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RESOURCE STEWARDSHIP DEPARTMENT

Creating Solutions for Our Future

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MEMORANDUM (2)

TO: Thurston County Planning Commission
Mineral Resource Lands Focus Group Members

FROM: Maya Bühler, Associate Planner
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DATE: November 9, 2017

SUBJECT: Comprehensive Plan Update - Mineral Resource Lands: Compatibility of
Agriculture and Mining

The questions outlined below were raised at the Mineral Resource Lands Stakeholder Group Meeting on September 19, 2017, in which initial drafts of the designation criteria and maps were discussed.

One of the questions raised at this stakeholder meeting was regarding the compatibility of agriculture and mineral lands. Stakeholders asked the following questions:

- Is mining compatible with preservation of agricultural lands of long term significance?
- Can reclamation plans adequately recover agricultural soils?

This memo addresses these questions using existing literature. Currently, the data used to exclude agricultural areas of long-term significance is based on the Thurston County zoning data, specifically the Long Term Agriculture (LTA) and Nisqually Agriculture (NA) zones. This data is highly accurate, available county-wide, and site-specific down to the parcel level.

The GMA goal on natural resource industries ([RCW 36.70a.020\(8\)](#)) reads:

“Natural resource industries. Maintain and enhance natural resource-based industries, including productive timber, agricultural, and fisheries industries. Encourage the conservation of productive forestlands and productive agricultural lands, and discourage incompatible uses.”

Previously and currently, the County has not co-designated agricultural lands and mineral lands. Co-designation of forest lands and mineral lands was one of the 23 issues brought by the *Weyerhaeuser et al.* challenge in 2010 (Case No. 10-2-0020c¹). The Growth Management Hearings Board (GMHB) held that Thurston County must reconsider this issue of co-designation of forest lands and mineral resource lands. Co-designation of agricultural lands and mineral resources lands was not specifically addressed in the case.

WAC 365-190-040(7)(b) directs jurisdictions to determine whether overlapping resource lands designations can coexist or are incompatible and require prioritization between conflicting uses. According to the WAC, deciding between competing, incompatible uses should consider which resource use has the greatest long-term commercial significance. King, Snohomish and Whatcom Counties currently exclude agricultural lands from designation. No GMHB decisions that deal directly with the exclusion of agricultural lands have been identified.

Are Long Term Agriculture and Mining compatible?

Stakeholder participants stated during the September 19, 2017, meeting that forestry is compatible with mining and can be done as a use after reclamation, and therefore agriculture should be considered as a use after reclamation. Co-designation of forestry with mineral resource lands has a long background in Thurston County, and was one of the issues identified in *Weyerhaeuser et al. v. Thurston County* (2010). At the time, the County's defense to preclude dual designation was that "all of the evidence finding there was uncertainty as to whether forest lands could return to their original state after mining and as to the amount of mineral lands located in forest lands". The County's decision to preclude dual designation of forest land and mineral resource lands was found contrary to:

[WAC 365-190-020\(5\)](#): "The three types of natural resource lands (agricultural, forest, and mineral) vary widely in their use, location, and size. **One type may overlap another type. For example, designated forest resource lands may also include designated mineral resource lands...**"

[WAC 365-190-040\(7\)\(b\)](#): "If two or more natural resource land designations apply, counties and cities must determine if these designations are incompatible. If they are incompatible, counties and cities should examine the criteria to determine which use has the greatest long-term commercial significance, and that resource use should be assigned to the lands being designated."

In regards to the issue of co-designation of forest lands and mineral lands, the GMHB found that the record was inadequate to determine whether or not dual designation is considered permissible. In response to this in 2012, the County adopted amended designation criteria (*Res. 14739 and Ord. 14740*) citing Best Available Science (BAS) to support refined exclusions and maintained the exclusion of forest lands. In 2012, a compliance order was issued that Thurston County must reconsider dual designation of mineral lands with long-term forest lands and critical areas. In January 2013, Thurston County removed all criteria creating exclusions for forest lands

¹ *Weyerhaeuser et al. v. Thurston County* (2010). Case No. 10-2-0020c. <<http://www.gmhb.wa.gov/LoadDocument.aspx?did=2672>>

or critical areas. The GMHB determined that with these additional amendments, Thurston County achieved compliance and the case was closed in March, 2013.

Stakeholders have suggested that research exists on compatibility between agricultural uses and mineral resource lands after reclamation, similar to forestry. According to [WAC 365-190-020\(5\)](#):

“The three types of natural resource lands (agricultural, forest, and mineral) vary widely in their use, location, and size. One type may overlap another type. For example, designated forest resource lands may also include designated mineral resource lands.

Agricultural resource lands vary based on the types of crops produced, their location on the landscape, and their relationship to sustaining agricultural industries in an identified geographic area.”

A literature review shows that there is the potential that lands used for mineral extraction can be reclaimed for agricultural uses. However, the literature available may consider different underlying circumstances than might be the case for Thurston County (i.e., coal mining rather than sand and gravel or bedrock mining, pastureland/commercial cropland as a use after reclamation, different soil qualities to be restored).

Reclamation of Mineral Lands for Agriculture. In Indiana, a 2015 study by USDA and DNR² shows that lands used for coal mining can be reclaimed for cropland soils. These soils have proven to be as productive as unmined cropland. Soils that are removed in preparation for mining are either replaced on an area that has been mined and graded already to restore topsoil on that site, or are stockpiled on site. Stockpiled soils suffered further degradation due to “double” handling by machinery. The removal of soils results in changes to the natural soil composition, including changes in pore space, permeability, capability to hold moisture and air, loss of living organisms, and reduction of organic matter. Reclaimed soils are greatly changed and must be managed as such. Although these lands can be restored, water and sediment control structures may be needed during reclamation in order to obtain the optimum restoration of soils. Other reclamation methods approved by the Indiana Department of Natural Resources include incorporation of soil amendments (lime, fertilizer, organic matter, and deep tillage). Furthermore, after reclamation, some management practices and techniques must be applied in order to maximize productivity, such as soil leveling, cover crops, avoidance of compaction, deep ripping, grazing plans, water management, and residue management.

In a study in Ohio by Shrestha & Lal (2008)³, post-reclamation land uses were compared to uses on undisturbed forest, hay, and agricultural lands to evaluate and help identify suitable land uses for mining companies. Soil samples were collected from different depths ranging 0-30 cm in order to determine particle size distribution, bulk density, water-stable aggregates, mean-weight diameter and soil moisture retention. Reclaimed mine soils with forest and hay improved the bulk density and water infiltration capacity, similar to the state of undisturbed forest, but was

² Boyles, G. *et. al.* (Aug, 2015). “Farm Management Practices for Reclaimed Cropland”. USDA. DNR. <<https://www.in.gov/dnr/reclamation/files/re-FarmMgtPractices.pdf>>

³ Shrestha, R. and Rattan Lal. (2008). Land Use Impacts on Physical Properties of 28 years old Reclaimed Mine Soils in Ohio. *Plant and Soil*. 306: 249. <<https://doi.org/10.1007/s11104-008-9578-4>>.

lower in agricultural soils. Shrestha & Lal (2008) encourages that forest and hay be established on reclaimed mine soils.

Return of reclaimed mined soils to pastureland has had success in other areas. In Hunter Valley, Australia, many [coal] miners have returned to using vast swathes of land for cattle grazing and agriculture. So far, trials have shown that cattle grazing on reclaimed mine soils is successful.⁴

Shrestha & Lal (2007)⁵ also found that soil quality and ecosystem function of reclaimed mine soils depends on the reclamation methods used and the re-establishment of vegetation. Some physiochemical properties of reclaimed mine soils may inhibit soil-forming processes and can adversely affect plant growth. These include soils that are low in carbon, nitrogen, and phosphorus; have high bulk density and fragmented rock; an unfavorable soil pH; poor structure; low porosity and moisture capacity; and low biomass productivity. This study showed that all land uses (hay, pasture, forest) established in reclaimed mine soils restore the soil quality similar to that of an undisturbed natural forest over a 28-year period.

Surface mining can generate chemical problems within the soil, including acid generation (poor pH). Reclamation research has shown that poor physical and chemical soil condition is the most limiting factor to successful row crop production on reclaimed mined land in the Midwest. Research has shown that surface mining can be a short-term land use that may be followed by productive farmland, if reclamation is done correctly.⁶

Can reclamation plans adequately recover agricultural soils?

The Surface Mine Reclamation Program (SMRP) is part of the Washington Geological Survey within the Washington Department of Natural Resources. The program was created in 1971 after the legislature created the Surface Mining Act. The SMRP makes sure that all lands and waters within the state are protected and reclaimed after mining is complete. It also provides consistent regulation of both permitted and unpermitted surface mines statewide. The SMRP monitors surface mines and issues reclamation permits. Monitoring for compliance is usually performed by on-site inspection, every one to two years. Aerial photography is frequently used as well to document mining activity.⁷

Surface mining reclamation restores vegetation, soil stability, and proper water conditions after mining. Reclamation for each site is different and should be tailored to the expected future use. Surface mines may do “segmental reclamation,” or partial restoration of the mine while other areas continue to be worked. This can help reduce the cost of reclamation, and restore the site to the desired condition more quickly.⁷

⁴ ABC News. (May, 2017). “Mining the farm: How Miners Turned to Agriculture in the Hunter Valley.” <<http://www.abc.net.au/news/2017-05-19/mining-and-farming-in-the-hunter-valley/8478012>>.

⁵ Shrestha, R. and Rattan Lal. (2007). Soil Carbon and Nitrogen in 28-years-old Land Uses in Reclaimed Coal Mine Soils in Ohio. *Journal of Environmental Quality*. 36:1775–1783 <<https://doi.org/10.2134/jeq2007.0071>>.

⁶ Darmody, R.G., Dunker, R.E., and R.I. Barnhisel. (n.d.) Reclamation of prime agricultural lands after coal surface mining: the Midwestern experience. <<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.182.9998&rep=rep1&type=pdf>>

⁷ Department of Natural Resources (2017). Surface Mining and Reclamation. <<https://www.dnr.wa.gov/programs-and-services/geology/energy-mining-and-minerals/surface-mining-and-reclamation#what-is-the-surface-mine-reclamation-program?>>.

Surface mine reclamation permits are required when there is intent to be a surface mine, or the removal of minerals results in 1) more than three acres of disturbed area; 2) mined slopes greater than 30 feet high and steeper than 1 foot horizontal to 1 foot vertical; 3) more than one acre of disturbed area within an eight-acre area. Exemptions to this include when materials or equipment is used for: 1) on-site construction, road maintenance, landfill construction; 2) public safety or restoring land following a disaster; 3) removing stockpiles; 4) forest or farm road construction or maintenance at the site or on contiguous lands.⁷

Compliance with the Surface Mining Act is maintained through inspections every one to two years. When a mine is out of compliance, a notice of correction is issued. DNR Reclamation program staff and miners work together to fix the problem. If the issue is not corrected, formal notice is given and enforcement may occur. The penalty for unresolved issues on a site may include stop work orders, civil penalties, or fines.⁷

What acreage of Long Term Agriculture is actually affected by the County's Mineral Lands Designation?

There is approximately 2,241 acres of Long Term Agriculture and Nisqually Agriculture resource lands that overlap with potential mineral resource lands, classified as follows:

Bedrock (100 acres)

- B3 - 100 acres

Sand and/or Gravel (2,141 acres)

- A3 – 266 acres
- B3 – 1,181 acres
- C1 – 4 acres
- C3 – 690 acres

By co-designating mineral resource lands (under the existing designation criteria) with Long Term Agriculture and Nisqually Agriculture, acreage would increase designated bedrock from 103,912 acres to 104,012 acres, or a 0.096% increase. Acreage for sand and/or gravel would increase from 36,791 acres to 38,932 acres, or 5.50%.

The total acreage of Long Term Agriculture or Nisqually Agriculture within Thurston County is 12,320 acres⁸ (compared to 140,702 acres of designated mineral lands under the current criteria). If the 2,241 acres that overlap between LTA and MRO were co-designated, and ultimately used for mining, it could reduce, at any given time, available agriculture lands under LTA from 12,320 acres to, at a minimum, 10,079 acres. If all co-designated lands were in use for mineral extraction at the same time, this would result in an 18% reduction of long-term agricultural lands.

⁸ TRPC. (n.d.). Long Term Agriculture Zoning. <http://www.trpc.org/DocumentCenter/View/2273>

According to TCC 20.54.065, Mineral Extraction is currently permitted within LTF, but not LTA or NA; this is aligned with the designation criteria that is currently in the Comprehensive Plan Chapter 3.

Conclusion

Mining may be an appropriate temporary use with agriculture, however available studies have focused on mining processes that differ from those more commonly applied in Thurston County (coal mining vs sand and gravel). Soil properties that are most often cited as areas of concern after a mining activity include, but are not limited to: moisture retention, compaction, permeability, and nutrients. Physical and chemical properties of soil are reported as a major limiting factor to reclamation of mineral lands for use as cropland. Additionally, the reclamation process plays an important role in the success of an agricultural land use on reclaimed mine soils. The reclamation process should be tailored specific to the intended land use after reclamation – forestry, pasture, cropland, etc. Best management practices for agriculture on a reclaimed property may be different than the best management practices for agriculture on undisturbed soils. Other considerations in the reclamation process may include the amount of soil disturbed, the depth of soil disturbance, and the length of mineral extraction.