DEPARTMENT OF INTERIOR

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Publication of 90-Day Findings for Two Petitions to List the North American Lynx in the North Cascades of Washington and Three Oaks From California as Endangered

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of petition findings.

SUMMARY: The U.S. Fish and Wildlife Service (Service) publishes 90-day findings that were made on petitions to add four species to the Lists of Endangered and Threatened Wildlife and Plants. Petitions to list the North American lynx in the North Cascades of Washington State and three species of oak from California have not presented substantial information indicating that the requested actions may be warranted.

DATES: The findings announced in this notice were made on February 4, 1992 (lynx) and September 23, 1992 (oaks).

ADDRESSES: The petitions, findings, supporting data, and comments are available for public inspection, by appointment, during normal business hours at the office of the Field Supervisor, U.S. Fish and Wildlife Service, Olympia Field Office, 3704 Griffin Lane S.E., Suite 102, Olympia, Washington 98502 (lynx) or the Field Supervisor, U.S. Fish and Wildlife Service, Sacramento Field Office, 2800 Cottage Way, rooms E-1803 and E-1823, Sacramento, California 95825 (oaks).

FOR FURTHER INFORMATION CONTACT: David Frederick, Field Supervisor, Olympia Field Office (206/753-9440) (lynx), or Wayne White, Field Supervisor, Sacramento Field Office (916/978-4866) (oaks) (see **ADDRESSES** section).

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(A) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act), requires that the Service make a finding on whether a petition to list, delist, or reclassify a species presents substantial scientific or commercial information indicting that the petitioned action may be warranted. To the maximum extent practicable, this finding is to be made within 90 days of the receipt of the petition, and the finding is to be published promptly in the **Federal Register**. If the Service finds that a petition presents substantial information indicating that a requested action may be warranted, then the Service initiates a status review on that species.

The Service has determined that the following petitions do not present substantial information that the requested actions may be warranted.

On August 22, 1991, the Service received a petition from the National Audubon Society, The Humane Society of the United States, Defenders of Wildlife, Greater Ecosystem Alliance, Friends of the Loomis Forest, Methow

Valley Forest Watch, Save Chelan Alliance, Lower Columbia Basin Audubon Society, Tonasket Forest Watch, Pilchuck Audubon Society, North Cascades Audubon Society and Sierra Club Cascade Chapter (collectively "petitioners") to list the North American lynx (*Felis lynx canadensis*) of the North Cascades ecosystem of Washington as an endangered species and designate critical habitat for the lynx. The petition, dated August 16, 1991, clearly identified itself as a petition and contained the names, addresses, and telephone numbers of the petitioners. The petition was signed by the attorney (Mark Tipperman) for the petitioners. The petition stated that the lynx is in imminent danger of extinction because of an extremely small population, an isolated habitat jeopardized by an ongoing practice of fire suppression, and encroachment by logging, roads, trappers and hunters, a very small prey base to feed on, and limited or no protection by the Washington State Department of Natural Resources and the U.S. Forest Service

The petition was reviewed by staff of the Service's Olympia, Washington, Fish and Wildlife Enhancement Field Office and its Portland, Oregon, Regional Office. The finding is based on numerous documents, including published and unpublished studies, responses to information requests, agency documents, literature syntheses, and field sighting records. Interviews were conducted with researchers, wildlife managers, personnel from Service field offices in Regions 6 and 7, British Columbia Ministry of Environment biologists, and others familiar with lynx. All documents and telephone conservation records on which this finding is based are on file in the Olympia field Office.

Lynx are found over most of Alaska and Canada, and their presence in Washington, Idaho, Montana, Utah, Colorado, and Wyoming marks the southern limits of their range in western North America (McCord and Cordoza 1982). Snowshoe hares (*Lepus americanus*) are the primary prey of lynx in north central Washington, as well as throughout the lynx's range (Saunders 1963, Van Zyll De Jong 1966, Nellis and Keith 1968, Nellis *et al.* 1972, Brand *et al.* 1976, More 1976). Lynx habitat coincides with habitat occupied by the snowshoe hare, its dominant prey (Koehler 1991).

The study by Koehler (Koehler 1988), conducted from 1981–87, indicated north central Washington supported a relatively stable, low density, low productivity lynx population presumably because of the scarcity of prey and poor habitat conditions for snowshoe hares. The information also indicated that the demography of lynx in Okanogan County, Washington, may be characteristic of lynx at the southern periphery of their range where habitat conditions are marginal for lynx and snowshoe hares.

The immediate threats to the survival of lynx were described by the petitioners, and focused specifically on the lynx in central Washington. They did not provide information indicating a decline throughout the entire range of the lynx or anywhere outside of Washington. Pursuant to 50 CFR 424.02(e), any species that is in danger of extinction throughout all or a significant portion of its range may be declared an endangered species under the Act.

Although it may be assumed the same aforementioned threats (encroachment by logging, roads, trappers, hunters, etc.) exist throughout the southern periphery of the lynx's range (Washington, Idaho, Montana, Utah, Colorado, Wyoming), there is no indication the lynx is in danger of extinction throughout all or a significant portion of its range. The current range of the lynx in the North Cascades of Washington does not constitute a significant portion of its entire range (Figure 3.3. Brittell *et al.* 1989). British Columbia and Alaska constitute the majority of the lynx's range.

The Service's Olympia staff contacted biologists in British Columbia and Alaska concerning the status of lynx. Information received from these contacts indicates a decline in the 1980's that has caused some management concern in British Columbia. It was noted that additional information on population dynamics is needed. The most pressing information needs in British Columbia are for a better understanding of snowshoe hare distribution, biology, and cyclic patterns in the diverse ecological zones of the province, and of habitat requirements and relationships for both hares and lynx in those areas (Hatler 1988). The information did not indicate that the lynx throughout British Columbia and Alaska is significantly declining or in danger of extinction.

Another question which must be addressed is whether or not the lynx in the North Cascades ecosystem of Washington is a distinct population. The term "species" is defined in 50 CFR 424.02(k) as "any species or subspecies * * * and any distinct population segment of any vertebrate species that interbreeds when mature". *See also*, 16 U.S.C. 1532(16).

The 1989 study "Native Cats of Washington," by Brittell *et al.*, documented radio-collared lynx emigrating out of Okanogan County of north central Washington into British Columbia. The December 1988 final report of the study "Demographic Characteristics and Habitat Requirements of Lynx in North Central Washington," by Gary M. Koehler stated that lynx are known to emigrate from the study area into British Columbia. From 1981–83, Brittell (unpubl. report) found 3 to 8 of 23 radio-collared lynx emigrating from the study area into British Columbia. Brittell also indicated that immigration into the study area (Okanogan County of north central Washington) may occur. Therefore, the lynx of the North Cascades ecosystem of Washington do not appear to be isolated from other parts of their range in British Columbia and do not represent a distinct population segment.

Regulations at 50 CFR 424.14 describe the information which the Service shall consider in making a determination as to whether the petition presents substantial information that would lead a reasonable person to believe that the petitioned action may be warranted. Information to be considered includes past and present numbers and distribution of the species, threats faced by the species, and status of the species over all or a significant portion of its range. Data presented by the petitioners and otherwise available to the Service indicate that numbers and productivity of lynx in the North Cascades ecosystem of Washington remain low, but are relatively stable. Low numbers and productivity are often characteristic of animal species at the edge of their range due to marginal habitat conditions.

The petitioners did not present information on the status of the lynx in other parts of its range. The North American lynx throughout its entire range (Alaska, Colorado, Idaho, Maine, Michigan, Minnesota, Montana, North Dakota, New Hampshire, Nevada, New York, Oregon, Utah, Vermont, Washington, Wisconsin, Wyoming, and Canada) is currently a category 2 candidate for listing. A category 2 candidate is one for which information now in the possession of the Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are not currently available to support a proposed rule. Information available to the Service on the status of

the lynx in British Columbia indicates that numbers had declined during the 1980's causing some management concern. However, the available information on the status throughout Alaska and British Columbia did not indicate a significant decline in numbers or a subspecies in danger of extinction.

On September 18, 1991, the Service received a petition to list three plants: blue oak (*Quercus douglasii* H. & A.), California black oak (*Quercus kelloggii* Newb.), and valley oak (*Quercus lobata* Nee.) as endangered species. Mr. Craig Dremann of Redwood City, California, submitted the petition dated September 17, 1991. The petition and other documentation have been reviewed to determine if substantial information has been presented to indicate the requested action may be warranted.

The petitioner stated that these three species "are endangered throughout their range by conversion of oak woodlands to agriculture or grasslands, firewood cutting, residential uses, livestock grazing, exotic annual grasses, climate changes, drought, lack of acorn production in some areas for the last decade, and other factors that have adversely impacted these species." The three species occur throughout California and, in the case of California black oak, into southern Oregon.

The changing status of oak woodlands in California has been a topic of great interest to botanists in recent years (Plumb 1980, Plumb and Pillsbury 1987, Standiford 1991). A recent statewide inventory of hardwoods in California (Bolsinger 1988) documents the extent of hardwood forest types, and estimates the occurrence of various species in woodland types dominated by other trees. The woodland types of the three oak species are listed below with the area occupied by each type (a plurality of a given species in the dominant crown classes) and the area of occurrence (includes areas where the species occurs as scattered trees or clumps and stringers in other types) according to Bolsinger (1988).

Woodland type	Area of woodland type (acres)	Total area of occurrence (acres)
Blue oak	2,911,000	3,398,000
California black oak	894,000	4,313,000
Valley oak	274,000	486,000

Blue oak is the most extensive hardwood type in California (Bolsinger 1988). Blue oak woodland forms a nearly continuous band around California's Central Valley, generally between 100 and 1,200 meters in elevation (300 to 3,600 feet) (Barbour 1987). This deciduous tree generally occurs on moderately rich, loamy, well-drained soils with neutral or slightly basic pH on gently rolling to steep topography (Barbour 1987). The type is generally considered to include two broad associations, stands dominated by blue oak, and stands in which blue oak is mixed with one or more other tree species.

California black oak is a deciduous tree that is most commonly an associate of mixed conifer stands. It is distributed from southern California to southern Oregon in the Coast Ranges, Sierra Nevada, and eastern slopes of the Cascades. According to Bolsinger (1988), California black oak grows best on conifer sites, and occurs in the absence of conifers most often on poor quality sites in relatively low density.

Valley oak is distributed throughout California's Central Valley, southward to the San Fernando Valley and Santa Monica Mountains (Griffin 1973). Although the range of this deciduous tree is relatively large (500 miles (804 kilometers) long and 100 miles (160 kilometers) wide according to Bolsinger (1988)), the acreage of the valley oak type is small. Valley oaks grow in a wide range of physiographic positions, usually some miles inland from the coast on relatively deep and fertile soils (Griffin 1973). In the Sacramento Valley, it shows a strong association with mesic riparian habitats (Knudsen 1987). Valley oak often occurs sparsely in grasslands, small groves and streamside stringers, and open savannas. It also is found in many parks, cities, and suburban residential developments.

The area occupied by oak woodlands has declined over the past 40 years or so. Oak woodlands have been cleared for rangeland, agricultural use, and residential development (including roads and reservoirs as well as homesites), at a rate of approximately 30,000 acres per year (for the years 1945 to 1985) (Bolsinger 1988). Most conversion to improve livestock pasturage occurs in blue oak woodlands. Valley oaks, on the other hand, are most seriously affected by residential construction and agricultural conversion (Bolsinger 1988). Typically, a fairly high percentage (Bolsinger (1988) says 80 percent) of mature trees remain on a site after residential conversion. This means that more oaks remain than would be estimated from habitat conversion figures, but the survival and reproduction of oaks under these conditions is not known. California black oak appears to be most adversely affected by reduced fire frequencies in its mixed-conifer habitat (Kauffman and Martin 1987), where the resulting heavier duff accumulation and higher-intensity fires tend to discourage establishment of young trees.

Barbour (1987) suggested that some hardwood communities have been so severely affected by human activity that they are in danger of becoming extinct; however, he did not specify which ones. Greg Greenwood (California Department of Forestry, pers. comm., December 13, 1991) concurred that certain habitat types, such as valley oak riparian and coast range forest types are endangered. Bolsinger (1987, 1988) addressed attrition of oak woodland from natural causes in lower foothills and valleys in a general manner. He concluded that either it is progressing too slowly to be detected over a 12-year period (the length of time between his observations) or that it is not as extensive as casual observation would indicate.

While the potential loss of certain hardwood communities represents a significant ecological concern, the protections of the Endangered Species Act can extend only indirectly to communities through one or more component species. In addition, none of the three oak species are restricted to specific habitat types, so continued loss of certain communities does not necessarily translate into a significant loss at the species level. The fact that tremendous public and professional attention is focused on the decline of certain hardwood communities suggests that there may yet be opportunity to halt or reverse this trend. Scientists continue to investigate both species and communities to identify possible management techniques that might help ensure perpetuation of these resources. Numerous local groups, primarily urban and suburban areas throughout California, are initiating actions to encourage management and enhancement of California's hardwood resources. Activities include such things as protective ordinances of various types, zoning, planting projects, heritage tree ordinances, registries, and conferences sponsored by community groups, municipal governments, landowners, and resource managers (Johnson 1987).

The petitioner cited woodcutting as a factor endangering blue oak, California black oak, and valley oak throughout their range. Oak woodland area has declined due to the cutting of firewood (Bolsinger 1988), largely for charcoal in the last century and early this century. In more recent times, Bolsinger (1988) reports that 14 percent of all woodlands sampled in his statewide inventory

showed evidence of cutting (5 percent cut within the last 5 years), but states that the volume cut is a minute fraction of the total wood volume on both woodland and timberland. According to Bolsinger (1988), fuelwood cutting does not appear to be a cause of woodland conversions at the present time. Wood cutting is often combined with clearing of oaks for rangeland or other uses. According to Bolsinger (1988), rangeland clearings in oak woodland between 1945 and 1975 amounted to about 32,000 acres per year, but since the 1970's have averaged less than 2,500 acres per year. He reports that oak stand thinning is now more prevalent than clearing.

Concerns over insufficient regeneration to perpetuate certain hardwood species have been expressed for over 75 years (Bartolome *et al.* 1987). According to Bartolome *et al.* (1987), "favorite culprits enjoy repeated mention in the literature", but there have been relatively few scientific investigations into these popularly cited causes, and results have sometimes been inconclusive or contradictory.

There have been at least two attempts to characterize the status of oak regeneration on a statewide basis (Bolsinger 1988, Muick and Bartolome 1987). Both studies tended to confirm that valley oak and blue oak are not regenerating well, but neither suggested that either species may be facing extinction from this cause. According to Bolsinger (1988), results from a one-time field survey cannot be conclusive about how hardwoods are regenerating. The mere presence of seedlings does not prove that tree replacement is occurring, nor does their absence necessarily indicate a problem. As an example, he cites that Douglas-fir seedlings are seldom found under a Douglas-fir overstory, yet seedling establishment by the species is common.

According to Bartolome *et al.* (1987), a major source of misinformation on hardwood regeneration has been overextension of stand size distribution data. Although correlation between size and age in oaks is statistically significant, this correlation is inadequate to determine most of the details of stand age necessary to assess regeneration. Because size-based studies cannot reveal past mortality or past stand structures, only part of the necessary information to determine regeneration status of present stands is known. Mortality rates for valley oak, California black oak, and blue oak have not been measured. In general, oaks are long-lived, with individuals surviving to several hundred years (Bartolome *et al.* 1987).

Current stand size structure of oak species is variable. Statewide, valley and blue oaks have apparently established infrequently during the last 50 years, but black oak shows signs of recent establishment based on presence of small trees, seedling, and saplings (Bartolome *et al.* 1987, Bolsinger 1988). Barbour (1987) cites several studies that concluded that establishment of blue oak appeared to be episodic, with the most recent flush occurring in the 1870's. The regeneration episode of the late nineteenth century may have created excessively stocked stands. In this case, lack of recent recruitment would be expected, and new individuals would be unnecessary for regeneration at the present time (Bartolome *et al.* 1987).

According to Bartolome *et al.* (1987), we do not know how much establishment is needed for regeneration of present stand structure, nor whether past patterns included periods without establishment prior to most recent establishment. They conclude that, in general, most investigations have lacked a proper temporal perspective on regeneration, particularly an understanding of how past stand structure affects the need for recruitment.

Regeneration varies with location as well as over time. Muick and Bartolome (1987) conducted a systematic investigation of the regeneration status of 8 major oak species in 25 California counties, and identified environmental or management characteristics associated with presence or absence of oak regeneration. They found regeneration of blue oak to be better in the Sierra Nevada than in the Coast Ranges. They concluded the blue oak regeneration is highly site specific, and found environmental factors such as slope as aspect to be significant factors in certain regions. The association of small-scale site variation with successful establishment was also noted by Griffin (1971), who found that seedling survival of blue and valley oak was higher in shade. Muick and Bartolome (1987) observed that valley and blue oak saplings were more common at canopy edges than either under the canopy or in open grassland. Other site characteristics have been investigated less thoroughly in relation to regeneration, such as interference with establishment by European annuals.

Bolsinger (1988) found that blue oak seedlings were scarce in the drier parts of the species' range, and suggested that blue oak woodlands might be retreating upslope to moister environments. Stand mapping and regeneration studies conducted by Rice and Greenwood support this observation (Rice, Assistant Professor, Dept. of Agronomy and Range Science, Univ. of California, Davis, pers. comm., November 12, 1991; Greenwood, pers. comm., December 13, 1991). Bolsinger (1988) found no valley oak seedlings on plots in the valley oak type, but documented them in conifer timber and interior live oak types, and noted that valley oak seedlings and saplings were sometimes observed outside plot boundaries. Bolsinger (1988) found valley oak saplings more often in types other than valley oak, such as California black oak, riparian cottonwood, and conifer timber types. Bolsinger (1988) also noted that his statewide sample does not represent nonforest areas such as widely scattered trees in grassland, small streamside stringers, and small groves less than an acre in size.

Bolsinger (1988) did not suggest that regeneration is a problem for California black oak based on his statewide sample, which found seedlings on 62 percent of the plots in type, and saplings on 44 percent. Muick and Bartolome (1987) found California black oak regeneration to be better in the Sierra Nevada than in either the north or south Coast Ranges. Kauffman and Martin (1987) cited declines in the abundance of California black oak in some areas within the mixed conifer zone. They attributed this to effects of fire suppression, which promotes buildup of downed woody materials that inhibit successful seedling establishment and which produce high heat loads when fires do occur, resulting in high mortality of California black oak in small size classes. They suggest that extremely hot fires were uncommon prior to the era of suppression, when frequent surface fires maintained much lower fuel accumulations than those of today.

Grazing is one of the "favorite culprits" mentioned by Bartolome *et al.* (1987), and has been thought to prevent regeneration of oaks. Bolsinger (1988) indicated that approximately 64 percent of blue oak woodland types, 28 percent of California black oak woodland types, and 73 percent of valley oak woodland types were grazed, but concluded that it is not clear that grazing always reduces oak regeneration and growth. Herbivory by deer and pocket gophers may inhibit regeneration on some sites (Griffin 1971, 1979), although Muick and Bartolome (1987) observed no significant pattern regarding presence of livestock grazing, gopher, or deer or blue oak regeneration, citing the almost universal presence of livestock grazing, gopher, and deer signs on plots with and without saplings. They also noted that they did not distinguish

season or intensity of livestock grazing, which would likely affect successful oak regeneration. Duncan *et al.* (1987) concluded that cattle grazing does not necessarily reduce regeneration of blue oak or valley oak in central California, based on observations of areas which had not been grazed for 40 or more years.

Griffin (1979) concluded that local damage by small mammals to valley oak seedlings in his study area in Monterey County, California, can prevent the development of valley oak saplings. He suggested that nutritious annual exotic species may have improved the habitat for many rodents to such a point that small mammal damage to seedlings may be higher than in the past, but that whether this source of seedling predation was a permanent threat to valley oaks was not clear, as the several-hundred year lifespan of these trees enables them to wait a long time for the proper combination of regeneration conditions.

Griffin (1971, 1979) measured acorn production of blue oak and valley oak in Monterey County, California, and concluded that acorn production was sufficient, even taking into account insect damage and predation by livestock and wildlife, to provide for more than the observed numbers of sapling-sized trees.

The petitioner cited exotic annual grasses as a factor endangering the three oak species. It has been suggested that the replacement of native perennial bunchgrasses with exotic annual grasses, which has occurred over the last century, has reduced oak regeneration (Danielson and Halvorson 1991, Gordon *et al.* 1989). Oak seedling growth is reduced for those seedlings grown with the exotic annuals (such as *Avena fatua* and *Bromus diandrus*) compared to those grown with the native perennial *Stipa pulchra*. This is true for both valley oak (Danielson and Halvorson 1991) and for blue oaks (Gordon *et al.* 1989). On the other hand, Bartolome *et al.* (1987) do not place much importance on exotic grass competition as a significant factor affecting oak regeneration.

Drought was another factor cited by the petitioner as endangering the three oak species. Rundel (1987) reviewed adaptations of California hardwoods to environmental stress such as drought and low nutrient availability. He concluded that California hardwoods, including blue oak, California black oak, and valley oak have evolved a broad range of adaptations to environmental conditions that occur within the state, and that drought represents a primary selective pressure. The adaptations vary with species, but include features such as wood anatomy, architecture and phenology of below-ground tissues, and physiological responses at both the whole plant and tissue levels. As a specific example, his measurements of relative water deficit of mature leaves at the point of zero turgor in blue oak and California black oak indicated high drought tolerance in these species. In other words, these trees have evolved with drought and have developed numerous physiological and morphological characteristics that allow them to persist through drought.

While drought has been identified as a major cause of deciduous oak seedling mortality (Barbour 1987, Danielson and Halvorson 1991, Gordon *et al.* 1991), and this undoubtedly affects successful recruitment in the short-term, these investigators have not suggested drought by itself or in combination with other factors as a threat to the long-term survival of any of these species in the wild.

In their summary of recommendations for future research into hardwood regeneration, Bartolome *et al.* (1987) state that factors most likely to reward investigation are those associated with grazing and how present canopy structure and local site potential affect understory environment for recruitment. They consider acorn production and predation, climatic change, and competition with herbaceous species as unlikely to be important.

An analysis of the existing data strongly suggests that the petitioner does not present substantial information indicating that listing blue oak, California black oak, and valley oak as endangered species may be warranted. Of the studies reviewed above, only a few consider the state-wide status of oaks; none specifically addresses the danger of extinction. Experts who were asked to address this concern agreed that none of the three oak species are currently in danger of extinction throughout all or a significant portion of their ranges, nor are they likely to become endangered within the forseeable future (Greenwood, pers. comm., December 13, 1991; Rice, pers. comm., November 12, 1991).

In spite of documented habitat conversion, blue oak and black oak still occur on approximately 3.4 and 4.3 million acres in California, respectively, while valley oak, never as widespread as the other two species, still occurs on nearly 500,000 acres. In regard to regeneration, existing data indicate that successful establishment of young trees, particularly valley oak, has not occurred at high rates over the past 40 years or so, but the significance of this is not clear. Researchers have predicted declines in extent of blue oak and valley oak woodlands, but also acknowledge that additional information must be obtained in order to place these observations in the proper ecological context and to assess their ecological significance.

In summary, the Service finds that the data contained in the above two petitions, referenced in the petitions, and otherwise available do no present substantial information that listing the North American lynx in the North Cascades of Washington or the three oak species from California may be warranted.

These finding were prepared by the staff of the Sacramento and Olympia Field Offices and reviewed by the Portland Regional Office. The findings are based on scientific and commercial information contained in the petitions, referenced in the petitions, and otherwise available to the Service at this time. All documents and telephone conversation records on which these findings are based are on file in the Sacramento and Olympia Field Offices.

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List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

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Acting Director, U.S. Fish and Wildlife Service.

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