

THE
NORTHERN
SPOTTED OWL

By
Jabber M. Aljabber

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Strix occidentalis caurina

Abstract:

*The Old-growth forest is a forest that is located in the Pacific Northwest. The Old-growth forest is one of the most important natural resources in the world. It supports certain species such as the Northern Spotted Owl (*Strix occidentalis caurina*) and the Marbled Murrelet (*Brachramphus marmoratus*). The Old-growth forests have significant values to both people and ecosystems. They are considered as a natural source for forests history information. On the other hand, one of the most important species that occupies in the Pacific Northwest is the Northern Spotted Owl. The Northern Spotted Owl is considered in risk due to habitat loss and fragmentation. Many studies show that the Northern Spotted Owl heavily depends on ancient forests. Therefore, the relationship between the Old-growth forest and the Northern Spotted Owl is very strong. As a result, huge efforts are made to protect both the Old-growth forests and the Northern Spotted Owl.*

Introduction:

The forest of the Pacific Northwest is among the last remaining Old-growth forests in North America. In the Pacific Northwest, the Old-growth forest is a forest that has large, old trees, varying tree heights, and dead trees. In other words, it is a forest that has not been cut for decades by humans. The Old-growth forests are very productive and diverse among the world's forests (World Wildlife Fund, 1995). The Old-growth forest is a suitable environment for many species due to the unique structures and characteristics (Smith and Smith, 2001). Therefore, the Old-growth forest has various creatures. It has distinct habitats for wildlife. It has many niches, which several species prefer to occupy and take advantage of its ecological conditions. For instance, some of these creatures include mosses, liverworts, lichens, fungi, insects, and some invertebrates (Stabb, 1996). Moreover, one of the most important creatures in the Old-growth forest in the Pacific Northwest is the Northern Spotted Owl (*Strix occidentalis caurina*).

Further, the Old-growth forest is important in respect with industry. Since, the Old-growth forests have large, big, and dead logs, they are valuable in producing wood products. Logs are used to produce high-quality lumber, paper, and plywood. However, the Old-growth forest possesses several features that make it different from other forests. For instance, the Old-growth forest is: a valuable natural diversity on the land; a great environment for threatened species; an important scientific resource (Stabb, 1996); and a place where there is a huge amount of dead wood as well as fallen logs (Smith and Smith, 2001). As a result, a strong conflict continues between (a) environmentalists (biologists and ecologists) who believe that the Old-growth systems provide a productive and rich

environment for the forest's creatures, and (b) economists who want to invest the Timber trees to produce wood products.

Threats to the Old-growth forests:

It is significantly important to identify the threats and the dangers that the Old-growth forest encounters. The main threats to the Old-growth forest can be seen in harvesting and clearing the Timber trees for wood products. Logging is a very serious problem in the Pacific Northwest, particularly in the Old-growth forests areas. The National Wildlife Federation (NWF) states, "The timber industry has already cut 90 to 95 percent of the ancient forests in the Northwest. Only one-third of the remaining ancient forests are now protected in parks and wilderness areas" (International Wildlife, 1992). Conserving the Old-growth forests is important. Therefore, in the past years, there has been a rough controversy between environmentalists and timber industry companies over the importance of retaining such forests or keeping jobs markets (Hughes, 1997). In their article, Bendix and Liebler say, "the keystone ... was 'jobs vs. owls' a message that owl protections would directly result in throwing people out of their jobs" (Bendix and Liebler, 1999, p.663). For instance, between 1988 and 1995 approximately 4590 mill jobs have been lost as well as 85,000 jobs have dispensed because of the logging restriction implemented by the federal government to protect not only Old-growth forests but also the Northern Spotted Owl species (Hughes, 1997).

Protecting the Old-growth forests translates into fewer Northwest industry jobs. Recent estimates of 1990's jobs losses caused by the Old-growth wildlife protection vary from 12,000 to 147,000 jobs (Alaric, 1992). Not surprisingly, workers who work in the timber industry blame the Old-growth forest's creatures especially the Northern Spotted

Owl. Bendix and Liebler explain the timber industry companies' argument, which is that the Northern Spotted Owl does not require much interaction with the forest as well as has the ability to occupy second-growth forests (Bendix and Liebler, 1999). Even though the Northern Spotted Owl can occupy second-growth forests, the environmentalists insist that logging is destructive for any ecosystem. Therefore, the more timber trees that are cut down, the more habitat is lost, the more creatures lose their home, the more greater threats increase. In his book, Stabb says, "a tree naturally falling to the ground is not loss to the forest. The log and disturbance it creates more like a boom town" (Stabb, 1996, p. 30). The falling trees are moist environments for some insects and crawling organisms.

Efforts to protect the Old-growth forests:

Environmentalists speak for trees since the many species of wild life are being wiped out. Many plans by the government and other organizations have been done to carry out a long-term campaign to protect Old-growth forests all over the world. The main focus, here, is to protect the Northern Spotted Owl. Protecting the Northern Spotted Owl will not be achieved unless the Old-growth forests are conserved. The National Wildlife Federation is one of the organizations that endeavors to implement a campaign to save the Old-growth forest habitat of threatened species especially the Northern Spotted Owl. In 1992, NWF conducted a major campaign to save the old-growth forest habitat of the threatened species such as the Northern Spotted Owl. NWF did not deny the serious economic problems of the Northwest timber industry that put a great blame on the Northern Spotted Owl (International Wildlife, 1992). Further, in 1995, The Fish & Wildlife Service put pressure on the Department of the Interior to list the Northern Spotted Owl as a threatened species in 1990. The Fish & Wildlife Service asked the

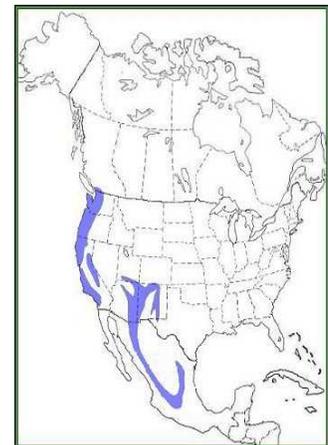
department to develop and carry out a recovery plan. As a result, it came out that the federal government will lose \$20 billion in timber sales and home, and builders will lose billions due to the lack of timber. Also, the most harmed from such a recovery are the taxpayer and the homeowner. However, the Fish & Wildlife were questioned that the whole campaign is based on biologically faulty data, and the Northern Spotted Owl is probably not endangered, and the estimates of its population have more than doubled. Therefore, many environmentalists do not deny this, but argue that the Northern Spotted Owl was not the main issue. It is merely a convenient legal excuse for a broader goal, which is preservation of the Old-growth forests (Nelson, 1995).

In addition, in his article, Cockburn states that in Portland, Oregon, President Clinton declared that he is saving the Old-growth forests by working to clarify the situation to the timber companies to stop logging ancient groves in the Northwest (Cockburn, 1996). On December 1995, a report on the state government of British Columbia's agreement advocated the recommendations of its scientists to desist clear-cutting in Clayoquot Sound's old-growth forest (Dillingham, 1995). Also, A (MacBlo) is a plan that aims to reduce harvesting of the forests' trees in all of British Columbia and to implement strategy focusing on old growth and habitat conservation (Genovali, 1998).

The Northern Spotted Owl

General History:

In a broad sense, there are three subspecies of this owl: *Strix occidentalis caurina*, which is known as the "Northern" Spotted Owl, *Strix occidentalis lucida*, which is known as the "Mexican" Spotted Owl, and *Strix occidentalis occidentalis*,



Spotted Owl Distribution in North America

which is known as the "California" Spotted Owl. The Northern Spotted Owls have large homelands, which meet their biological needs. One of the best homes of the Northern Spotted Owl is the Old-growth forest in the Pacific Northwest. In 1858, the Northern Spotted Owls were found (Lindner, 2000) from the mountains of the northern California down the Sierra Nevada to the mountains of southern California (Natalie, 1995).

Moreover, the Northern Spotted Owls were listed as a threatened species in 1990 by the U.S. Fish & Wildlife Service under the Endangered Species Act of 1973 (Cascade Center; Lindner, 2000). Therefore, the Northern Spotted Owls are native to the Pacific Northwest, which includes Oregon, Washington, California, southern part of British Columbia, and parts of Mexico.

General Characteristic:

The Northern Spotted Owls love to live in the Old-growth forest. They live on their own. The Northern Spotted Owls come in various sizes and colors (Lindner, 2000).



They are large, nocturnal, woodland owls and are darkly colored, with a round head, and dark brown sharp eyes.

Their brown feathers are heavily spotted with white on the breast and belly, with fewer spots on the wings, back, and

head. Spotted Owls are placid owls. In flight, they have heavy methodical wing beats.

They are considered as active predator birds.

The Northern Spotted Owl's size is as follows: length: average 48cm (19") for females, 46cm (18") for males; Wingspan: average 109cm (43") for females, 106cm (42") for males; and Weight: 518-760g (1-1¼ lbs) (N. A.).

Scientific Classification:

Kingdom: **Animalia**, Phylum: **Chordata**, Subphylum: **Vertebrata**, Class: **Aves**,
Order: **Strigiformes**, Family: **Strigidae**, Genus: **Strix**, Species: ***Strix occidentalis***
caurina, and common name: **The Northern Spotted Owl** (Vesey, 1860).

Habitat Requirements:

As was mentioned in the Northern Spotted Owl's history, the preferable habitats for this kind of creature are the Old-growth forests because these forests provide the necessary needs for them. As Rice states, the Northern Spotted Owl requires a certain forest structure, which consists of large trees with cavities for nesting (Rice, 1992). Such a habitat consists of four important components, which are the following: nesting, roosting, foraging, and dispersal.

Nesting & Roosting:

Since the Northern Spotted Owls depend on particular structures in their environment, the Old-growth forest provides them with the most appropriate productive environment. The Old-growth forest has many layers of trees, which protect the Northern Spotted Owl from sun as well as heat. Nesting sites are in large tree cavities, whereas roosting sites are close to the ground of the forest, which allow the owls to hunt their prey (Sierra Legal Defence Fund, 2001). Other things that the Old-growth forest provides are the moderate high canopy closure, multi-species canopy, broken tops of trees, large accumulation of fallen trees, and other debris (U.S. Fish & Wildlife Service). The fallen trees help to produce the canopy and multi layer. Also, fallen trees will offer the Spotted Owls more space to fully spread their wings and fly through the forest (Lindner, 2000).

Foraging:

The Northern Spotted Owls use a wide array of forest types (e.g. foraging through open and fragmented habitats). Therefore, the Old-growth forest that provides the necessary structures for nesting and roosting provides also foraging habitats for the Northern Spotted Owls (U.S. Fish & Wildlife Service). The Northern Spotted Owls start foraging for food at night after sunset and end sometimes before sunrise. They do not forage while they fly, but they stand and wait for an appropriate time to dive down onto prey (N. A.).

In addition, the primary prey for the Northern Spotted Owls are flying-squirrel (*Glaucomys sabrinus*), dusky-footed (*Neotoma fuscipes*), bushy-tailed woodrats (*Neotoma cinerea*), and red-tree-vole nests (Cascade Center; U.S. Fish & Wildlife Service; Rice, 1992; and Sierra Legal Defence Fund, 2001). Also, they feed on brush rabbits, young snowshoe hares, red-backed voles, deer mice, and different small animals (Cascade Center, (N. D.).

Dispersal:

It is said that the habitat that allows the Northern Spotted Owl to disperse may not be a suitable habitat for nesting, roosting, or foraging. The dispersal habitat consists of forest stands with sufficient trees size and canopy closure, which provide some protection to the owls from predators and allow the owls to forage for food between the original nest site and the new nest site (U.S. Fish & Wildlife Service).

Breeding:

The breeding season of the Northern Spotted Owl begins in March and ends in September. Timing and success in producing offspring are strongly correlated to the availability of food. It is amazing to know that the Northern Spotted Owl mate for life, but a new mate is readily taken if the other disappears. Also, they begin to breed between the ages of two to three years. Old nests are not repaired before eggs are laid and tend to be used over years. Usually 2 eggs are laid but as many as 4 are possible. Eggs are laid from March through mid-May, and the female incubates the eggs for at least 28 - 32 days, whereas the male delivers food to the nest and passes it to the female to feed to the young. At 32-36 days the young leave their nest. However, they are not fully developed, and therefore, they often fall to the ground. At the sixth week, owlets will be able to fly short distances. Owlets at the age of 6 – 9 weeks are able to capture insect prey by themselves. Families remain loosely associated during summer before young disperse in the autumn. Adults tend to remain near their traditional nesting territories, while juveniles disperse widely, as much as 100 to 200 kilometers (60 to 125 miles) (N. A.).

**Threats to the Northern Spotted Owl:**

Since the Northern Spotted Owl requires specific structures in the Old-growth forest in the Pacific Northwest, the most threatened factors to them is habitat loss and fragmentation, which result of timber harvest, fir suppression, and clearing for agriculture (Cascade Center; and Sierra Legal Defence Fund, 2001). The Sierra Legal Defence Fund states that 3,000 hectares of appropriate habitat is harvested each year in the area of

the Northern Spotted Owls. In addition to habitat loss and fragmentation, there are several minor factors that threaten the Northern Spotted Owl. For instance, individual owls and pairs will become geographically isolated because of the logging activities in the surrounding habitats. Therefore, without connected habitats, the Northern Spotted Owl cannot disperse. Thus, lack of dispersal habitat is leading to the rapid decline of the species because of the inability of owls to locate one another as well as a narrowing gene pool caused by physical isolation of owls. Another factor is that adult Northern Spotted Owls will neither take advantage of nor fly through clear-cuts or even young forests due to predators, heat stress, and lack of prey. Young spotted owls have only a 15-19% chance of surviving in their first year because of the threats caused by habitat fragmentation (Sierra Legal Defence Fund, 2001). Therefore, the more timber trees are being cut-down, the more habitat loss, the more decline in the number of the Northern Spotted Owls.

Demographic studies:

There are many and diverse studies of the Northern Spotted Owl. These studies include population dynamics, diet, habitat, prey, dispersal, behavior, physiology, and genetics. Several demographic studies are designed to monitor the survival as well as rates of reproduction of the Northern Spotted Owl. These demographic studies cover a large part of the owl's range. They are considered the source of most of the current information on population trends (E. D. Forsman, U.S. Forest Service, 2000).

The known number of pairs in the Pacific Northwest is approximately as follows: 30 in British Columbia, 860 in Washington, 2,900 in Oregon, and 2,300 in northern California (E. D. Forsman, U.S. Forest Service, 2000). One of the main tasks of

conservation biologists is to evaluate the viability of endangered and threatened species under different natural conditions, under alternative options for wildlife management, reserve design, and habitat protection plans. These evaluations usually ask questions about the predicted future abundance, risk of extinction, or chance of recovery of the species. Also, the demographic studies play a major role in predicting population trends and implementing plans to protect endanger species such as the Northern Spotted Owl in the Pacific Northwest.

In a study conducted by Andersen and Dipak Mahato, they use demographic models to compare two spotted owl conservation strategies: (1) habitat area strategy: 1-3 nesting sites are used in a large number of small reserves, and (2) habitat conservation area plan: 10-20 active nests are used in a smaller number of larger reserves. They conclude that the larger reserves are much more effective in keeping populations viability due to the result of the behavior of juvenile spotted owls when they are searching for appropriate places to live after leaving their nests. Therefore, they look more carefully for larger reserve areas that have a greater diversity of different aged trees than in smaller reserve areas (Johnson, 1995).

Another study, funded by U.S. Forest Service, focused on factors that may affect the viability of the Northern Spotted Owl in the United States. The study used RAMAS GIS to combine two resources of variability in determining the threat the species encounter. The two resources are survivals and fecundities. Moreover, Akcakaya said, “demographic stochasticity was modeled to describe chance variations in reproduction, survival and dispersal. These types of natural variation were used to express the model results in probabilistic terms such as the viability of the species” (Akcakaya, 2001;

Akcakaya, 1996).

RAMAS GIS found 18 habitat patches. The size distribution of the patches was skewed, with the 4 largest patches. These 4 patches make approximately 96% of the total area of all patches, and the seven largest make up about 98%. Due to the large variegations in sizes of neighboring populations, the model findings were not very sensitive to the rate of inter-patch dispersal of juvenile spotted owls. However, the model predicted a large difference between lower and upper bounds on the viability of the northern spotted owl. Akcakaya stated that according to sensitivity analyses, “the viability of the metapopulation was most sensitive to the set of vital rates used... and also sensitive to the degree of spatial correlation among vital rates of the populations” (Akcakaya, 2001; Akcakaya, 1996).

The Population Viability Analysis (PVA) is a systematic examination of interacting factors that place a population or species at risk of extinction. PVA program is “designed to link GIS-generated landscape data with a detailed metapopulation model for extinction risk assessment, viability analysis, reserve design and wildlife management” (Akcakaya, 1996). The program operates in four steps: landscape data, temporal changes in habitat characteristics, a metapopulation model, and simulations.

Finally, Zabel et al stated that metaanalyses of demographic parameters indicate that the Northern Spotted Owl populations are declining throughout their range. In their study (1996), they aimed to estimate survival, fecundity, and annual rates of population change for resident, territorial female Spotted Owls in two different areas in the coastal mountains of southwestern Oregon (Coos Bay Study area and Siskiyou Study area). Also,

they investigated whether the amount of rainfall correlated to reproduction rates of Spotted Owls (Zabel et al, 1996)

Having such objectives, they put 376 owls on the Coos Bay Study Area and 110 owls on the Siskiyou Study Area. Owls in Coos Bay included the following: 191 owls >3 years old (93 females and 98 males), 49 1 & 2 years old (26 females and 23 males), and 136 juveniles. Owls in Siskiyou included the following: 69 >3 years old (31 females and 38 males), 10 1 or 2 years old (5 females and 5 males), and 31 juveniles. The sample also included one immigrant from another study area. Moreover, the sample of Coos Bay Study area included 9 owls >3 years old and 13 1 or 2 years old owls that were marked by researchers on adjacent study areas and subsequently immigrated into our study area. Studying four years of data from the Coos Bay and Siskiyou Study Areas, they found that the estimate of population has changed for Coos Bay during 1990-1993 indicating that the population was declining at a rate of 7% per year. Also, both the Siskiyou and Coos Bay studies were of short duration. Reproduction varied greatly between 1990 and 1993 at both study areas. Similar variation in reproduction was reported in other studies (Zabel et al, 1996).

Efforts to protect the Northern Spotted Owl:

Many plans have been designed and implemented since the Northern Spotted Owl was listed as a threatened species in 1990 by the Endangered Species Act of 1973. For instance, the U.S. Fish & Wildlife Service were concerned about the impact of timber logging on the behavior of the Northern Spotted Owl pair several years ago. Therefore, the Oregon Department of Forestry and the US Fish & Wildlife Service have reached an agreement that aims to promote conservation of the threatened Northern Spotted Owl on

state forest lands in the north coast of western Oregon. U.S. Fish & Wildlife Service (2001) lists some the agreement's goals:

1. Increase protected core use areas for nesting pairs from 70 acres to at least 250 acres and establishes core area protection for certain known resident single northern spotted owl sites.
2. Share information between the U.S. Fish & Wildlife Service and timber industry agencies on planned operations within the home range of the Northern Spotted Owl.
3. Prevent the collection or cutting of firewood within a ¼ mile of any owl site in the nesting and fledging season for owls (March 1st - September 30th).

Another plan is Scatter Creek Watershed Habitat Conservation Plan in Thurston County, WA. A grant of \$300,000 is provided to develop the Habitat Conservation Plan (HCP) in the surrounding area of Scatter Creek Watershed (27,423 acres). This plan intends to cover more than 30 species that are listed at risk, including the Northern spotted owl (Tollefson and Morgan, 2001).

In addition, the President's Forest Plan (FEMAT) is developed over four years to promote the recovery of the Northern Spotted Owl together with sustainable forestry practices in western Oregon. The FEMAT significantly increased the amount of federal land designated for wildlife and conservation purposes (State Land Board, 1998).

Moreover, on April 1993, President Clinton called for a Forest Conference in Portland, Oregon to address the human and environmental needs served by the federal forests of the Pacific Northwest and Northern California. Clinton, his Vice-President, and much of the Cabinet spent sufficient time listening to all points of view and collecting

information. The President then directed his Cabinet to create a balanced, comprehensive, and long-term policy for the management of over 24 million acres of public land. A team was established, including an interagency, interdisciplinary team of expert scientists, economists, sociologists, and others. The team is called Forest Ecosystem Management Assessment Team. After three months of intensive works, which included the review of all developing proposals for management of federal forests within the range of the Northern Spotted Owl, the team issued an intensive report assessing ten options (Northwest Forest Plan, 1993).

Finally, one of the plans to protect the Northern Spotted Owl in the Pacific Northwest is The Jobs-In-The-Woods (JITW). In 1995, Watershed Restoration Program began as part of the Northwest Forest Plan. The Federal funds were appropriated to the U.S. Fish & Wildlife Service for implementation of a Watershed Restoration Program to support projects on non-federal lands (e.g. private, tribal, and state lands) within the range of the Northern Spotted Owl (U.S. Fish & Wildlife Service, 1995).

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