“Wireless” radiation: A biodiversity loss missing link?

Meg Sears PhD

Prevent Cancer Now

October 26, 2022

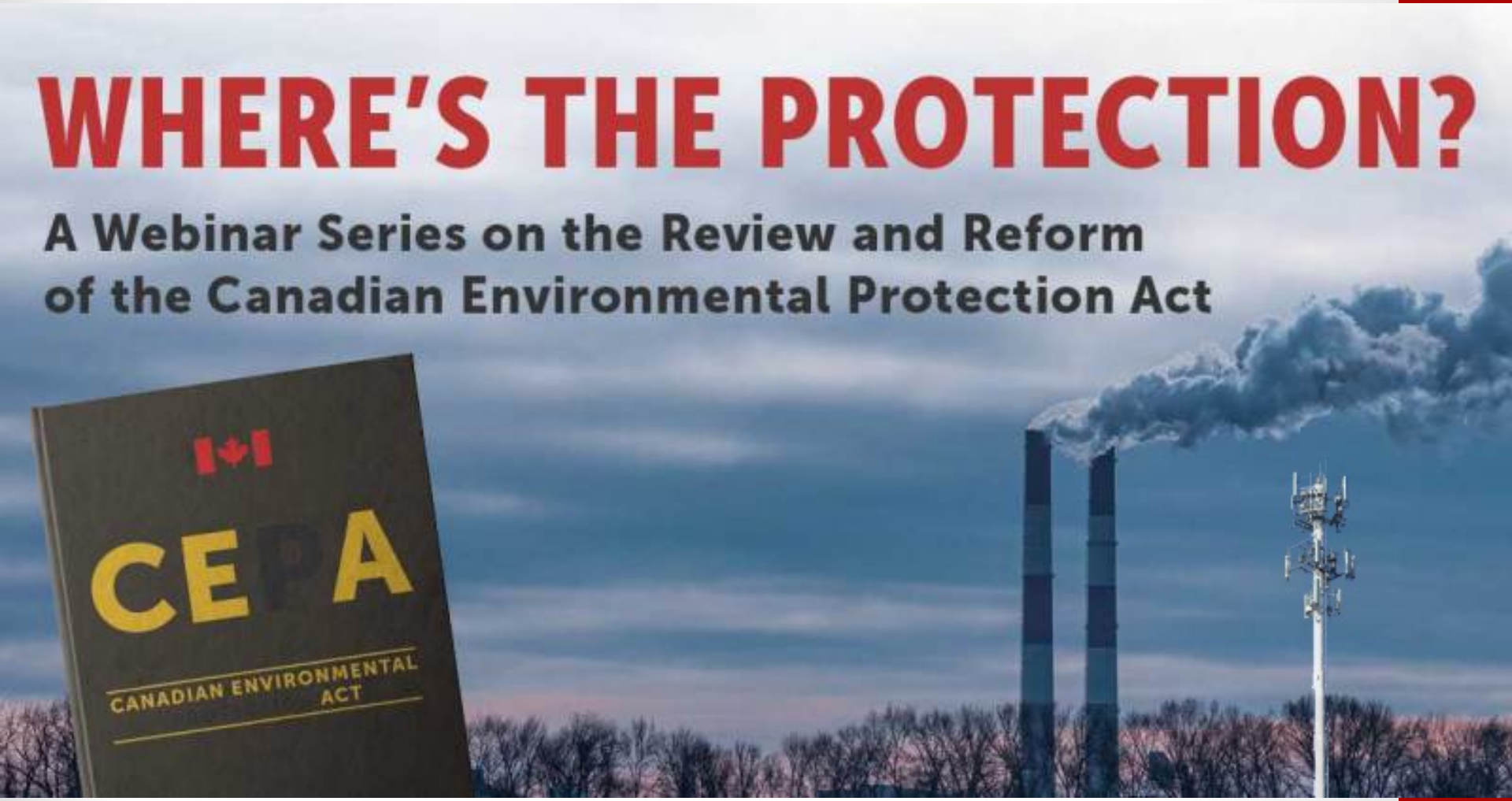
In webinar #4:

Where’s the Protection? A Series on the Review and Reform of the *Canadian Environmental Protection Act* sponsored by the Canadian Environmental Law Association and Nature Canada.



WHERE'S THE PROTECTION?

A Webinar Series on the Review and Reform of the Canadian Environmental Protection Act



Contested Carcinogenicity

Health Canada

Radiofrequency radiation **does not** cause cancer

International Agency for Research on Cancer

RFR **possibly does** cause cancer (IARC, 2011)

BUT, with intervening research RFR is now a **high priority to reassess**

Some independent doctors, epidemiologists and other scientists in Canada and internationally

Radiofrequency radiation **is** a human carcinogen

Miller et al.(Sept 2018) Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102).
http://www.sciencedirect.com/science/article/pii/S0013935118303475

2021 Review of environmental effects of radiofrequency radiation >1000 studies

Unique physiologies … Some species of flora and fauna are sensitive to exogenous EMF in ways that may surpass human reactivity.

B. Blake Levitt*, Henry C. Lai and Albert M. Manville II

Effects of non-ionizing electromagnetic fields on flora and fauna, part 1. Rising ambient EMF levels in the environment

https://doi.org/10.1515/reveh-2021-0026

B. Blake Levitt*, Henry C. Lai and Albert M. Manville II

Effects of non-ionizing electromagnetic fields on flora and fauna, Part 2 impacts: how species interact with natural and man-made EMF

https://doi.org/10.1515/reveh-2021-0050

Biological effects have been seen broadly across all taxa and frequencies at vanishingly low intensities comparable to today's ambient exposures.

B. Blake Levitt*, Henry C. Lai and Albert M. Manville II

Effects of non-ionizing electromagnetic fields on flora and fauna, Part 3. Exposure standards, public policy, laws, and future directions

https://doi.org/10.1515/reveh-2021-0083

Broad wildlife effects

Levitt *et al.*

- orientation and migration
- food finding
- reproduction
- mating
- nest and den building
- territorial maintenance and defense
- longevity and survivorship
- cyto- and geno-toxic effects

It is time to recognize ambient EMF as a novel form of pollution and develop rules at regulatory agencies that designate air as 'habitat' so EMF can be regulated like other pollutants.

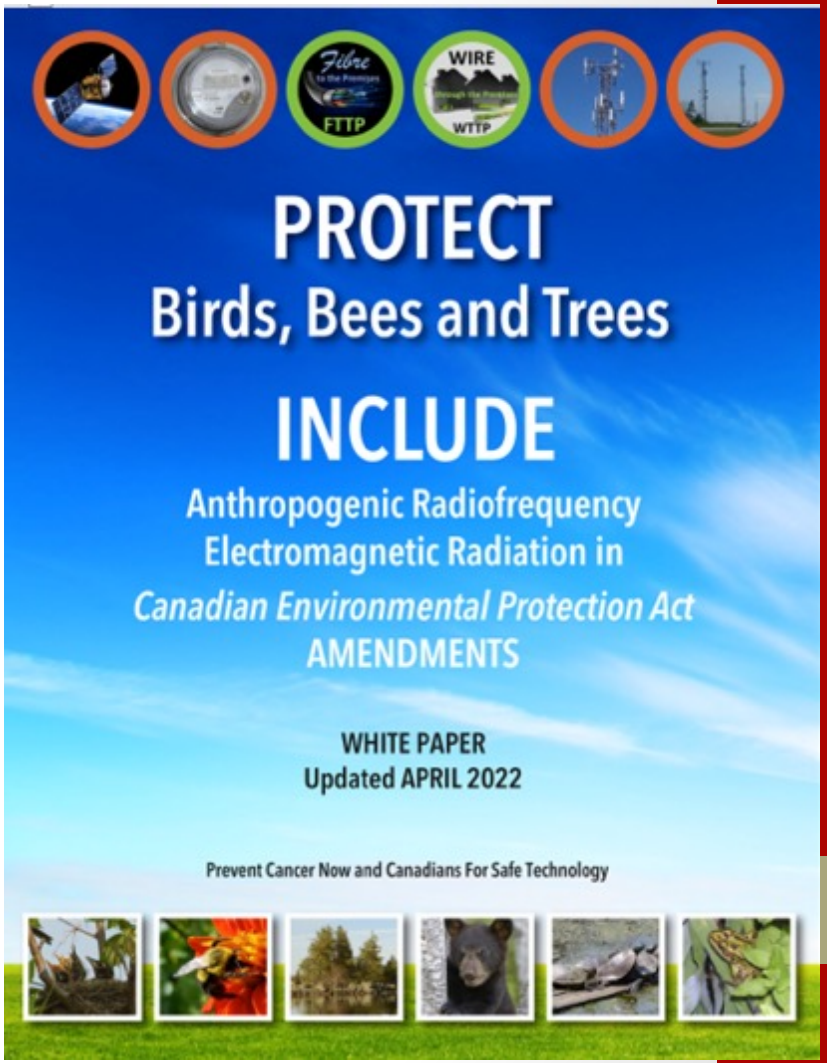
Wildlife loss is often unseen and undocumented

until tipping points are reached.

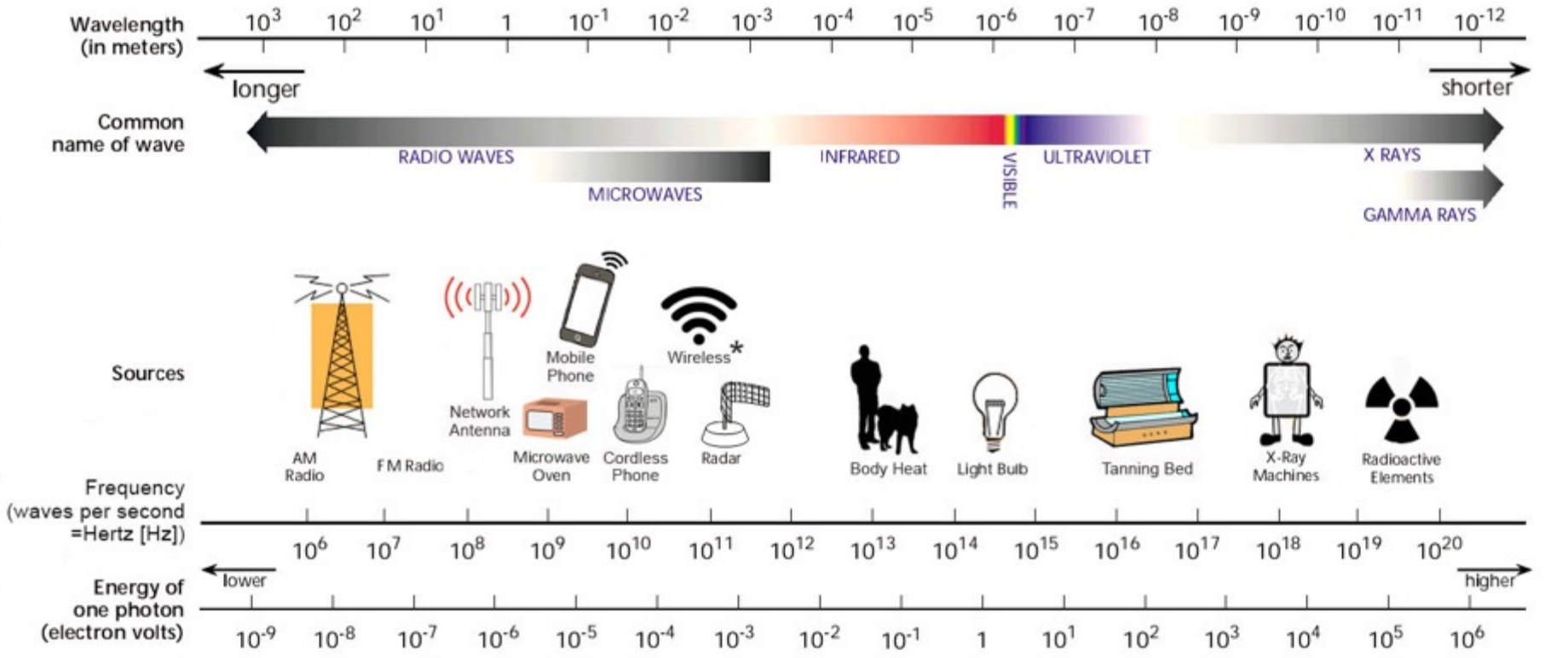
Amend CEPA to learn about radiofrequency electromagnetic radiation (RFR)

Protect fauna and flora, as well as human health, by amending the *Canadian Environmental Protection Act, 1999* to *prepare to* address current regulatory gaps.
Make anthropogenic radiofrequency electromagnetic radiation (RF-EMR or “wireless radiation”) subject to data collection and research (S. 44).

Let’s open our eyes!



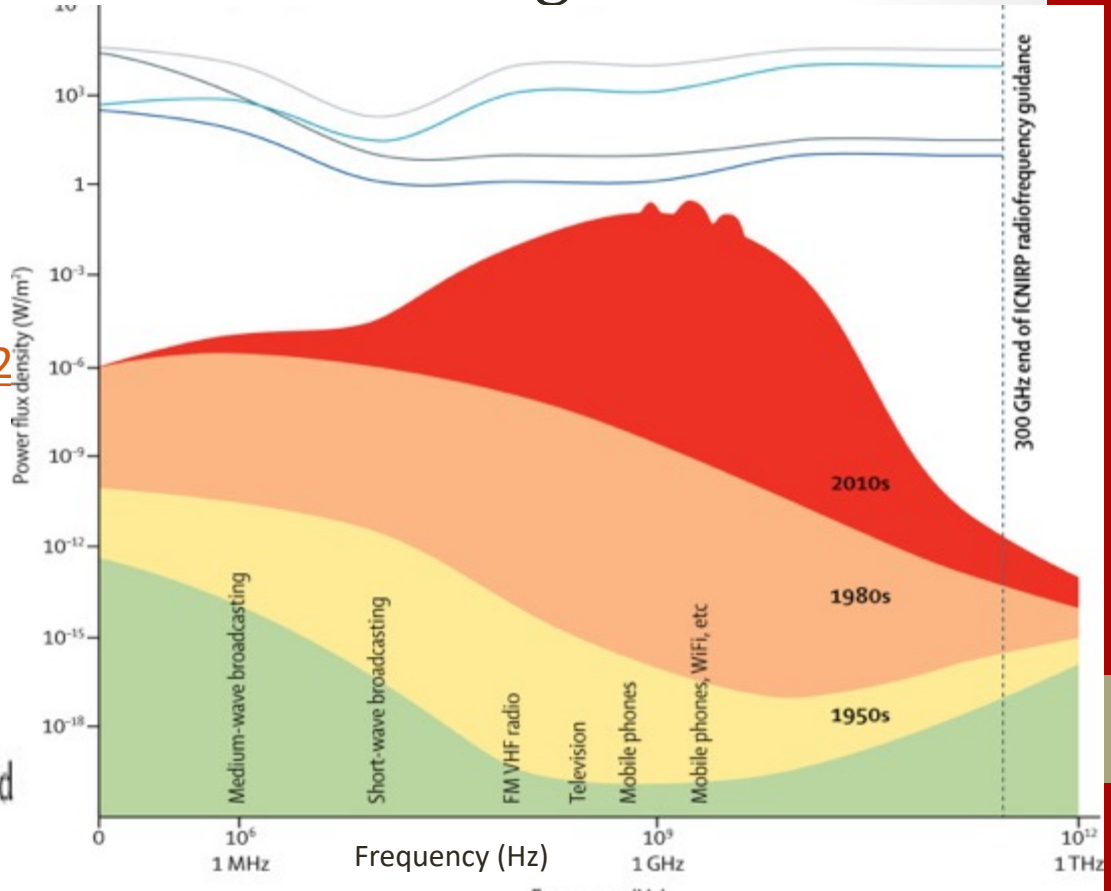
THE ELECTROMAGNETIC SPECTRUM

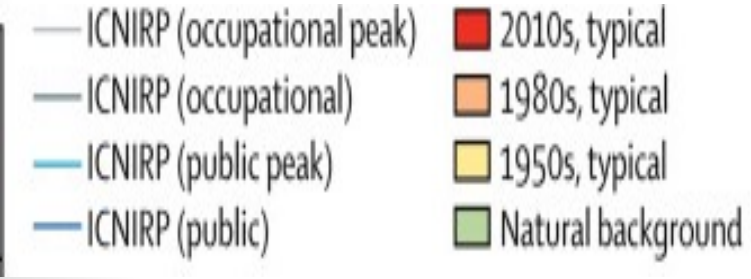


* Cellular and cordless phones; computers, laptops, tablets and peripheral equipment; antennae, Wi-Fi, access points and drones; monitors (e.g. security, medical, for babies); toys and entertainment systems; "smart" utility meters and appliances; control systems (e.g. indoor climate or lighting); "wearables"; power transfer/battery charging stations; and more.

Typical peak exposure to telecommunications radiation - quintillions of times above historical background- **2018**

Bandara & Carpenter (2018) **Planetary Electromagnetic Pollution: It Is Time to Assess Its Impact.** The Lancet Planetary Health https://doi.org/10.1016/S2542-5196(18)30221-3





Canada's Safety Code 6

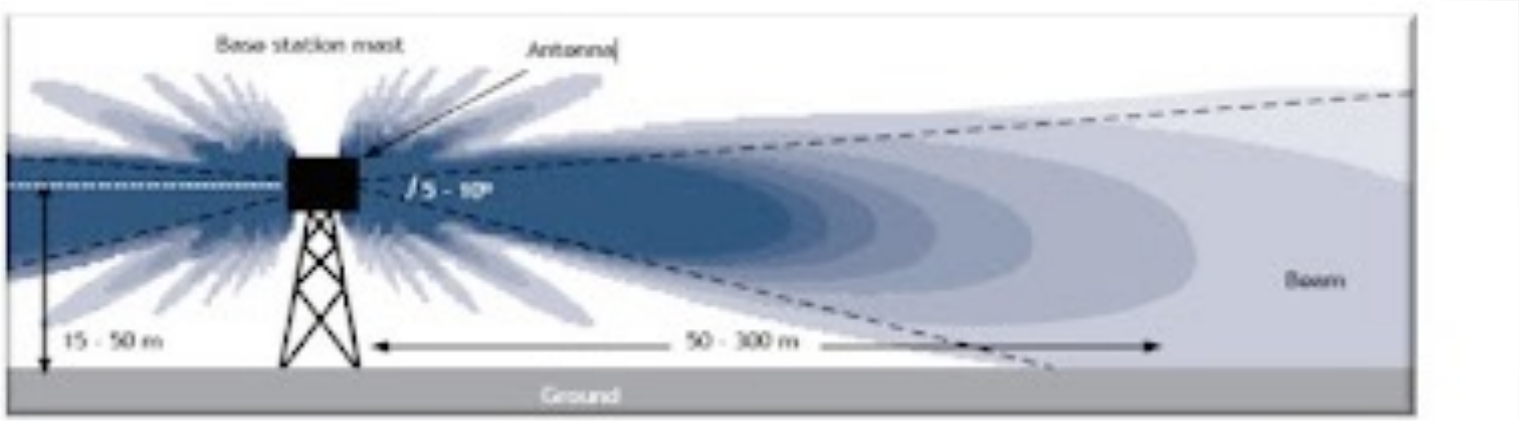
Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz

- **Considers only humans / *similar* to international guidance**
- Protects against over-heating of tissues, at relevant frequencies
- Scientific review incomplete, not systematic, out-of-date
- Exposure limit was doubled for 5G frequencies, with no consultation or substantive evidence of safety
- Not included: "non-thermal" effects
  complex pulsed signals
  synergism with chemicals

www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/consult/_2014/safety_code_6-code_securite_6/final-finale-eng.pdf

preventcancernow.ca/wp-content/uploads/2022/10/SearsFriesenBEMSposter-ScientificReviewCanada.pdf

Environmental Exposure: RF-EMR from a cell tower



Propagation of "main beam" from antenna mounted on a tower or roof top

People living within 50 to 300 meter radius are in the high radiation zone (dark blue) and are more prone to ill-effects of electromagnetic radiation.

http://neha-wilcom.blogspot.com/2011/05/radiation-pattern-of-cell-tower-antenna.html

What doesn’t stay on the ground, outside the fence?





Who might be in the antenna main beam?

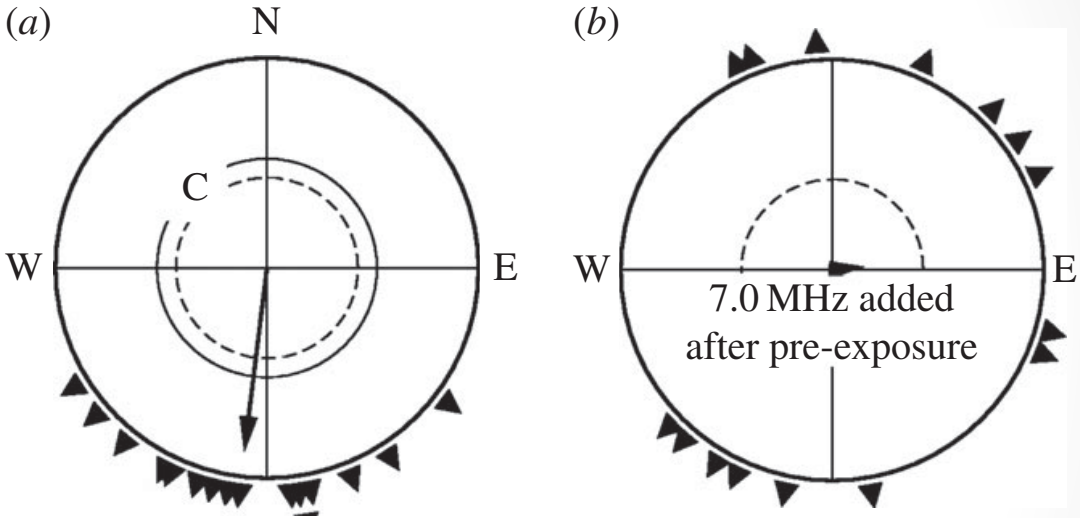


Towers are proposed nearby and in natural areas—most neighbours don't complain



Birds and insects get lost – magnetoreception impaired

Cryptochrome in birds and insects used to sense the earth's magnetic field. Radiofrequency radiation interferes with orientation



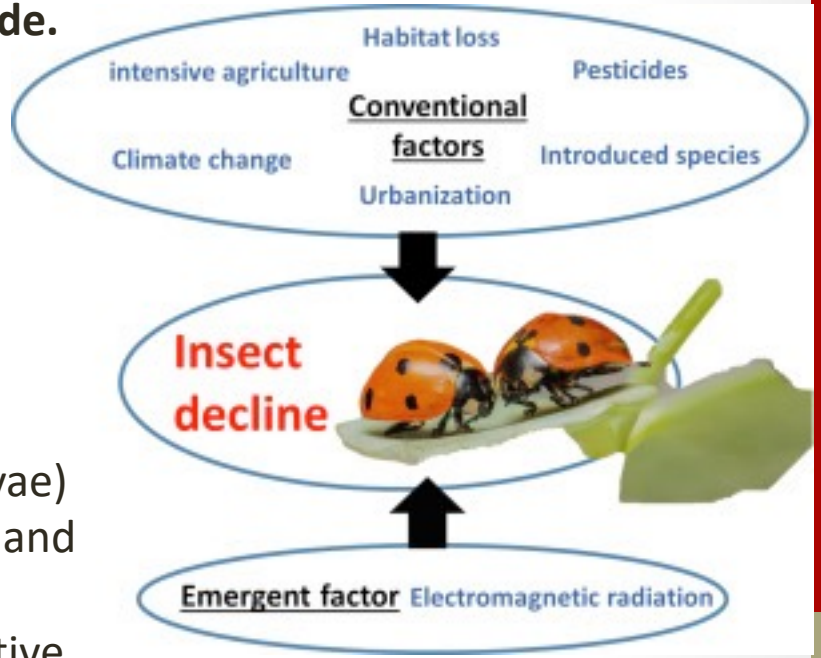
Example: Robins lost sense of direction during exposure to 7 MHz field

Wiltschko et al. 2015. **Magnetoreception in birds: the effect of radio-frequency fields**
DOI:10.1098/rsif.2014.1103

Electromagnetic radiation as an emerging driver factor for the decline of insects

Biodiversity of insects is threatened worldwide.

- Insects form base of the food web
- Insects are especially sensitive to RF-EMR.
- Electromagnetic radiation may be a complementary driver in this decline.



Some documented effects:

- Foraging, feeding, navigation, fecundity, pollination, propolization (+ feeding of larvae)
- Exposures from power lines, phones, WiFi and towers
- Effects on immune, nervous and reproductive systems

A. Balmori, 2021, Sci Total Environ. doi.org. /10.1016/j.scitotenv.2020.144913

RF From Telecommunications Antennas Correlated With Changes in Abundance, Diversity and Richness of Insects

Distribution, diversity and abundance of some insects around a telecommunication mast in Ilorin, Kwara State, Nigeria.

- A 22 week study on the impact of a telecommunications tower found that as the RF levels increased closer to the tower, the diversity and abundance of insects decreased.

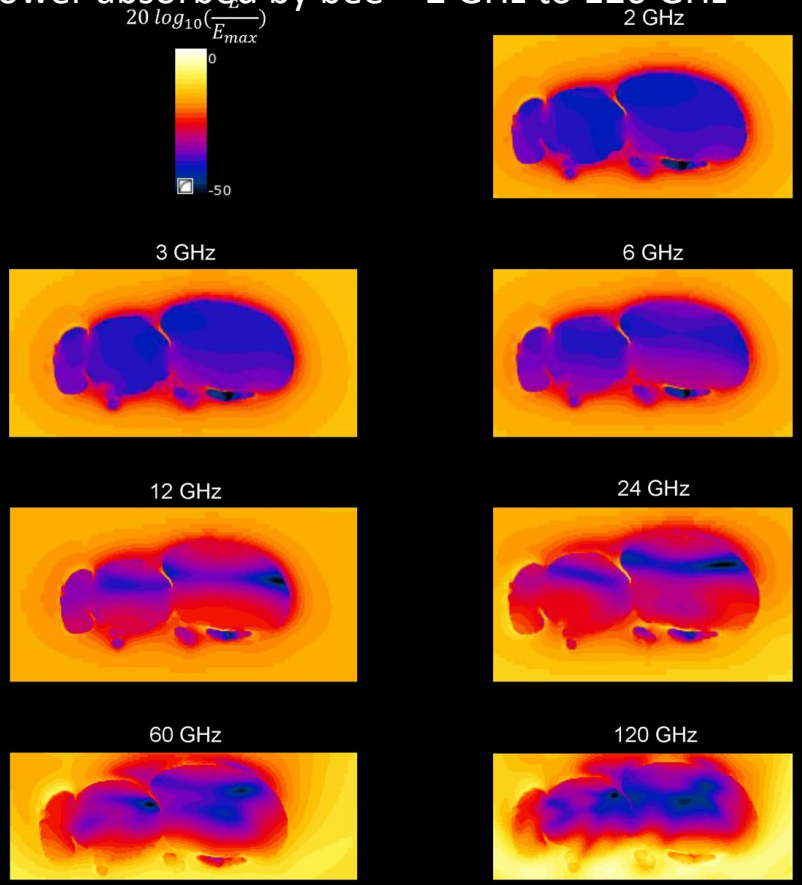
Adelaja, O.J., Ande, A.T., Abdulraheem, G.D. et al. Bull Natl Res Cent 45, 222 (2021). https://doi.org/10.1186/s42269-021-00683-y

Electromagnetic radiation of mobile telecommunication antennas affects the abundance and composition of wild pollinators.

- Study of two Mediterranean islands. …beetle, wasp, and hoverfly abundance decreased with EMR, whereas the abundance of underground-nesting wild bees and bee flies unexpectedly increased with EMR. … it might also have additional ecological and economic impacts on the maintenance of wild plant diversity, crop production and human welfare.

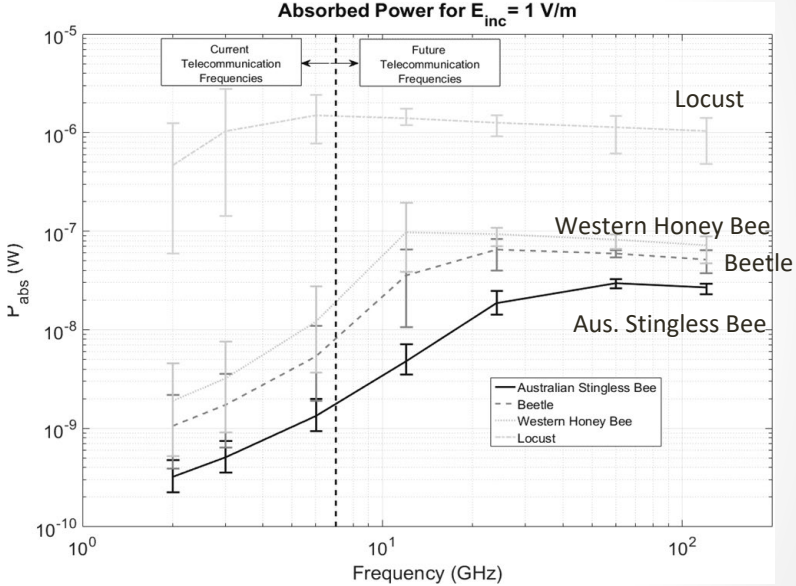
Lázaro, A. Chroni, T. Tscheulin, J. Devalez, C. Matsoukas, & T. Petanidou. (2016). Journal of Insect Conservation, 20(2), 315–324. https://doi.org/10.1007/s10841-016-9868-8

Power absorbed by bee ~ 2 GHz to 120 GHz



Protective policy for one species will not guarantee protection for other species.

Exposure of Insects to Radio-Frequency Electromagnetic Fields from 2 to 120 GHz (5G)



Thielens et al. *Scientific Reports* 8, no. 1 (March 2, 2018): 3924. https://doi.org/10.1038/s41598-018-22271-3.

Radiofrequency radiation injures trees around mobile phone base stations (2016)

Waldmann-Selsam et al. – International team documented tree injuries facing RFR sources, progressing over time until the tree dies. Trees sheltered from radiation by buildings thrive

Bernartzky (1986) revisited



http://dx.doi.org/10.1016/j.scitotenv.2016.08.045



Section of red oak tree, August 2013



Section of red oak tree, August 2015

Breunig, Helmut. "Tree Damage Caused By Mobile Phone Base Stations An Observation Guide." (2017).

What is coming for trees, with 5G?

Dense “small cel deployment. Mission BC

These are increasingly common.



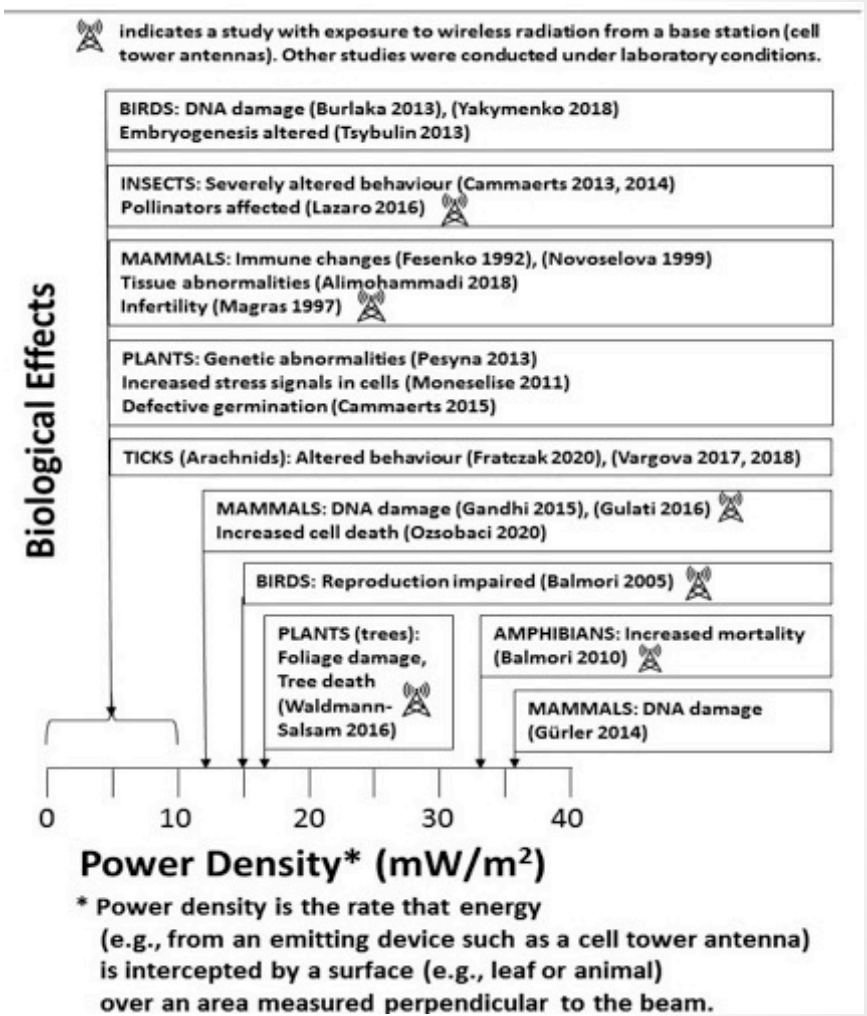
Biota affected a very low levels of wireless radiation

Figure from
"Protect Birds, Bees and Trees" White Paper

Examples of biological effects on biota exposed to "wireless radiation" levels

50 to more than 2,000 times below Safety Code 6

(2,000 - 10,000 mW/m^2 depending upon the frequency).

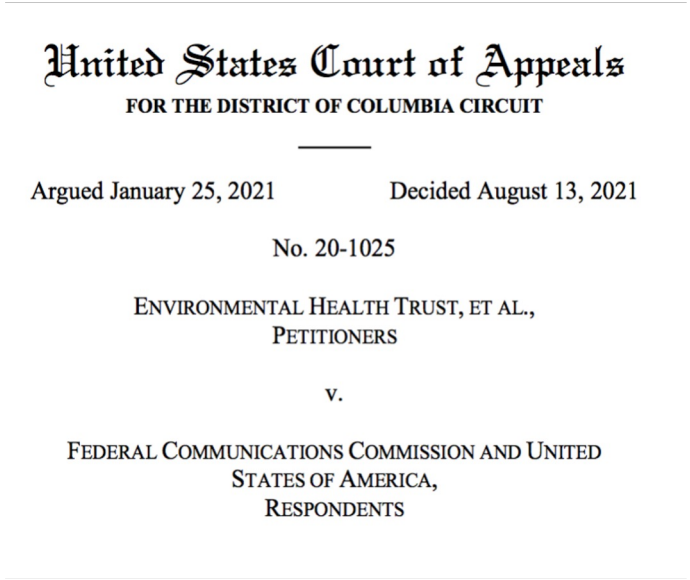


MISSING in Canada: Environmental protection against RF-EMR

Canada

- 2015 – evidence provided to ENVI study on CEPA
- 2017 – the Government committed that Environment and Climate Change Canada would examine evidence
- 2021 – in response to a petition to the Commissioner for the Environment and Sustainable Development, ECCC confirmed that evidence was not examined and there was no plan to do so.

MISSING in USA: Environmental protection against RF-EMR



United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Argued January 25, 2021 Decided August 13, 2021

No. 20-1025

ENVIRONMENTAL HEALTH TRUST, ET AL.,
PETITIONERS

v.

FEDERAL COMMUNICATIONS COMMISSION AND UNITED STATES OF AMERICA,
RESPONDENTS

Environmental Health Trust et al. v Federal Communications Commission and U.S.A.

- In 2021, the second-highest U.S. court stated,

"The Federal Communications Commission also completely failed even to acknowledge, let alone respond to, comments concerning the impact of RF radiation on the environment."

Superior alternatives

Wired infrastructure is inherently more:

- future-proof
- reliable
- sustainable
- energy efficient
- safer

Wireless networks and services are inherently more:

- complex
- costly
- unstable (subject to frequent revision and "upgrades")
- constrained in what they can deliver

Which is the better business case?

Re-Inventing Wires:

The Future of Landlines and Networks



National Institute for Science, Law & Public Policy
Washington, DC

Let's not make this another Late Lesson from Early Warnings



Thank you



Special thanks to

Canadians for Safe Technology

Environmental Health Trust

Canadian Environmental Law Association

PREVENT CANCER NOW

Contact: Meg Sears PhD

info@preventcancernow.ca