



## **State Trust Lands Implementation Monitoring Report: Implementation of the Uncommon Habitats Component of the Multispecies Conservation Strategy**

*This document is meant to fulfill Washington Department of Natural Resources' (DNR's) ongoing commitment to report on the implementation of the State Trust Lands Habitat Conservation Plan (HCP). The intended audience includes the Services (including the U.S. Fish and Wildlife Service and National Marine Services), the public, and DNR staff.*

### **Executive Summary**

Uncommon habitats on state lands (including but not limited to balds, caves, cliffs, and talus fields) are afforded protections by the uncommon habitats component of the multispecies conservation strategy in the State Trust Lands Habitat Conservation Plan (HCP). The objective of this project was to determine DNR's level of compliance with the strategy by assessing the implementation of conservation measures applied to these features on timber sales that closed between July 1, 2012, and Dec. 31, 2014. To accomplish this, we visited 74 uncommon habitat features (23 balds, 3 caves, 46 cliffs, and 2 talus fields) associated with 33 timber sales. We determined that 96 percent of these features were protected in ways that met or exceeded the protection requirements described in the conservation strategy and procedural guidance. We recommend that DNR's timber sales and silviculture staff receive additional and/or continued training on the identification of these habitats and interpretation of the guidance. The training should also include the things to look for on borderline features that may indicate particular benefit to wildlife, best practices for mapping and documentation, and when it is advisable to consult with a biologist or other specialist.

### **Introduction**

The multispecies conservation strategy described in The State Trust Lands Habitat Conservation Plan (HCP, Washington State Department of Natural Resources 1997),

which applies to all westside HCP planning units, is directed at providing habitat for numerous species of concern<sup>1</sup>. For many of these species that are not federally listed, the multispecies strategy provides habitat by

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<sup>1</sup> Species of concern include federally listed, state listed, federal candidate, and state candidate animal species.

leveraging the HCP conservation measures for salmonids, northern spotted owls, and marbled murrelets. These conservation measures, however, provide habitat to species of concern that primarily inhabit riparian and/or late seral forests. For species that require other unique habitat elements, the HCP prescribes additional protections through the uncommon habitats component of the multispecies conservation strategy.

The uncommon habitats that the HCP provides conservation measures for include “talus fields, caves, cliffs, oak woodlands, large snags, balds, mineral springs, and large, structurally unique trees.” The protection of uncommon habitats is crucial because these habitats, once altered or destroyed, are exceedingly difficult to restore or recreate. This, combined with the fact these habitats are rare features on the landscape that can provide critical habitat to some species of concern, warrants their protection in order to meet the overall conservation objectives of the HCP.

This project assessed DNR’s protection of geomorphic uncommon habitat features including balds, caves, cliffs, and talus fields. None of the timber sales reviewed for this project included oak woodlands or mineral springs (in fact, these features are rarely encountered in areas where DNR conducts active forest management, personal communications and Washington State Department of Natural Resources 2008). Additionally, this project does not assess large, structurally unique trees and snags (often referred to as ‘leave trees’), which have

historically received more focused review from implementation monitoring staff given their ubiquity (over 90 percent of westside timber sales implement this strategy) and the substantial cost and effort to effectively monitor (Washington State Department of Natural Resources 2005 and 2009).

The HCP and procedural documents available in the Forestry Handbook<sup>2</sup> describe conservation and management objectives for uncommon habitats. This guidance describes the required outcomes for DNR forest management activities that occur in the vicinity of these features in order to be compliant with the overall objectives of the HCP. The conservation objectives for the features included in this review include:

- *Balds* – avoid physical damage to balds, including road construction and harvest operations, and other activities that may disturb vegetation and alter natural plant succession
- *Cave* – maintain the microclimate at the cave entrance, maintain the physical integrity of cave passages, and minimize human disturbance to bat hibernacula and maternity colonies
- *Cliff* – minimize disturbance to geomorphic features and protect species that inhabit cliff habitat
- *Talus fields* – maintain the physical integrity of the talus field and minimize micro-climate change

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<sup>2</sup> The Forestry Handbook is an online repository of procedural guidance and other information for the management of DNR managed forest lands.

## Objective

In order to determine DNR's level of compliance with the uncommon habitats component of the multispecies conservation strategy, we field-reviewed DNR's implementation of conservation measures afforded to geomorphic uncommon habitat features associated with timber sales that closed between July 1, 2012, and Dec. 31, 2014, with the purpose of determining if the conservation objectives for each feature were implemented as written in the guidance.

## Methods

The population of interest for this project included all timber sales in westside HCP planning units listed as "completed" in NaturE (DNR's financial tracking system) during fiscal years 2013, 2014, and the first half of 2015 (6/1/2012 - 12/31/2014, n = 256 timber sales).

We identified uncommon habitats for monitoring by reviewing available documentation on the Timber Sales Document Center (TSDC<sup>3</sup>). HCP and SEPA checklists<sup>4</sup> were the most common location where DNR staff disclosed the presence of uncommon habitats on their sales (harvest units prescriptions available in DNR's Planning & Tracking database, as well as correspondence from region biologists, also provided information). This process identified 35 timber sales with potential uncommon habitat features, all of which were visited by monitoring staff for field assessment (the

monitoring program resides in the Forest Resources Division, Silviculture and Monitoring Section). While visiting these documented features, we did a visual, on-the-ground inspection of harvest units to identify undocumented/unidentified uncommon habitat features.

We used a TruPulse 360R laser rangefinder/hypsometer and a Garmin 64 GPS to assist in the collection of buffer width and feature height and area measurements. For balds and cliffs, for which specific buffer protections are not prescribed by the HCP, we estimated buffer widths for informational purposes. For caves and talus, where buffer protections are explicitly prescribed by the HCP, we measured buffer widths as precisely as possible from the edge of the feature to the first stump in the upland harvest beyond the buffer; we repeated these measurements for every 50 feet of buffer edge.

**Balds** – Monitoring staff first made a determination of whether or not the feature was a bald given the description in the HCP and PR-14-004-220 (Protecting Balds). Monitoring staff looked at various indicators of bald habitat, such as vegetative composition (dominated by grasses or moss) and soil characteristics (thin soils that inhibit tree growth) to make this determination. Identifying balds can be difficult given the lack of detail defining what constitutes a bald provided by the HCP and in the Forestry Handbook. We referenced additional information on bald vegetation and

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<sup>3</sup> TSDC is an online repository of documentation, field notes, and compliance notes for DNR timber sales.

<sup>4</sup> HCP and SEPA (State Environmental Protection Act) checklists are documents completed by DNR staff for every timber sale that discloses the HCP conservation strategies being implemented (HCP checklist) and identifies and analyzes environmental impacts from governmental decisions (SEPA checklist).

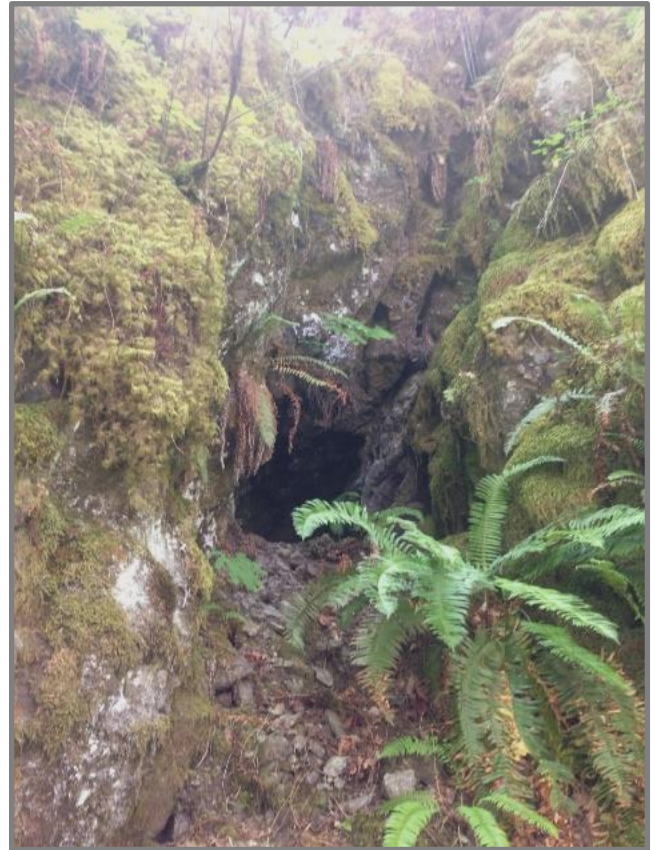
identification criteria made available through DNRs Natural Heritage Program (Washington State Department of Natural Resources 2006 and 2015a).

We estimated bald size for informational purposes (the HCP and current guidance do not identify a minimum size for balds that require protections). We noted any protections that were afforded to the bald (such as leave tree or herbicide buffers) as well as any management outcomes that do not meet the conservation objective for balds (such as physical damage from harvest operations or vegetative community conversion from silvicultural activities).

**Caves** – Monitoring staff first determined if the feature was a cave given the definitions available in the HCP and PR 14-004-180 (Protecting Caves), which describe a cave as a “naturally occurring cavity, recess, void, or system of interconnected passages...large enough to contain a human.” The HCP prescribes a 250-foot no disturbance buffer around cave entrances, a 100-foot buffer around the vertical projection of cave passages, and restricts road construction in the vicinity of the cave entrance and passages. For safety purposes, we only verified the existence of a cave from the outside since the minimum criteria of being “man-sized” is discernable without entering the cave; this was also possible because none of the caves visited for this project, according to biologist assessments, had a passage system that would require additional buffering.

Besides the guidance in the HCP and PR 14-004-180 (Protecting Caves), there is a Draft Revised Cave Procedure (Washington State Department of Natural Resources 2010)

available for DNR staff to implement with approval from the HCP Implementation Manager. This procedure affords different levels of protections to caves based on habitat value, which is a function of various biological and physical characteristics including but not



**Figure 1.** This cave was categorized as having low habitat value using the Draft Revised Cave Procedure. It was protected within a large leave tree area protecting an associated complex of cliff habitat, ultimately exceeding the required 30-foot radius buffer required for a cave with low habitat value.

limited to cave size, complexity, and wildlife utilization. Under the draft procedure, low, medium, and high value caves are to receive no-disturbance leave tree buffers of 30-, 125-, and 250-foot radiuses around the cave entrance, respectively (Figure 1), as well as

reductions to the distance in which road construction is prohibited.

At each cave we measured the width of the buffer protections applied around the cave entrance, documented any disturbance to the cave and/or its buffer, and noted any road construction that occurred within a quarter mile of the cave. We then compared the gathered information against the guidelines for whichever procedure was implemented (HCP or Draft) to determine if the HCP conservation objective was attained. If the Draft Cave Procedure was used, we verified that its implementation was approved by the HCP Implementation Manager.

**Cliffs** – Monitoring staff first determined if the feature was a cliff using the definition for cliffs in the HCP and PR 14-004-190 of a “steep, vertical, or overhanging rock face” greater than 25 feet in height. Cliffs under 5000 feet above sea level (ASL) only require protection under the HCP if they are “likely used by wildlife.” While monitoring staff noted features useful to wildlife (such as cracks, crevices, fissures, overhangs, etc.) on each cliff, we assumed all cliffs required HCP protection unless otherwise documented in TSDC. The guidance does not define what factors or structural criteria qualify as “steep” enough to include in the height measurement for cliffs. Also, it is difficult to objectively determine if a borderline cliff feature meets the 25-foot minimum height requirement due to a lack of clarity in where to take height measurements. Since the degree of steepness

required is not clearly defined, the top and bottom measurement points used to determine height can be arbitrary in certain instances when these features have a gradient of steepness. Sometimes it was not possible to safely or accurately assess the size and complexities of some cliffs due to rugged terrain or a dense forest canopy that impedes height measurements. In these situations, monitoring staff made as accurate an assessment of the feature as possible while assuring a safe working environment.

In addition to the size of the cliff, we noted any protections that were instituted (such as leave tree buffers) as well as any apparent damage to the cliff face caused by management activities which would not be congruent with the conservation objective for cliffs. The guidance stipulates that cliffs over 80 feet in height and below 5,000 feet ASL be evaluated for peregrine falcon use. When the 80-foot criteria was met, monitoring staff looked for documentation of this evaluation and assessed whether specific protection requirements (e.g., harvesting activity timing restrictions), if any, were effectively implemented.

**Talus fields** – Monitoring staff first made a determination whether the feature was a talus field based on the structural definitions for talus fields in the HCP and PR 14-004-170, which describe a homogeneous area of rock rubble ranging in size from 1 inch to 6.5 feet in size and greater than or equal to one acre in sizes. To achieve the conservation objective

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<sup>s</sup> Most of the Columbia HCP planning unit protects talus fields greater than or equal to a quarter of an acre in size, but this project did not assess any of these smaller talus fields. While all talus fields visited for this project were non-forested, forested talus exists (often in tandem with non-forested talus) and is defined as talus with greater than 30% canopy closure.

for talus fields, the HCP requires a 100-foot buffer be applied to the feature. For forested talus, this buffer can be harvested as long as 60 percent canopy cover is retained and the integrity and micro-climate of the talus field is not compromised.

At each talus field, we assessed the width and integrity of the buffer. We used a spherical densiometer to initiate buffer measurements on the talus field side of the buffer at the approximate location where canopy closure exceeded 30 percent (i.e., the non-forested talus field to forest interface). While performing buffer measurements, we visually assessed the buffer for undocumented and/or unintended damage from harvest operations or road construction. Additionally, road construction through a talus field or its buffer requires region manager approval; in this situation we looked for region manager approval for the activity.

## Results

In total, monitoring staff visited 82 potential uncommon habitat features associated with 35 timber sales (~14 percent of the 256 timber sales in our population of interest had at least one potential uncommon habitat associated with it). Of these, 74 features (90 percent) associated with 33 timber sales were determined by monitoring staff to meet the HCP definition for the feature in question. Of these 74 features, 71 (96 percent, Table 1) were determined by monitoring staff to 1) be protected in ways that meet the conservation objectives identified in the HCP for each feature, or 2)

have sufficient documentation stating the feature was not useful to wildlife and did not require specific protections under the HCP (this only occurred with cliffs).

**Balds** – We visited 25 potential balds associated with 14 timber sales. Of these, monitoring staff determined 23 balds met the HCP definition of a bald. Balds ranged in size from 0.1 to 1.72 acres (average 0.26 acres). Seventeen balds were protected with leave tree buffers with minimum widths ranging from 10 to 50 feet (average 25 feet) and 6 balds had no buffer or just a few scattered trees left for protection.

Of the 23 balds meeting the HCP definition, 21 were determined by monitoring staff to be protected in ways that met the conservation objective (91 percent compliance rate). The first bald that did not meet the conservation objective (0.15 acres) was afforded an effective buffer from a site preparation herbicide application, but part of the bald was subsequently planted with Douglas-fir seedlings. A section of the other bald (0.1 acre) appeared to have herbicide applied to it during site preparation and was also partially planted with Douglas-fir seedlings. The location of both balds were documented on maps available either on TSDC or from the district timber sales staff. It was determined these actions failed to meet the conservation objective for balds because they caused vegetation disturbance that “might alter natural plant succession” as described in PR 14-004-220 (Protecting Balds). Neither of these balds had leave tree buffers applied to them. As corrective action, seedlings planted

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Forested talus has slightly different management guidance that is not addressed in this report since this type of feature was not encountered.

within the bald areas were pulled by region and/or monitoring staff in addition to having discussions about lessons learned.

Of the two balds that monitoring staff determined did not meet the HCP definition for balds, one was an old homestead with bracken fern as the dominant vegetation (this feature was already protected within a wetland management zone [WMZ]); the other was a small rock outcrop with no associated soils or bald vegetation (it was protected with approximately 20 feet of leave trees). Neither of these features had documentation indicating they were assessed by a biologist.

**Caves** – We visited three potential caves associated with three timber sales and determined all three caves met the HCP definition for caves. All of these caves were protected through guidance outlined in the Draft Revised Cave Procedure. Two low-value caves (requiring a minimum 30-foot buffer) and one medium value cave (requiring a minimum 125-foot buffer) had sufficiently sized buffers and no evidence of damage to cave structures, meeting the conservation objectives for caves (100 percent compliance rate). The buffer for one of the low value caves was incidental as the feature and its buffer were protected within a large leave tree area (LTA) protecting a complex of cliffs and balds per biologist recommendations (Figure 1). The other low value cave, while adequately protected, did not have written approval from the HCP Implementation Manager to implement the Draft Revised Cave Procedure; however, there was a detailed assessment completed by a biologist. The buffer for the medium value cave was nearly doubled (up to 200 feet) in places to protect cliff, bald-like,

and talus field-like features per biologist recommendations (Figure 2).



**Figure 2.** This leave tree area provides protections for a medium value cave, a cliff, and bald- and talus field- like habitat features.

**Cliffs** – We visited 50 potential cliffs associated with 28 timber sales. Of these, monitoring staff determined 46 cliffs (92 percent) met the HCP definition of a cliff. Cliffs ranged in size from 27 to 130 feet tall (average 55 feet tall) and were typically protected with leave tree buffers ranging from 10 to 100 feet (average 31 feet). Of these 46 cliffs, 7 cliffs associated with 2 timber sales were determined by a DNR biologist to not contain unique habitat features and documented that these features did not require specific protections. These cliffs can be described as having little vertical structure and no cracks, overhangs, crevices, and/or fissures useful to wildlife. Regardless, five of these cliffs were protected with leave trees.

Of the remaining 39 cliffs, one was determined by monitoring staff as not meeting the conservation objectives for cliff habitat (97 percent compliance rate). This 40-foot tall feature was not protected with any leave trees and had some minor abrasions on

the top of the face where the slack line from a cable yarding operation had contacted the cliff. While this cliff was insignificant in terms of structure (relatively short compared to other cliffs in the area, and had no apparent cracks, crevices, or fissures), the harvesting of trees around the cliff and the yarding of trees over the cliff was determined to not be compliant with the HCP conservation objectives for cliffs. It should be noted however, that yarding over cliffs is permitted so long as the operation is sufficiently documented as it was for the cliffs mentioned in the preceding paragraph.

There were eight cliffs that were at least 80 feet tall, all these cliffs had documented biologist assessments for use by peregrine falcon or perching raptors; none of these cliffs required additional protections specifically for these species. Three cliffs were identified in biologists’ correspondence as providing particular benefit to wildlife and/or served as a unique landscape feature for the area. These features were all greater than or equal to 100 feet tall (one was nearly 4000 feet long) and protected with a minimum 41 feet of leave tree buffer, on average, which met or exceeded biologist recommendations.

One cliff was found while visiting a talus field that was not documented in timber sale packet. This cliff was effectively protected within the buffer provided for the talus field; however, it was agreed upon by monitoring staff and the region biologist on site that the talus field in question did not meet the definition of a talus field and therefore did not require protections. The four features (out of the 50 potential cliffs) determined to not meet the HCP definition of a cliff all were simply

structured rock outcrops and/or did not have a steep-to-vertical pitch greater than 25 feet.

**Table 1.** The number of features whose protections met the HCP conservation objectives, the total number of features that required HCP protections, and the rate of compliance by feature type.

<b>Feature type</b>	<b># of features meeting HCP conservation objectives</b>	<b>Total # features that required protections</b>	<b>Rate of compliance</b>
bald	21	23	91%
cave	3	3	100%
cliff	38	39	97%
talus field	2	2	100%
<b>Overall</b>	<b>64</b>	<b>67</b>	<b>96%</b>

**Talus field** – We visited four potential talus fields associated with four timber sales. Of these, monitoring staff determined two of these features met the HCP definition for talus fields, both of which were afforded protections that met the conservation objectives for talus fields (100 percent compliance rate). The first talus field was two acres in size and was protected with a no-harvest leave tree buffer averaging 147 feet in width; the talus field buffer was reduced for a short portion to facilitate road construction (this action was approved by the DNR region manager). The road construction affected approximately 0.05 acres of the talus field buffer. The other talus field was one acre in size and located at the bottom of a 100-foot tall cliff. Since the timber sale unit was located above this cliff, a biologist permitted not leaving the full 100-foot buffer instead instructing the forester to concentrate on protecting the top of the cliff with select large diameter leave trees (this plan was documented on TSDC). It was not possible to



safely and accurately measure the buffer for this feature but monitoring staff estimated it was approximately 50 to 75 feet in width using imagery on GIS.

Both the potential talus fields that monitoring staff determined did not meet the HCP definition for talus fields were ‘ancient talus’ that have, over centuries, been filled in with organic matter and no longer provide the unique structural habitat necessary to be considered talus fields. Both these features were ultimately protected with leave tree buffers, one of which contained an undocumented cliff. One of these talus fields also did not meet the size requirements necessary for HCP protections.

## Discussion

### *In the context of previous monitoring efforts*

Historically, DNR has implemented management activities in the vicinity of uncommon habitats with an exceptionally high rate of compliance (Table 2, Washington State Department of Natural Resources 2005 and 2008). A primary reason for this, as identified through discussions with region staff for this project and during previous monitoring efforts, is the fact foresters typically employ extra caution while working around these features as they are not encountered on a regular basis. This is also true for DNR’s implementation of thinning treatments in designated northern spotted owl habitat and wetland and riparian management zones (Washington State Department of Natural Resources 2013, 2014, and 2015b). While this conservative approach, at times, leads to the protection of features that do not meet the HCP definitions (this project visited two bald-like, two talus

field-like, and four cliff-like features that received protections), this situation is preferred to the alternative of not protecting borderline features and risking not being in compliance with the HCP. This is particularly true for balds and cliffs (features which don’t have specific buffer widths prescribed by the HCP), as the protection of these features with leave trees is permissible and often a preferred management practice since these trees typically count towards tree retention requirements required by the large, structurally unique, tree strategy in the HCP and PR 14-006-090 (Management of Forest Stand Cohorts [Westside]). Affording protections to cave- or talus field- like features — habitats that do have prescribed buffer

**Table 2.** The total number, type, and overall compliance rate for HCP defined uncommon habitat features visited by monitoring staff for monitoring report publication years 2005, 2008, and 2017. The monitoring projects reported in 2005 and 2008 reviewed uncommon habitat associated with one year's worth of timber sales, while the 2017 project reviewed timber sales over a 2.5 year period.

Feature type	Report Publication Year		
	2005	2008	2017*
Bald		1	23 (9)
Cave	1		3 (1)
Cliff	8	10	46 (18)
Talus	1		2 (1)
Oak woodland		1	
Overall compliance rate	100%	100%	96%

\* rounded annualized rate of occurrence for the 2.5 year monitoring period in parentheses

widths — is of a greater concern because the timber within these unnecessarily applied buffers could otherwise be harvested and sold for the benefit of the trusts (the area of a cave

buffer, not applying the Draft Revised Cave Procedure, is at least 4.5).

Although the presence of HCP-defined uncommon habitats on DNR timber sales is historically low and DNR staff are adept at identifying these features, it may be prudent for management to clarify the desired workflows to assure compliance with the conservation objectives for uncommon habitats in the future. For example, management could establish consistent expectations for documenting whether cliffs require HCP protections, require marking bald locations on silviculture and timber sale contract maps, and consistently marking these features on the ground so they can be avoided when treatments and/or harvesting operations occur.

**Table 3.** The different combinations of uncommon habitat features found on timber sales visited for this project, as well as the number of timber sales and features associated with each combination.

<b>Feature combination</b>	<b># of timber sales</b>	<b># of features</b>
bald	5	12
cave	1	1
cliff	17	25
bald + cliff	5	23
cave + cliff	1	2
cliff + talus field	2	3
bald + cave + cliff	1	4
bald + cliff + talus field	1	4
<b>Total</b>	<b>33</b>	<b>74</b>

***Uncommon habitat synergy and borderline features*** – Multiple types of uncommon habitats often occurred together on the same timber sale (on all but three timber sales, multiple habitat features

occurred within or adjacent to the same timber sale unit). There were two to three different types of uncommon habitats (e.g. cliff and cave, or bald, cave, and cliff) on 30 percent of the timber sales visited for this project (Table 3). Moreover, there were two or more individual uncommon habitat features (e.g., three cliffs, or two balds and two cliffs) on 48 percent of the timber sales visited, which accounted for 77 percent of the features assessed for this project.

On numerous occasions there were talus field- or bald- like features associated with HCP-defined cliffs. Specifically, monitoring staff noted eight talus field-like areas (talus fields not meeting size and/or habitat requirements to require protections under the HCP) and one HCP-defined talus field below cliffs (these cliffs averaged 79 feet high). We noted bald-like conditions (small areas, typically less than 0.05 acres, with thin soils and a predominance of moss or a vegetation composition different than the surrounding forest) above nine cliffs and two HCP defined balds directly above cliffs that received protections (Figure 3). Regardless, all these bald- and talus field-like features were protected within expanded leave tree areas initially created to protect the associated cliff habitat and successfully buffered from subsequent site preparation and tree planting activities.

Discussions with region staff highlighted some concern over whether these bald-like areas require protection since the guidance does not provide a minimum bald size where protection is necessary. Previous monitoring reports noted this same issue, and ultimately described these features as ‘low quality balds.’

An Ecological Integrity Assessment (EIA)<sup>6</sup> for balds identifies size as a key ecological attribute for bald habitat quality (*in press*, see EIA website in footnote for more information), and the upper limit of the lowest quality classification for balds is 0.4-acres (balds visited for this project averaged 0.26-acres). Other discussions with staff specialists indicate balds typically need to be a minimum of 0.25-acres to have the light conditions on the ground to support high quality bald vegetation (personal communications).



**Figure 3.** The picture on the left shows a talus field-like area found below a complex of cliffs and a medium value cave (refer to Figure 2 for another view of this area). The picture on the right shows a bald-like area, ~0.03-acres, found above a cliff. Both features were protected within leave tree areas expanded to include the borderline features.

Similar sentiment was expressed by DNR region staff in regards to borderline cliffs, which are common on state lands (46 percent of the cliffs visited for this project were less than or equal to 40 feet in height). Specifically,

the issue of what steepness metric/threshold constitutes a cliff and at what points along the feature base and top do you take height measurements. These and other ambiguities in the procedural guidance make it difficult to objectively determine whether some features require biologist consultation and potential protections (Figure 4). Foresters may be hesitant to seek biologist consultation for borderline features, potentially increasing the likelihood of missing an important habitat structure (crack, crevice, etc.) that the forester is not trained to identify.

Additional direction to DNR region timber sales staff in regard to identifying borderline balds and cliffs for consultation and/or protection, whether through additional guidance or training, may benefit both DNR's compliance with the conservation strategy and returns to trust beneficiaries (since buffer protections may not always be necessary).

#### **Additional recommendations –**

**Caves** – We recommend informing foresters of the minimum structural requirements for caves and the types of potentially overlooked features that may meet the HCP definition. What looks like a small rock overhang may be an HCP defined cave. Additionally, documenting the locations of new caves is necessary to assure non-timber forest management activities (such as road or rock pit development) don't occur within cave protection limits.

<sup>6</sup> An Ecological Integrity Assessment (EIA) is a methodology used by NatureServe and the Natural Heritage Network to assess ecological integrity/condition of an occurrence of a plant association or ecological system. Visit <http://www.dnr.wa.gov/NHP-EIA> for more information.

**Cliffs** – We recommend documenting a biologist’s determination that a cliff is not useful for wildlife on TSDC, particularly if the management plan includes conducting harvest operations around the cliff or if leave tree protections are not applied. When determining an adequate level of leave tree protection around a cliff in order to assure the cliff face is not damaged, it may be useful to consider the stability of trees being left (this applies to bald protections as well). For example, thin soils, trees with height-to-diameter ratios in excess of 100, a predominance of shallow rooted species such as western hemlock, or J-butted trees may indicate potential buffer instability and pose a higher risk for wind-throw damage to the cliff face (Figure 5). These situations may warrant a wider buffer being applied to protect the feature.

**Balds** – We recommend creating a map of bald locations and posting it on TSDC, especially if the bald does not have a buffer and is interior or on the edge of a unit. The purpose of this map is to inform region silviculture staff of the location of these features in order to prevent herbicide application and/or tree planting. It is equally important that the map is clearly labeled in TSDC and identified in P&T as being available. On two occasions balds were protected with a single row of leave trees. While these trees created a clear no-spray buffer for site preparation, their location in the thin soil of the bald edge increase their susceptibility to wind-throw (we noted two instances of trees that had fallen away from the bald following harvest). Wind-thrown trees may ultimately damage a bald and it is recommended that DNR staff either 1) harvest up to the bald edge,



**Figure 4.** This is an example of a borderline cliff feature that, depending on the top and bottom points of height measurement, meets the 25-foot height requirement. Ultimately, this cliff was determined by a biologist to be a cliff, but insignificant to wildlife. Regardless, this feature was protected within a LTA.

or 2) retain a larger and more wind-firm leave tree buffer between the bald and the harvest area. If harvesting occurs up to the bald edge, it is recommended this edge be clearly marked on the ground. Painting the butt of edge trees to be harvested along a bald edge and/or double-tagging these trees both are effective methods for signifying a change of prescription on the ground to silviculture staff when the edge trees are removed during harvest (Washington State Department of Natural Resources 2014).



**Figure 5.** This leave tree area is effectively protecting a 30-foot tall cliff. Soils around cliffs and balds are often thinner than the surrounding forest and can increase the risk of wind-throw following harvest, as can be seen in the picture. This can be exacerbated by shallow-rooted species such as western hemlock. It is important to consider these factors when designing protections measures for these features in order to attain HCP conservation objectives.

**Talus fields** - We recommend training foresters on the different types of structural characteristics that define the talus fields requiring HCP protections and how to handle talus field-like features when they occur (when in doubt, consult a biologist). When applying a buffer to non-forested talus fields, we recommend marking the points where buffer shots are initiated with flagging (this is the point where canopy closure hits 30 percent). Marking this point is important because 1) canopy closure is a difficult metric to verify and measure consistently, and 2) given that harvesting the talus field buffer is permissible, the talus field edge could move depending on the amount of buffer harvested (even if the buffer is not harvested, wind-throw could influence this point as well).

Marking your buffer starting point on the ground permits accurate assessment of protection measure implementation.

## Conclusion

The protection of uncommon habitats is an essential part of DNR's effort to attain the overarching conservation objectives of its HCP. The protection of uncommon habitats is crucial because these habitats, once altered or destroyed, are difficult to restore or recreate. The results of this project (96 percent overall compliance rate), particularly in the context of the successful implementation of these strategies discussed in previous monitoring reports (Table 2, past compliance), support the claim that DNR staff do an exceptional job implementing forest management activities in the vicinity of these rare landscape features. The few inconsistencies with the guidance we discuss in this report are minor, and should not overshadow the success DNR has exhibited in implementing infrequently encountered guidance. It is of note that when confronted with borderline features or situations not explicitly covered by the guidance, DNR staff consistently took a conservative management approach opting to the side of caution as opposed to risking non-compliance with the HCP. It would be beneficial for timber sales and silviculture staff to receive additional and/or continued training on the identification of these habitats and interpretation of the guidance, things to look for on borderline features that may indicate particular benefit to wildlife, best practices for mapping and documentation, and when it is advisable to consult with biologists or other specialist.

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## Acknowledgements

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Project Design Support – Mike Buffo, Forest Resources Division

Content Review – John Fleckenstein, Conservation, Leasing, and Transactions Division

Content Review – Heather McPherson, Forest Resources Division

Editorial Review – Bob Redling, Executive Management and Support

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