



Bringing Sustainable Practices to Craigville

Hosted by Red Lily Pond Project Association & CCMA



AGENDA

- Welcome Bill McKinney, CCMA / Skye Gibson, Red Lily Pond Project
- Keynote Kristin Andres 30 minutes
- Net Zero Sam Carpenter 15 minutes
- Solar Panels Doug Farquhar 15 minutes
- Light pollution/Fireflies Skye Gibson 10 minutes
- Closing questions and rain barrels raffles





A Cape Cod Friendly Landscape ~ an ecological approach to our landscapes

Kristin Andres, Associate Director for Education
Association to Preserve Cape Cod (APCC)





Worldwide, more than 40% of insect species are declining.

One third are at risk of extinction.

(Biological Conservation, 2019)

25% of native wild bee species in the U.S. are at risk of extinction.

Primary causes are habitat destruction, pesticide use, development, and a changing climate.

(Pollinators in Peril 2017 report, Center for Biological Diversity)



Since 1970, we have lost 3 billion birds.

In the last 50 years, 29% of the breeding birds in North America vanished. (*Science*, Sept. 2019)

432 species of North American birds are threatened with extinction.

70 species are at the tipping point.
(*State of the Birds* 2016; Rosenberg, et. al. 2019, *State of the Birds* 2022)

Photo credit: Fred Atwood

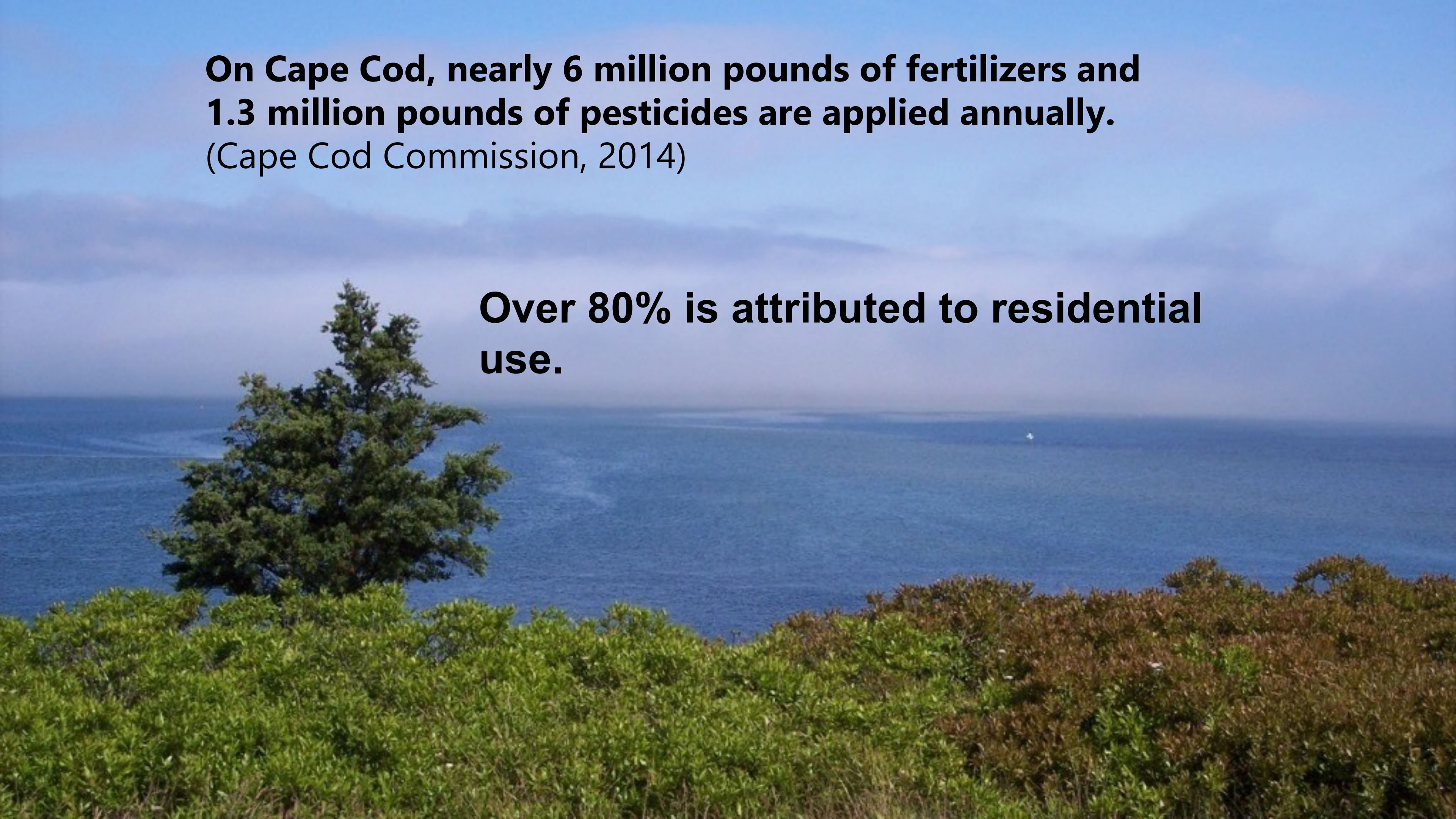


90% of coastal embayments and 37% of freshwater ponds are suffering from unacceptable water quality due to excess nutrients. (APCC's *State of the Waters: Cape Cod 2022*)

Nutrient overload due to wastewater, fertilizers and stormwater runoff.



CapeCodWaters.org



On Cape Cod, nearly 6 million pounds of fertilizers and 1.3 million pounds of pesticides are applied annually.
(Cape Cod Commission, 2014)

Over 80% is attributed to residential use.



What can we do?

We can shift away from the traditional landscape paradigm of the 1950's.

A photograph of a white house with black shutters and a garden filled with yellow Black-eyed Susans. The house is on the left side of the frame, and the garden is in the foreground and middle ground. The background is filled with lush green trees and foliage. The text is overlaid on the right side of the image.

Ecological Landscapes
are designed and cared
for with nature in mind.

~

*Make the connection with nature
in our landscapes.*

Native plants are the cornerstone of
an eco-landscape



- Support local ecology
- Healthy landscapes for people, pets, and wildlife
- Protect water quality & conserve water
- Preserve a “sense of place”
- Reduce energy input and carbon footprint, store carbon
- Act of stewardship

Cape Cod Native Plants – the true Proven Winners!

Well-adapted to the Cape

- Salt spray tolerant
- Drought tolerant
- Do well in nutrient-poor soils



CapeCodNativePlants.org



Beach Plum



Bayberry



Seaside



Plants are the basis for life. They capture the sun's energy and make it available for other living things.

Native plants, insects, birds and other wildlife co-evolved together in eco-regions, developed complex relationships.

They need each other.

Catbird eating pokeweed.
Photo credit: Bill Massarro

Native Plants - Ecological Value

Insects and plants co-evolved and have specialized relationships that ensure the survival of their species.

(e.g.) Pollinators are offered nectar & pollen in exchange for pollination





Meet the Pollinators!

- Bumble Bees
- Mason Bees
- Sweat Bees
- Carpenter Bees
- Butterflies
- Moths
- Flies
- Beetles
- Wasps

- Honey Bees (native to Europe)

More than 80% of the world's plants require insect pollination.

We have about
400 wild bee species
in New England.

Unlike the European
honeybee, the vast
majority of our wild bees
are solitary nesters.



Some wild bees
live above ground.

Carpenter Bee on
Spotted Bee Balm, *Monarda punctata*



Some bees need
the soft pith of a
plant stem.





Others are ground nesting bees.



Antechamber

7 mm

6 cm

Nest cell

18 cm

7 mm

7 inches



Did you know many bees are specialists?

Mary



About 25% of wild bees in the Eastern part of the U.S. are specialist bees.

https://issuu.com/cornellbotanicgardens/docs/creating_a_pollinator_garden_for_specialist_bees_f

- *Blueberry Bee, Adrena bradleyi*
- *Photo: Hannah Burrack*





Common Milkweed
Asclepias syriaca



Butterfly Milkweed
Asclepias tuberosa



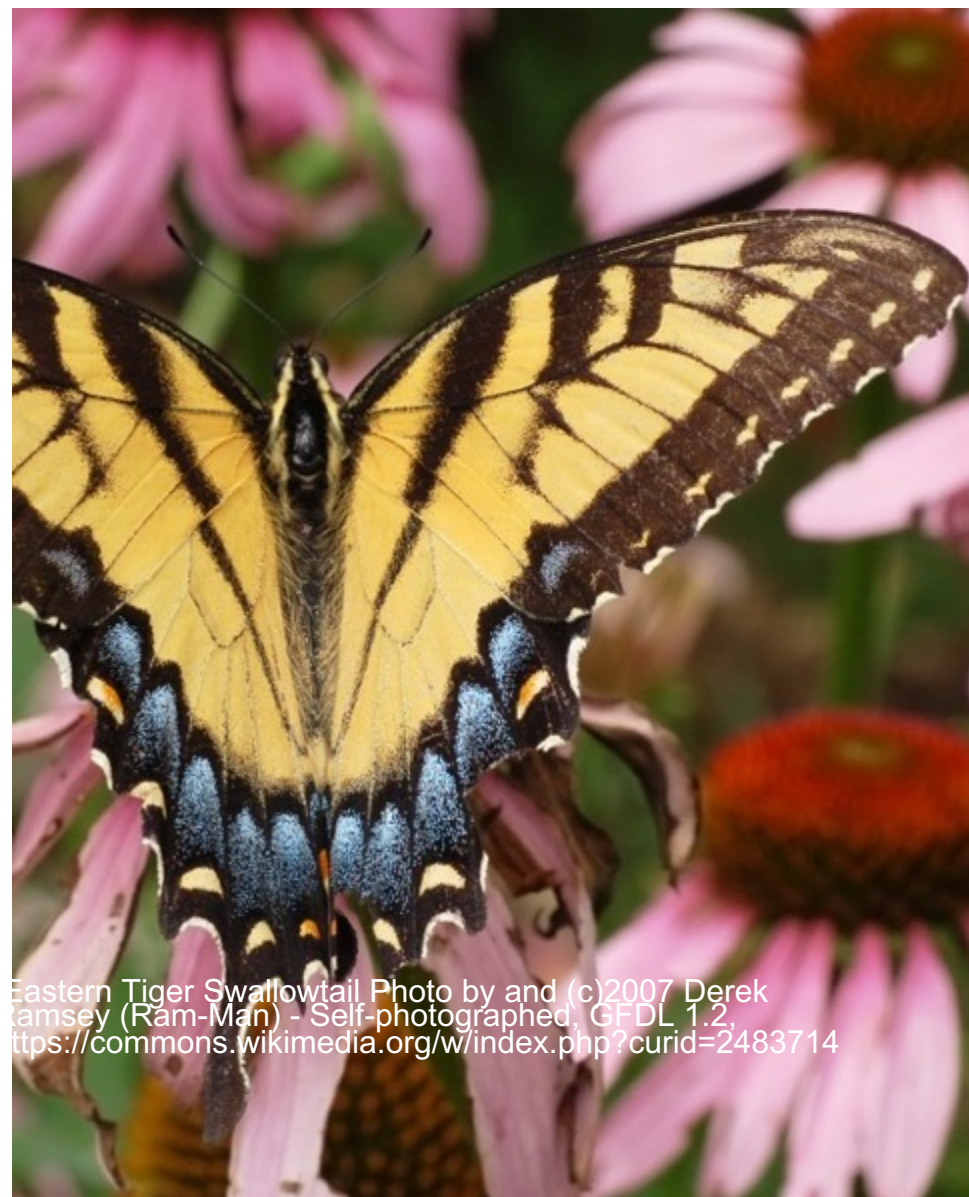
Whorled Milkweed
Asclepias verticillata



Rose Milkweed
Asclepias incarnata







Eastern Tiger Swallowtail Photo by and (c)2007 Derek Ramsey (Ram-Man) - Self-photographed, GFDL 1.2, <https://commons.wikimedia.org/w/index.php?curid=2483714>



HOST PLANTS

Spicebush Swallowtail

~

**spicebush and
sassafras**

=====

Eastern Swallowtail

~

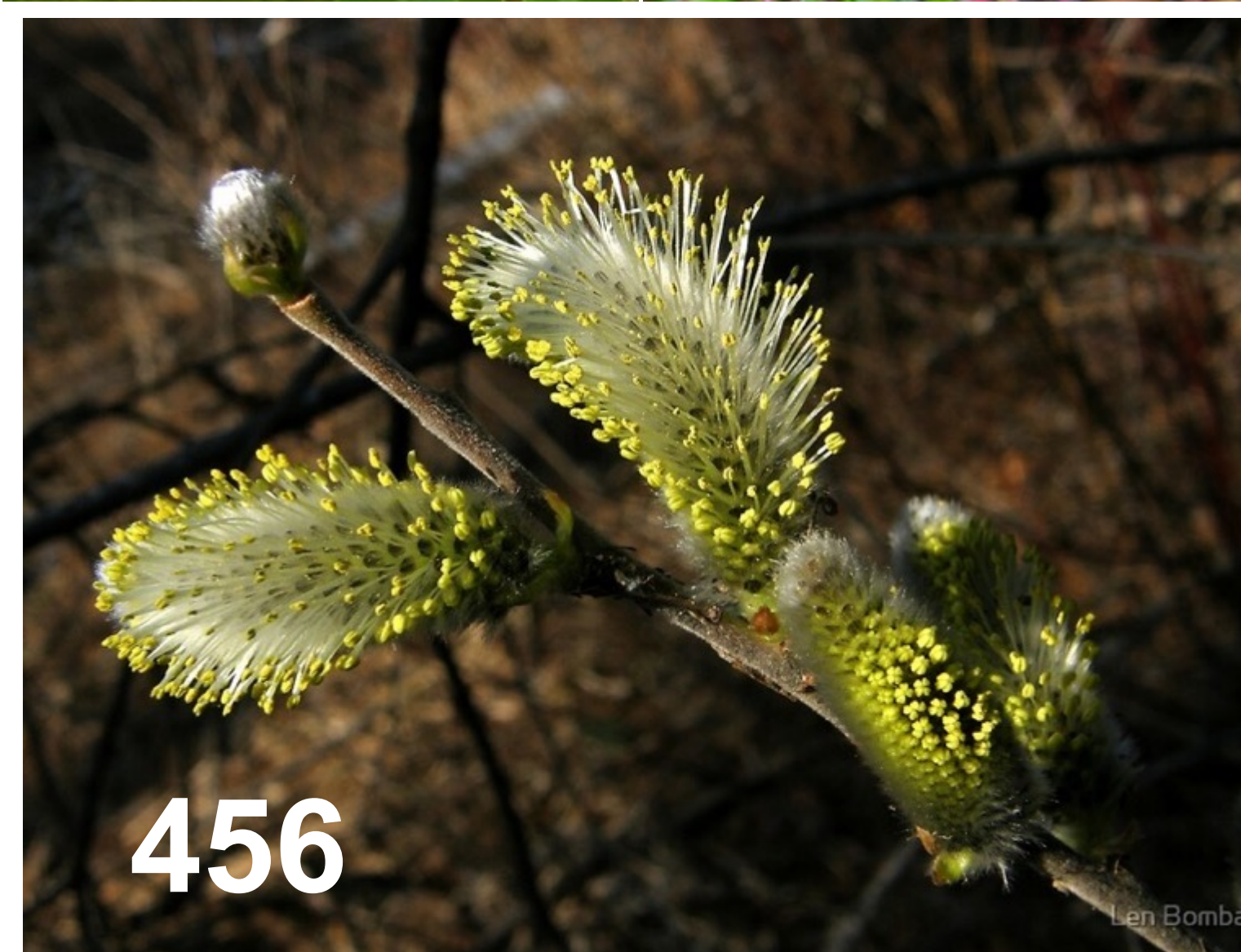
**wild black cherry,
birches, and tulip tree**



456



256



456

Len Bomba



534

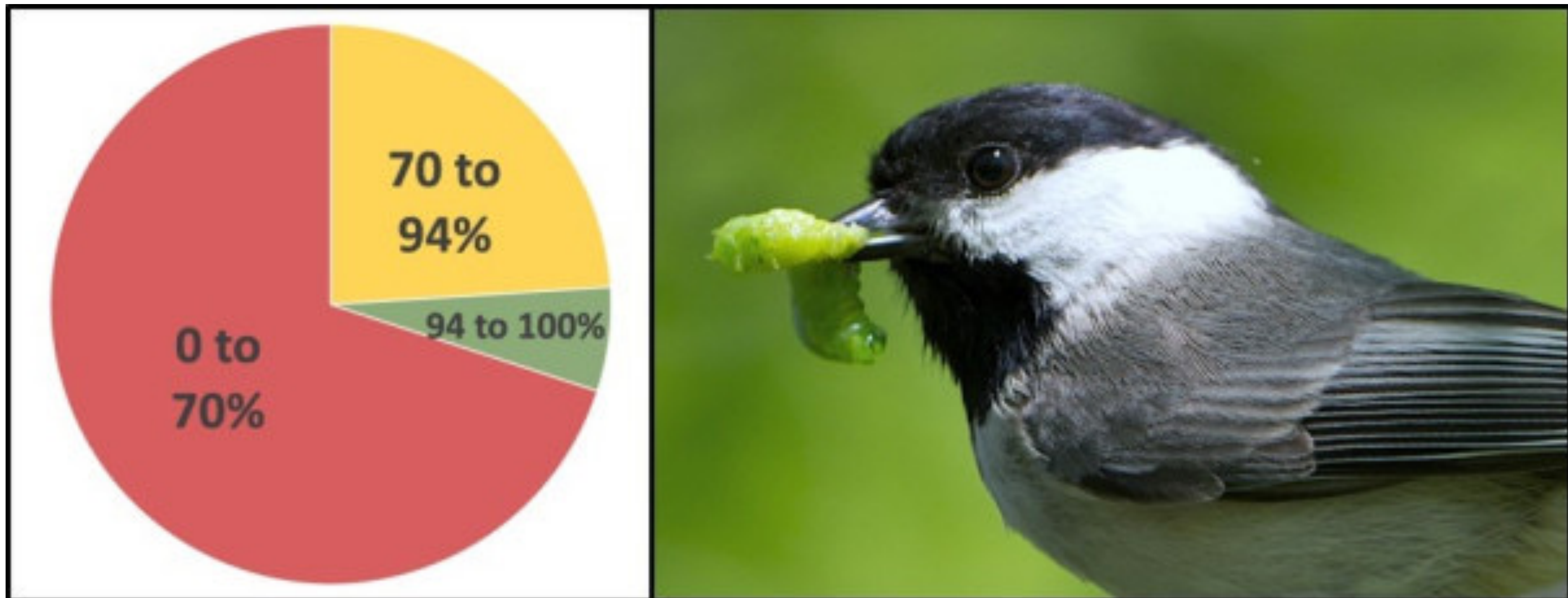




Typically, traditional suburban landscapes are mostly treated turf lawn and non-native species.

What happens when you don't have host plants for caterpillars?

A study on chickadees in a suburban Maryland neighborhood found the survival rate of baby chickadees severely declined in landscapes with less than 70% Native Plants. (*Narango, et al. 2018*)



Avoid use of fertilizers and pesticides.
This includes fungicides, herbicides, and insecticides.



Leave the leaves, leave the seeds, leave the stems..



Shrink lawn area to what you need.



More plants, less lawn – think “throw rug” instead of “wall-to-wall carpeting.”

Low green alternatives: wild strawberry, bearberry, Pennsylvania sedge

Make it a Cape Cod lawn. It's a thing!

clover, moss, violets without no irrigation, no fertilizers or pesticides.

Incorporate more native plant species.



Goldenrods

Not the cause of hay fever

Over 24 native species of goldenrod in
New England

Support 110 species of caterpillars

Necessary for the life cycle of about a
dozen wild bee species in the mid-
Atlantic and Northeast

Monarch butterflies depend on the
nectar for their trip back to Mexico





Asters

Diverse!

Calico aster

Blue Wood aster

Large-leaved aster

New England aster

White Wood aster

Tall White aster

Smooth Blue aster

Flax-leaved Stiff aster

**Goldenrods and Asters
have the greatest value
for the most species of
insects.**

Kristin Andres
kandres@apcc.org



Questions





CRAIGVILLE - “ZERO BY 2050”

Why & How

Sam Carpenter





IN 2018, THE CCMA MADE THE FOLLOWING PLEDGE

In recognition of its Mission to ensure the continued beauty of our beloved Village for future generations, the CCMA acknowledges it must meet the needs of the present without compromising the ability of future generations to enjoy the splendor of Craigville and must reinforce the ongoing noble works of the Red Lily Pond Project.

Accordingly, it is moved that the CCMA will use its best efforts to become a “Net Zero Community” by the year 2050. In doing so, the CCMA will reduce its impacts across the key resources of energy, water and waste, using approaches that are economically viable, socially beneficial and environmentally responsible.

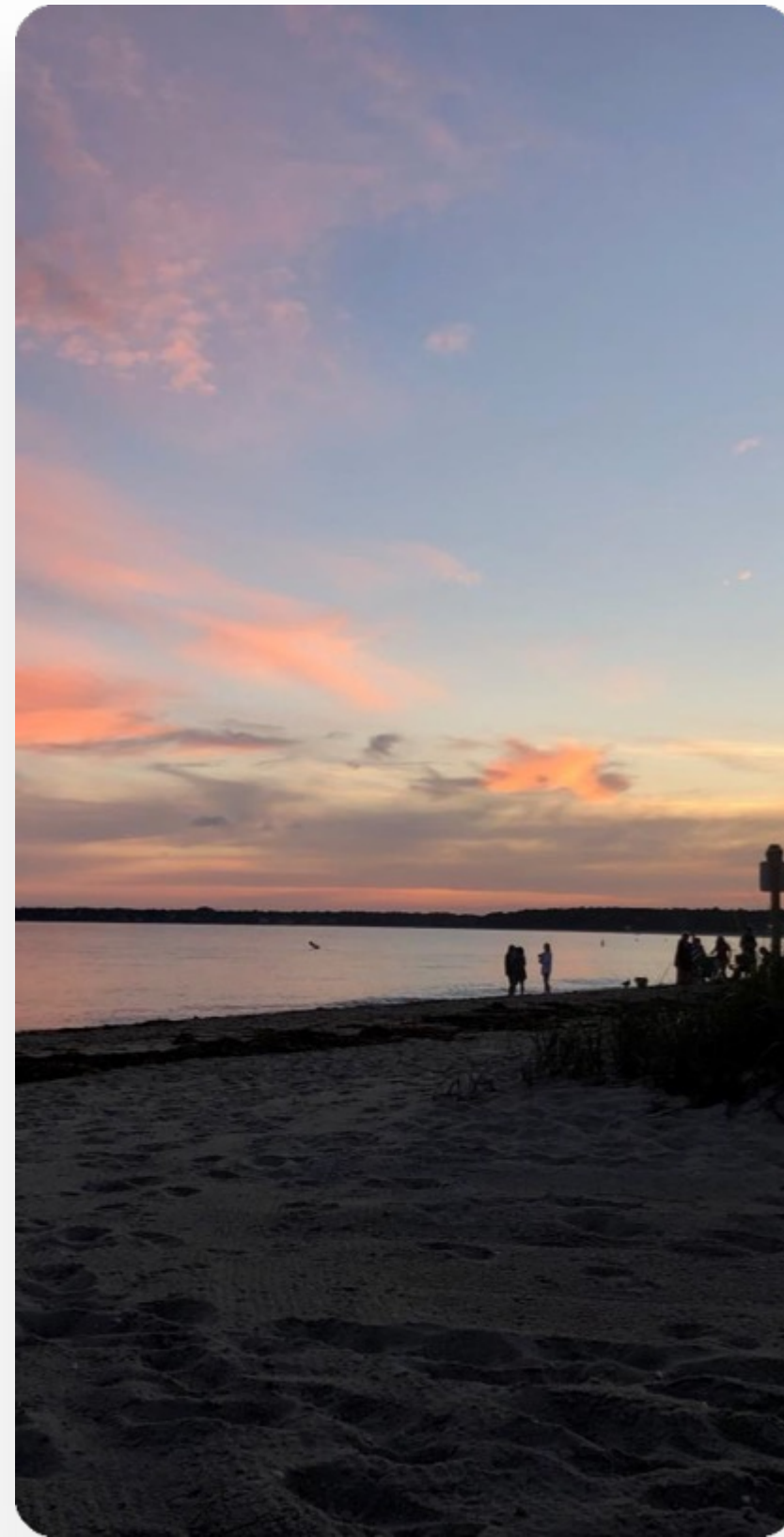


SO WHAT IS “NET ZERO”?

The CCMA defined “Net Zero” as:

- Net-Zero energy means cutting the community’s greenhouse gas emissions to zero by reducing energy consumption through efficiency & conservation measures and by producing and/or buying enough clean energy to meet all remaining needs.
- Net-Zero water means continuing to support the efforts of the Red Lily Pond Project and working to preserve and protect the quality and availability of water needed to sustain the livability and beauty of the community.
- Net-Zero waste means reducing waste to a minimum, reusing and/or composting what we can, recycling the rest, and sending zero waste to landfill.





REASONS WHY WE SHOULD CARE ABOUT CLIMATE CHANGE*

- Snow Leopards, Turtles, Polar Bears
- Coffee
- Coral Reefs
- Clean Water
- Flooding
- Rainforests
- Clean Air
- Clean tech is really cool



BILLIONS MORE REASONS WHY WE SHOULD CARE ABOUT CLIMATE CHANGE*

- Climate change effects every person on earth
- Climate change is dramatically changing the the world we will hand over to future generations.

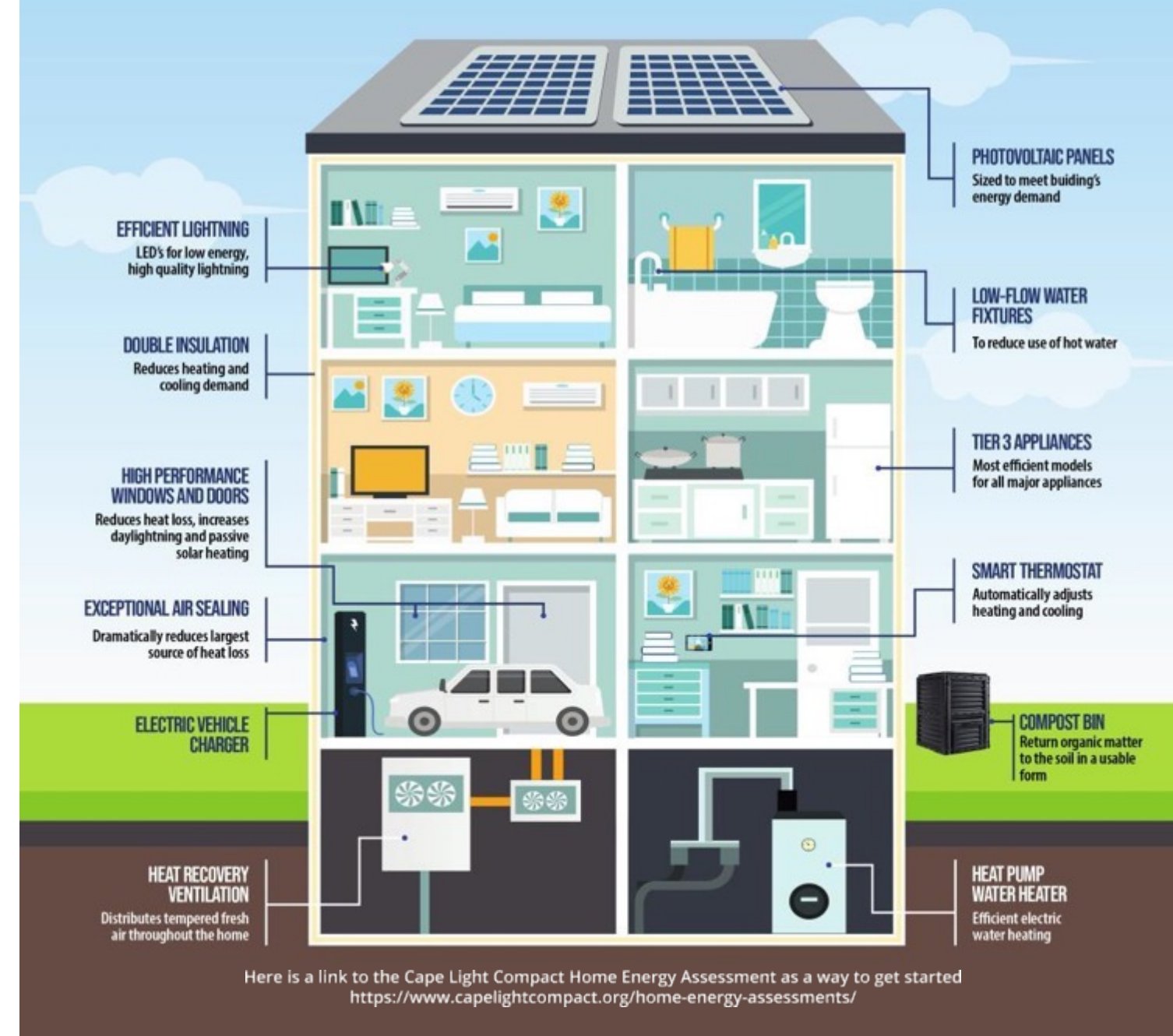
*10 reasons why climate change is important.
WWF. (n.d.). <https://www.wwf.org.uk/updates/10-reasons-why-climate-change-important>

WHAT CAN WE DO?

STEPS TO THE NET ZERO IN CRAIGVILLE VILLAGE



Craigville Village has established a goal of Net Zero by the year 2050. As you consider ways to help balance the energy needed by your home with ways to generate renewable energy, below are a few improvements to keep in mind.



WHAT CAN WE DO? (ENERGY)



- Do a Mass Save Energy Audit from
 - Home Works Energy: +1 781 305-3319 or
 - Cape Light Compact: +1 800 797-6699
- Install LED lighting and programable thermostats- Weather seal windows and doors- Upgrade insulation
- Upgrade appliances as needed with Energy Star appliances.
- Upgrade mechanical systems needing replacement with state-of-the-art air sourced (or, if possible, geothermal) electric heat pumps. They may be a bit more expensive up-front, but in the long term they are more cost effective.
- Consider installing rooftop solar (if you have a south-facing, unshaded roof that has at least 25 years of life left). Many “PPA”s require little or no upfront cost from the homeowner Doug Farquhar to speak further on this topic” .



WHAT CAN WE DO? (WATER)

Install low flow showerheads (and, if renovating, low flow toilets).

01

Reduce irrigation system and/or watering your lawn to 2 days/week

02

Reduce or eliminate fertilizers used on lawn & garden (run off, even if the fertilizer is “organic”, can adversely affect our local water systems)

03

Eliminate pesticides, herbicides, insecticides, etc. used on lawn & garden (again, run off will adversely affect our local water systems)

04

Be prepared for sea level rise – consider raising homes (or, at least, raising mechanical systems) if renovating.

05

WHAT CAN WE DO? (WASTE)



Reduce:

- Recycle in bins, not bags
- Do you need a plastic straw?
- Is your newspaper on-line?

Reuse:

- Reusable grocery bags
- Reusable water bottle
- Reusable coffee mug
- If you do have a paper bag, it makes a good holder to recycle junk mail or deposit cans.

Recycle:

- It takes some organization, but, if it is recyclable, the Barnstable Transfer Station likely takes it.

Compost:

- There are several great composting services that service Centerville and the Barnstable Transfer Station takes food waste



Questions





Solar Panels

Doug Farquhar

A discussion about the benefits from, the concerns about, and the process to install residential solar electricity-generating panels





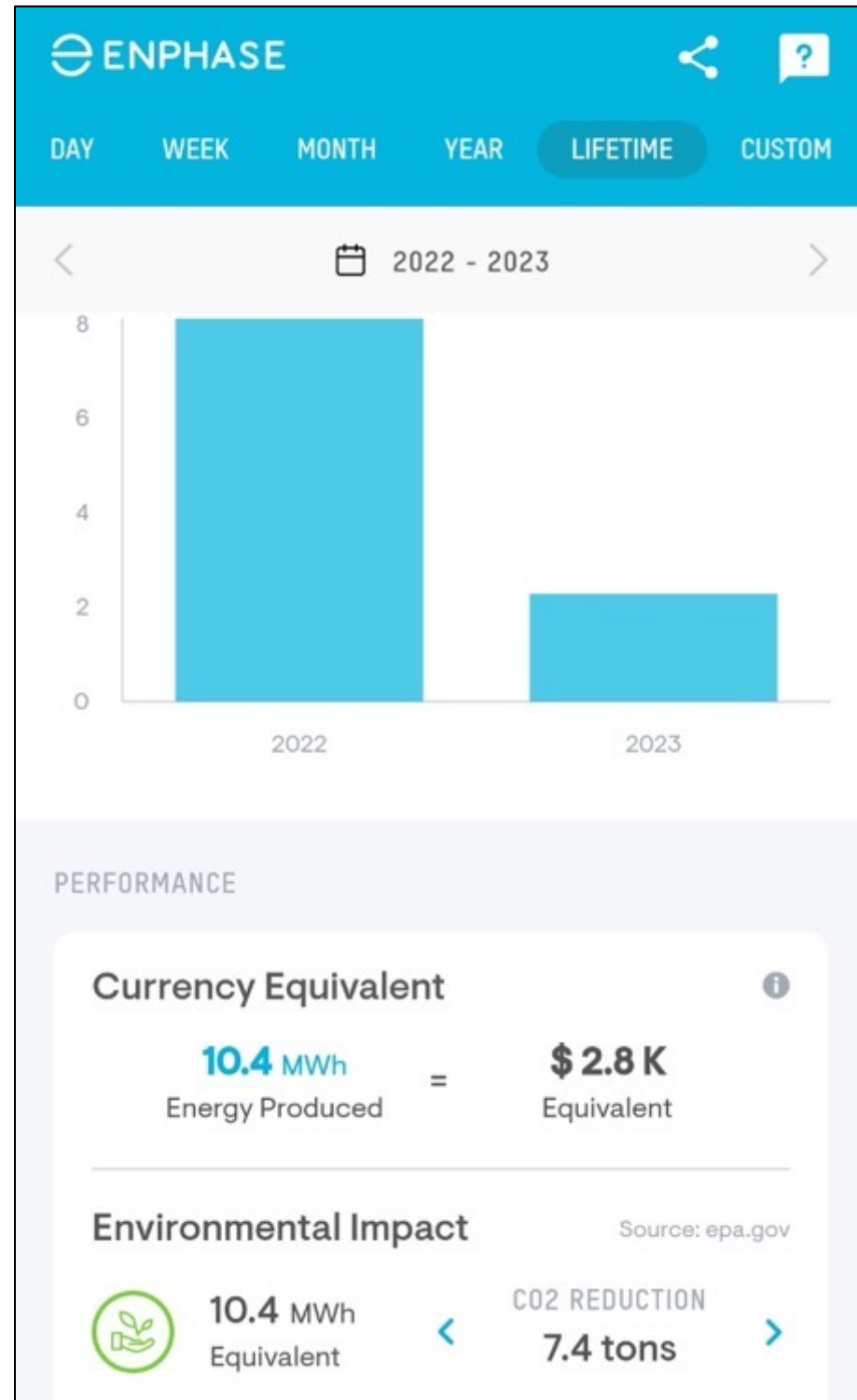
How much was your electric bill for June?



Ours was **-\$360**



Yes, that is minus **\$360**



Reasons for

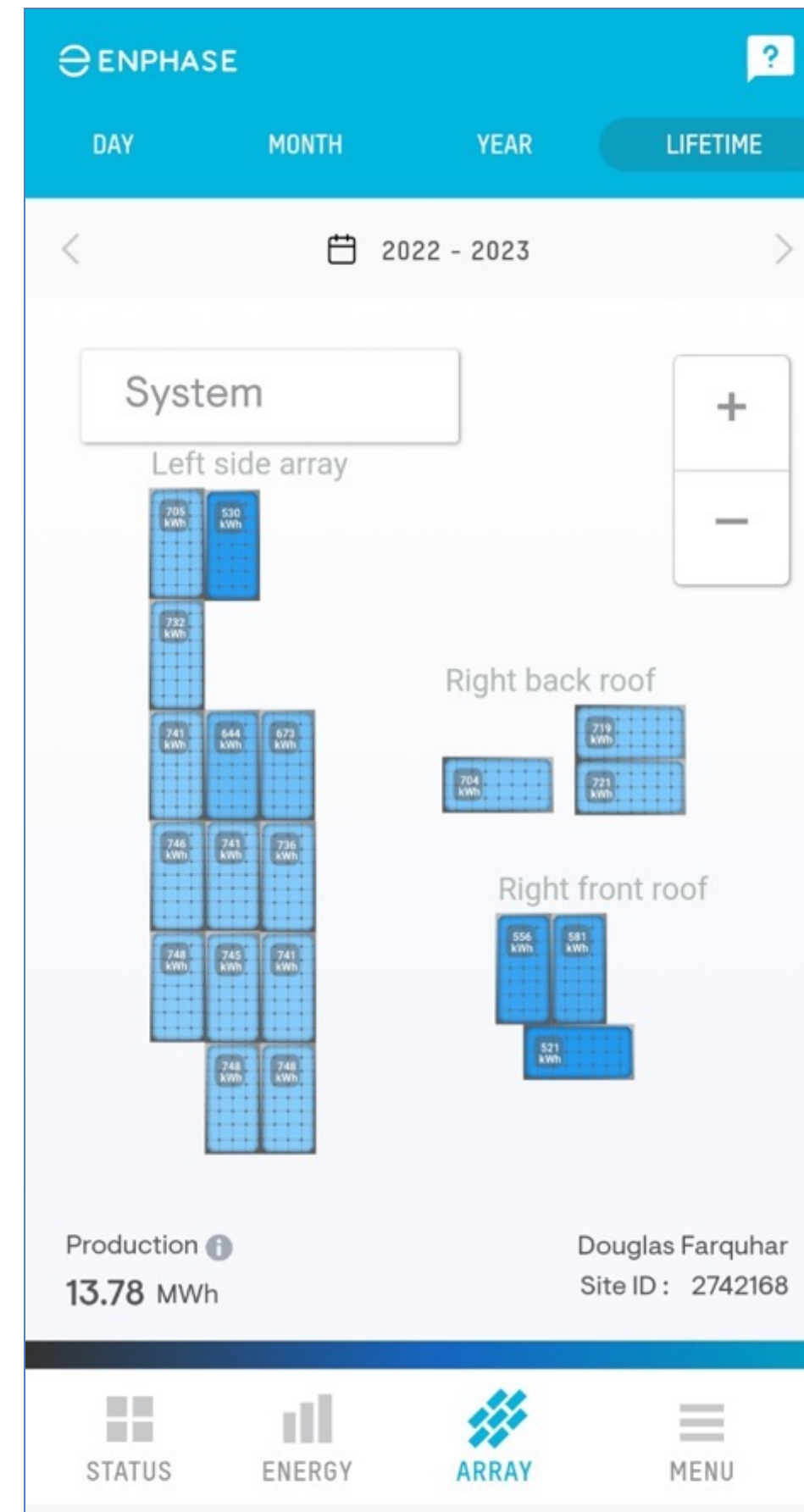
- Reduces need for coal, gas, or nuclear-generated power.
- The cost of electricity is going up rapidly.
- We estimated about a 7 to 8 year payback of the upfront costs when we signed our contract, based on then-current electricity rates. We are happy to pay only the service fee of about \$11 a month for all the electricity we will need for at least the next 20 years.

Summary of electricity produced in about 12 months, calculated with kWh value of \$.35



Reasons for

- Roofs need not be south-facing.
- The panels on all our roof surfaces have generated nearly the same amount of energy for the 15 months since the installation.
- The panels will withstand winds up to 120 mph.
- For us, we will both be retiring soon. The after-tax investment of about \$20k means that we won't be paying any electric bills while drawing on retirement accounts.



Range of power generated per panel in 15 months: 521-748 kWh.

Outliers were one panel shaded by chimney and Widow's Walk, and the three northeast-facing panels on the "right front roof"



Our experience

EVERSOURCE Account Number: 1476 317 0025 Statement Date: 06/21/23 Service Provided To: DOUGLAS FARQUHAR	No Payment Due	
	Amount Due On 06/16/23	-\$652.88
	Last Payment Received	\$0.00
	Balance Forward	-\$652.88
Total Current Charges	-\$360.21	

- Most recent Eversource bill shows experience over the past 12 months (left) and electricity that Eversource paid us to generate (below).

Svc Addr: 109 LAKE-ELIZABETH DR CENTERVIL MA 02632 Rate 32 R1 RESIDENTIAL Cycle 13 Service from 05/17/23 - 06/16/23 30 Days Next read date on or about: Jul 19, 2023						
Meter Number	Current Read	Previous Read	Current Usage	Reading Type		
7652989	96089	97076	-987	Actual		
Monthly kWh Use						
Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	179	0	0	0	105
Jan	Feb	Mar	Apr	May	Jun	
547	238	110	0	0	0	

Other Charges or Credits		
NET MTR CRDT	-987 KWH X 0.37624	-\$371.35
<hr/>		
Subtotal Other Charges or Credits		<hr/> -\$371.35 <hr/>



Reasons against

1. **Would it destroy the look of our beautiful old home?**

We were very nervous that the sight of the panels would ruin the looks of our home, which was built somewhere around 1880. However, thoughtful panel placement matched most of the roof line.

2. **They are so expensive!** The upfront cost of the installation was about \$29,000, not including a \$15,000 storage battery that could power our home in the event of a power outage. We get a federal income tax credit that reduces the price, but the installation was still expensive.

3. **Trees may have to be cut down.**



Process

- Scan your last electric bill showing consumption for a year
- Contact solar panel installation company and provide street address
- Solar company, using Google Earth, generates a crude solar panel installation design and generates a rough estimate of cost and financial returns
- If you are interested, solar company will come to site and double check measurements, ability of roof to support panels, orientation of roofs, slope of roofs, where electric lines will run, and impact of any shade trees
- Solar company generates final contract
- Minimal deposit required
- Solar company secures permits
- Installation occurs several months after contract is signed
- Eversource installs double meter, which shows consumption and energy generated.
- You turn the system on.



Meanwhile, in other parts of the village ...

“The picture of my house shows 10 of 20 panels. They were installed in 2015. Since then, I have never paid for electricity. In addition, I receive checks for the sale of energy on the stock market referred to as “SRECs”. I also added air conditioning thru the use of mini splits that can heat a room as well. I am very pleased with the solar panels. I did need to remove them when the house was re-roofed.”



Dianne Carpenter

Questions





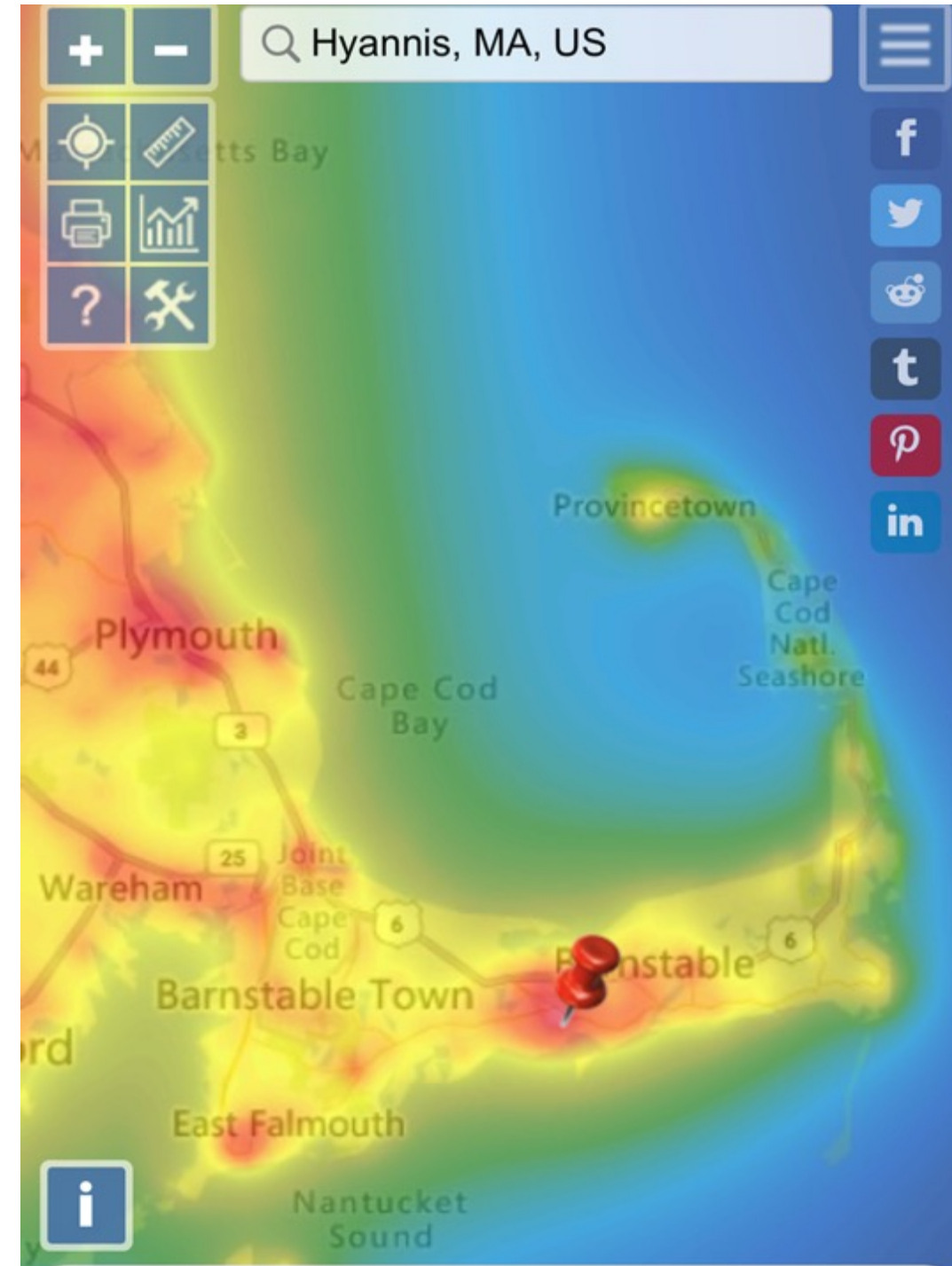
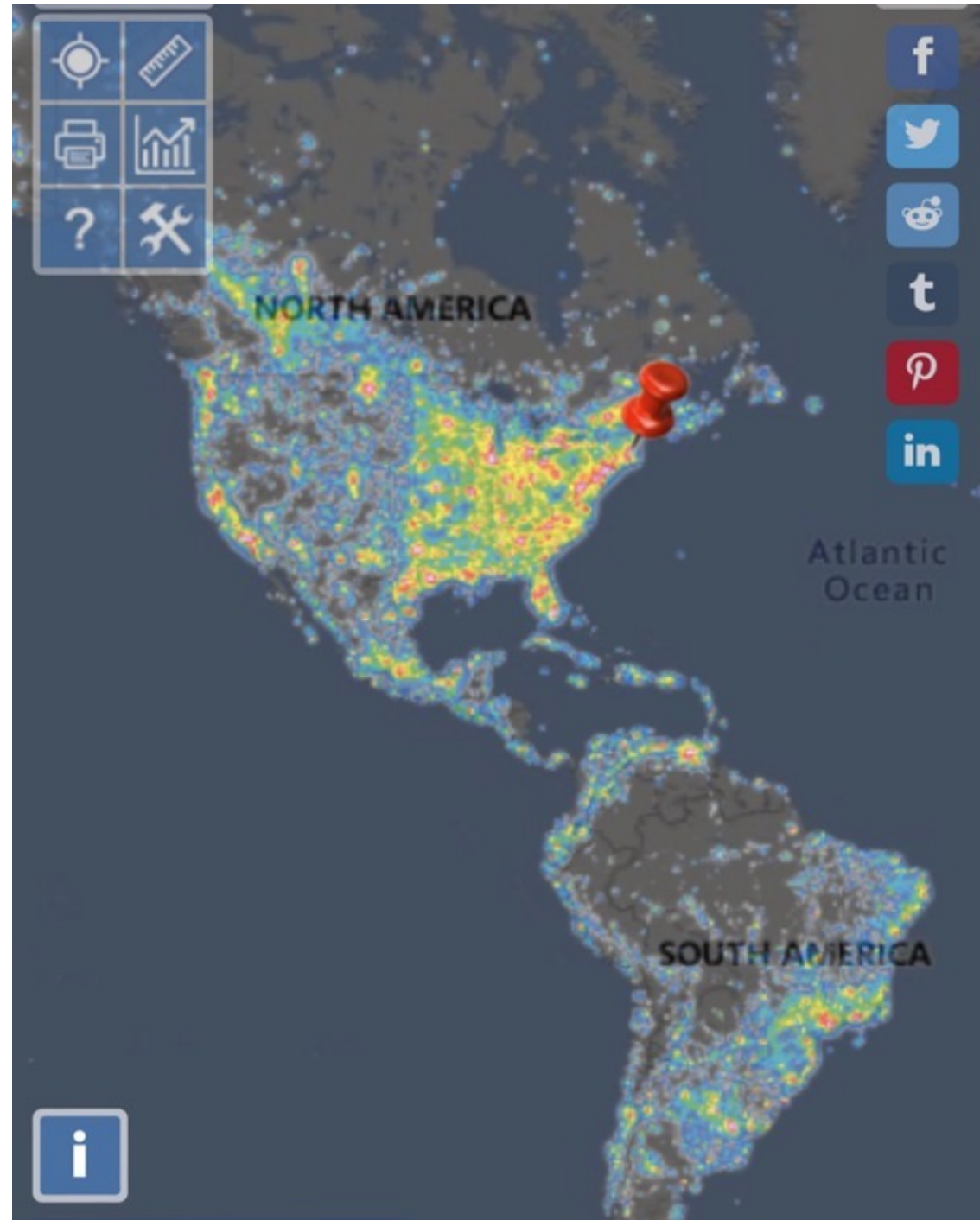
Light Pollution / Fireflies

Skye Gibson



Let there be light?

LEDs:
Energy efficient, cost saving, and bright – but so bright they are dimming our night skies. Over the past decade, the night sky has become nearly 10 percent brighter each year because of artificial lights, mainly LEDs emitting too much glare. Streetlights, illuminated billboards, stadium lights, and home and business buildings are all sources. But LED lights are a form of pollution we can manage.



People often choose a light that is brighter than it needs to be. We typically think of light bulbs based on wattage, or how much energy the bulb consumes, but our focus needs to change with LEDs. LEDs use fewer watts than traditional incandescent light bulbs and people should choose a light based on lumens, often marked as brightness. A lower-wattage LED still has the same level of brightness as an incandescent light bulb.

A third of the population can't see the Milky Way at night

A new atlas reveals where light pollution obscures the night sky



NIGHT LIGHTS More than a third of Earth's population can no longer see the Milky Way at night, a new atlas of light pollution shows. Chad, Central African Republic and Somalia boast the most pristine skies, while Kuwait, Qatar and Saudi Arabia are among those countries with the worst light pollution.

Light on land but also light on sea.

Even the sea has light pollution. These new maps show its extent

Lights from coastal and offshore development may impact marine organisms far below the surface



Offshore oil and gas rigs and wind farms in the North Sea shine brightly on the water, as does the glow of coastal cities in, for example, the United Kingdom (landmass at left) and Norway (upper right). In April, the region's waters are clear enough that the artificial light can penetrate from 1 meter (dark blue) to 30 meters (yellow) deep.

JOSHUA STEVENS, T.J. SMYTH *ET AL*/ELEMENTA: SCIENCE OF THE ANTHROPOCENE 2021

Humans' nighttime light has the most impact in the top meter of the water, the team found. Here, artificial light is intense enough to cause a biological response across nearly 2 million square kilometers of ocean, an area roughly that of Mexico. Twenty meters down, the total affected area shrinks by more than half to 840,000 square kilometers.

But aside from the lumens, not all LED lights are the same. Common types of LED lights contain higher proportions of bluer wavelengths. Blue light travels at shorter wavelengths and higher frequencies, making air particles to oscillate faster and scatter in the atmosphere more than other colors. The blue is redirected in several different directions across the sky. That's also why our sky appears blue.

When you go to the store, you may see some LED lights labeled 4,000 Kelvin, 3,000 Kelvin or even 2,000 Kelvin. These are temperature indicators that correlate with the light's appearance of warmth (yellow) or coolness (blue).

On average, LED lights at 4,000 Kelvin are about 29 percent blue. Lights at 3,000 Kelvin are about 21 percent. LED lights at lower temperatures, preferably at 2700 Kelvin or lower, emit less blue light and should be used. Warmer hues also scatter less in the atmosphere than cool blue light. Warmer color LEDs, yellow or amber, are better for our eyes, too.



Aside the bulb we choose, we can limit our light pollution by simply turning out lights, inside or out, that we aren't using. For lights outside your home or in public spaces, use motion detectors, timers and dimmers to reduce the hours of unnecessary light while saving more energy. With outside lights, direct the light downward, and avoid uncovered or exposed lights that emit light upward and horizontally. The angle and height of the light can also affect the spread of the beam. Hooded streetlamps help contain the direction of the lights away from the environment. But even beaming LED light down does not eliminate it. Bright light with a lot of blue can bounce off the ground and scatter into the night sky, still contributing to light pollution. Again, it's better to use LEDs at warmer temperatures, with low lumens.



How Can I Make My Lights Firefly Friendly?

There are many ways to make your lighting less disruptive to nearby fireflies.

Best Method

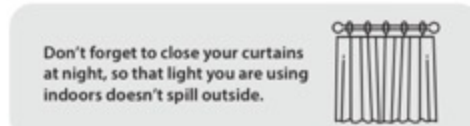
Turn out lights you aren't using! This can be done in many ways:

1. Remove lights that only serve a cosmetic purpose, such as tree lights and facade lighting.
2. Turn off as many other outdoor lights as you can—darkness is best for fireflies.
3. Install motion activators that turn off your lights when no one is around.
4. Install timers that turn off your lights when you are not likely to be around (such as after you normally go to bed) and when fireflies are active, which is dusk through dawn in summer months.

Good Method

If you need to have lights on, consider these ways of minimizing their impact:

1. Dim your lights to the lowest acceptable intensity with dimmer switches or filters.
2. Filter your lights with red gel filters to minimize their visibility to fireflies and other insects. These filters are often available at major general retailers or specialty lighting or camera stores.
3. Install shielding around your lights to keep light from escaping up into the sky (which worsens light pollution) and direct light away from grass, shrubs, or trees and toward intended areas like walkways.



Learn More

For more recommendations on how to help fireflies, check out our conservation guidelines *Conserving the Jewels of the Night*, available online: <https://xerces.org/publications/guidelines/conserving-jewels-of-night>.

To learn more about artificial light at night, visit the International Dark-Sky Association (IDA) at www.darksky.org.

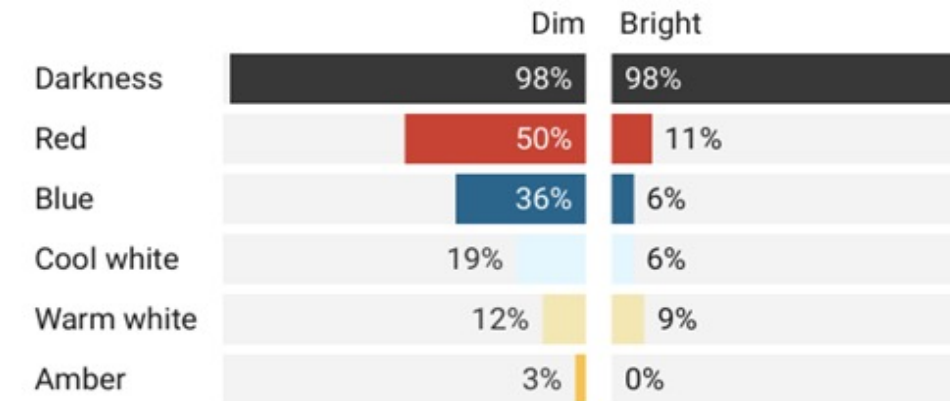


Aside from the visual impacts and health impacts from light pollution, night light destroys species. Fireflies, our childhood flickers of summer, are dying from light.



Light brightness and color affect how often fireflies flash

In a laboratory study, female fireflies were most active in the dark, responding to 98% of the courtship flashes from nearby males. They also responded more often under dim light than under bright light, regardless of what color the light was. Red and blue light, which fireflies don't see very well, had less impact on their courtship behavior than did white or amber light.



Average female response rate (%).

Chart: The Conversation, CC BY-ND • Source: [Owens and Lewis, 2021](#) • [Get the data](#)

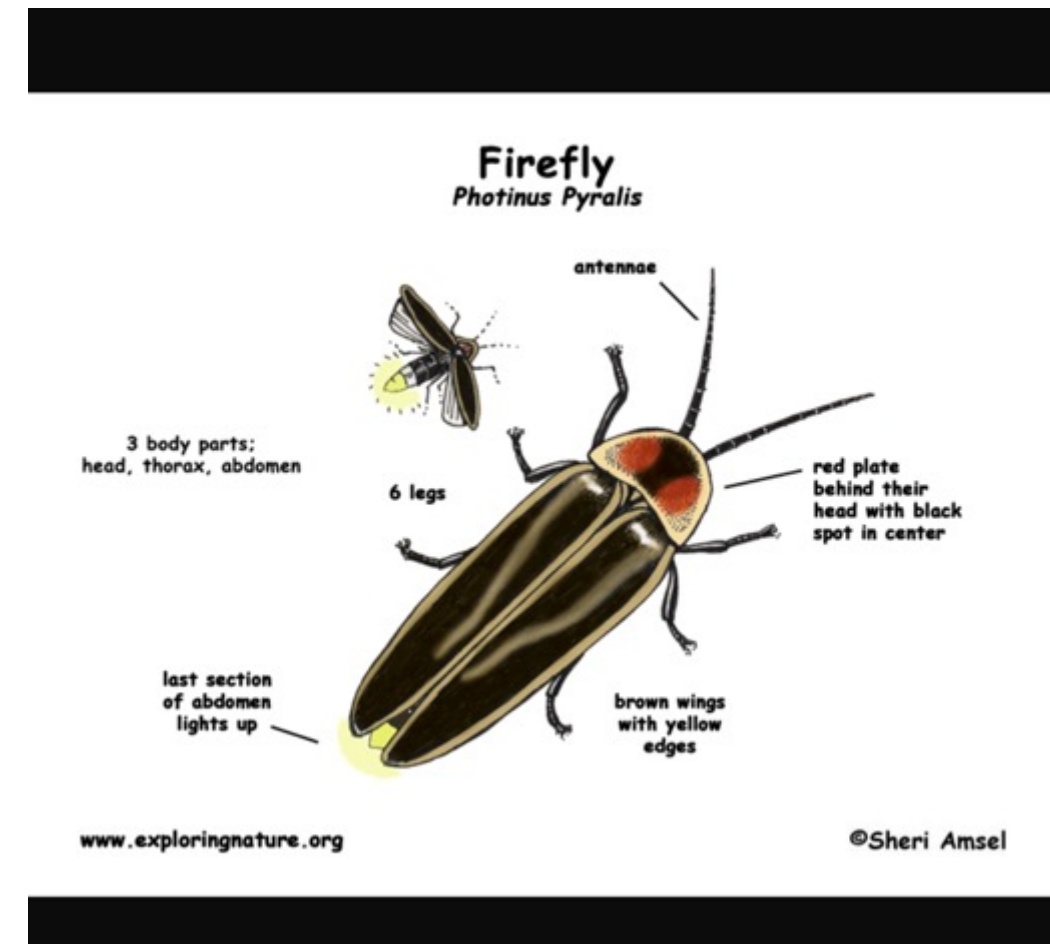
It may be that female fireflies are quite literally blinded by the light shining down into their eyes. Or even if they do manage to pick out a male flash pattern here and there, they might not think it worth a reply.

Previous research shows that female fireflies prefer bright flashes over dim ones, and background light can turn an otherwise bright flash into one that is dull and unimpressive.

theconversation.com

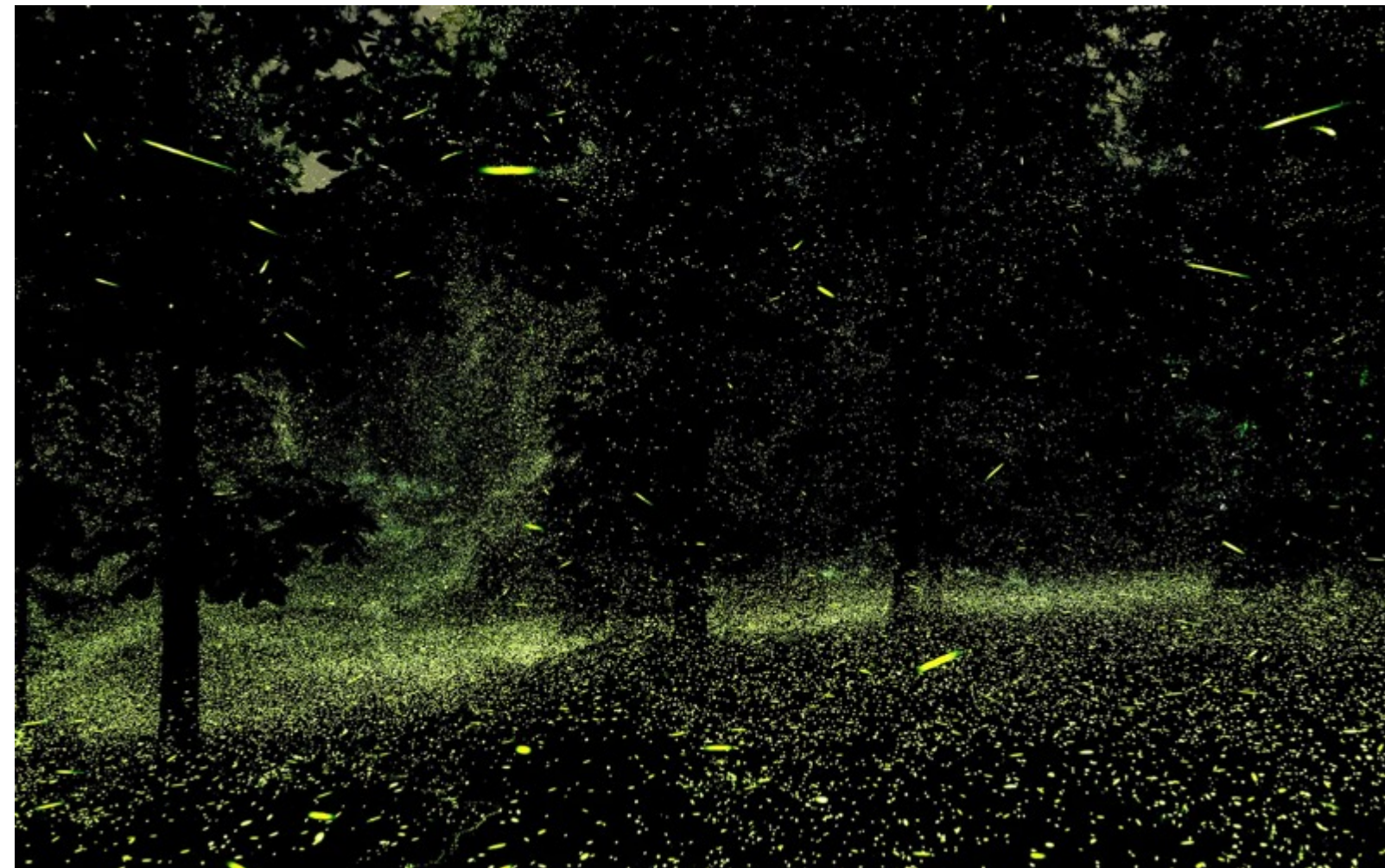


Nearly 1 in 3 firefly species in the United States and Canada are threatened with extinction, with further declines from the mangroves in Malaysia to the grasslands in England. Fireflies are technically a type of beetle, at risk from broad spectrum insecticides. Much of the swampy soil young fireflies need to thrive is increasingly being bulldozed for golf courses, suburban subdivisions and other types of development, making habitat loss a top threat.



To understand the threats to fireflies, start underground. US fireflies spend the most of their lives in their larval state, roaming the dirt to consume snails, worms and other soft-bodied grub several times their size. When the time is right in the spring, juvenile fireflies seek a spot to pupate. Much like how a caterpillar transforms into a butterfly, a young firefly rearranges its body to turn into an adult. Then they take flight and light up.

The adults live for only a few weeks and Fireflies flicker at each other to find their mates. Some start flashing at dusk. Others wait until midnight to turn on the lights. Some wink at each other with a double flash; others a triple. There are more than 2,000 species of fireflies globally, each doing a different dance.



Even in the best conditions, males drifting in the air struggle to find females on the ground. The artificial light we pour into the night is interrupting these bioluminescent courtships. Brightening the night not only makes it harder for fireflies to see each other, it can also trick them into thinking it is daytime, erasing their habitat.” Light gets rid of places where they can be. But if you literally turn off the light, that threat is gone. We protect them by protecting their habitat. On top of letting parts of our grass grow and leaving leaf litter to retain moisture, and reducing pesticides, we can minimize lights at night. Turn on outdoor lighting when you use or need it, use motion sensors and timers, and be mindful of what kind of light we shed and how, determined by our light fixtures.

Fireflies provide us with much more than twinkling and igniting summer memory. They are the insect canaries in the insect coalmine, whose disappearance signals our human deterioration of the delicate and critical balance in nature. Let that lightbulb go off.



Questions



Rain Barrel Raffle



Thank you to our presenters and
the Craigville community for attending this session!

