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Dear Ms. Josie,

RE: Environmental Assessment for the South Deer Landscape Management Project (EA# OR110-05-10)

Please consider my comments on this project. They are based on my professional judgment and experience in fire ecology, and my familiarity with the relevant scientific literature. I provide these comments in the interest of encouraging the use of scientific, ecological principles in public land management (e.g. Aber et al. 2000).

I prefer the Natural Selection Alternative that has been developed by the local community over the other action alternatives. The community recognizes that a high degree of disturbance from timber harvest has already occurred in the South Deer Creek project area, compromising natural values. The natural selection approach to extracting timber in this case appears to be a means of minimizing further damage and disturbance in the watershed while still providing sustainable levels of timber harvest. Further, the natural selection approach is said to produce minimal activity fuels over time, so it does not create the immediate slash management problems associated with more traditional timber harvests.

The natural selection alternative would also not create fire hazards associated with the other action alternatives. This alternative recognizes that the project area is a fire prone environment, especially with the residual effects of past timber harvests. The alternative's threefold strategy of maintaining remaining closed

forest, treating areas where fire severity is most elevated due to human impacts (dense plantations or second growth), and focusing on the home ignition zone for protecting property from fire is a logical approach to fire hazards. There is no need to further increase landscape level fire risk by opening forests and promoting more combustible understory vegetation..

In contrast, the EA does not express concern over management activities that create fire hazard problems. If a goal of management is to reduce fuel conditions in the landscape leading to unnaturally severe fire, the last action that should be pursued is the conversion of remaining old growth forest into combustible plantations. Yet, that is what is proposed under alternatives 2 and 3.

Old growth forests often dampen the spread and intensity of fire (Countryman 1955, Perry 1995). Without providing any empirical evidence, the EA presumes otherwise, a significant misconception. Low elevation, long-unburned Douglas-fir/hardwood forests like those of the project area are forest types that are experiencing very little high severity fire (Odion et al. 2004a-b, Azuma et al. 2004). Fire in these moist, old-growth forests is having beneficial effects of restoring its past influence, and there is not evidence that too much fire disturbance from an ecological standpoint can be expected. In fact, after a long period of reduced fire influence, fires that decrease stand density and create patchy landscape structure, may be most beneficial and best for expediting restoration (Miller and Urban 2000; Fule´ et al. 2004). Early successional habitat created by fire, with its rich array of snags and shrub vegetation is particularly important and rare habitat (Lindenmayer and Franklin 2002). The idea conveyed in the EA, that fire during the normal fire season in old-growth forests would be detrimental is misleading.

The proposed timber harvest and management burns would not have the restorative and heterogeneous effects of a natural fire. As required under NEPA, the agency should take a hard look at relevant scientific data on fire behavior and beneficial effects of natural fire. It makes no sense to presume old-growth forests should be cut down and replaced by combustible plantations when old-growth forests burn infrequently with complexity that favors biodiversity.

The EA also needs to take a scientific look at fuel dynamics in closed wet temperate forests rather than presuming continuous fuel buildup like that found in formerly open, dry ponderosa pine forests. In many temperate forests, the fuels that determine fire behavior may reach equilibrium (Gutsell et al. 2001, Johnson et al. 2001), decrease with long fire intervals (Romme 1982, Christensen 1991, Bond and van Wilgen 1996, Odion et al. 2004a-b), or change in other ways that differ from continuous fuel build up (Agee and Huff 1987). A fundamental property of forests is that their leaf area reaches a maximum relatively early in succession (Waring and Schlesinger 1985), so foliar fuels, do not exhibit a continuous net increase. Understory trees in closed forests may not contain the leaf area (about 0.037 kg/m^3) for propagating fire (Scott and Reinhart 2001), and so the presence of such trees due to fire suppression or other causes does not necessarily equate to build-up of fuel that helps propagate fire. The EA does not recognize any minimum level of foliar fuel necessary to vertically propagate fire in its use of the term “ladder fuel” and does not appear to factor this into its fire modeling. Conifer

poles in closed forests typically have very sparse foliage and may not be significant propagators of fire. If they were, there would be much more high severity fire in long-unburned old-growth forests.

The EA relies heavily on a hypothesis that the project area is outside the natural range of variability due to fire suppression actions, citing a publication by Thomas and Agee (1986). This publication is about prescribed burning at Crater Lake. In a more relevant publication based on research not far from the project area, at Oregon Caves, Agee (1991) could find no evidence of fire in recent centuries during a period of 100 years. This may be a longer fire interval than currently exists in much of the project area today considering that fire suppression did not become effective in many areas of the Klamath-Siskiyou region until the 1940's.. Given the potential for 100 year or more natural fire intervals, and the limitations of trying to estimate the past influence of fire on a heterogeneous landscape using fire scar analysis, which appear to significantly underestimation fire free intervals over whole landscapes (Minnich et al. 2000, Baker and Ehle 2001, Veblen 2003), the hypothesis that the project area is all outside the natural range of variation from recent centuries due to fire suppression may be incorrect. Complicating matters is the non-equilibrium nature of fire's influence. It has changed constantly throughout the Holocene in the Klamath region (Whitlock et al. 2003), so it is impossible to know the natural range of variation in fire with just estimates from recent centuries when conditions were different than both prior to this and now.

On the other hand, areas where significant timber harvest occurs are indisputably outside any natural range of variation, with numerous stumps, exotic species and other altered forest structure, function and composition. Despite the concern expressed in the EA over unnatural conditions, the South Deer Landscape project proposes actions to create more area far outside any natural range of variability.

The EA also fails to adequately address the impacts of proposed burning. Native organisms have not evolved with deliberate burning, as it is typically applied in our region. This may involve pile burning, which sterilizes patches of soil, which then become prone to invasion by exotic species (Korb et al. 2004). The prolonged combustion and soil heating under a burn pile does not occur over an entire burned area as presumed in the EA (118), these effects are restricted to large, human created piles of surface fuel that do not occur in natural forests. Prescribed burning is also typically done during spring or after fall rain. Fires at this time do not produce the natural range of severities and other natural fire effects (Moritz and Odion 2004). These fires are lethal to numerous organisms that survive fire during the regular fire season, such as soil stored seeds that become seasonally sensitive (Borchert and Odion 1995). Nesting birds and dormant herptofauna may be adversely affected. Finally, out of season burns can lead to increase fuel loading (Show and Kotok 1924). Plant tissue is unusually sensitive to heat during the wet season, when tissue moisture content is high. Out of season broadcast burning causes much foliar mortality while often consuming very little surface fuel.

An additional concern largely overlooked in the EA is facilitation of exotic species invasions, which are known impacts from the partial harvests proposed (Korb et al. 2003, Keeley 2005). Exotic plant spread as a result of timber harvest activities

needs to be fully disclosed and discussed as an unavoidable, significant impact (see http://www.werc.usgs.gov/fire/seki/ffm/). Of particular concern in the is the invasion of grasses, non-native thistles and Scotch Broom, which have already degraded many low elevation areas following partial harvests that open the forest or chaparral canopy. Grass and thistle seed disperses well and seed of broom is spread readily by foot traffic and in overland flow (Swezy and Odion 1997, Bossard 2000). Once established, broom may be impossible to eliminate. Broom is further spread by fire (Odion and Haubensak 1997). The activities proposed in alternatives 2 and 3 appear well-suited for spread and establishment of grass, broom networks, from which the noxious weed can spread further. This could increase fire hazards due to the combustibility of broom (http://www.cdfa.ca.gov/phpps/ipc/ weedinfo/brooms.htm). The EA does not describe the irreversible degradation of ecosystems via the promotion of alien plant invasions.

Timber harvest activities also have the potential to spread alien forest diseases such as Sudden Oak Death. Sudden oak death is caused by a newly described pathogen, *Phytophthora ramorum* (Rizzo & Garbelotto 2003). *Phytophthora*s are considered the most devastating pathogens of dicotyledonous plants (Kamoun 2000), and such pathogens are a particular concern when they are non-native and hence attack hosts with no evolved defenses. *P. ramorum* can spread in infected leaf, wood (sawdust), and soil particles in chainsaws, machinery, hand crews, etc. Research has shown it is effectively spread in foot traffic (Cushman et al. 2004). Long-unburned vegetation, as found in much of the project area, is especially susceptible to the disease (Moritz and Odion 2005a-b). *P. ramorum* has been recently distributed throughout the United States in nursery stock (Stokstad 2004), and is spreading in wildlands, suggesting it could be in the project area in the near future. All of these factors suggest the logging and other activities can place forests in the project area at significantly increased risk for the disease in coming years. These potential long-term impacts need to be shared with the public. In addition, an explanation of how large amounts of public money are currently being spent to try to control this disease is needed in any assessment of actions that could spread the disease.

Along with *P. ramorum*, two other *Phytophthora* species have now been isolated from trees showing similar symptoms, *P. nemorosa* (Hansen et al. 2003), and *P. pseudosyringae*. *P. nemorosa* is a newly described species, while *P. pseudosyringae* is known from Europe. These diseases provide additional incentive for measures preventing disease spread. Strategies for mitigating the spread of *Phytophthora* where human activities occur are imperfect, and the best way to prevent spread is the cessation of activities that are known to cause it (Hansen et al. 2000).

A primary reason for concern about Sudden Oak Death and similar diseases is the high rates of mortality of tanoak and California black oak. Declines of tanoaks and black oaks due to *P. ramorum* will affect hundreds of vertebrates and invertebrates that consume the rich source of food these dominant trees produce. For example, one study estimated annual acorn production of a single mature tanoak to be 455 kg (Tappeiner et al. 1990). There is much concern that Sudden Oak Death may

cause a cascade of long-term ecological impacts in affected ecosystems (Rizzo and Garbelotto 2003). The disease has recently been identified as a serious potential threat to Northern Spotted Owl (*Strix occidentalis caurina)* habitat requirements (Courtney et al. 2004). Yet, despite these concerns the Deer Creek Landscape Project proposes to cut down tanoak less than 12 inches in diameter. There may be numerous trees in this size class. The impacts of this activity compounded with the additional potential loss of tanoak and black oak due to facilitation of disease spread are not adequately addressed in the EA.

The EA left out the Natural Selection Alternative's supporting documentation that was in their appendices. Other scientific literature relevant to this project that has been pointed out to BLM and reviewed here has also been ignored. The natural selection alternative is supported by science and would avoid many of the impacts of alternatives 2 and 3. The following is a brief summary of the merits of the natural selection alternative:

1) The Natural Selection Alternative would retain and restore late successional forest ecosystems, which, as discussed above, have the lowest fire hazard conditions, but also have the greatest value for old-growth associated wildlife.
2) The Natural Selection Alternative does not target the most important species and resources for wildlife.
3) The Natural Selection Alternative would remove many of the same forest resources for products that alternatives 2 & 3 slash and burn without creating openings in the canopies that will increase shrubs and brush and heat up surface fuels.
4). Stewards on site with fire tankers will increase immediate response to fire. This can have a greater effect in terms of fire safety than any type of fuel treatment.
5) The Natural Selection Alternative recognizes and uses science and data backed studies for the region that support its practices.
6) The Natural Selection Alternative recognizes that we currently have a very incomplete understanding of the role of fire in these forests and the significant risks to forest and community health associated with intrusive treatments in the face of this high level of uncertainty.
7). The Natural Selection Alternative places more emphasis on protecting people and property by focusing on the home ignition zone.
8). The Natural Selection Alternative eliminates the potential harm to wildlife, native seed banks, etc. from unnatural prescribed burning.
9). The Natural Selection Alternative does not confuse the issues of fuel hazard reduction with forest product removal.

The South Deer Watershed management could become a great example of collaboration between community and government stakeholders leading to sound management balancing ecological and economic goals. I believe it is in the best interest of BLM as a manager of public lands to seriously consider the well-informed and well-intentioned Natural Selection Alternative. Thank you for your consideration.

Sincerely,

Dennis C. Odion

Literature Cited

Aber, J., N. Christensen, I. Fernandez, J. Franklin, L. Hidinger, M. Hunter, J. MacMahon, D. Mladenoff, J. Pastor, D. Perry, R. Slangen and H. van Miegroet. 2000. Applying ecological principles to management of the U.S. National Forests. Issues in Ecology. No. 6. Ecological Society of America, Washington, D.C.

Agee, J.K. 1991a. Fire history along an elevational gradient in the Siskiyou Mountains, Oregon. Northwest Science 65: 188-199.

Agee, J. K., and M. H. Huff. 1987. Fuel succession in a western hemlock/Douglas-fir forest. Canadian Journal of Forest Research 17: 697-704.

Azuma, D. L., J. Donnegan, and D. Gedney. 2004. Southwest Oregon Biscuit Fire: an analysis of forest resources and fire severity.

Baker, W. L. 1992. Effects of settlement and fire suppression on landscape structure. Ecology 73: 1879–1887.

Baker, W.L. 1994. Restoration of landscape structure altered by fire suppression. Conservation Biology 8(3): 763-769.

Baker, W.L., and D. Ehle. 2001. Uncertainty in surface-fire history: the case of ponderosa pine forests in the western United States. Canadian Journal of Forest Research 31: 1205-1226.

Bond, W.J. and B.W. van Wilgen. 1996. Fire and plants. Chapman and Hall,

London.

Borchert, Mark I. and Dennis C. Odion. 1995. Fire intensity and vegetation recovery in chaparral: a review. Pages 91-100 in Brushfires in California Wildlands: Ecology and resource management. International Association of Wildland Fire, Fairfield, WA._

Bossard, C. R., J. M. Randall, and M. C. Hoshovsky. 2000. Invasive plants of California's Wildlands. University of California Press, Berkeley, Ca..

Cohen, J.D. 2000. Preventing disaster: home ignitability in the Wildland-Urban Interface. Journal of Forestry 98:15-21._

Courtney SP, Blakesley JA, Bigley RE, Cody ML, Dumbacher JP, Fleischer RC, Franklin AB, Franklin JF, Gutierrez RJ, Marzluff JM, Sztukowski L (2004) Scientific evaluation of the status of the Northern Spotted Owl. Sustainable Ecosystems Institute, Portland.

Countryman, C.M. 1955. Old-growth conversion also converts fire climate. Fire Control Notes 17(4): 15-19.

Christensen, N. L. 1991. Wilderness and high intensity fire: how much is enough. Pages 9-24 in Proceedings of the 17th Tall Timbers Fire Ecology Conference, May, 1989, Tallahassee, Florida.

Cushman, J. Hall, Benson, Shelly, Kozanitas, Melina, Meentemeyer, Ross. 2004. Importance of humans and deer as dispersal agents of an invasive pathogen that causes Sudden Oak Death. Paper presented at the 2004 annual meeting of the Ecological Society of America, Portland, OR.

D'Antonio, C.M. 2000. Biological invasions, fire and global change. Pages 65-94 in H.A. Mooney and R.J. Hobbes, eds. Invasive Species in a Changing World. Island Press, Covelo, CA.

DellaSala DA, Williams JE, Williams CD, Franklin JF (2004) Beyond smoke and mirrors: A synthesis of fire policy and science. *Conservation Biology* **18**, 976-986.

Fule´ PZ, Cocke AE, Heinlein TA and Covington WW (2004) Effects of an intense prescribed forest fire: is it ecological restoration? *Restoration Ecology* **12**, 220-230.

Geppert, R.R., Lorenz, C.W., and Larson, A.G., 1985. Cumulative Effects of Forest Practices on the Environment: A State of the Knowledge. Wash. For. Practices Board Proj. No. 0130, Dept. of Natural Resources, Olympia, Wash.

Gutsell, S.L., E. A. Johnson, K. Miyanishi, J. E. Keeley, M. Dickinson, and S. R. J. Bridge. 2001. Correspondence. Nature 409:977.

Hansen E.M., P. Reeser, J.M. Davidson, M. Garbelotto, K. Ivors, L. Douhan, and D.M. Rizzo. 2003. *Phytophthora nemorosa,* a new species causing cankers and leaf blight of forest trees in California and Oregon. Mycotaxon 88: 129-138.

Hansen, E. M., D. J. Goheen, E. S. Jules, B. Ullian. 2000. Managing Port-Orford-cedar and the introduced pathogen *Phytophthora lateralis*. Plant Disease 84: 4-14.

Hunter, M. L. (editor). 1999. Maintaining Biodiversity in Forest Ecosystems. Cambridge University Press, Cambridge, U.K.

Isaac, L. A. and H. G. Hopkins. 1937. The forest soil of the Douglas-fir region and the changes wrought upon it by logging and slash burning. Ecology 18: 264-279.

Johnson, E. A., K. Miyanishi, and S.R.J. Bridge. 2001. Wildfire regime in the boreal forest and the idea of suppression and fuel buildup. Conservation Biology 15:1554-1557.

Johnson, E. A. 2003. Towards a sounder fire ecology. Frontiers in Ecology and Environment 1: 271.

Kamoun S (2000) *Phytophthora*. In: Kronstad J (ed) Fungal pathology. Kluwer Academic Publishers, Dordrecht, pp. 237–265

Keeley JE (2005) Fire management impacts on invasive plants in the western United States. *Conservation Biology*, in press.

Keeley, J. E. 2001. Fire and invasive species in Mediterranean-climate ecosystems of California. Pages 81-94 in K.E.M. Galley and T.P. Wilson, eds. Proceedings of the Invasive Species Workshop: the Role of Fire in the Control and Spread of Invasive Species. Misc. Publication No. 11, Tall Timbers Research Station, Tallahassee, FL.

Korb, J. E., N.C. Johnson, and W. W. Covington. 2004. Slash pile burning effects on soil biotic and chemical properties and plant establishment: recommendations for amelioration. Restoration Ecology 12: 52-62.

Lindenmayer DB, Franklin JF (2002) Conserving forest biodiversity – a comprehensive multiscaled approach.' (Island Press: Washington DC).

Mack, M. C., and C. M. D'Antonio. 1998. Impacts of biological invasions on disturbance regimes. Trends in Ecology & Evolution 13: 195-198.

Meentemeyer R., D. M. Rizzo, W. Mark, E. Lotz. 2004. Mapping the risk of establishment and spread of sudden oak death in California. Forest Ecology and Management 200:195-214.

Miller C, Urban DL (2000) Modeling the effects of fire management alternatives on Sierra Nevada mixed-conifer forests. *Ecological Applications* **10**, 85-94.

Minnich, R. A., M. G. Barbour, J. H. Burk and J. Sosa-Ramírez. 2000. Californian mixed-conifer forests under unmanaged fire regimes in the Sierra San Pedro Mártir, Baja California, Mexico. Journal of Biogeography 27: 105-129.

Mooney, H. A. and R.J. Hobbes, eds. 2000. Invasive Species in a Changing World. Island Press, Covelo, CA.

Moritz MA, Odion DC (2004) Prescribed fire and natural disturbance. *Science* **306**, 1680.

Moritz, Max, A. and Dennis C. Odion. 2005a. Further examining the relationship between past fire and Sudden Oak Death occurrence. For proceedings of the 2005 conference on Sudden Oak Death, Monterey, Ca. USDA Forest Service Gen. Tech. Rep. PSW-GTR-xxx. 2005

Moritz, Max A. and Dennis C. Odion. 2005b. Examining the strength and possible causes of the relationship between fire history and Sudden Oak Death. Oecologia.

Odion DC, Strittholt JR, Jiang H, Frost EJ, DellaSala DA, Moritz MA. 2004a. Patterns of fire severity and forest conditions in the Klamath mountains, Northwestern California. *Conservation Biology* **18**, 927-936.

Odion, Dennis C., James R. Strittholt, Hong Jiang, Evan J. Frost, Dominick A. DellaSala, and Max A. Moritz. 2004b. Fire and vegetation dynamics in the

Western Klamath Mountains. Pages 71-80 in K. L. Mergenthaler, J. E. Williams, and E. S. Jules eds. Proceedings of the Second Conference on Klamath-Siskiyou Ecology. Siskiyou Field Institute, Cave Junction, Oregon. pdf.

Odion, D. C., and K. A. Haubensak. 2002. Response of French broom to fire. Pages 296-307 *in* N. G. Sugihara, M. E. Morales, and T. J. Morales, editors. Proceedings of the symposium: fire in California ecosystems: integrating ecology, prevention and management. Miscellaneous Publication No. 2, Association for Fire Ecology, Berkeley, California.

Perry, D.A. 1995. Self-organizing systems across scales. Trends in Ecology and Evolution. 10: 241-244.

Perry, DA, Amaranthus MP. 1997. Disturbance, recovery and stability. Pages 31-56 in Kohm KA, Franklin JF, eds. Creating a Forestry for the 21st Century. Island Press, Covelo California.

Rhodes, JJ, Odion DC (2004) Evaluation of the efficacy of forest manipulations still needed. *BioScience* **54**, 980.

Rizzo, D. M. and M. Garbelotto. 2003. Sudden oak death: endangering California and Oregon forest ecosystems. Frontiers in Ecology and Environment 1: 197-204.

Romme, W.H. 1982. Fire and landscape diversity in subalpine forests of Yellowstone National Park. Ecological Monographs 52: 199-221.

Scott, JH, and ED Reinhardt. 2001. Assessing crown fire potential by linking models of surface and crown fire behavior. USFS RMRS -RP-29.

Show, S. B., and E. I. Kotok. 1924. The role of fire in California pine forests. U.S. Department of Agriculture Bulletin 1294.

Stokstad, E. 2004. Nurseries may have shipped Sudden Oak Death pathogen nationwide. Science 303: 1959.

Swezy, D. M. and D. C. Odion. 1998. Fire on the mountain; a land-manager's manifesto for broom control. Pages 76-81 in California Exotic Pest Plant Council's 1997 Symposium. http://www.caleppc.org/symposia/97symposium/swezy.html.

Tappeiner JC, McDonald PM, Roy DF (1990) *Lithocarpus densiflorus* (Hook. & Arn.) Rehd. Tanoak. In: Burns RM, Haonkala BH, (tech cords) Silvics of North America: 2. hardwoods. USDA Forest Service, agriculture handbook 654, vol 2, Washington, DC, pp 417-425.

Thomas, P.H. 1971. Rates and spread of some wind-driven fires. Forestry 44: 155-175.

Veblen, T. T. 2003. Key issues in fire regime research for fuels management and ecological restoration. Pages 259-276 *in* P. N. Omi and L. A. Joyce, technical eds. Fire, Fuel treatments and Ecological Restoration: Conference Proceedings. USDA Forest Service RMRS-P-29. Rocky Mountain Research Station, Fort Collins, Co.

Waring, R.H., and W.H. Schlesinger. 1985. Forest Ecosystems: Concepts and Management. Academic Press, Orlando, Florida.

Whitlock C, Shafer SL, Marlon J (2003) The role of vegetation change in shaping past and future fire regimes in the northwest U.S. and the implications for ecosystem management. *Forest Ecology and Management* **178**, 5-21.

Whittaker, R.H. 1960. Vegetation of the Siskiyou Mountains, Oregon and California. Ecological Monographs 30: 279-338.