ABSTRACT

Within the Willamette River basin of Oregon, populations of terrestrial vertebrate species associated with grassland and oak savanna ecosystems are declining as their habitats are lost through land conversion and plant succession in the absence of natural disturbance. While State land use regulations have protected and encouraged forestry and farming on private lands and have directed rural housing development to designated zones, planning and implementation of protection for native ecosystems has been limited. In the lowlands of the basin, an area where most of the land is privately owned, less than 1.6% is dedicated to the conservation of biodiversity. If biodiversity is to be maintained, the conservation network will have to be expanded in this region.

This need is present even as human populations in the basin are expected to double over the next 60 years, and current rural residential zones are projected to reach capacity by 2020. Thus, demand for new rural housing will likely rise concurrent with the increasing urgency for establishment of new conservation reserves.

One approach toward meeting both of these needs is to couple the wealth production of rural development to conservation by permitting rural housing development in return for conserving and/or restoring native ecosystems.

The objective of this project is to test whether such a mitigation policy can be deployed in less environmentally sensitive areas of the basin so as to provide useful amounts of housing while improving habitat conditions for species of concern.

Four alternative rural development scenarios are defined: 5 acre subdivision, 15 acre subdivision, cluster housing, and cluster housing with mitigation. A fifth scenario, “plan trend”, represents the continuation of current policies with no additional areas of rural development. The landscapes for each scenario in the year 2050 are modeled by applying scenario-specific land use/land cover changes to the starting landscape of 1990. A habitat model is then used to evaluate the changes, with respect to 1990 conditions, in the cumulative amount of habitat provided by each landscape for each animal species.

The results indicate that only cluster development with mitigation provides meaningful habitat improvement for species both basinwide and in the region of new development. Under plan trend and all other alternative development scenarios, habitat conditions decline for more species than improve, basinwide. Oak and grassland species, in particular, respond favorably to the mitigation policy which restores 84,819 acres of native habitats in the foothills of the basin, an amount equivalent to an increase of 140% in the conservation network of the lowlands.

The cluster scenarios site 40,930 homes, in comparison to 50,450 homes in 5 acre subdivisions, and 18,030 homes in 15 acre subdivisions. Cluster development is found to be the most efficient in terms of developed area per house, and new road miles per house. This type of development uses the least amount of high value farm lands and the least amount of the most productive forests (site class I and II).

It is concluded that rural cluster development in certain areas of the basin when accompanied by conservation and restoration of native habitats, can benefit both humans and wildlife.

KEYWORDS: alternative futures, landscape modeling, habitat evaluation, rural housing, cluster development, biodiversity, wildlife, Willamette River basin.

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List of Acronyms

BLM ..... Bureau of Land Management
BMPs ..... Best management practices
CC90 ..... Landscape of current conditions circa 1990, derived from EC90 (see below)
EC90 ..... Landscape of existing conditions circa 1990, from PNW-ERC
EFU ..... Exclusive Farm Use
ESA ..... Endangered Species Act
ESEE ..... Economic, Social, Environment and Energy
GLO ..... General Land Office
HSI ..... Habitat Suitability Index
LCDC ..... Land Conservation and Development Commission
LU/LC ..... Land use/ land cover
NGO ..... Non-Governmental Organization
NRCS ..... Natural Resource Conservation Service, US Dept. of Agriculture
NWI ..... National Wetlands Inventory
OAR ..... Oregon Administrative Rules
ODF ..... Oregon Department of Forestry
ODFW ..... Oregon Department of Fish and Wildlife
ODOT ..... Oregon Department of Transportation
ONHP ..... Oregon Natural Heritage Program
ORS ..... Oregon Revised Statutes
OWEB ..... Oregon Watershed Enhancement Board
OWRD ..... Oregon Water Resources Department
PESVEG ..... Landscape of pre-settlement vegetation, circa 1850, from PNW-ERC study
PNW-ERC .... Pacific Northwest Ecosystem Research Consortium
PT ..... Plan Trend landscape for year 2050, from the PNW-ERC study.
PT-EX ..... Plan trend scenario 2050, extended from the PNW-ERC work for this project to include, in particular, vegetative succession.
RNA ..... Research natural areas
ROZ ..... Residential overlay zone; defined for this project as a planning zone in which rural residential development can occur if special conditions are met; otherwise, the primary zoning of farm or forest land guides land use.
RR ..... Rural residential
RR-5 ..... Scenario of 5 acre rural residential subdivision within the ROZ
RR-15 ..... Scenario of 15 acre rural residential subdivision within ROZ
RR-CL ..... Scenario of rural cluster housing within the ROZ
RR-CONS .... Scenario of rural cluster housing accompanied by habitat restoration with the ROZ; also referred to as the “conservation cluster” scenario
RRZs ..... Rural residential zones; areas zoned for rural housing under Oregon state land use regulations
SSURGO ..... soil survey data base, from NRCS
T&E species . Threatened and endangered species
TNC ..... The Nature Conservancy
TOC Project . Willamette River Basin Trajectories of Change Project; alternative futures study by PNW-ERC of the Willamette River Basin in 2050.
UGB ..... Urban Growth Boundary
USDA ..... US Dept of Agriculture
USDI ..... US Dept of Interior
WRB ..... Willamette River Basin