. Only 1 stream segment out of 108 field-classified Types 1 – 4 was mistyped for a 99% compliance rate. We found the majority of non-compliant streams to be field-classified as Type 5. Thirteen of the 14 total mistyped stream segments were field-classified as Type 5, but were field verified to be Type 4 (12) or Type 3 (1) and require buffers of 100 ft or more (compliance was only 87%). Based on the rate of compliance, and the fact that we found streams incorrectly field-classified as Type 5 in every west-side region except one, it appears that some type of field refresher on stream identification is needed.

In the OESF, harvest activities within the riparian buffers must maintain the physical integrity of the stream channel and floodplain, as well as the other objectives outlined in the HCP IV.107 (DNR 1997). We found thinning of trees from the overhanging stream banks to be inconsistent with the conservation objectives.

### ***Spotted owl***

For the most part we found the spotted owl strategy implemented in our management activities to be compliant. The most compelling issue with respect to spotted owl compliance is the lack of tracking and documentation of habitat thresholds and habitat removals in NRF and Dispersal landscapes, and in the OESF. We found very little timber sale documentation that substantiated NRF/Dispersal habitat thresholds before and after harvest activities. HCP requirements are different in the OESF than in the



east- and west-side planning units. One of the requirements in the OESF is to evenly schedule and distribute harvests of available young- and old-forest habitat over the duration of the restoration phase of the HCP (40 – 60-year period). Specifically, available habitat will be calculated for each landscape-planning unit, and harvests of that habitat will be scheduled and conducted so that they are evenly distributed by decade over the duration of the restoration phase of the HCP. From our monitoring visits and research of timber sale documentation, we were unable to verify whether requirements of the HCP were met in the OESF for the sales that we reviewed specifically with respect to identification of young- and old-forest habitat in sales, and evenly distributing the harvests of available habitat over the duration of the restoration phase of the HCP.

### ***Standard Practices Memorandum SPM03-10***

The HCP checklist is the principal document that provides us with information about which HCP conservation strategies were applied in our management activities. The HCP checklist is required to be completed and distributed for activities as outlined in Standard Practice Memorandum SPM03-10 (DNR online). It is from the completed checklists that we first begin to stratify the strategies that have been implemented in our management activities, and then to select a sample for review. HCP checklists have not consistently been completed and submitted to the HCP Implementation Monitoring Section as required by SPM03-10, and for the most part have not been completed and/or submitted for non-timber management activities at all. The purpose for submitting completed HCP checklists to the HCP Section is so that we can develop a database showing the HCP strategies that have been implemented in our activities, which will facilitate our ability to select the samples to review. Currently, because we have not consistently received completed checklists, we must request the activity “jackets” from the Title Records Office for timber management activities, and the responsible programs for non-timber and silvicultural management activities, in order to determine which strategies were implemented. This has greatly hampered our ability to be efficient and to provide the regions with information on the upcoming year’s selected activities in a timely manner.

### ***Timing of field visits***

During this field review season, we scheduled our field visits in the regions beginning in July. Because fire impacts on staff began the first of July, many region and division staffs were not available for the field visits. Continuing fires made it difficult for region staff to participate, so division-monitoring staff (depleted as well) continued with field visits without region participation, but at a rate much lower than scheduled. Field visits were finally concluded in November, leaving little time for preliminary analysis before the Annual Meeting with the Services. We have concluded that field visits need to be scheduled and completed earlier in the field season both to avoid fire season conflicts, and also to allow completion of the analysis and monitoring report before the Annual Meeting.

## **Recommendations**

- Better documentation. Our HCP is a multi-decadal plan and completing written documentation now will be the only way to determine success in the future. Distribution of the required documentation according to SPM03-10 is also essential.

- We encourage region participation. We provide a program code for region staff to charge their time so that region budgets are not impacted, but more importantly to allow interaction and understanding of both activity objectives and monitoring compliance criteria.
- To avoid fire season conflicts, we will schedule most of the field visits in the spring, or early summer, and if additional visits are required, complete them as soon after fire season as is practicable.
- To avoid small errors in the widths of RMZ buffers, we recommend that for every tag placed on a tree nearer to the stream, the next tag should be placed on a tree just outside the measured, required buffer width, so that the “average” required width is achieved.
- Stream typing and buffer width inconsistencies need to be addressed. We see the need to provide guidance consistent with the HCP commitments in a riparian guidance document and provide training in the field to compliment the written guidance.
- Because the 2003 implementation monitoring fieldwork was not completed until November, completion of this report was delayed until after the Annual Meeting in December and the 5-year Comprehensive Review Meeting in April. Future field reviews will be scheduled earlier in the year to allow completion of the monitoring report before the Annual Meeting.

## **Acknowledgements**

We especially want to thank the region employees that participated with us in the field reviews. Only with their participation did we gain a thorough understanding of the objectives of the activities that implemented the HCP strategies we reviewed. The implementation monitoring team also wishes to acknowledge the contributions of the many individuals who participated in the production and support for this project. To date we have received many pieces of correspondence and feedback from DNR region and division staffs as well as the U.S. Fish and Wildlife Service. We thank everyone who has taken the time to provide us with his or her thoughts and suggestions.

## References

- Beyer, W.H. ed. 1976. *Handbook of tables for probability and statistics*. Cleveland, OH: CRC Press.
- Cochran, W. G. 1963. *Sampling techniques*. New York: John Wiley and Sons.
- Hanson, E., D. Hays, L. Hicks, and L. Young. 1993. *Spotted owl habitat in Washington, a report to the Washington Forest Practices Board*. Olympia, WA: Washington State Department of Natural Resources.
- King, J.E. 1966. *Site index curves for Douglas-fir in the Pacific Northwest*. Weyerhaeuser Forestry Paper No. 8. Centralia, WA: Weyerhaeuser Forestry Research Center.
- Steel, R. G. D and J. H. Torrie. 1960. *Principles and procedures of statistics*. New York: McGraw-Hill Book Company.
- U.S. Department of Agriculture; U.S. Department of Commerce, National Marine Fisheries Service; U.S. Department of the Interior; and the Environmental Protection Agency. 1994. *Interagency framework for monitoring the President's Forest Ecosystem Plan*. Washington, D.C.: U.S. Department of Agriculture, U.S. Forest Service; U.S. Department of Commerce, National Oceanic and Atmospheric Administration; National Marine Fisheries Service; U.S. Department of the Interior, Fish and Wildlife Service and Bureau of Indian Affairs; and the Environmental Protection Agency.
- Washington Forest Practices Board. 2001. *Washington Forest Practices: Rules – WAC 222; Board Manual (watershed manual not included); Forest Practices Act RCW 76.09; Small Forest Landowner Statute RCW 76.13.100 – 76.13.130*. Olympia, WA: Department of Natural Resources.
- Washington State Department of Natural Resources (DNR). 1997. *Final habitat conservation plan*. Olympia, WA: Author.
- Washington State Department of Natural Resources (DNR). 2003. Forestry Handbook Home Page. DNR. <http://146.76.5.203/handbooks/forestry/Home.htm> (accessed May 14, 2004)
- Washington State Department of Natural Resources (DNR). 2003. SPM03-10: HCP Implementation Documentation and Reporting. DNR. [http://146.76.5.203/SPMs/SPM\\_2003/SPM03-10DRAFT2.htm](http://146.76.5.203/SPMs/SPM_2003/SPM03-10DRAFT2.htm) (accessed August 23, 2004)

## Appendix A. Spotted Owl Field Forms

### Spotted Owl Implementation Monitoring Decision Tree OESF

Timber Sale:  
Region:  
HCP Planning Unit:  
Landscape Planning Unit:

Date:  
Reviewer:

1. **Did the management activity alter the structure and composition of 5 or more acres of forest?** (Describe Activity)  
Yes, go to #2  
No, go to #4
2. **Did the management activity occur in old-forest habitat?**  
Yes, go to #8  
No, go to #3
3. **Did the management activity occur in sub-mature or young-forest marginal habitat?**  
Yes, go to #9  
No go to #4
4. **Did the management activity take place within one of the spotted owl circles listed in the Implementation Memo?**  
Yes, go to #5  
No, go to #6
5. **Did the management activity occur in non-habitat?**  
**How was this documented?**  
Yes, end procedure  
No, go to #6
6. **Did the harvest activity take place within the best 70 acres of an owl site center?**  
Yes, go to #7  
No, end procedure
7. **Were timing restrictions observed during the breeding season?**  
Yes, end procedure  
No, end procedure
8. **Was the documented management activity implemented correctly on the ground?** (*Name the type of activity*)
  - a) Was at least 20% of old forest habitat retained or restored, within the landscape-planning unit, after the management activity was completed?
  - b) Has the landscape plan been "completed"?

- c) What were the total available acres before the management activity was completed?
  - d) How many acres were available after the management activity was completed?
  - e) How was this determined and how is this currently being tracked?
  - f) Are management activities being evenly distributed over the restoration phase?
9. **Was the documented management activity implemented correctly on the ground?** *(Name the type of activity)*
- a) Was at least 40% of old-and-young forest habitat retained or restored within the landscape-planning unit, after the management activity was completed?
  - b) Has the landscape plan been completed?
  - c) What were the total available acres before the management activity was completed?
  - d) How many acres were available after the management activity was completed?
  - e) Have the harvest thresholds for the Initial implementation of the OESF Spotted Owl Conservation Strategy been exceeded for the Landscape Planning Unit?
  - f) How are these harvest thresholds being tracked throughout the restoration phase?
  - g) Are management activities being evenly distributed over the restoration phase?

## Spotted Owl Implementation Monitoring Decision Tree Eastside and Westside Planning Units

Name of timber sale: \_\_\_\_\_ Unit# \_\_\_\_\_  
 Township(s) \_\_\_\_\_ Range(s) \_\_\_\_\_ Section(s) \_\_\_\_\_  
 DNR Region: \_\_\_\_\_  
 HCP Planning Unit \_\_\_\_\_  
 Packet review by: \_\_\_\_\_ Date: \_\_\_\_\_  
 Field Review by: \_\_\_\_\_ Date: \_\_\_\_\_

### Management activity in a designated **NRF** area-

If answered yes to the bold questions marked as 1,2,3,or 4 continue and answer their sub-parts marked as a, b, or c.

- [ ] Yes [ ] No 1.) **Did the management activity take place in existing NRF habitat (sub-mature or higher quality) that counts toward the target amount for a WAU?**
- [ ] Yes [ ] No a.) Was the management activity within a 500-acre Nest Patch?  
 (This applies to Westside stands only)
- [ ] Yes [ ] No Was the WAU above the target threshold?
- [ ] Yes [ ] No Did the management activity occur in the 200-acre Nest Patch buffer?
- [ ] Yes [ ] No b.) Were structural characteristics of sub-mature quality or higher retained?
- [ ] Yes [ ] No c.) Has MORE than 5% of the sub-mature or higher quality habitat within a WAU been modified within a two-year period?  
 If no, how much has been modified within the two-year period in that WAU?
- [ ] Yes [ ] No 2.) **Did the management activity occur in a forest stand that is not yet habitat but is managed with the intent of developing habitat? (for a WAU that is below the 50% threshold)**
- [ ] Yes [ ] No Was the area that was designated to grow NRF habitat delineated? (50% of the total NRF designated area within that WAU)
- [ ] Yes [ ] No Is this documented in the timber sale packet?  
 How was this threshold level determined?
- [ ] Yes [ ] No a.) Did the management activity **increase** the time required for the target amount of NRF habitat to be attained if the stand was left unmanaged?  
 Describe the activity that was completed.

- [ ] Yes [ ] No  
[ ] Other
- 3.) **Did the management activity occur in a WAU that has exceeded the target amount for NRF habitat (sub-mature or higher quality habitat)?**  
Was the area that was designated to grow NRF habitat delineated?  
Is this documented in the timber sale packet?  
How was this threshold level determined?
- [ ] Yes [ ] No
- a.) Did the management activity lower the total amount of NRF habitat below the target amount?
- [ ] Yes [ ] No
- b.) Did the management activity take place within 0.7 miles of a known nest site during the breeding season?
- [ ] Yes [ ] No
- 4.) **Did the management activity take place within a WAU, that was at or below threshold and was not part of the 50% designated NRF habitat?**  
Describe the type of activity

#### Management activity in a designated **Dispersal Area-**

- [ ] Yes [ ] No  
[ ] Other
- 1.) **Did the management activity take place in a quarter township(eastside) or WAU (Westside) designated as dispersal habitat?**  
What WAU or quarter township did the management activity take place in?
- [ ] Yes [ ] No
- a.) Was the quarter township or WAU **above** the 50% target amount?  
What was the percent of dispersal habitat before the sale?  
  
What is the percent of dispersal habitat after the sale was complete?  
  
How was this percent determined?
- [ ] Yes [ ] No
- Was a region biologist consulted for this sale?  
What type of data was used to determine the percentage levels?  
  
What type of management activity was conducted?
- [ ] Yes [ ] No  
[ ] Yes [ ] No
- b.) Was the quarter township or WAU **below** the 50% target amount?  
Did the management activity occur in the non-habitat sections of the WAU?  
What management activity was conducted?
- [ ] Yes [ ] No
- Was a region biologist consulted for this sale? Was this documented?  
What type of data was used to determine the percentage levels?

### Management activity in a WAU NOT designated to provide habitat for spotted owls-

Yes  No 1.) Was a spotted owl nest site discovered during the timber sale planning that was in a stand not designated to provide spotted owl habitat?

Yes  No a.) Were seasonal harvest restrictions observed around the 70-acre core surrounding the nest site?

### Salvage Operations and Activities related to Forest Health

Yes  No **1.) Did the salvage operation take place in NRF/Dispersal or a designated Owl circle?**

Yes  No a.) Was the salvage operation conducted because of windthrow, fire, disease, or insect infestation? Please specify-

Yes  No b.) Were discussions held with the U.S. Fish and Wildlife Service? Were these discussions documented?

Yes  No c.) Were mitigation recommendations given by U.S Fish and Wildlife?

### Management Activities within **Owl Circles-**

Yes  No 1.) Did the management activity take place within one of the spotted owl management circles listed in the Implementation Memo that the department agreed to protect during the first ten years of the HCP?

Yes  No  
 N/A a.) Did the management activity occur in the **non-habitat** portion of the owl circle?

Yes  No Was there documentation from the region biologist?

What type of harvest prescription was conducted?

Yes  No 2.) Did the harvest activity take place within the best 70 acres of a site center outside designated NRF and Dispersal?

Yes  No a.) Were timing restrictions observed during the breeding season within the best 70 acres of a site center?

b.) What type of harvest prescription was conducted?



## Appendix B.

### Distance Correction Factors

Horizontal distance measurements were taped, and corrected for slope; paced, and corrected for slope; or measured with electronic laser rangefinder units (model Impulse) set in the Horizontal Distance (HD) mode. To rectify measurement errors, a correction factor was calculated for the paced as well as the rangefinder measured distances.

The control distance for the laser rangefinder was established by measuring between two trees on level ground using a tape. The correction factor was then calculated for the rangefinder. The control distance for pacing was then measured with the laser rangefinder adjusted using the correction factor for the rangefinder.

| <b>PACED DISTANCE CORRECTION FACTOR</b> |                       |                          | <b>LASER RANGEFINDER CORRECTION FACTOR</b> |                                |                          |
|---|-----------------------|--------------------------|--|--------------------------------|--------------------------|
| <b>Control Distance</b>                 | <b>Paced Distance</b> | <b>Correction Factor</b> | <b>Control Distance</b>                    | <b>Laser Measured Distance</b> | <b>Correction Factor</b> |
| 176.2 ft                                | 163.68 ft             | 1.076                    | 73 ft                                      | 72.16 ft                       | 1.012                    |
| 168.28 ft                               | 163.68 ft             | 1.028                    | 73 ft                                      | 71.91 ft                       | 1.015                    |
|   |                       |                          | 73 ft                                      | 71.22 ft                       | 1.025                    |
| <b>Average Correction Factors</b>       |                       | <b>1.052</b>             |  |                                | <b>1.017</b>             |