Letter explaining the Biological Aspects of the proposed golf course, by Roger Miller

Based on a quick density count viewing into the edges of the upland forest area of Kohler Company's 247 acre parcel in Section 14 along the Lake Michigan shoreline in the Town of Wilson, I estimate the number of trees of greater than 6" trunk diameter to be roughly in the range of 50,000 to 70,000. Kohler's grading plan for the golf course included on DNR's website shows that about 63% of that upland forest gets re-graded, which would necessarily remove about 30,000 to 45,000 trees, as a rough estimate, having trunks greater than 6" diameter.

In regard to the issue of loss of vegetation that converts atmospheric carbon dioxide into oxygen; that capacity is roughly proportional to leaf area, for which all the trees of smaller diameter also provide a significant (but unquantified here) contribution. In place of removed trees, the golf course development would have some areas of very short grass that replaces very little of the lost leaf area, plus some taller grass area that would replace a little bit of the lost trees effect in this respect.

However, it's important to recognize that conversion of carbon dioxide to oxygen during the growing season is largely offset by quite rapid decomposition by microbes of fallen trees and leaves that's concurrently producing carbon dioxide. So the best quantitative indicator of the net annual "carbon sink" effect at any location is indicated by the rate at which organics are accumulating in the soil. The land east of the Black River was converted from lake bed to dunes just 4,500 years ago when the lake level dropped about 13 feet quite abruptly. The exposed sandy lake bed blew to form dunes and depression over which forest and wetlands succeeded. The wetlands have already accumulated relatively thick organic soils because that environment lacks oxygen that many types of microbes use to decompose plant material. Conversely, the surficial soils of the wooded uplands that formed on the higher ground is well-oxygenated. So there is a relatively low rate of permanent "carbon sequestering" there as evidenced by development of quite thin and meager "topsoil".

So the primary adverse effects on the environment of upland deforestation is the loss of quantity and diversity of habitat. This includes the loss of upland ecologic functions critical for the ecologic function of the adjacent wetlands that are not being filled. The golf course plan shows massive grading and deforestation and replacement with fairways right along the edge of great lengths of wetland along the Black River. Ignoring that adverse effect in both Kohler's EIR and WDNR's EIS for this project is one of the major deficiencies that Quentin Carpenter has repeatedly pointed out. The EIR and EIS are supposed to address all aspects of the proposed project, not just filling some of the wetlands. These reports entirely omitted any specific description of the adverse effects of the massive deforestation, including those effects on wetlands not being filled that is planned along more than a mile of wetland boundary.

There's also another aspect that seldom gets recognized; bulldozing the rhizome (shallow soil-microbe—fungi-root zone) of the wooded uplands disrupts a complexly interacting environment that takes a long time to develop. This provides virtual "communication" via enzymes, carbohydrate, and mineral exchanges amongst all components of the living surface of the land that ultimately affects plants and tress as well as the mobile insect, animal, and bird components of an ecosystem. This forest is now about 150 years past it being last lumbered out, although I recall there are some specimen oaks and white pines that may be older. So this area has likely acquired much of the functionality of "old growth". Quentin can also speak to that with far more qualification than I can.

The prior Kohler golf courses within the county were developed on land that been deforested by 1900

and was largely already disturbed by agriculture. The locations of those courses avoided deforestation. That land use also results in less fugitive phosphorus and nitrogen going to surface waters than even the best contemporary agricultural practices. Kohler's Section 14 land and the planned golf course there is a contrast in all respects other than accommodating the sport of golf.

The several residential subdivisions located within wooded uplands of the Black River neighborhood that our firm has designed over the last 50 years, limited deforestation and ground disturbance to about 33%, avoided wetland filling, and maintained wide undisturbed buffers along wetlands, to accommodate that "permitted" (undeniable in R-1 zoning) land use. And Kohler's existing subdivision located just north of their planed golf course limited deforestation to less than 33%. The more recent "Woods" subdivision (by others) did the exact opposite by planning 90% deforestation and consequently continues to be an economic and ecologic travesty that is not prevented in the future by any update to the Town's zoning ordinances. Even the City of Sheboygan ordinances, which are intended for more dense development that is appropriate for a township, limit "clear cutting" to 50%. Kohler's Tented Forest plan, which was also a "permitted" (undeniable use in R-1 zoning) use limited ground disturbance to substantially less than 10%, avoided any wetland filling, maintained buffers along wetlands, and avoided any disturbance of the natural lakeshore.

Although the above isn't a brief answer that I infer is hoped by the context that the question of loss of trees is presented, these are things that people need to know for reasons extending beyond legitimate concerns about this particular proposed project. And to this point I'm going to close by wrapping back to the climate change aspect of the question. In spite of all that is repeated in the common public venue, the complex interactions of atmospheric gas composition and the effects on regional and global climate are as yet to be reliably well elucidated. Achieving even a marginally functional understanding of this requires continuing effective oceanic, terrestrial, and atmospheric research and data gathering that is ongoing across the globe. The most complex part of this "equation" are the roles of all three physical phases (vapor, liquid, solid) of H2O (water) that is not only the predominant "greenhouse gas" but also the predominant thermodynamic (energy transfer) mechanism in both atmosphere and oceans, not to mention its interactions with plants and those inter-related climatic effects.

In the meantime, the relatively brief, warm interglacial periods (such as the last 10,000 that we are presently in that will likely continue for at least that much more time) that life on our planet enjoys in between the much longer periods of extensive continental glaciation, have been and will likely continue to be climatically very dynamic. Even the driving and interacting factors prior to homo-sapiens are not yet well understood. The 200 ppm addition of atmospheric carbon dioxide that man has done since WWI that has brought us to the 400 ppm of today, is not unprecedented naturally within the last 65 million years that produced the present diversity of life. During much of that time span CO2 typically ranged from 500 to 1,000 ppm.

The present annual increase of 2 ppm in CO2 will likely continue to grow to about 3 ppm over the next couple decades, largely caused by the US and China that burn 2/3's of the world's fossil fuels without any compensating permanent CO2 sequestration. And because China is presently investing massive amounts of research into solutions to reverse that trend (while concurrently still burning lots of coal just as we are), including more future reliance on fission as the heat source for production of electrical base load demands to reverse that trend, the present huge challenge for the US is to do likewise in combination with beginning to follow the northern European example where housing people in a modern industrial society uses about 1/3 of the energy that we do in the US.

Otherwise, over the next century the planet's atmospheric CO2 will go beyond even the 1,000 ppm prior natural range for which present life forms here have developed. And that can be quite reliably anticipated to have greater effects beyond the various associated perturbations in just "climate". Aside from loss of forests on a regional scale that affects regional climate, cutting down trees or not cutting down trees in Wisconsin will not have any effect on climate because over the last several decades there has been continuing net gain in forest in this state. The related lithospheric carbon rapid re-cycling isn't doing much permanent sequestration of atmospheric CO2 due to natural decomposition balanced with plant growth. And during the pending decades of increased atmospheric CO2, trees will be thriving throughout the temperate zones across the globe because atmospheric CO2 is a primary "nutrient" for plant growth. But all climate change effects, and those particularly within 30 degrees of latitude both north and south of the equator that tend to be either quite wet or quite dry, will exacerbate the continuum of environmental, economic, social, and political challenges there. All the while ocean levels will continue to rise at rates at least as fast as they have throughout the last 10,000 years.

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Sincerely,

Roger G. Miller, PE, President
Miller Engineers & Scientists