1 Funding

1 Transition Activities

1 Monitoring

1 Objectives

3 Monitoring Program

4 Monitoring Procedures

4 Monitoring Reports

6 Management Activities in Progress or Under Way When the HCP is Adopted

6 Research

6 Objectives

6 Research Priorities and Topics

8 Research Program

9 Research Procedures and Reports

9 Reporting

V. Plan Implementation

V. Plan Implementation

Implementation of the HCP is governed by an agreement among DNR, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. (See the Implementation Agreement.) The Implementation Agreement defines the roles and responsibilities of these parties regarding implementation of the HCP. The HCP and the Implementation Agreement are supplementary to each other. Together, they fulfill the requirements as outlined in the Endangered Species Act for issuance of an incidental take permit. (See the section in Chapter II on the Endangered Species Act for a discussion of these requirements.) The processes for addressing unforeseen or extraordinary circumstances, amending the HCP, review, and funding are among the issues discussed in the Implementation Agreement.

Funding

DNR shall submit to the Washington State Legislature, on at least a biennial basis, an agency operating and capital budget for asset management that will be adequate to fulfill DNR's obligations under the HCP, Incidental Take Permit, and Implementation Agreement. Failure by DNR to ensure that adequate funding is provided to implement the HCP shall be grounds for suspension or partial suspension of the Incidental Take Permit.

Transition Activities

Timber sales prepared by DNR normally require approximately 24 months of preparation between the planning of the sale and its eventual auction. The HCP conservation strategies require certain actions to occur (i.e., the designation of the 300-acre spotted owl nest patches) and certain materials be prepared (e.g., implementation procedures for riparian areas) in the first year after approval of the HCP and issuance of the Incidental Take Permit. Additionally, once implementation procedures are completed, training will be required for DNR staff. For these reasons, following approval of the HCP and issuance of the Incidental Take Permit, a transition period will be required. Timber sales in the DNR "pipeline" at the time of approval of the HCP will continue to be brought forward by DNR through the end of calendar year 1998, provided such sales are consistent with spotted owl survey agreements in effect between DNR and the U.S. Fish and Wildlife Service. Such sales will not include known occupied marbled murrelet sites or unsurveyed, suitable marbled murrelet habitat. Because of current DNR actions such as spotted owl survey efforts and the deferral of sale of marbled murrelet habitat, it is believed that take of any listed species will be limited to non-existent. Mitigation for any such take has been included in the conservation strategies contained within the HCP.

Monitoring

OBJECTIVES

DNR shall monitor this HCP on DNR-managed lands according to the following objectives for all planning units:

(1) to determine whether the HCP conservation strategies are implemented as written; and

(2) to determine whether implementation of the conservation strategies results in anticipated habitat conditions.

These two monitoring objectives can be referred to as implementation and effectiveness monitoring, respectively (U.S. Forest Service et al. 1994).

There is a third monitoring objective, referred to as validation monitoring (U.S. Forest Service et al. 1994), for DNR-managed lands in the Olympic Experimental State Forest (OESF) Planning Unit:

(3) 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.

Implementation monitoring will document the types, amounts, and locations of forest management activities carried out on DNR-managed lands in each HCP planning unit, both inside and outside areas addressed by the conservation strategies. Activities in areas addressed by the HCP will be described in sufficient detail to document compliance with the requirements of the conservation strategies. Activities outside of these areas will be described in summary detail. Implementation monitoring will also periodically describe changes in landscape-level habitat conditions in areas managed to provide spotted owl and murrelet habitat. Such monitoring will be primarily accomplished through DNR's planning and tracking, and geographic information systems. Statistically valid sampling of management activities will be conducted to evaluate the reliability of information stored in these databases.

Effectiveness monitoring will document changes in habitat conditions, including general forest structure, specialized habitat features (e.g., in-stream large woody debris, marbled murrelet nesting platforms), and spotted owl prey populations, that result from timber harvest and other forest management activities carried out pursuant to the HCP. Only habitat areas addressed by the conservation strategies, i.e., riparian, spotted owl nesting, roosting, and foraging (NRF), spotted owl dispersal, and marbled murrelet habitat areas, will be monitored for effectiveness. Within these habitat areas, representative samplings will be monitored, which means not all managed acres or management activities will be monitored. Effectiveness monitoring will rely upon field-based before-and-after comparisons. Changes in habitat conditions will be evaluated both in the short term (one to three years after harvest) and over the life of the HCP.

Validation monitoring, which will occur only within the OESF Planning Unit, will document spotted owl and marbled murrelet use of areas managed to provide nesting habitat, and salmonid use of streams crossing DNR-managed lands. For spotted owls and marbled murrelets, validation monitoring will rely upon surveys to detect changes in site occupancy, numbers and locations of breeding pairs, and reproduction, as appropriate for each species. For salmonids, validation monitoring will employ surveys to detect changes in the productivity of spawning adults and salmon-habitat relationships. As an additional objective for the OESF, validation monitoring reflects the emphasis on experimentation that defines the OESF. (See Section E in Chapter IV titled Olympic Experimental State Forest Planning Unit.) In this sense, the OESF will be an open-air laboratory in which the assumptions that underlie the conservation strategies will be tested.

MONITORING PROGRAM

Table V.1 outlines the monitoring program that results from applying the first two monitoring objectives to the major conservation strategies. (See the sections in Chapter IV on conservation strategies for the northern spotted owl, marbled murrelet, and riparian areas, and the unique spotted owl and riparian conservation strategies for the OESF.) Implementation and effectiveness monitoring will be carried out for all of these major strategies. The spotted owl conservation strategy, current spotted owl and marbled murrelet habitat, and current riparian ecosystem conditions are not uniform across planning units. Effectiveness monitoring will necessarily be tailored to the conservation strategy and habitat or ecosystem conditions in each planning unit.

Validation monitoring will be carried out for spotted owl nesting habitat, marbled murrelet nesting habitat, and salmonid habitat in the OESF. Validation monitoring will not be undertaken for the other conservation strategies or in other planning units. Validation monitoring will not be undertaken for spotted owl dispersal habitat. The OESF spotted owl conservation strategy does not draw the management distinction between NRF habitat and dispersal habitat that prevails in other HCP planning units. In the other planning units, an evaluation of the cause-and-effect relationship between conditions on DNR-managed lands and the ability of juvenile spotted owls to disperse successfully across the landscape would be difficult to design, expensive to implement, and impractical to undertake, given the distribution of DNR-managed lands. Resources for monitoring the HCP's success in providing dispersal habitat will be better directed at evaluating forest structure and prey responses (i.e., effectiveness monitoring) in areas that are specifically managed for spotted owl dispersal habitat.

Validation monitoring for salmonid habitat will be focused to detect changes in the productivity of spawning adults and salmon-habitat relationships, parameters that are not affected by marine conditions and downstream fisheries. This will involve estimating numbers of spawning adults and numbers of recruits (i.e., out migrating smolts or rearing juveniles), and surveying different stream habitat types and conditions to determine fish numbers, species composition, and densities. Validation monitoring for salmonid habitat will be conducted in an appropriate watershed unit comprised primarily of DNR-managed lands, to minimize the potential influences of management activities not under DNR's control. Validation monitoring will not be conducted for any other, non-salmonid fish species, or for wildlife species (other than spotted owls and marbled murrelets) influenced by the riparian/salmonid conservation strategy.

Effectiveness and validation monitoring need not be undertaken while the interim murrelet conservation strategy is in effect. Although lower quality habitat types that support up to 5 percent of the total murrelet use of DNR-managed lands within each of the five west-side and the OESF planning units may be harvested under the interim strategy, DNR will not alter or manage the higher quality murrelet nesting habitat, which supports 95 percent of potentially occupied sites, during this period. Neither will there be any attempt to alter or manage any habitat known to be occupied by murrelets, regardless of habitat quality. DNR expects to initiate effectiveness monitoring in all planning units where murrelet nesting habitat is a management goal once the long-term murrelet conservation strategy has been designed and implemented. DNR also expects to initiate validation monitoring in the OESF once the long-term murrelet conservation strategy is in place.

DNR recognizes the substantial financial commitment that the HCP monitoring program entails. DNR will provide adequate funding for monitoring to the extent that DNR is given the flexibility to make such budget decisions. DNR shall request funds from the legislature to cover the costs of the monitoring program. The exact funding level may vary from year to year, depending on actions of the legislature.

MONITORING PROCEDURES

Detailed procedures will be prepared to implement the monitoring approaches for each element of the HCP monitoring program outlined in Table V.1. These procedures will identify specific assumptions or hypotheses to be tested, data to be collected, sampling intensity and frequency, field and analysis methods, budgets, and timelines; the procedures will provide the level of detail anticipated in the U.S. Fish and Wildlife Service's Endangered Species Habitat Conservation Planning Handbook (USFWS and NMFS 1996). Monitoring procedures will be prepared by a team of scientists from DNR, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. Implementation, effectiveness, and validation monitoring procedures will be completed and reviewed before forest management activities consistent with a conservation strategy are first undertaken. Tables V.2 and V.3 outline some of the environmental variables that will be measured as part of effectiveness monitoring for the spotted owl and riparian conservation strategies, respectively.

MONITORING REPORTS

DNR will prepare an annual report that describes the results of all monitoring activities carried out during the preceding calendar year. Monitoring reports will be completed and submitted to the U.S. Fish and Wildlife Service by March 30 of each year.

Table V.1: Outline of the HCP monitoring program

	HCP habitat goals			
Monitoring objective	**Spotted owl nesting, roosting, foraging habitat**	**Spotted owl dispersal habitat**	**Marbled murrelet nesting habitat[1]**	**Riparian/salmonid habitat**
Implementation	All planning units	All planning units	Five west-side planning units and the OESF	Five west-side planning units and the OESF
Effectiveness	All planning units	All planning units	Five west-side planning units and the OESF	Five west-side planning units and the OESF
Validation	OESF Planning Unit only		OESF Planning Unit only	OESF Planning Unit only (salmonid habitat only)

[1]Only implementation monitoring will be done during the interim conservation strategy for the marbled murrelet. See text.

Table V.2: Environmental variables to be measured in effectiveness monitoring for the spotted owl conservation strategy

Environmental Variables	
Spotted owl nesting, roosting, and foraging habitat	**Spotted owl dispersal habitat**
density of nesting structures snag density snag diameter distribution	
tree density tree species composition tree diameter distribution canopy closure canopy height woody debris ground cover prey density	

Table V.3: Environmental variables to be measured in effectiveness monitoring for the riparian conservation strategy

Salmonid Habitat Element	Environmental Variables
large woody debris	linear density size category tree species shape of form decay category poolforming function
channel characteristics	bankfull width bankfull depth stream gradient total water surface area pool maximum depth pool residual depth pool location pool frequency
sediments	percent of fine sediment in spawning gravel

MANAGEMENT ACTIVITIES IN PROGRESS OR UNDER WAY WHEN THE HCP IS ADOPTED

Management activities in progress or under way when the HCP is adopted that are exempt from compliance with the conservation strategies (see the Implementation Agreement) will be reported as part of implementation monitoring. Otherwise, such activities will not be monitored.

Research

OBJECTIVES

The conservation strategies in this HCP require that research be carried out to answer certain specific questions. These questions can be grouped under three broad research objectives:

- To obtain information needed to move from short- to long-term conservation strategies.
- To obtain information needed to assess and improve the effectiveness of the conservation strategies.
- To obtain information needed to increase management options and commodity production opportunities for lands managed pursuant to the HCP.

RESEARCH PRIORITIES AND TOPICS

These objectives give rise to three research priorities:

(1) Research that is a necessary part of a conservation strategy. DNR recognizes the interim nature of a short-term approach and has delayed management actions until new information is obtained.

(2a) Research needed to assess or improve conservation strategies that are in place. Information gaps that restrict DNR's ability to provide conservation benefits are evident, but DNR has not delayed management actions.

(2b) Research needed to increase management options and commodity production opportunities for lands managed pursuant to the HCP, including testing of new technologies and experimental application of silvicultural techniques.

(3) Research needed to improve general understanding of the animals, habitats, and ecosystems addressed by the HCP.

Research topics identified in the HCP can be prioritized accordingly.

Priority 1

Riparian

- Determine how to design and manage riparian buffers that maintain wind-firm streamside forests.
- Evaluate the local and downstream effects of forest management activities along Type 5 waters not associated with unstable slopes. Determine whether conditions necessitate buffers along Type 5 streams, and if so, determine how to design and manage such buffers.

Spotted Owl

- Determine the amounts of down woody debris necessary for nesting, roosting/foraging, and dispersal habitats.
- Develop better stand-level definitions for nesting habitat.
- Determine the amount and distribution of nesting habitat needed to support nesting spotted owls within managed forest landscapes.
- Develop better stand- and landscape-level definitions for dispersal habitat.
- Determine how to manage and harvest timber within nesting and roosting/foraging habitats.

Marbled Murrelet

- Evaluate the habitat relationships of murrelets occupying DNR-managed lands. Determine which areas and habitat conditions support nesting murrelets.
- Determine whether certain breeding sites are more important to the population than others and, if so, identify the conditions that influence these differences.
- Develop the ability to delineate the boundaries of breeding sites.
- Determine how to protect and manage breeding sites.
- Determine whether nesting murrelets can colonize unoccupied suitable habitat.

Priority 2

Riparian

- Determine how to harvest timber and meet conservation objectives within riparian areas.
- Determine how to harvest timber and meet conservation objectives on hillslopes with high mass-wasting potential without triggering land slides and causing adverse effects to fish habitat.
- Determine the best approach to growing healthy riparian buffers while managing the buffer for economic return.

Spotted Owl

- Determine the types, amounts, and configurations of habitat required to support spotted owls in managed forest landscapes.
- Develop the ability to accelerate development of functional spotted owl nesting and roosting/foraging habitats in conjunction with commercial silvicultural activities and timber harvest.
- Determine how to reduce the risk of catastrophic habitat loss due to fire, insects, or disease, while maintaining existing nesting and roosting/foraging habitats.

Marbled Murrelet

- Determine whether it is possible to harvest timber at or near breeding sites and meet conservation objectives.

Multispecies

- Determine how to design, create, and manage landscape-level habitat patterns to benefit a variety of native animals that use the various forest ages and structures in a geographic area.

- Determine how to best move these patterns across the landscape through time in order to allow maximum flexibility for timber harvest.

Priority 3

Riparian

- Develop basic information on the relationships between forest management activities and riparian ecosystems in managed forests.

- Develop basic information on the relationships between forest management activities and hydrology in managed forests, particularly the relationships among forest management activities, basin soils, and stream-channel/stream-bed changes during rain-on-snow floods.

Spotted Owl

- Determine whether snags are a necessary part of northern flying squirrel habitat in eastern Washington.

Marbled Murrelet

- Develop basic information on murrelet ecology.

Other research topics may arise as the HCP is implemented and new knowledge is obtained.

RESEARCH PROGRAM

DNR will actively manage the HCP research program to ensure that information is obtained in a timely and cost-effective manner and that research is accomplished with high standards of quality and credibility. DNR does not intend to create a large research infrastructure to conduct the necessary investigations. Most HCP research will be done for DNR by qualified research institutions through cooperative agreements and contracts. Certain applied research that requires close coordination with DNR operations may be carried out by DNR scientists. Some enhancement of current DNR infrastructure will be required to direct the research program, manage the information obtained, and ensure that new information is successfully incorporated into operational programs.

To the maximum extent possible, HCP research will be carried out on DNR-managed lands in the OESF Planning Unit, where management emphasizes research and experimentation. (See the section in Chapter I titled Why the OESF is Unique and Section E of Chapter IV on the OESF conservation strategies.) The special research relationship between DNR and the Olympic Natural Resources Center will enhance DNR's ability to meet HCP information needs. Research that cannot be carried out on the western Olympic Peninsula, or cannot be extrapolated from this planning unit, will take place on other appropriate DNR-managed lands.

There is considerable overlap between the HCP research priorities described previously and those envisioned for the OESF. (See the section in Chapter I titled Why the OESF is Unique.) However, it is important to note that the OESF has broader research objectives and different overall research priorities than those that are part of this HCP. In other words,

both priorities for the HCP and other, non-HCP priorities will shape the overall OESF research program. Research on watershed processes and aquatic habitats, the habitat needs of late seral species, ecosystem productivity and health, timber harvesting systems, landscape management, and other topics will be featured in the OESF, in addition to the HCP research topics described previously.

DNR recognizes the substantial financial commitment that the HCP research program entails. DNR will provide research funding commensurate with the importance of the HCP and the scope of the research questions to the extent DNR is given flexibility to make that decision. The exact funding level may vary from year to year, depending on actions of the Legislature, but DNR shall request at least $1 million per year for HCP research until the Priority 1 research topics listed above have been adequately addressed. In some cases, however, it may not be necessary for DNR to fund research on a particular topic. Other organizations may sponsor work that will generate the knowledge needed. An important part of the HCP research program will be to stay in touch with other Pacific Northwest research programs and assimilate information that can be used to meet HCP information needs.

RESEARCH PROCEDURES AND REPORTS

A research procedure will be prepared for each investigation that is part of the HCP research program. Research procedures will describe background and rationale, specific objectives, research approach, hypotheses to be tested, data to be collected, field and analysis methods, budgets, and timelines. A study's principal investigator(s) will prepare procedures for research in consultation with DNR. Investigators will also prepare annual reports that describe the results of work carried out during the preceding year, summarize data collected, and present preliminary data analyses. A comprehensive final report that includes detailed results, conclusions, and management recommendations will be prepared at the conclusion of each research project. DNR will emphasize rapid dissemination of research results to DNR managers, planners, and technical specialists, and rapid assimilation of new information into conservation and management approaches. DNR will also require investigators to seek publication of research results in refereed professional journals.

Reporting

The Implementation Agreement describes how reviews and inspections will occur.

DNR will provide the U.S. Fish and Wildlife Service and the National Marine Fisheries Service with standard year-end reports compiled through DNR's geographic information system or other methods, such as summaries of timber sales and other management activities. As discussed in the earlier section in this chapter titled Monitoring, DNR will also prepare an annual report that describes the results of all monitoring activities carried out during the preceding calendar year. Monitoring reports will be completed and submitted to the U.S. Fish and Wildlife Service by March 30 of each year.