# You and the Climate Change Puzzle

(Photo by Sepp Photography)



# Climate Change

- Your garden
- Your yard
- Your neighborhood
- Your town
- Your planet

By Mike Fillon, Master Gardener

# Me



- I've written 12 books\* and over 2,000 articles, on a variety of science and health topics.
- For 20 years wrote for *Popular Mechanics*.
- Three years as Head Science Writer at Morehouse School of Medicine.
- Five years at the *Journal of the National Cancer Institute* and a number of other health organizations including Emory University the Rheumatoid Society and Arthritis Foundation.
- - One of WebMD's first writers.
- Founding Editor-in-Chief of *Breakthroughs in Health* magazine.
- For the past six years I've written for the American Cancer Society.
- I'm a Master Gardener for 12 years; for three at Brook Run Park and presently at Kelley Cofer Park in Tucker.

### Boola, Boola...

In 2023, I was awarded a certificate from the Yale University School of Public Health after completing a three-course syllabus on Climate Change. (Included 7 exams, 14 essays and 20 Zoom sessions.)



The Yale School of the Environment and Yale Divinity School Religions and Ecology: Restoring the Earth Community



# Welcome to the Anthropocene (Pronounced an·thruh·puh·seen)

(Huh?!?)

### Anthropocene

Also known as "the Great Acceleration," we are living in a geological epoch where humans became the single most influential species on the planet.(1950- now)



### Here's another uncommon word

### "Solastalgia"

Environmentally induced distress people are experiencing due to environmental change beyond their control...



### What climate change has wrought: Besides -

- CO2 emissions,
- global warming,
- species extinction,
- Deforestation and
- Other human actions...

### ... there's our waste.

# Billions upon billions tons of waste.



### What is Climate Change/Global Warming?

Principal cause of climate change is due to heat-trapping emissions from the burning of coal, oil and natural gas.

A Science Advances study simulated a situation **without** greenhouse gas emissions -

Researchers <u>could not recreate</u> the heat waves observed in the last 45 years.



### The heat is on...

- While we've had heat waves before since 1979,
- global heat waves are moving **20% more slowly**...
- ... and are happening 67% more often, and cover larger areas.
- From 1979 to 1983, global heat waves lasted 8 days on average.

From 2016 to 2020 it rose to up to 12 days.

(Source: Science Advances, April 5, 2024)

• Heat is just one climate change problem.

### A couple of other results:



### U.S. Cities to be underwater in future.



# Not sure if climate change - including global warming - is due to humans?

- A Cornell University study in 2021 found that 99.9% of more than 88,000 climate change studies agree that largely due to carbon emissions, humans have accelerated the trend.
- The remainder are easily debunked.
- Studies that claim the opposite are usually funded by fossil fuel companies and their allies.

# Need more proof?



- A review of 12,000 peerreviewed studies found that 97% agreed climate change was due to human activity.
- Again of the remaining 3% most were easily debunked.

Despite what you may be told about "two sides":

97% who believe it's

true VS 3% who don't

is a consensus-

### But... but... but... What about ALL THAT snow!!!



#### Dr. Steve Campbell @Historian\_Steve

Your periodic reminder that less ice at the Arctic is consistent with a weaker jet stream that allows cold air to drift down into the Great Plains.

The frigid temps you're experiencing happen BECAUSE of a warming planet, not in spite of it.



### Other scary data from *Miseducation...*

- "As of 2019, 30% of Americans falsely thought global warming was mostly natural."
- "Four in five didn't know there was scientific consensus on the question."

### Mis-education is deliberate...

"We are the only country in the world that has had a multibillion-dollar deny-delayconfuse campaign."

Frank Niepold, Senior Climate Education Coordinator at NOAA's (National Oceanic & Atmospheric Administration)Climate Program Office (CPO) in Silver Spring Maryland.

### where do you stand?



Highest Belief in Global Warming Most Concerned Most Motivated Lowest Belief in Global Warming Least Concerned Least Motivated







- The Active Alarmed (34% or 8% of the U.S. population) exhibit high levels of climate activism.
- The *Willing Alarmed* (**46% or 11%)** are willing but do so rarely.
- The *Inactive Alarmed* (20% or 5%) are uncertain about engaging in climate activism.



### A World-wide movement...



### **Climate Fresk initiative**



# **Greenhouse Gas Culprits**



- Carbon Dioxide (CO2)
- Methane (CH4)
- Nitrous Oxide (N2O)
- Flourinated gases (HFCs)

True...

CO2 occurs naturally in the atmosphere as part of the Earth's "carbon cycle." But, we have upped the cycle so much it is now **out of whack**.





### Who should work on climate change?

- Business
- Science
- Non-profits
- Government
- <u>Us</u>

### Be wary of "Green-washing" & "Youth-washing"

- <u>Greenwashing,</u>" also called "green sheen," greenwashing is <u>deceitful</u> <u>marketing that exaggerates a</u> business's current or past practices in order for them to appear environmentally friendly.
- For example:
- **Biodegradable** does not always mean better for the environment.
- "Environmentally friendly" has no legal status and can be claimed for even the weakest reasons.
- **locally grown** doesn't necessarily mean better for the environment.

### "Youth washing"...

Deceitful Messages designed to appeal to younger generations...

"Right now, climate change is 99% problem, 1% solution. Young people want 20% problem, 80% solution."

Frank Niepold, Senior Climate Education and Workforce Program Manager and Coordinator at National Oceanic & Atmospheric Administration (NOAA.)



# What is "climate justice?"

• Climate Justice recognizes the disproportionate impacts of climate change on low-income communities and communities of color around the world; those least responsible for the problem.

Converting Skeptics, Building Trust

- Many still believe that solving climate change requires -
- Sacrifice
- Less comfort
- Less convenience
- Slower growth

What if the opposite is true?

What if climate initiatives deliver on the things people value most?
- Grow the economy
  - Raise tax revenue
    - Build trust
  - Spark civic pride
- Improve modern life

# Two Key Climate Change Strategies:

Adaptation

Mitigation

# Adaptation

 Climate change adaptation is "adjusting" what already exists to lower the impact of climate change to moderate or avoid harm.

# **Climate Change Adaptation**

These can include:

• **Early warning systems:** Research shows that just 24 hours warning of an oncoming heatwave or storm can reduce the subsequent damage by 30%.

• **Climate-resilient infrastructure:** Improve roads, bridges, and power lines that can withstand shocks from extreme climate impacts.

(Ironically, oil companies are building taller drilling platforms to counter rising sea levels and storms.)

• Water supplies and security: this includes strategies to cope with floods, droughts, rising sea levels, even wildfires. By 2030, half of global citizens are expected to face severe water shortages.

• **Long-term planning:** We need to peer into the future to plan and guide governments and industries on investments and regulatory changes

• And, crucially, raise public awareness.



## Bioswale in Nassau County, Long Island



# Mitigation

• **Climate mitigation** focuses on limiting - and hopefullystopping and reversing the upward trend of warming.

• Mitigation solutions focus on reducing carbon emissions and using sequestration to pull carbon out of the air.

#### • Here are a few mitigation ideas:

- Solar panels
- Wind
- hydroelectric
- Geothermal
- Electric vehicles\*



 Qcells' Cartersville factory (photo) is part of a \$2.5 billion investment funded, in part, by the recently approved climate and healthcare law.

(Unfortunately, it's being repealed)

 The first part of the expansion, completed last year, increased the annual output to 5.1 gigawatts; 30,000 panels a day.

# Adaptation and Mitigation Combined

- An Alabama study found that climate-resilient construction methods can protect homes, and save a lot of money.
- A voluntary construction code created by the nonprofit Insurance Institute for Business and Home Safety (IBHS) for wind and rain mitigation saw significantly fewer and less costly claims.

Three levels of designations employ methods including

- Improving roof fasteners
- Using impact-rated doors and windows, and
- Anchoring walls more securely to their foundation.

(The program requires third-party verification of work.)





- About 80,000 homes across 32 states now have Fortified designations.
- The enhanced standards do add cost: between 0.5% to 3% more for new construction, and 6% to 16% for retrofits.

Can 'cool roofs' help Atlanta combat extreme heat?

City leaders consider roof reflectivity requirements for new construction.



#### **Carbon Sequestration**

- **Carbon sequestration** is a fancy expression that describes extracting carbon dioxide (CO2) and other forms of carbon from the air and burying it in the ground.
- Industry- including petroleum companies- you know, the companies who helped get us into our climate change worries- are developing high-tech (and expensive) ways of accomplishing this.

#### We could spend millions (billions?) on this. Or...



## ... plant more trees! (My favorite climate mitigation strategy)

- We don't have to wait for high tech sequestration to bail us out; we have at our disposal, other "experts" who will do it for free.
- Trees are very good at doing this and have about 350 million years' experience in absorbing- or if you prefer, sequestering carbon.



#### Plants are the OPPOSITE of factories.

Plants attract carbon and store it, Many factories belch it out.

We treat agriculture like mining by stripping away the nutrients from the soil, without replenishing them.



- Trees and other plants, help mitigate and impact global warming and climate change by slowing the build-up of greenhouse gases, which are released by burning fossil fuels.
- Young trees absorb CO2 at a rate of 13 pounds per tree each year.
- After 10 years they absorb up to 48 pounds of CO2 per year.

- Trees, and all green plants, use photosynthesis to convert carbon dioxide (CO2) into sugar and other elements that they use for food and growth. (Just like us.)
- Then they release oxygen for us to breathe.



Planting a fruit tree – or any native tree for that matter - is about the future...

... it is a true act of optimism and faith.



- Tree canopies absorb greenhouse gases and emit oxygen, and provide shade and cooler temperatures.
- While generally shorter in stature, fruit trees offer the same benefits, plus they provide food.

- It's safe to say around **25 per cent** of carbon emissions from burning fossil fuels is absorbed and stored by plants.
- Trees store the carbon as wood, and continue to add more and more over their lifetimes. (The amount they absorb varies by species.)
- True, they do release some CO2 from natural processes such as decay and respiration, but that only represents a fraction of what they absorb.



- Trees have many, many other attributes that benefit humans and other life.
- Trees **capture particulate pollution from the air** and also help lower concentrations of other air pollutants such as ozone and nitrous oxide.
- Greater use of plants **can save energy via cooling** improving air quality.
- Plants can enhance our health and well-being. Studies show visiting nature including "**forest bathing**" can boost moods and reduce negative feelings.
- Caring for plants **can be very relaxing** and it can be a rewarding experience to see something that you look after grow and thrive. (Have you ever considered caring for a Bonsai tree in your home?)



Same city, same day, same time: two different streets.





• At 47.9%, Atlanta has the highest percentage of overall urban tree canopy in the nation when compared to other cities that have conducted Urban Tree Canopy (UTC) Assessments.

- In 2018, the City of Atlanta conducted its 3rd canopy assessment and estimated tree canopy coverage to be 46.5% (40,609 acres.)
- Unfortunately, not very long ago, the tree canopy was measured in the low 50%.

#### **Canopy Concentration within Atlanta**

- 61% of all single-family residential land is tree covered.
- 40% of all multi-family residential land is tree covered.
- 20% of all land zoned commercial is tree covered.
- Densely developed areas, such as downtown, surrounding neighborhoods, and former Atlanta Housing Authority developments have less than 5% tree cover.
- In April 2023, the city of Atlanta set a target to restore a 50% tree canopy in the future.

(Georgia Tech study)

## Life cycles of plants also help...



- When plants die, they decompose and their carbon content is absorbed into the soil and feeds animals, insects, microbes and.
- Once again, only a fraction is released back into the atmosphere.

## We All Gotta Eat, right?

#### We MUST Cultivate Our Food "Nature's Way"

#### Huh?

What the heck do these trendy buzz words mean? Organics Permaculture Sustainability and Regeneration

## Nature's Way...



Frankly, I prefer a different expression...

## **Clever Laziness**





## It simulates nature by obeying its rules.



## It recognizes that all life has basic needs...

- Nutrition
- Water
- Appropriate sunlight
- Air circulation
- Means to reproduce

# All plants –like all living things have a will to survive....





### or babied...

# They don't want to be coddled...


## And our sweat and toil? Not much help...



### But First, What is your "carbon footprint?"

• EPA Climate Calculator:

#### https://www3.epa.gov/carbon-footprint-calculator

Many of our daily activities - such as using electricity, driving a car, or disposing of waste - cause greenhouse gas emissions. Together these emissions make up a household's carbon footprint.

The EPA calculator estimates your footprint in three areas:

- home energy
- transportation
- waste

Everyone's carbon footprint is different.

## A little effort can make a difference

 In a study at San Jose State University researchers - led by Professor Eugene Cordero PhD, followed students who took an intensive course on personal decisions related to climate change relating to what to drive (and when,) what to eat and their disposal and recycling habits added up to –

- Wait for it...
- 2.86 tons less carbon emissions per student per year!!!

Which brings us back to permaculture:

There's one indisputable rule everyone plants something for food or enjoyment must recognize ...

## Nature ALWAYS prevails...

• Healthy squash

Squash beetle





## .... hubris never wins.

- Always remember:
- When we plant a tree, garden and lawn, we are planting it where we want it....
- ... not necessarily in the ideal location the tree, bush, vegetable, flower or grass- might need in order to survive and thrive.
  (So we're starting with one strike against us.)

• Nature's Way is a system of agricultural principles that simulate natural ecosystems.

#### Nature's Way:

- Everything we plant including fruits, vegetables and herbs should be grown without -
- synthetic pesticides
- herbicides
- fertilizers or
- sewage sludge

#### So relax....

.... Why fight Nature?



## One of our biggest mistakes...

Predators FEAST on monocultures



# And what, perhaps, is our biggest monoculture?

## Hmmm...



There are no straight lines or sharp corners in nature..."

Antoni Gaudi (1852-1926) Architect, Catalonia, Spain



- Nature doesn't plant trees, bushes or flowers in straight lines, or concentric circles.
- (Only we do!)



## No one sprays or fertilizes the forest...



Instead; let's bring the lessons of the forest into our yards...

#### Otherwise....

#### ... STRIKE 2!

#### **Regenerative landscaping**



## • **Regenerative landscaping** restores soil, boosts biodiversity, sequesters carbon, and fosters climate resilience.

- **Regenerative landscaping** cuts harmful chemicals, reduces fossil fuels, improves water, and fosters greater connection to nature.
- "We can transform our yards and neighborhoods- into vibrant spaces, like a cafe or park, fostering creativity, community, and belonging."
- Tres Crow, Dreamer-in-Chief, GreenBox Homes, Tucker, Georgia

#### **GreenBox Homes**

"Sustainable yards for all! Fine purveyors of joy and community. Tres Crow, Dreamer-in-Chief

We've joined forces with the Fruitful Community Foundation to grow more beautiful, abundant, and sustainable communities by turning homeowners like you into urban land stewards!

"With a one-on-one consultation, microcourses, explainer videos, planting plans, and a members-only social network, Green Box Homes is the easiest (and funnest!) way to get plugged into the ecolandscaping revolution. See how much fun your yard can be!











Minnesota is paying homeowners to replace their lawns with bee-friendly wildflowers, clover and native grasses.



## Speaking of bees...



The roof of hundreds of bus stops have been covered in plants as a gift to honeybees by a city in the Netherlands.



Ok! Not necessary! We removed We've invasives and planted native plants planted natives and in all these city parks. the native bees are Now let's already arriving. add bee hives We don't need to save the bees! European Honeybees. Native bees are the ones that need saving!

pollinator friendly yards on facebook



# <section-header><image>

#### **BECAUSE OF THIS**



- Native plants have tight relationships with wildlife, formed over many thousands of years, providing natural sources of food, cover and places to raise young.
- A recent study in *Science* reports a 22% decrease in butterfly abundance across the contiguous US between 2000 and 2020.





The National Wildlife Federation recommends that yards strive for **50% to 70% native plants** to provide multiseason bloom, including flowers, shrubs, grasses, and groundcovers and trees.

#### Please keep in Mind

- 96% of terrestrial birds rear their young on insects.
- Native insects, including butterflies and moths, cannot process non-native plants' chemical defenses so they shun them decreasing available food sources.



Here's an excellent exception for a non-native plant.

#### Goumi berries!

Non-invasive and an excellent nitrogen fixer. Insects leave them alone. Birds love them.



• A few things you might not know...



There are more living organisms in a teaspoon of soil than all the humans on Earth.

Oak tree DNA shares the same building blocks as humans, has similar gene structure and may encode for some proteins that are similar to humans.





We have a 60% genetic similarity with banana plants.
## Fruit flies?

## 60% identical!



Unlike animals who can move around in search of food, shelter or a mate, plants are confined to one spot.

In fact, their lack of movement **heightens** their defense systems.

When you use poison on mice or grass, it moves steadily up the food chain — poisoning foxes birds, and all wildlife. Just stop.



"Because of this ..." writes Daniel Chamovitz, Ph.D., Director of the Manna Center for Plant Biosciences at Tel Aviv University.

"... plants have evolved complex sensory and regulatory systems that allow them to modulate their growth in response to ever-changing conditions."



• When leaf-eating insects attack a plant, the affected plant emits volatile chemicals into the air. Through "smell," this effectively warns neighboring plants of a possible attack.



# Global warming effect om plant defenses

**Elevated CO2 impairs** a key component of the plant's defenses against leaf-eating insects.

In other words, we're compromising the plant's ability to defend itself.

- The same thing occurs when we spray volatile chemicals.
- We weaken our plants.

- Peter Wohlleben, author of *The Hidden Life of Trees:* Dr.
  Wohllegen describes how trees are like human families:
- Tree "parents" live together with their children,
- Communicate with them,
- Support them as they grow,
- Share nutrients with those who are sick or struggling, and
- Even warn each other of impending dangers.



### The Tucker Orchard Guild's Planting Beliefs & Guidelines:

(Or, what the chemical companies don't want you to know!)

There are three parts of this:

- Building the best soil money <u>can't</u> buy
- Companion planting, including fruit tree guilds. (Or, what the forests can teach us.)
- Putting insects to work.

For soil building, there are two major thrusts:

- "Wood-Wide" Web
- Soil Food Web

# Wood-Wide Web

- 'Wood wide web'—the underground network of microbes that connects trees. Millions of species of fungi and bacteria swap nutrients between soil and the roots of trees, forming a vast, interconnected web of organisms throughout the woods.
- **Mycorrhizal** networks are underground hyphal networks created by mycorrhizal fungi that connect individual plants together and transfer water, carbon, nitrogen, and other nutrients and minerals.



# The soil food web

- The **soil food web** is the <u>community of organisms living</u> all or part of their lives in the soil.
- It describes a complex living system in the soil and how it interacts with the environment, plants, and animals; and describes the transfer of energy between species in an ecosystem.



#### The Soil Food Web

This is the work of "soil pioneer" Dr. Elaine Ingram, from Oregon State University:

"Our soil teams with a multitude of organisms which provide the necessary work for healthy plants to grow free from disease, ...pests, and infertility...



Garden French manicure! 😂



# We want living soil, NOT dead dirt.

Besides lack or a well-rounded nutritional profile (as mentioned before) three main problems with synthetic fertilizers:

:

- Good nutrition for us and our trees- begins in healthy, chemical-free soils:
- The issue of endocrine disruption pesticides and other poisons we add to our soils, can impact our health.
- As author Michael Pollen says, "We are what we eat, eats!"

## **Pollution and leaching**

The salts they contain leach from the soil into groundwater, and end up in rivers and lakes.

The extra nitrogen washing out of urban soils into the water cause algae blooms, which suffocate fish and other aquatic animals.



# Synthetics do not "feed the soil"

... and drive off beneficial insects.

The result is a steady decline in the overall health of gardens.

Weeds and pests become more prevalent. This results in a steady download cycle of greater fertilizer and herbicide treatments.

#### **NOTE: DO NOT CONFUSE**

weeds with groundcovers and other nitrogen fixers including clover!





#### 3. Your plants form a chemical dependency –

When nutrients are too plentiful, your garden plants and lawn have no need to grow strong roots in their search for nutrients. With a stunted root system, they are less resistant to weeds and pests, forcing the constant use of pesticides.

We want a soil that's full of the beneficial fungi that help <u>plants grow vibrantly and resiliently</u>, and aid - we hope- in inter-tree communication.

There's **beneficial** fungi....

.... And also **pathological** fungi.

We want one but not the other!

- Tips to prevent bad fungi:
- Sunlight is the best disinfectant
- Air circulation
- Active mycelium network to overpower root entry.

One other tip – actually a request:

<u>Avoid peat moss</u>. Peat bogs are great at carbon sequestration but their shrinking due to our garden usage.

What are Fruit Tree Guilds? *(Applies to vegetables, also)* 

Fruit tree guilds are complementary plants – with distinct roles- surrounding a single or cluster of fruit trees emulating the symbiotic relationships that exist between plants in nature.

Each plant benefits others in the vicinity, interact with animals and soil microorganisms to create an ecosystem.

#### Suppressors:

A circle of bulbs underneath the drip line <u>subdue grass growth</u> which competes with the fruit tree and the surrounding plants for nutrients. **Alliums such as chives, leeks and <u>garlic</u>** are good choices. The best plant is the <u>daffodil</u>, because they deter deer and rabbits which find them poisonous. Plant them in a circle at the tree's "drip line."





#### Repelers

Besides attracting predators, these plants **repel potentially damaging insects**. <u>Nasturtiums</u> are best for this function; and many commercial apple orchards plant them around the base of the trees to help protect their crops.



#### "Attractors"

**Dill, <u>fennel</u> and coriander:** The**s**e attract a <u>beneficial</u> variety of insects to the guild; some help pollinate the plants, while others prevent damaging species of insect from becoming a problem.

#### **Mulchers**

These plants **naturally provide mulch** to the guild by leaving on the ground to rot into the topsoil, providing nutrients that all the plants in the guild can access. Comfrey, artichokes and rhubarb all work well as mulchers.



#### **Fixers**

Besides the nutrients added by the accumulators, **these plants add the best form of nitrogen in the soil.** Leguminous plants have special nodules on their roots that form a symbiotic relationship with certain soil bacteria to help 'fix' nitrogen. <u>Clover, hairy vetch</u>, **peas, beans and alfalfa** are all regarded as fine nitrogen-fixers.



![](_page_136_Picture_3.jpeg)

It's estimated that at any given time, there are 1,000 different types of insects in the typical backyard.

<u>What % do you think cause</u> the most damage to our plants? • To repeat...

Plants also possess a range of active defense abilities that respond to pathogens

- such as bacteria and fungi-

and also parasites, from microscopic viruses to phytophagous insect.

## Only 3%....

This means that when we **spray** to kill insects we also risk killing the beneficial and harmless ones, leaving more room for infestations of the bad bugs, throwing that natural balance out of whack...

## **Putting Insects to Work**

- Plants under attack by herbivores (vegetative-eating insects), send out chemical signals knows as herbivoreinduced plant volatiles (HIPV.)
- These signals are received by carnivorous insects- telling them a plant is under attack and, by the way, as a meat-eater, you'll find the attackers delicious.

![](_page_140_Figure_3.jpeg)

 While plants don't have white blood cells and other immune system traits like animals, they do respond via systemic acquired resistance (SAR) and induced systemic resistance (ISR)- similar to our ability, in a sense, to "learn" and adapt...

![](_page_142_Picture_0.jpeg)

Wasps are incredibly territorial and will not build a nest within 200 yards of another one. So build or buy your own fake nest! It's like a scarecrow for wasps. Hang one in the front yard and one in back, and you're done.

# Battling biting ants?

- Spreading coffee grounds will drive them away.
- (NOT kill them.)
# Here are some our the friends you'd like to attract...

• Lady bug



Assassin bug



### **Praying Mantis**



### **Big-eyed bug (Geocoris)**



## Other tips at home

- DO NOT TILL:
- Only disturb the soil as much as necessary.

 According to the book, Weedless Gardening by Lee Reich, there are 140 weed seeds buried in each pound of soil. "If you want to hear the sound of birds don't buy a cage. Plant a tree."



### THESE ANIMALS ARE MADE POSSIBLE BY FALLEN LEAVES



## Southeastern U.S. Native Plants

### Annuals

False foxglove (Agalinis) Partridge pea (Chamaecrista) [A] Fleabane (Erigeron) [B]

### Perennials

Milkweed (Asclepias) [C] Baptisia (Baptisia) Thistle (Cirsium) Coneflower (Echinacea, Rudbeckia) [D] Boneset (Eupatorium) Joe pye weed (Eutrochium) Sunflower (Helianthus) Blazingstar (Liatris) [E] Beebalm (Monarda) [F] Beardtongue (Penstemon) Mountain mint (Pycnanthemum) Rosinweed (Silphium) Goldenrod (Solidago) Aster (Symphyotrichum, Eurybia) [G] Wingstem (Verbesina) Ironweed (Vernonia) [H]

### Shrubs

Summersweet (Clethra) Hydrangea (Hydrangea) St. John's wort (Hypericum) [I] Holly (Ilex) Elderberry (Sambucus) Blueberry (Vaccinium) [J]

### Trees

Serviceberry (Amelanchier) Redbud (Cercis canadensis) [K] Dogwood (Cornus) American holly (Ilex opaca) Sourwood (Oxydendrum arboreum) Wild Cherry (Prunus) Wild Plum (Prunus) [L]













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## Why more communities are banning gas-powered leaf blowers



# Many weeds are NOT weeds:

Clover is a great nitrogen fixer. (Meaning it draws nitrogen from the air into the soil; eliminating the need for nitrogen-dense fertilizer.



# **Busting dandelion myths**



## **Choose native plants!**



 Dandelions mine minerals deep in clay soil and bring them to the surface.

# Organization Organization Organization Organization Organization Organization

This is called "Foodscaping." Each yard has a vegetable garden with fruit trees. Neighbors consult with each other so they can trade the food



The next time you boil pasta or steam some **vegetables** in your kitchen, instead of pouring the **water** down the drain, use it in your garden or in your house to keep your **plants** green and flourishing. You can also use **water** from boiling eggs, which is full of calcium your **plant** needs to grow.









Let lawns grow in May to create food and habitat for pollinators!

### Tell your city planners...





So; what do organics, permaculture, regeneration and sustainability mean???



they mean ensuring a bountiful planet for future generations...

### Please remember...





"While many people think organics, permaculture, sustainability and other "granola" ideas are too time consuming, and require back breaking work - even with the acknowledged benefits- if we let nature do their part (by cooperating with her!) ultimately it ends up being a lot less work.

*Plus; it helps us battle climate change."* 

And that's not a quote from Dr. Ingham-

That one's from me!



### Let's Make the Future Bright



### Coming soon...





By Anna Consolazio, MPH\* Mike Fillon, MS (And A Cast of Billions)



## A few reminders...









- By local author, Pattie Baker.
- HIGHLY Recommended.



## Outside Help

- Compost and hard wood chips- build trees natural defense systems
- Beneficial nematodes: Home orchard
- Foliar spray: Neem Oil
- Foliar spray: (**Bacillus subtilis**) Fungicide strain QST 7- Serenade, Crease.
- **BT-** (**Bacillus Thuringiensis**) Soil & root drench (Dunwoody)
- Bacillus amyl-oliq-ue-faciens: Particularly, strain D747, which is a naturally occurring bacterium that is found in close association with roots, leaves and other plant parts. It is reported to prevent the establishment of disease-causing fungi and bacteria by rapidly colonizing plant surfaces.



- Neem Oil affects over 400 varieties of insects and is an important part of an integrated pest management strategy. While it won't cure fungal or bacterial diseases it will prevent them.
- Mix 1 tsp of neem oil and 1/2 tsp of liquid dish soap to 1 quart of water, or 4 tsp of neem oil and 2 tsp of liquid dish soap as an emulsifier- to 1 gallon of water. Shake well.

## ONLY IF ABSOLUTELY NECESSARY

- Milky spores
- Spinosad
- Insecticidal soaps
- Garlic Barrier
- Pyrethrum (*Chrysanthemum cinerariifolium*)
- Sulfur Fungicide
- Copper Fungicide
- Surround (Kaolin spray)

### Regardless of the substance

### Avoid spraying ANYTHING from bud break to petal drop.

## Repeat: What is your "carbon footprint?"

### • EPA Climate Calculator:

### https://www3.epa.gov/carbon-footprint-calculator

Many of our daily activities - such as using electricity, driving a car, or disposing of waste - cause greenhouse gas emissions. Together these emissions make up a household's carbon footprint.

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- transportation
- waste

Everyone's carbon footprint is different.

(There are other carbon footprint calculators out there)