Technical commentary on H 5344 (02/03/23).

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Line 8: This is factually incorrect. There are no known old-growth specialist species in New England. There is scientific evidence that mature forests as young as 80 years old are capable of supporting habitat requirements of mature forest species (DeGraaf et al 2006). In fact, while mature forest species in New England tend to be generalists, early-successional and young-forest species are often habitat specialists. Many early-successional and young forest species that were once abundant in pre-colonial southern New England are now in decline or have disappeared completely (Litvaitis 1993, Askins 1993, Litvaitis 2001).

Line 9-10: This is factually incorrect. There are no RI-native tree species that are old-growth ecosystem obligates. Native shade-tolerant, long-lived species will grow just fine in second-growth forests. However, there are some young-forest obligate tree species, long-lived shade-intolerant species, and species requiring bare soil to germinate that will be excluded in mature and old forests (Burns and Honkala 1990).

Line 11: This is factually incorrect. Species diversity is dependent on forest type and forest health, not forest age. In southern New England, younger forests tend to be more species-diverse than older forests (De Graaf et al. 2006) due to higher resource and sunlight availability.

Line 12-13: Old forests eventually reach an equilibrium in carbon cycling. Carbon is stored, but the natural decay associated with older forests, aging mature forests, and old-growth forests releases carbon, offsetting active sequestration. Old growth-forests are important culturally and ecologically, but they are not the optimal tool for carbon mitigation.

Line 14-15: It would take much longer than 100 years for old-growth characteristics to form on their own; 100 years is not a very long time in terms of trees and forests (Burns and Honkala 1990). For a forest to realize significant old-growth characteristics at only 100 years, management based on forest science would need to be used to create old-growth characteristics sooner (D'Amato and Catanzaro 2007).

Line 18-Page 2, Line 1: There is no such thing as a "perfect natural state." This is not a scientific term and is undefinable. Forest ecology is driven by natural disturbance and succession; it is not static. Rhode Island's forests especially are disturbance-adapted communities (e.g. fire), though these natural disturbances have been excluded over time following European settlement (Litvaitis 1993, USDA 1994). The term "pre-colonial condition" is a more accurate description of old growth.

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Line 6-8: Mitigating natural disturbance **is** a form of active management. Furthermore, mitigating natural disturbance does the exact opposite of promoting old-growth, which develops as a result of long periods of natural succession and disturbance processes. Excluding natural disturbance favors certain forest types (i.e. shade-tolerant, fire-intolerant species that are not characteristic of much of the pre-colonial forest in RI).

Line 9-10: This definition of forest ("concentration of trees and related vegetation") is not backed by science. To illustrate, it could technically apply to several non-forest greenspace types, e.g. arboretums, gardens.

Line 13-14: Determining status using "at least 3 of the following characteristics" would include most of the forested parts of RI, directly contradicting the current consensus on what characterizes old-growth forests (elaborated per line below).

Line 16-17: This could include most arboretums and mansion grounds, as well as old farm sites with old fence trees. "Numerous" is not a defined metric.

Line 18: This only applies to certain forest types. This completely ignores the pre-colonial condition of RI's forested landscape, much of which was populated by the fire-adapted oak-hickory-chestnut forest type (Abrams 1992, USDA 1994, USDA 2016, Thompson et al. 2013, Cogbill et al. 2012). Compared to our contemporary RI forests, pre-colonial Rhode Island also had a greater amount of early-successional habitat created by natural fire and storm disturbance (Brooks 2003). A bias toward shade-tolerant forests creates a less-diverse landscape and favors fewer native species of plants and wildlife (DeGraaf 2006).

Line 24: Pit and mound topography is indicative of mature forests, but only certain forest types on certain sites are prone to this kind of microtopography. It does not necessarily indicate old-growth forest (e.g. it is often seen in maturing white pine plantations growing in moist soil conditions – not an old growth situation).

Line 25: "Balding" bark is not specific to old growth. Smooth bark disease is caused by a fungus that colonizes the bark of some trees species, resulting in the bark decomposing or sloughing off. It will not harm the tree (though it can reduce fire resistance). This condition is often found in maturing or old trees; oaks in shady backyards often exhibit this, and some tree species will never have smooth bark disease at all. While maturing and mature forests can exhibit this characteristic, it is far too common to be considered one of the defining characteristics of old-growth forest. Furthermore, smooth bark disease has no bearing on the ecological or cultural importance of old-growth forest.

Line 26: "Stag-head" is not defined; trees exhibiting these crown forms are not specific to old-growth. This crown form can also be found in open-grown mature trees (e.g. "wolf" trees, old field trees, fence line trees, old yard trees etc). Crown decadence is a better indicator.

27: An understory with little underbrush is often an indicator of an **unhealthy** system. Only certain forest types (e.g. eastern hemlock) can exhibit a "clean" understory and still be considered healthy ecosystems. The majority of RI's native precolonial forest types would be full of native grasses, forbs, and wildflowers (e.g. fire-adapted and upland ecosystems; Borden et al. 2021), as well as flowering shrubs, vines, spring ephemerals, and perennials (e.g. wetland and rich mesic ecosystems). In RI's current forest, a clean understory is an indication of overbrowsing by deer (Healey 2003, Rooney and Waller 2003) and thick duff layers, which are a wildfire risk in most of RI's forest types. This "clean" degraded understory condition can actually prevent forests from reaching an old-growth condition (Oliver and Larson 1996).

28: Not all forest types will have a large variety of tree species. Some forest types will only have 2-3 species, due to the natural site condition (e.g. thin, sandy soils on RI's ridgetops often exhibit pure stands of chestnut oak; upland oak forests often exhibit only 3-4 tree species; Atlantic white-cedar grows naturally in pure stands in swamps).

29: Any healthy forest (and some unhealthy ones) will have the capacity for self-perpetuation. This is not specific to old-growth.

33-34: The state does not fund forestry operations on private land.

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Line 2-3: Tree coring is not necessary to determine old-growth characteristics. The age of a tree is not what defines old-growth forest; the structure and ecosystem characteristics at the forest level are what determine old-growth function. Soil sampling is also not necessary, and likely uninformative to determining old-growth characteristics.

"Survey" is a term referring to locating and mapping boundaries. In forest science, the term "inventory" is used to refer to taking forest data.

Line 7-8: These groups may not have a qualified member (i.e. forester, ecologist, forest scientist, natural resource scientist) to conduct the inventory.

Line 8-9: The only materials required for a forester, or other forest science professional to identify potential old-growth are a Diameter-tape, a map, and a calculator.

Line 14-15: Tree-coring and soil sampling are not the best ways to determine old-growth characteristics. Additionally, they are expensive, time consuming, and cause undue disturbance to potentially fragile ecosystems. Tree age is not what makes old-growth important; forest characteristics and ecology are what make old-growth important

Line 24: To maintain scientific integrity, forest inventories should always be conducted or closely directed by qualified professionals: forest science, natural resource, and ecology professionals.

Line 30-31: This assumes there will be 15 such areas in the state that would benefit from a preservation strategy. Most of RI's forests are ecologically compromised due to colonial land use practices, invasive species, disease and pests, and climate change. A permanent bar on all management practices removes the tools to address emerging issues.

Line 32-33: This means (according to Page 2, Line 11-12) that there can be no wildfire mitigation, no invasive species treatments, and no recreational management (i.e. trail maintenance, safety maintenance), as those are all alterations to a forest. This could result in situations culminating in forest decline and death, or public safety threats.

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Line 1-3: It is unlikely that there is any remaining old-growth in Rhode Island left to preserve (Davis 2003). However, there are plenty of maturing forests that can be managed for the ecosystem services that old-growth characteristics provide (RI Forest Stewardship Program data, D'Amato and Catanzaro 2007). Mature, healthy forests on state lands are not at risk of harvest; the biggest threat to RI's forest ecosystem is permanent land conversion associated with development, not active forest stewardship driven by science-backed techniques (internal data via Intent-to-Cut program).

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