
Chapter 1. INTRODUCTION

...wherein I introduce the project, my motivations for working on it, and a brief summary of what this document contains.



Oregon white oak (*Quercus garryana*) savanna, Finley Wildlife Refuge, Benton County, Oregon.

Environmentalists versus Developers - Wildlife or Humans - Government Control or Private Rights - Concrete or Food: bumper sticker battles that condense the issues that confront the spread of humans into the rural landscapes. Should we accept that there is no middle ground whereby a win-win situation exists for both individual landowners and for the environment? I don't think so. Ecologists argue that if we simplify and unravel ecosystems, we risk long-term environmental and economic harm. We all know that we need housing, and food, and timber. Clearly it is to our benefit to engage in long-term planning that lays out a path to better ensure that humans fit into the landscape in the least intrusive way, and that the ecosystem remains as complete as possible. Can this be done? I set out in this project to explore some of these issues in the rural lands of the Willamette River Basin (WRB), Oregon.

This project addresses the conflict over rural residential development. I hypothesize that new housing can be sited with acceptable levels of environmental impact. By compensatory mitigation for loss of native habitat, native biologic systems can be maintained and better protected from environmental damage. And, without innovation in land use planning and practices in Oregon, biodiversity will inevitably decline in certain regions of the WRB.

This project was formulated during my participation in the Pacific Northwest Ecosystem Research Consortium (PNW-ERC) project which assessed the environmental and ecological consequences of three alternative futures for the Willamette River Basin (Hulse, Gregory and Baker, 2002). In researching the trajectories of urban and rural development in the WRB, and in modeling the alternative futures, it became evident that growth pressures on both human and ecological infrastructures are building. This is publicly manifest by the political pressures being brought to bear on land use planning and State regulatory processes. State land use planning policies are under attack by private rights groups who want rural landowners to

have greater freedom in developing their properties. "Smart growth" advocates are countering with political campaigns to support urban infill and protect resource lands. Best management practices (BMPs) aimed at protecting wildlife species and the environment are increasingly portrayed as onerous and uneconomical by property rights activists and conservative politicians. Environmentalists are calling for more protection of riparian areas and water quality. Inexorable urban growth continues despite growth management laws.

These public debates amidst the jockeying for influence by parties of all political persuasion are consequences of rapid population growth in the Pacific Northwest over the past decade (estimated at a rate equivalent to India's (Northwest Environment Watch, 2002)). The PNW-ERC estimates that the population of the WRB will double by 2050. Where these people live will affect many of the things that Northwesterners value, including agricultural and pastoral vistas, wildlife, clean rivers, and forests.

Under Oregon state land use planning, virtually all rural lands outside existing rural residential zones (RRZs, also known as "exception areas") are currently zoned for farming or forestry, effectively disallowing any residential development. Based on population growth estimates, these RRZs will be fully developed by 2020. Since it is unlikely that future population growth can be confined entirely to urban centers, new rural housing areas will have to be identified in the near future.

Such rural development will change the existing landscape of the WRB. It will inevitably consume what are currently classified as resource lands, will require new infrastructure of roads, utilities and schools, and will potentially change the rural character of the valley. By altering land cover, any new rural land use, including housing, has the potential to also alter the trajectory of biodiversity within the WRB. This can ultimately cause severe disruptions to the economy and the social fabric of a community if a species is listed and Federal regulations are put in place (e.g., the decades long controversy caused by the listing of the Northern

Spotted Owl in the Pacific Northwest). Ecosystem resilience (that is, the ability of the ecosystem to recover from disturbance) and in turn, ecosystem services, can be harmed by loss of species. Thus, it is clearly prudent to consider the effects of anticipated development on biodiversity, and to develop potential responses or strategies to head off future problems. Unfortunately, as history shows, local planning continues to favor the short-term needs of people, and tends to be reactive rather than proactive when species are not yet listed. Also, the interaction between rural land use and native species is a complex, cumulative process in which the effects of individual site-specific land use changes on the continued survival of a regionally-distributed species are difficult to assess. Further, the intensity and location of land cover changes disproportionately affects some species more than others because of the location and size of their home range and territory, their degree of habitat specialization, and the extent and pattern of their existing habitat.

The intent of this project is to formulate and test through computer modeling, an approach to rural housing development that will also provide long-term benefit to native terrestrial vertebrate species. I hypothesize that rural cluster development on large parcels of land will be less detrimental to terrestrial species biodiversity than the common pattern of small acreage ownership. When coupled with habitat conservation and restoration, and with wildlife-friendly management practices in unbuilt sections of the parcels, I hypothesize that wildlife habitat will improve with new cluster rural development, and in doing so, will create a landscape matrix that is more conducive to preserving biodiversity within the WRB than the current condition.

In this project, I assume that the goals of the state land use planning system remain essentially intact through the year 2050, but that some current rules have been relaxed in order to permit rural housing in areas where such development is currently banned. By considering a suite of environ-

mental and social conditions, I locate privately-owned areas within the WRB that are suitable for development under these proposed new rules. I develop four alternative future scenarios that compare and contrast different models of rural development within these new RRZs: 5 acre subdivision, 15 acre subdivision, cluster housing, and cluster housing with habitat restoration. These scenarios are embedded in what is essentially the Plan Trend 2050 landscape developed by the PNW-ERC for the Willamette River Basin Trajectories of Change (TOC) Project (Hulse, Gregory and Baker, 2002). Indicators are evaluated from the resulting landscapes to measure the changes in quantities that reflect particular human and societal interests in the landscape.

I use a habitat suitability index (HSI) model to evaluate the effects of each alternative future in the year 2050 on terrestrial vertebrate species biodiversity. I measure these effects relative to the conditions in 1990 to ascertain trends in habitat for all species under each scenario. I also compare these trajectories to conditions modeled for the landscape of the WRB prior to European American settlement (circa 1850), and for the landscape that represents continuation of current plans through to 2050. By comparing and contrasting the results, I estimate the impact of the hypothesized modes of rural development on biodiversity. Finally, drawing from the lessons learned in the process of constructing the alternative landscapes and from the HSI modeling results, I suggest a strategy by which at-risk habitats within the WRB can be conserved and/or restored.

White oak leaves and acorns. Near Elmira, Lane Co. Oregon.

