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Ecological Forestry in the Working Forests of King County, Washington

Ecologically sustainable forestry was succinctly defined by Lindenmayer et al. (2006) as ‘‘... perpetuating ecosystem integrity while continuing to provide wood and non-wood values; where ecosystem integrity means the maintenance of forest structure, species composition, and the rate of ecological processes and functions within the bounds of normal disturbance regimes.’’ Many of the current practices in King County’s “working forests” align well with this definition. The introductory paragraphs on King County’s forestry program website match up fairly well, emphasizing a focus “on the retention of forestland for its environmental, social, and economic benefits.” The site acknowledges the difficulties of housing a rapidly growing population.

Seattle, the county seat, is consistently ranked among the fastest growing cities in the nation, with a population over 652,000 as of 2013. With 1.9 million residents, King County as a whole has the 14th largest population of any county in the United States. As industrial and private forest lands are rapidly sold and developed for residential use, they lose vital ecological function, and the fragmentation caused by development makes them unsuitable for traditional production forest management. The County uses a variety of incentive programs that motivate developers and private landowners to protect the remaining natural resources or use them in sustainable ways, while also

exhibiting sound ecological forestry principles on forest lands the County manages directly.

As of 2010, King County has a total land area of 2,115 square miles (US Census Bureau, 2015), or more than 1.3 million acres, two thirds of which are forested, and half of which are designated as “forestland of long-term commercial significance in the Forest Production District” (King County, 2015). The Forest Production District’s mission is to maintain a constant total acreage of forestland, but allowing for changing land use patterns as different parcels enter and exit commercial viability.

Another program the County uses is called the Public Benefit Rating System. The PBRS is a points system that takes the assessed land value and lowers it by 50-90%, depending on the value of the natural resources being protected by the landowner. By artificially lowering the assessed value, the landowner pays lower taxes. This practice takes into account the realities of most forest lands belonging to private landowners, who could stand to make a considerable profit selling their land to developers, even if they might prefer to keep it preserved in its natural state.

King County’s “working forests” are part of the County’s “working resource lands,” which fall under the auspices of the Department of Natural Resources and Parks. The County’s Programmatic Plan for Working Forests (2003) states that the primary goal for land managers of working forests is to “balance sustainable timber production with conservation and restoration of resources, and with public use.” The Plan goes on to define *sustainable* as “maintaining healthy forests through silvicultural practices that sustain or improve ecological, economic, and social functions.” This

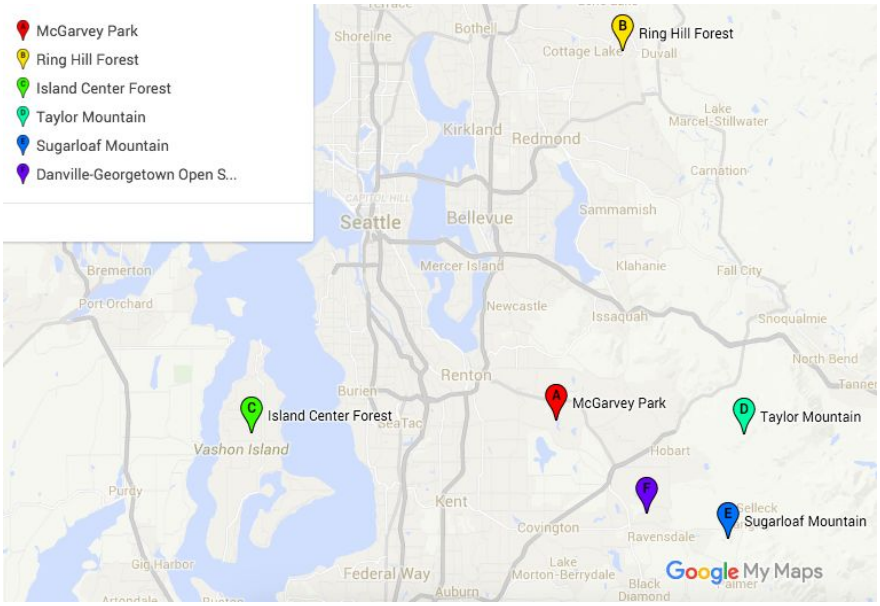
maintains the theme between the various programs as prioritizing ecological functions, but keeping economic and social values in mind. Additionally, section 3.1.1, the first section on timber production, specifies that the County is to “meet Washington State Forest Practice Act standards to protect water quality...”, which brings it in line with Washington State Department of Natural Resources standards (WADNR), which are already following many of Dr. Franklin’s recommendations of ecological forestry practices. Section 3.1.6 specifies that harvest revenue shall be used for the management of forest properties. Other sections that are especially pertinent to ecological forestry concepts include:

3.22: “Consider cumulative impacts on ecological resources within the context of surrounding land uses.”

3.5.3 “Adapt management to reflect evolving forestry research”

3.6.4 “Plan updates and monitoring indicators should be flexible and based on adaptive management principles”

There are several examples of a “working forest” that have been successful in achieving these objectives, including the Island Center Forest (363 acres) on Vashon Island; McGarvey Park Open Space (400 acres), east of Renton; Danville-Georgetown Open Space (334 acres) near Maple Valley; Sugarloaf Mountain (285 acres) a little further east; and Taylor Mountain (1822 acres), connecting the Cedar River Watershed to Tiger Mountain State Park. To the north is Ring Hill Forest (320 acres), between Redmond and Duvall.



In addition to being one of King County's working forests, the Island Center Forest (ICF) has also achieved certification under the Forest Stewardship Council (FSC), as well as the American Tree Farm System (ATFS). ICF is FSC certified through its membership in the Northwest Natural Resource Group (NNRG). NNRG has its own Northwest Certified Forestry program, which is "a membership program for public, nonprofit, and family forest landowners that provides access to Forest Stewardship Council (FSC) certification…". The FSC certificate for the NNRG was first issued in 2005, and just renewed in 2015, but ICF was first granted FSC certification in May 2009, at which time it was also certified by ATFS. The ATFS "is a strong network of woodland owners who share the same core values of hard work, community responsibility and commitment to protecting America's forest legacy." The FSC and ATFS requirement do not seem to have hurt the attempts at ecological forestry in ICF, but in fact make the wood harvested in the forest more marketable, which allows the forest to continue functioning.

In accordance with King County regulations, ICF has a published stewardship plan, created in 2006. A review of this plan revealed many standard practices that agree with principles of Ecological Forestry. The plan uses successional stages as described in Franklin et al (2002). The plan encourages adaptive management methodology, requiring a review of the plan every ten years, incorporating the latest science and theory, and working with multidisciplinary teams to achieve the best possible approach. There is strong emphasis on protection of riparian and other wet areas, as well as "protection and creation of snags, wildlife trees, and coarse woody debris." The creation of patchiness and complex forest structure is encouraged, which is mostly achieved through the use of Variable Density Thinning. "In general, 4-5 densities should be created: no-entry areas, light thin, moderate thin, heavy thin, and gaps." There were not any specifics of how large any aggregates left behind should be, which is unfortunate, as the DEMO study results suggest that the minimum size specified by the Northwest Forest Plan (and thus, WADNR regulations), is far too small, recommending "aggregates ≥ 1 ha in size and dispersed retention at levels considerably greater than current minimum standards" (Aubry, Halpern, & Peterson, 2009). One of the overall goals is the establishment of old growth forest structure, with lots of structural complexity, but there seemed to be too much prioritization of large diameter trees, and not necessarily *old* trees. I also did not find any mention of specifically allowing post-harvest, early successional habitats to remain. Fire was not referenced as a management tool, but rather something the forest could be made more resilient against, or as a pattern that harvested units could be made to mimic.

The McGarvey Park Open Space stewardship plan (2011) is also in line with many ecological forestry values. McGarvey's vision is to "serve as a model of how active management can provide and maintain a balance of ecological, economic, and social values that forests provide." The main goals for the site encourage structural complexity, biodiversity, and biological legacies. However it also specifies using commercial thinning to achieve late seral stage characteristics, but not early seral stage. These two goal sets seem to be at odds with each other, as the early seral stage supports the most diversity. Successional stages again referencE Franklin et al (2002).

The Danville-Georgetown Open Space plan's (2014) vision statement is identical to McGarvey's, as are its forestry practice goals and recommendations.

The McGarvey and Danville-Georgetown lands were both acquired through King County's "4 to 1" development program. This program is run by the Department of Permitting and Environmental Review (DPER), and was developed as a way to meet requirements of the Washington State Growth Management Act of 1990 (Harvard, 1996). The program allows rural lands to be re-zoned as urban for purposes of development, so long as 80% of the lands in question are given to the county for protection or restoration in perpetuity. The remaining 20% can then be developed under the new zoning.

Sugarloaf Mountain Forest is 285 acres in size, and was acquired by the County in 2001 through its Transfer of Development Rights Program. The mountain's Forest Stewardship Plan (2005) is similar to the others, but has an additional layer of ecological forestry principles in that its second management goal includes a diverse age

structure, stating it will “develop and sustain healthy, multi-species, multi-age stands.” Some of the recommended treatments do not recommend sufficient aggregate size, however, specifying only 1 acre patches. However, the plan includes adaptive management principles, so this could, and likely will, change in the future. Sugarloaf seems to be fairly unique in that it does not officially allow any public access. The County is allowing the extensive Alder stands to passively restore the soil quality, which was degraded from past site uses of logging and coal mining. As the soil quality improves and stabilizes, reducing the risk of erosion to either of the two watersheds the property straddles (Cedar River and Green River), and conifers have a chance to grow to a marketable size.

Taylor Mountain Forest is by far the largest working forest site, and appears to be the largest collaborative effort as well, as it is a “partnership planning project” between WADNR, King County Department of Natural Resources and Parks (KCDNRP), and the City of Seattle - Cedar River Watershed. The forestry recommendations in the Taylor Mountain Forest - Forest Stewardship Plan (2003) include using “variable retention harvesting [to provide] diversity of structure and function.” However, the Plan fails to acknowledge the value of early successional habitat to the *prey* of old growth forest dwellers, stating that “wildlife species dependent on old-growth structure, such as spotted owls, lynx, wolverine, fisher, and flying squirrels, are not present in most of the area and are unlikely to move into the existing young or immature forest for at least the next 100 years.”

Ring Hill Forest was acquired in 1997 with help from the Trust for Public Land. Ring Hill differs from the others in that its management plan calls for it to “demonstrate progressive forest management.” The term “progressive” is not clearly defined, but language in other parts of the document sound like it was written by a more traditional, production forester, calling out whether or not certain actions are allowed or required under WADNR rules, instead of what actions are called for by ecological considerations. The poor merchantability of the trees and high rate of dwarf mistletoe infestation seems to have soured the author on the site as a whole. The recommendation that “reforestation should consider planting diverse tree species at a spacing of 13 by 13 feet or 250 seedlings per acre” seems particularly like a blanket prescription that doesn’t take individual site attributes into consideration.

Overall, and with some exceptions in the Ring Hill Forest plan, the general tone of adaptability in the stewardship documents was very impressive. The intention is clearly to maintain or restore sites that provide a diverse range of habitats and ecosystem functions, while also providing recreational and educational opportunities for the public. Revenue generated from timber harvest is directed back into the County forestry program, and the harvests themselves follow many of the principles of ecological forestry. Consideration is given to the specific site history of each forest, and the disturbance regime that would normally be found there, and that timber harvests can potentially mimic.

Several of the County’s working forests are up for reevaluation in 2015 and 2016. It will be interesting to see just how adaptive their management plans are in practice,

and if the County can apply even more ecological forestry concepts, like including early successional habitats. The ongoing success of Island Center Forest as both FSC and ATFS-certified should provide strong support of applying the same prescriptions in the other sites. King County's population is projected to grow to over 2.2 million by 2030 (King County, 2011). All those people will need homes, and homes need timber, which could potentially be sourced from our own forests. Those same forests can provide habitat for native species like the Northern Spotted Owl, and space for people to enjoy and learn about nature. Ecological forestry can help us reach these different objectives consistently and sustainably.

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