Chapter 9. Terrestrial Wildlife

This chapter summarizes the terrestrial wildlife studies that have been carried out on the Forest. The chapter then focuses on three specific wildlife resources whose management has the potential to influence watershed processes. These three resources are riparian birds in general, spotted owl management, and marbled murrelet management. These latter two species, managed under provisions of the federal ESA through the Forest's Habitat Conservation Plan (HCP; ODF 1995), have affected present and future land management activities through determination of rotation ages for management basins, Habitat Conservancy Areas (HCA) for the spotted owl, and Marbled Murrelet Management Areas (MMMA). Each of these determinations, and variations being considered in the new HCP, will have effects on both upslope and riparian management into the foreseeable future.

SUMMARY OF WILDLIFE STUDIES

This summary of terrestrial wildlife studies for the Forest is based on discussions with John Toman, ODFW District Wildlife Biologist in Charleston; Marcia Humes, ODF Wildlife Biologist in Salem; and Randy Smith, ODF Southern Oregon Area Wildlife Biologist in Coos Bay. In addition, the studies identified below were reviewed, as was the 1995 HCP.

Few wildlife studies have been conducted specific to the Forest with the exception of those dealing with endangered species. While the ODFW conducts an annual elk census and has a long-term study of bears using tetracycline-laced bait as a marker, the results of neither study can be disaggregated specifically to the Forest (personal communication, John Toman, ODFW 2003). The largest non-endangered species, terrestrial wildlife study is, *A Report on Avian Surveys Conducted on the Elliott State Forest*, May-July 2001, by Jennifer Weikel and David Vesely. The results of this study are discussed in the next section.

Endangered species concerns arose on the Forest subsequent to the 1990 listing of the northern spotted owl as a threatened species. The initial effect of the listing was the designation of 1.5-mile buffers ("owl circles") around each nest tree. The significant coverage of these circles on the Forest and effects on forest management were immediately apparent, and in 1992 led the State Land Board to initiate development of an HCP as an alternative to owl-circle-based management (Rice and Souder 1998). When completed in 1995, the Forest's HCP provided 6 years of coverage for marbled murrelets in addition to the 60-year coverage for spotted owls. During development and subsequent implementation, the HCP required monitoring and research studies for both spotted owls and marbled murrelets. Northern spotted owl density surveys done on the Forest in 1996 and most recently in 2003 by Kingfisher Ecological. These surveys provide valuable insight into owl numbers over time on the Forest. In 2000, the principal investigators associated with the Oregon Cooperative Fish and Wildlife Unit and the College of Forestry at Oregon State University summarized the results of spotted owl studies conducted since 1993 in the Forest (Glenn et al. 2000).

The 1995 HCP provided the ODF with a 6-year incidental take permit for marbled murrelets. Under the permit, the ODF was required to survey proposed timber sale areas and rate them for murrelet suitability using six habitat characteristics: multi-storied canopies, remnant trees, deformed trees with greater than 5 inch limbs, number of potential nesting platforms, live crown ratios, and gaps in the stand (Appendix K, ODF 1995). From these line transects a stand's habitat suitability for marbled murrelet was rated in one of three classes: low, medium, or high. During the 6 years of the HCP, timber harvest was to occur first in stands classified as having a low murrelet suitability rating, then in medium, and finally in high suitability areas.

The murrelet incidental take permit required ODF to conduct a study to test and validate whether the suitability rating accurately predicted murrelet use of a particular forest stand. Thomas Hamer of Hamer Environmental (Meekins and Hamer 1996) conducted this analysis, determining that the HCP procedure poorly predicted low and medium quality habitat (although 91% for high-rated habitat). A revised procedure that used only the number of platforms 5 inches in diameter and ground slope was adopted to replace the approach in the 1995 HCP. This "Hamer Model" was used until the 6-year permit expired and the ODF went back to a "take avoidance" strategy of protocol surveys and MMMAs.

A commitment of $500,000 in funding towards a study of marbled murrelet reproductive success in Oregon coastal forests also was required as part of the 1995 HCP. This study, done by S. Kim Nelson and Amanda Wilson (2002), looked at murrelet habitat requirements on all State Forests in western Oregon, including the Elliott. The result showed that high-value marbled murrelet habitat on the Elliott State Forest was characterized by trees with large platforms having substrate and cover, the number of substrate-covered trees in a stand, and high densities of platform-covered trees (Nelson and Wilson 2002). In addition to these two studies, the ODF annually provides summaries of marbled murrelet surveys at the District level (ODF 2002; undated).

BIRDS UTILIZING RIPARIAN AREAS

In a study of birds on the Elliott State Forest, Weikel and Vesely (2001) established 25 point count stations placed randomly on roads in each of the 17 management basins. Stations were sited on non-major roads and surveyed early in the morning to lessen the effects of road traffic. Each site was surveyed only once. After a 2 minute waiting period after arrival, the surveyor listened for and observed birds for 10 minutes at each station. On any given day, counting started 15 minutes before sunrise and ended by 10 AM to correspond to the primary activity period for birds. Data were collected for birds observed within 50 meters (about 55 yards) of the point location, birds beyond the point location, and birds flying over but within 50 meters of the station.

Methods

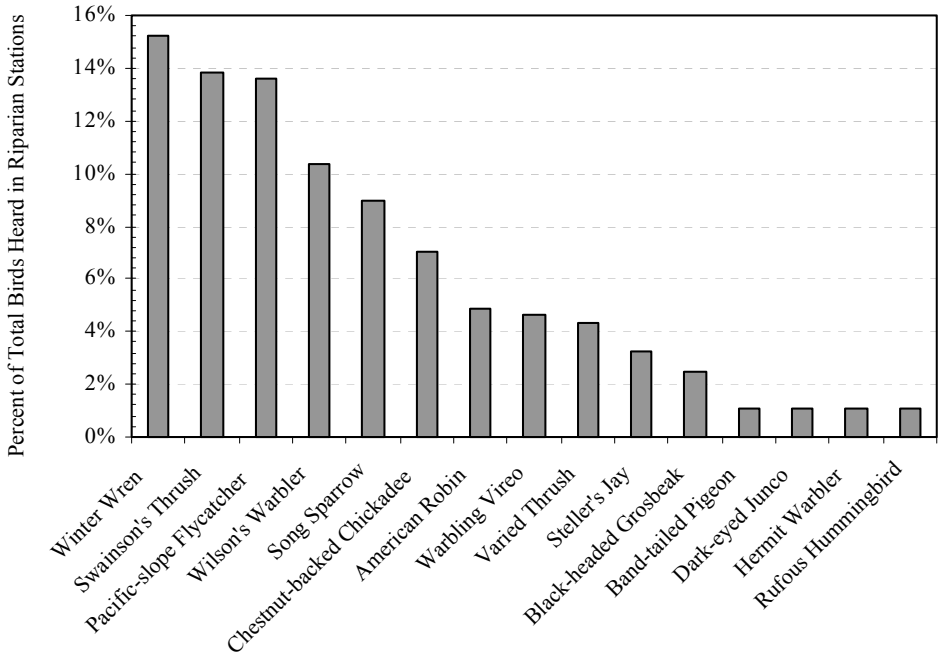
For this analysis, the bird count station locations located within mapped riparian corridors along fish-bearing streams were identified (see Map 7.1). Data on bird species and numbers

were extracted from the bird count file for those stations within mapped riparian corridors for birds observed within 50 meters of the station center.

Results

The data was aggregated by management basin and the resulting information is shown in Table 9-1. In addition, a chart was created showing each species' contribution (if greater than 1%) of birds found in riparian areas in the Forest (Figure 9-1).

Figure 9-1. Most common (>1%) bird species observed from riparian areas.



Source: Weikel and Vesely 2001

Because of the way that the avian surveys were conducted, the results, even for those stations located in riparian areas, do not necessarily suggest a strong correlation or habitat dependency. Taking surveys along roads, which commonly form the boundary between riparian and upland communities, resulted in more "edge" species and probably a proportion of forest-associated species, rather than riparian-associated species. Only two specifically aquatic-obligate species, belted kingfishers and American dipper, were observed during the surveys.

Table 9-1. Number of Individual birds observed at survey stations located in riparian areas of the Forest by management basin.

Bird Species	Management Basin*							Totals
	8	**9**	**10**	**12**	**14**	**15**	**16**	
American Dipper					1			1
American Robin	2	4	1	4	3	4		18
Belted Kingfisher					3			3
Black-headed Grosbeak				4	4	1		9
Brown Creeper				1	2			3
Band-tailed Pigeon		1		3				4
Black-throated Gray Warbler						1		1
Chestnut-backed Chickadee	1	4	3	1	13	3	1	26
Dark-eyed Junco				1	2		1	4
Evening Grosbeak					1			1
Golden-crowned Kinglet					2			2
Hairy Woodpecker					3			3
Hermit Warbler					3	1		4
Hutton's Vireo					2			2
Least Flycatcher					1			1
Pileated Woodpecker							1	1
Pacific-slope Flycatcher		3	3	6	29	6	3	50
Purple Finch	1			1				2
Rufous Hummingbird	1		1	1	1			4
Song Sparrow	1	3	3	11	12	3		33
Spotted Towhee				1				1
Steller's Jay		3	2	2	4	1		12
Swainson's Thrush		4	2	13	26	5	1	51
Varied Thrush				3	11	2		16
Warbling Vireo		3		5	5	2	2	17
Western Tanager				1	1	1		3
Western Wood-pewee				2				2
Wilson's Warbler	2	3	1	11	20		1	38
Winter Wren		2	3	13	27	9	2	56
Total Birds by Basin	**8**	**30**	**19**	**84**	**176**	**39**	**12**	**368**
Total # Species by Basin	**6**	**10**	**9**	**19**	**22**	**13**	**8**	**29**
Number of Riparian Stations	**1**	**3**	**6**	**10**	**19**	**5**	**2**	**46**

* Not all management basins contained listening stations in riparian areas.
Data from Weikel and Vesely 2001.

Northern Spotted Owl Management

With the 1995 HCP, the ODF moved from an owl-circle-based approach to a late-successional habitat-based approach in management of the Forest for spotted owls. This latter approach took two forms: first, approximately 43% of the Forest was designated as long-rotation basins (rotations between 160-240 years) intended to provide nesting, roosting, and foraging habitat; and second, HCAs were established as late-successional reserves intended to protect sensitive wildlife habitat areas within each management unit by providing permanent protection for threatened and endangered species, as well as by contributing to the overall biodiversity (ODF 1995). In addition, a buffer area of 70 acres of suitable habitat was required around spotted owl nests for the first 5 years, in the remaining 57% of the forest that is designated as shorter-rotation basins (80 years). All basins, both long- and short-rotation, must maintain the 50-11-40 rule for spotted owl dispersal habitat (50% of the area having trees averaging 11 inches in diameter with 40% canopy cover).

While the long-rotation basins are not *de facto* reserves, in the near term only "stand improvement cuts," such as thinning from below, are expected in these areas. On the other hand, the HCAs are intended to be reserves and their layout in the Forest has the potential to affect watershed processes. Management of the long-rotation basins and HCAs with less frequent and less intensive forestry operations will affect watershed processes differently than intensively managed areas, as discussed in Chapter 6, *Erosion and Sediment*. The spatial patterns resulting from these land management objectives may affect both the frequency of landslides and their potential for delivery of large wood to streams.

Methods

Using the union routine, the analysis team combined Arc-View Shape files delineating rotation ages, HCAs, and 5th field HUCs to create a map and Excel file. Map 9.1 shows the arrangement of long-rotation basins and HCAs on the Forest. Table 9-2 shows the area and proportion of these land designations in the Forest.

Results

As shown in Table 9-2 and on Map 9.1, long-rotation basins are not equally distributed across the Forest. Almost all (84%) of the Forest in the Tenmile region is in long rotations (160+ years), with over 75% of the Umpqua region also in this category. In contrast, while 47% of the Coos region is in the Forest, only 19% of this area (consisting of the Elk Creek Basin and that portion of basin #8 in the Palouse Creek drainage) is designated for long rotations. While Palouse Creek has some of the highest coho salmon populations on the Oregon Coast, the upper West Fork Millicoma (with the exception of Elk Creek) and Marlow Creek, two strong fish streams, are in short (80 year) harvest rotations. In contrast to the long rotation basins, HCAs are more evenly distributed among the three regions (Table 9-3), representing 6.6% of the Forest in the Coos region, 2.4% in the Tenmile region, and 7.1% in the Umpqua region.

Table 9-2. Land allocation for spotted owl habitat protection in the Forest.

Watershed by 5th field HUC	Elliott State Forest		Long-rotation Basins		HCAs	
	Acres	%	Acres	%	Acres	%
Umpqua Region						
Umpqua/Scottsburg	211	0.2	0	0	0	0
Mill Creek	9,237	9.9	2,826	30.6	682	7.4
Lower Umpqua	18,760	20.1	18,723	99.8	1,327	7.1
Subtotal	28,208	30.2	21,549	76.4	2,009	7.1
Tenmile Region	21,559	23.1	18,085	83.9	1,487	6.9
Coos Region						
Millicoma River	37,116	39.7	4,443	12.0	1,976	5.3
Coos Bay	6,564	7.0	3,800	57.9	893	13.6
Subtotal	43,680	46.7	8,243	18.9	2,869	6.6
Grand Total	**93,448**	**---**	**47,877**	**51.2**	**6,365**	**6.8**

Marbled Murrelet Management

Marbled murrelets were listed as a threatened species under the federal ESA in 1992. Critical habitat for the species was finalized on May 24, 1996. According to the U.S. Fish and Wildlife Service (USFWS), "…the Elliott State Forest was originally proposed for designation as critical habitat. The State of Oregon has since completed the Elliott State Forest HCP that includes provisions for the marbled murrelet and received an incidental take permit. This permit describes how the area will be managed for murrelets. Therefore, the USFWS has removed this area from the final designation" (USFWS 1996). The initial murrelet incidental take permit expired in 2001; the ODF is currently revising the 1995 HCP with the intent to obtain a new permit. Since the incidental take permit has expired, the Forest is currently operating under 'take avoidance' where suitable habitat around proposed timber sales is surveyed according to standard protocols. The ODF designated MMMAs as part of their initial 6-year incidental take permit for marbled murrelets. No timber harvesting is done in the MMMAs, although some thinning has been allowed to improve stand structure. Seasonal activity restrictions are placed on areas within 0.25 miles of MMMAs.

Methods

Similar to the spotted owl management methods discussed in the previous section, the analysis team combined, using the union routine, the 5th field HUC layer with the ODF layers containing MMMAs.

Results

Table 9-3 shows the acreage of MMMAs by region, and Map 9.2 shows their spatial extent across the Forest. These MMMAs cover 2.4% of the Tenmile region, 7.4% of the Umpqua region, and 12.1% of the Coos region. Significant detections during timber sale surveys result in new MMMAs (ODF 2002; undated).

Table 9-3. Percentage of the Forest in Marbled Murrelet Management Areas.

Watershed by 5th field HUC	Elliott State Forest		MMMAs	
	Acres	%	Acres	%
Umpqua Region				
Umpqua/Scottsburg	211	0.2	61	28.8
Mill Creek	9,237	9.9	1,115	12.1
Lower Umpqua	18,760	20.1	837	4.5
Subtotal	**28,208**	**30.2**	**2,013**	**7.1**
Tenmile Region	21,559	23.1	515	2.4
Coos Region				
Millicoma River	37,116	39.7	5,081	13.7
Coos Bay	6,564	7.0	199	3.0
Subtotal	**43,680**	**46.7**	**5,280**	**12.1**
Grand Total	**93,448**	**---**	**7,807**	**8.4**

Reserves Resulting from Management for Spotted Owls and Marbled Murrelets

Under the 1995 HCP, the HCAs for the spotted owl and the MMMAs can be considered reserves since no harvest (except thinning) is allowed once they are older than 40 years. These reserve areas are more likely to have large trees than more intensively managed parts of the Forest. The watershed effects of larger trees are discussed in Chapter 6, *Erosion and Sediment* and Chapter 7, *Riparian Vegetation and Large Wood*. Map 9.3 shows how these reserves are arrayed across the Forest landscape. Table 9-4 shows data on the extent (area and proportion) of reserves by region and type (HCA, MMMA or both).

Table 9-4. Land allocations for spotted owl habitat protection.

Watershed by 5th field HUC	Elliott State Forest		Reserves					
			HCAs		MMMAs		Total*	
	Acres	%	Acres	%	Acres	%	Acres	%
Umpqua Region								
Umpqua/Scottsburg	211	0.2	0	0.0	61	28.8	61	28.8
Mill Creek	9,237	9.9	682	7.4	1,115	12.1	1,534	16.6
Lower Umpqua	18,760	20.1	1,327	7.1	837	4.5	2,068	11.0
Subtotal	**28,208**	**30.2**	**2,009**	**7.1**	**2,013**	**7.1**	**3,663**	**13.0**
Tenmile Region	21,559	23.1	1,487	6.9	515	2.4	1,660	7.7
Coos Region								
Millicoma River	37,116	39.7	1,976	5.3	5,081	13.7	5,882	15.8
Coos Bay	6,564	7.0	893	13.6	199	3.0	1,092	16.6
Subtotal	**43,680**	**46.7**	**2,869**	**6.6**	**5,280**	**12.1**	**6,973**	**16.0**
Grand Total	**93,448**	**---**	**6,365**	**6.8**	**7,807**	**8.4**	**12,296**	**13.2**

* Takes into account the overlap between HCAs and MMMAs shown in Map 9.3.

From a watershed perspective, these reserves have two principal effects. First, because few forest management operations will take place in them, few anthropogenic sources of impacts to streams will occur. However, because of their status, certain types of watershed restoration activities within these areas will be constrained either in type (no tree pulling), extent (number of trees available for use as large wood in streams), or season (permitted period of work activity).

SUMMARY

The commonality among the previous discussions in this chapter is the effect that different stand structures and management regimes have on wildlife (both aquatic and terrestrial). In addition, watershed processes (such as landslide frequency, aquatic habitat formation, sediment delivery and nutrient cycling, rainfall to streamflow relationships) are all affected by upslope management.

Management under the 1995 HCP (ODF 1995) and the *Elliott State Forest Management Plan* (ODF 1993) delineate the Forest into longer (160+ years), and shorter (80-160 year) harvest rotations. If continued over time, this strategy will result in those shorter rotation basins having more frequent cycles of weak root strength (increasing slide potential), as discussed in Chapter 6, *Erosion and Sediment*.

From a wildlife perspective, creating and retaining habitat structure will be a goal of any future forest management strategy. Structural retention refers to any practice that retains significant elements from a harvested stand for incorporation into a new stand. These elements include snags, fallen logs, and live (green) trees (Rose et al. 2001). Each of these three structural components benefits the ecosystem (both aquatic and terrestrial) in different ways depending upon their density and extent.

FRAMEWORK OF APPROACHES

Focus group discussions with the ODF and ODFW staff during review of the draft analysis identified a number of relevant wildlife-related concerns. The two primary ones were how to evaluate the effects of retaining large dead wood (standing snags and downed trees) and green trees during clearcut harvests; and how management of, and wildlife concerns in, stands adjacent to fish-bearing streams affects potential restoration opportunities.

Based on these focus group concerns and subsequent inputs by Marnie Allbritten (ODFW) and Marcia Humes (ODF), additional effort was undertaken in an attempt to link wildlife-related concerns to the watershed analysis, principally through review of the database provided in *Wildlife-habitat Relationships in Oregon and Washington* (Johnson and O'Neil 2001). However, it became apparent that the effort required to adequately link wildlife habitat effects in upland management to watershed processes exceeded the contract scope of work. While this linkage would be useful and appropriate, a more realistic place for this work is in the new HCP, once silvicultural strategies are identified with a greater degree of certainty. Nevertheless, it is possible to make some general recommendations, as discussed below.

1. Manage dead large wood and green tree retention to meet multiple objectives. According to Rose and others (2001), "Effective management of decaying wood must do more than simply provide for inputs of dead trees....management should strive to provide for diversity of trees species and size classes, in various stages of decay and in different locations and orientation within the stand and landscape." Adequate information is available in the scientific literature on the functions of structural legacies, and how they can meet multiple objectives. Specifically:

   A. Location and distribution. Discussion of location and distribution is generally focused on clumped versus dispersed patterns of distribution. According to Rose and others (2001), snags and downed wood may follow a naturally clumped distribution, and thus, management should take advantage of site-specific occurrences without having to match a particular spatial distribution pattern. It is probably beneficial to vary local densities of snags and down wood across the ground, within and among stands, in order to provide a higher level of habitat structural diversity.

   B. Trends over time. Snags and logs decay and change over time; live trees either live and get bigger or die and become snags and down logs. These structures function differently or at least for different species, as stands develop over time. Thus, the temporal dimension to decaying wood needs to be considered to ensure that sufficient snags and down wood densities are provided through time. Because snags and down logs function differently in terms of their wildlife value depending on their species, diameter, height (length), decay class, decay trajectory, and whether or not they are hollow (Rose et al. 2001), temporal considerations also should include recruiting wood with a wide range of characteristics.

   C. Consider upslope versus riparian location for retained wood. One potential difference to keep in mind between the "upslope" and "riparian" areas is that the riparian areas that are buffered are providing a different type of habitat (forested with edges) than the upslope (primarily nonforested), so structural retention is likely playing a different role in these areas.

2. Identify the benefits and trade-offs of various large wood and green tree retention strategies. There was a request on the part of ODF Elliott staff to have information on the tradeoffs and benefits from a wildlife perspective related to the spatial location and distribution of retained green trees. While requiring more effort than possible in this project, a cursory look at the benefits of green tree retention shows that green trees:

   - Function as biodiversity refugia.
   - Provide future recruitment for snags and down wood.
   - Can be used to grow very large trees in subsequent rotations.
   - Green tree retention can be implemented to favor species that produce larger and more persistent wood (such as Douglas-fir and redcedar) and/or species that are shade-tolerant to add tree species diversity (such as hemlock and redcedar).

- As discussed in Chapter 6, *Erosion and Sediment*, green trees may reduce landslide hazards via maintenance of root strength. While additional literature review, research, and modeling are needed, the spatial distribution and density of retained green trees can play an important watershed process function.
- Retained green trees (and snags and downed wood) provide improved habitat structural functions for late-successional wildlife species earlier in the life of a stand.

The second area of wildlife-related recommendations relates to opportunities to improve watershed conditions and stream habitat through collaborative efforts among ODF, ODFW, and watershed councils. The Forest has benefited in the past through these collaborative efforts, and significant future opportunities have been identified in this analysis. In the past, however, some instream restoration efforts, such as pulling trees into streams, have been constrained by concerns over management of federally listed species, specifically the marbled murrelet. Criteria to determine the specific trees or stands suitable for use in stream complexity restoration work have been developed and are currently being applied in a project on the upper West Fork Millicoma River. The criteria differ slightly depending upon whether the proposed pull sites have been surveyed for marbled murrelets according to accepted protocols, as discussed below (*Regional General Permit For Large Wood and Boulder Placement*, Permit #2000-001, dated June 30, 2000).

For surveyed stands where no significant detections (i.e. occupancy) have been found:

- Projects … must not remove trees from known occupied or unsurveyed suitable habitat within 50 miles of the Pacific Coast.
- For projects located within 0.25 miles of a known occupied murrelet site: (1) no work will occur from April 1 to August 5, and (2) work activities from August 6 to September 15 shall not begin until 2 hours after sunrise and conclude no later than 2 hours before sunset.

Additional requirements for unsurveyed pull tree source stands are:

- Within 50 miles of the Pacific Coast, no standing trees exhibiting structural characteristics suitable for marbled murrelet nesting shall be removed or in any way used for large wood placement. In general, these trees are large (greater than 32 inches DBH) with large branches, deformations, or moss cover creating a platform of at least 6 inches upon which a murrelet may lay an egg.
- All noise-producing activities (including the use of all mechanized equipment such as chainsaws, heavy machinery, etc.) within 50 miles of the Pacific Coast and within 0.25 miles of potential murrelet habitat [forest stands containing the structure described in section 8(a) above] and implemented between April 1 and September 15 (as permitted below) shall not begin until 2 hours after sunrise and conclude no later than 2 hours before sunset. These daily restrictions minimize potential disturbance effects to murrelets during known peak activity times in the forested environment.

The need for additional instream habitat structures leads to the following recommendation:

Extend marbled murrelet surveys. Where possible as part of normal operations, the ODF should consider extending marbled murrelet protocol surveys to include coverage for riparian and near-stream stands that could be potential sources of pulled trees. Potential stream areas that could benefit from additions of large wood are identified in Chapter 8, *Aquatic Organisms and Their Habitat*, and potential project areas and source stands could be identified through coordination with ODFW and watershed councils.

RECOMMENDATIONS

This project illuminated further needs. Some of these needs will be at least partially addressed in the HCP and Forest Management Plan revision process, while others can be addressed as separate projects.

- Explore the impact on watershed processes of arrangement and scale of reserves.
- Explore the impact on watershed processes of the kinds of habitat in reserves.
- Examine how long-rotation basins, short rotation basins and dispersal habitat requirements affect watershed processes.
- Create a tool that can be used as a guide to describe benefits and risks when designing green tree retention areas. For example, the guide could cover: (1) The expected benefits for the watershed if green trees are left in particular locations; and (2) Information on "correct" sizes and amounts of material to load up a channel for future delivery to desired target locations.