



Testimony of Sharon E. McGregor, on Behalf of *Biodiversity for a Livable Climate*
In Support of the Healthy Soils Amendment to
House 4438, An Act Promoting Climate Change Adaptation, Environmental and Natural
Resource Protection, and Investment in Recreational Assets and Opportunity
Before the House Committee on Bonding, Capital Expenditures and State Assets
May 15, 2018

Dear Chairman Cabral, Vice Chair Balsler,
and Members of the Committee,

Thank you for the opportunity to come before you today to speak about the Healthy Soils Amendment to House 4438. On behalf of *Biodiversity for a Livable Climate* and in partnership with numerous organizations, I urge the Committee's favorable action on the bond bill and this amendment.

Biodiversity for a Livable Climate's mission is to advance restoration of biodiversity and ecosystems, for climate stabilization and renewal of ecological processes – to benefit people and all life on earth. We do this through education/outreach, collaboration, legislation and policy, and on-the-ground projects. Bringing biodiversity and ecological restoration into the climate conversation, we teach that these, together with emissions reductions, are equal parts of the solution to our rapidly changing climate.

Our organization's central tenet is that mobilizing the power of biology to sequester "legacy" carbon from the atmosphere, down to 300 ppm, is a moral imperative and our best hope to reverse climate change and avert climate disaster scenarios. We advocate practical means to achieve this goal within a few decades, including passage of soils legislation empowering farmers, forest managers, wetlands managers, and private land owners to employ regenerative soils management and water retention practices. We engage partners in restoring biologically diverse, carbon-rich ecosystems in backyards and at the community, regional and continental scales.

High carbon sink habitats are our restoration focus: soils, grasslands, tropical and temperate forests, wetlands, and coastal systems. Of note: Recently advanced restoration methods for soils, coupled with agroecosystem farming designs and practices, work quickly to increase yields and nutrition levels of crops and restore associated parched, lifeless lands to lush, verdant habitats.

Massachusetts is making good progress in emissions reductions, including shifting to renewable energy sources and boosting energy efficiency across sectors. We can certainly do more with emissions reductions, and we must. At the same time, through the Healthy Soils amendment to House 4438, we can also begin to restore the form and function of soils and other high carbon sink ecosystems, and thereby put nature "back to work" for us – *back to performing the climate-*

essential role of drawing down carbon from the atmosphere and storing the carbon in soils and vegetation.

The Healthy Soils amendment is a tool by which the Commonwealth can jump-start nature's dramatic rebound to "sustainer of a healthy, livable climate" -- beginning with agricultural lands. Agricultural lands have been a major source of carbon release to the atmosphere. Now they can become one of our greatest carbon sinks, through regenerative, soil enriching farm practices that boost both water retention on the landscape and carbon storage. Very important, regenerative farm practices also produce higher yield, more nutritious crops.

The Healthy Soils amendment defines regenerative agriculture and amends Chapter 20, section 6C (MA Food Policy Council) by making regenerative agriculture an explicit food system goal and appointing a regenerative agriculture expert to the Council. It also establishes the MA Healthy Soils Program Fund "to enhance education, training, employment, income, productivity and retention of those working or aspiring to work in the field of regenerative agriculture, and to provide incentives for regenerative agriculture in the Commonwealth." The MA Department of Agricultural Resources is the administering agency.

In defining regenerative agriculture practices, the Healthy Soils amendment is explicit that regenerative agriculture improves the health of soils, including consideration of depth of topsoil horizons, water filtration rate, organic carbon content, bulk density, biological activity, biological diversity, and bare ground. I highlight biological activity and biological diversity, *as it is **living soils** that absorb and retain water and store carbon.*

Earth's situation in 2018 is critical:

- Atmospheric CO₂ 410 ppm
- Rising temperatures (2014 the warmest year, and 2017 the second warmest on record)
- Major extinction in progress (loss of biodiversity)
- Soil erosion > 75 billion tons annually
- Land desiccation and fires (water tables dropping)
- 400 Dead Zones (anoxic regions) in the ocean
- Arctic Ocean almost free of summer ice
- Increasing frequency and intensity of storms

What to do? Between 50 million years ago and today, the earth kept getting dramatically cooler. Why? – *Azolla* Water Fern created carbon rich soils 25 feet deep, which became the Permafrost. Following the proliferation of *Azolla*, grasslands and ruminants co-evolved, adding to carbon stores in the soils. *Primarily these two factors – Azolla Water Fern and grasslands/ruminants – dramatically increased carbon drawdown and caused the cooling, creating the "Just Right" planet we know today.*

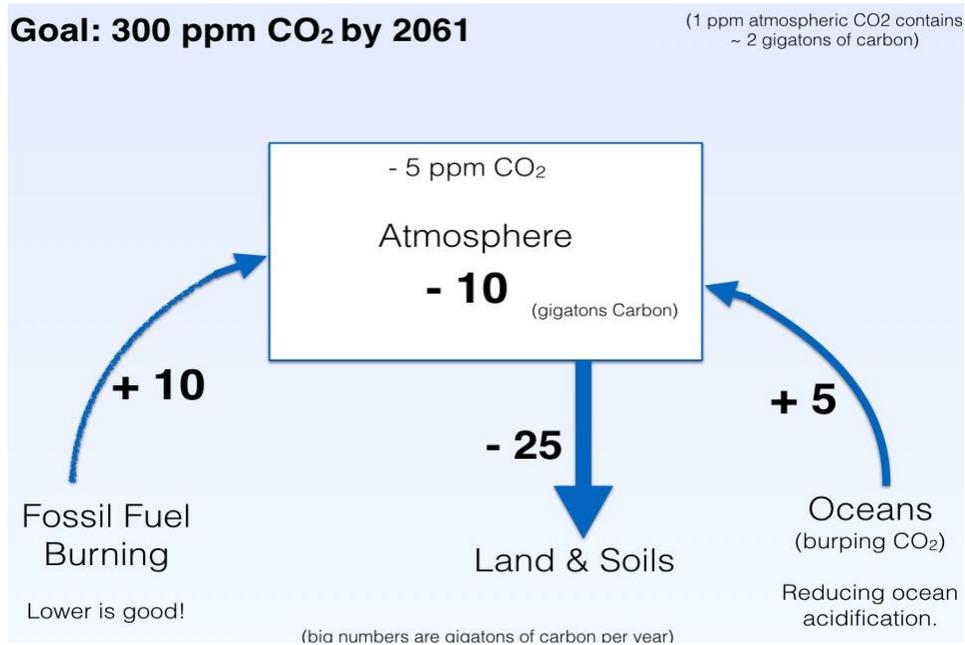
In present time, a well hydrated, soil rich, vegetated, biodiverse earth can again cool the climate and regrow ice in the Arctic, *setting us back on course to a "Just Right" planet again.* With all due haste, let's begin the work of landscape hydration, soil enrichment, revegetation, and widespread restoration of biodiversity in Massachusetts.

The Healthy Soils amendment, focusing on farmlands and agricultural practices, is how Massachusetts can begin (and model) the most important undertaking of our time – that is to empower nature to stabilize the climate.

Humans evolved in an ice age; now we are in a desiccation age. Without biodiversity – in the soils and throughout the Biosphere -- the land can't hold water. Without water retention on the

landscape, we can't sustain *vegetation* and associated ecological processes (photosynthesis, evapotranspiration, and nutrient cycling) that sustain *us*. Without healthy ecological processes, we can't have carbon drawdown to yank that excess carbon out of the atmosphere. Regenerative agriculture embodies all of these and can significantly benefit climate.

The following graphics illustrate that carbon capture by farms and agricultural practices is a key pathway in the "Road Map to 300 ppm CO₂ in the atmosphere".



Road Map to 300 - Several Pathways.

Ecosystem Land Type	Billions of Acres	Yearly Carbon Capture (tons/acre)	Billion Tons (per year)
Grasslands - Deserts	10	1	10
Regenerative Farms Permaculture	5	2	10
Forests	5	2	10
Wetlands	2	8	16
Living Shorelines (Rising Sea Levels)	1	4	4
Arctic Permafrost (Azolla and Grazing Herds)	1	2	2
Total	24		52 GT C ↓

Graphics by: *Jim Laurie, Restoration Ecologist
Biodiversity for a Livable Climate*

James Hanson and the *Intergovernmental Panel on Climate Change* (IPCC) agree: We must step up reductions in emissions, and at the same time remove the legacy carbon from the atmosphere and cool the planet, ASAP.

Massachusetts has an opportunity to rise to the level of urgency with our climate, and be a model for climate change response that we wish for other states and countries. With regenerative agriculture, we can restore the form and function of agricultural soils, boost the economic success of our farms and the nutritional value of our foods, and reduce/eliminate drought or flooding impacts on agricultural lands. We can begin to stare down feedback loops and overall acceleration of climate change/impacts and relegate to history intense storms like we have experienced in recent months and years.

Massachusetts legislators can lead the way. We respectfully request that the Committee on Bonding, Capital Expenditures and State Assets act favorably on House 4438 and the Healthy Soils amendment thereto.

Sincerely,

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