Welcome to this week's presentation and conversation

hosted by the

Canadian Association for the Club of Rome

Sharing creative ideas on YouTube that moderate the rate and depth of changing Earth systems.

Why isn't the Canadian Environmental Protection Act working, and how can it be made relevant in the 2020s and beyond?

Scientist Meg Sears and lawyer David McRobert will discuss translation of what science tells us is necessary to protect human and environmental health, into law. The Senate is presently considering amendments to *Canadian Environmental Protection Act, 1999*, Canada's major legislation to prevent pollution. First, Bill S-5 introduces "The Right to a Healthy Environment," but without means for enforcement, is this just a "right with no remedy"? Modernizing CEPA requires catching up with scientific methods, least-toxic solutions (or doing without); declaring chemicals that mimic hormones "toxic"; and a "climate lens" to improve efficiencies, durability and recyclability of products, and reduce waste.

A lesser-known agent that would be new to CEPA is radiation for "wireless" telecommunications. Scientists found adverse effects in every species adequately studied, at exposures well below Health Canada guidance to protect humans. This non-ionizing radiation may be a preventable co-factor in dramatic declines of insects and birds, along with pesticides and climate change. Fortunately, non-radiating fibre-optic and wired connections are higher capacity, faster, and more resilient, secure and energy efficient.

Dr. Sears' and David McRoberts' presentation will be followed by a conversation with the participants.

2022 March 16

The *Canadian Environmental Protection Act* Why isn't it working, and how can it be made relevant in the 2020s and beyond?

CACOR, Ottawa
Dr. Meg Sears and David McRobert
March 16, 2022

PREVENT CANCER NOW

Goals of Presentation

CONTEXT: The Senate is considering amendments to *Canadian Environmental Protection Act, 1999* (CEPA) Canada's major legislation to prevent pollution, and to protect human and environmental health

Bill S-5: *Strengthening Environmental Protection for a Healthier Canada Act*

- Summarize how what science tells us is necessary to protect human and environmental health, can be translated into law
- Introduce why radiation for telecommunications ("wireless radiation") should be regulated under CEPA
- Understand and avoid "regulatory failure"

We're building on the January 5, 2022 CACOR presentation, *Science for Public Health and Effective Environmental Law*

Outline

- *Canadian Environmental Protection Act, 1999* – an introduction
- Introducing Bill S-5 amending CEPA – improvements and shortcomings
- Regulatory failure
- Operationalizing the Right to a Healthy Environment
- Ubiquitous, rapidly escalating bioactive agent – radiation for telecommunications – should be regulated to protect the environment
  - Some science
  - Safer solutions
- *At this juncture, how might we forestall regulatory failure?*”””

Timeline: *Canadian Environmental Protection Act*

- Canada has had toxic substances legislation since the mid-1970s
- Environmental Contaminants Act (1975-1988)
- Canadian Environmental Protection Act (1988 – 1999)
- CEPA,1999 (current law)
- Proposed: Bill S-5, ***Strengthening Environmental Protection for a Healthier Canada Act***

CEPA: Introduction

- Canadian Environmental Protection Act,1999 – principal law governing manufacture, import and use of chemicals in Canada
- Primary purpose "to contribute to sustainable development through **pollution prevention**" (CEPA,1999 – Declaration)
- "**Virtually eliminate** most persistent & bioaccumulative toxic substances" (Preamble)
- Federal government duties include: protection of environment & human health through application of **precautionary principle** (s. 2)

What is toxic under CEPA, 1999?

- A substance must be declared “toxic” before Canada can act to reduce exposure
- “toxic” defined in s. 64 as a substance entering or that may enter the environment in a quantity or concentration or under conditions that:
  - Have or may have immediate / long-term effect on environment or its biological diversity;
  - Constitute or may constitute danger to environment on which life depends; or
  - Constitute or may constitute danger in Canada to human life or health (s. 64)

CEPA summarized (1)

- First priority of CEPA: *Pollution Prevention* and *Elimination of Toxic Substances*

  Second priority: *Management* (priorities get blurred)
- Under both Health Canada, and Environment and Climate Change Canada (ECCC)
- Addresses most substances other than drugs and pesticides, with notices, assessments, categorization and regulation
- Broad scope - substances in industry, products, food, and the environment (e.g., air, water, soil, wildlife, indoor environments)

CEPA summarized (2)

- Results in codes of practice, procedures and practices to reduce emissions, effluents and wastes to achieve *acceptable risk*
- Requires some transparency and public engagement
- Not only chemicals – CEPA also addresses animate products of genetic modification (e.g., GM salmon)

Bill S-5: *Strengthening Environmental Protection for a Healthier Canada Act*

- Bill S-5 makes minor, housekeeping amendments where significant changes are needed, while trying to fix parts of the Act that are not broken
  - deviates significantly from 1995, 2007, 2008, and 2017 parliamentary committee recommendations
  - no changes made to s. 22 despite two decades in which it was not used by public
- Removes the phrase “toxic substances”
  - bolsters industry perspective that it is inappropriate to label substances ‘toxic’, and creates legal uncertainty that may undermine CEPA’s constitutionality

Amendments to Bill S-5 that are needed:

- Mandatory testing obligations on industry where available information is lacking to help determine whether a substance is toxic, or capable of becoming toxic, in the context of such issues as endocrine-disrupting substances, cumulative effects, and impacts on vulnerable populations
- Establishing authority for enforceable ambient air quality standards to address nationally problematic substances like lead
- Retaining and improving existing authority in CEPA that Bill S-5 would remove on such issues as:
  - virtual elimination of toxic substances;
  - geographic targeting of regulatory authority; and
  - identifying substances as “toxic.”

Bill S-5: The Right to a Healthy Environment

- **Featured progress: The Right to a Healthy Environment**
- Intuitively, a healthy environment is essential for all life
- Some Environmental and Civil Society organizations say, “good first step”

  BUT
- In 2022, ***this is a tall order***
- It is unclear who the “right-holders” are
- With no means for enforcement, is this just a "right with no remedy"?
- Risk is that this right is seen as “symbolic”; very controversial and opposed by industry and other stakeholders
- Attempted in other provinces (e.g. Ontario EBR, 1993)
- How would this Right be operationalized?

Modernize CEPA for A Right to a Healthy Environment

1. Improve scientific methods, data requirements and decision-making to
   - Detect harmful exposures *early*
   - Protect vulnerable populations and workers
   - Precautionary approaches to **Hazard versus Risk**, esp. with uncertain exposure
2. Clarify application of the *Precautionary Principle* to consider *Essentiality* for *Substitutions* for all substances of potential concern
   - Require least-toxic solutions (including doing without)
   - Apply a climate lens to choose options, and reduce waste
3. Strengthen – not weaken – listing and pollution prevention for toxic substances

Modernize CEPA for A Right to a Healthy Environment … 2

5. Declare that substances that mimic hormones, **endocrine disruptors are "toxic,"** along with mutagens, carcinogens and reproductive toxins
6. Regulate "look-alike" chemicals as groups
7. Maintain a **single list of toxic substances** with pollution prevention for all
8. Prevent **genetic pollution** via genetically modified organisms
9. *Regulate non-ionizing radiation used in telecommunications*

Many Players Make This Happen … Will Regulation Succeed?

Fundamentals of Regulatory Design

Malcolm K. Sparrow

What is Regulatory Failure?

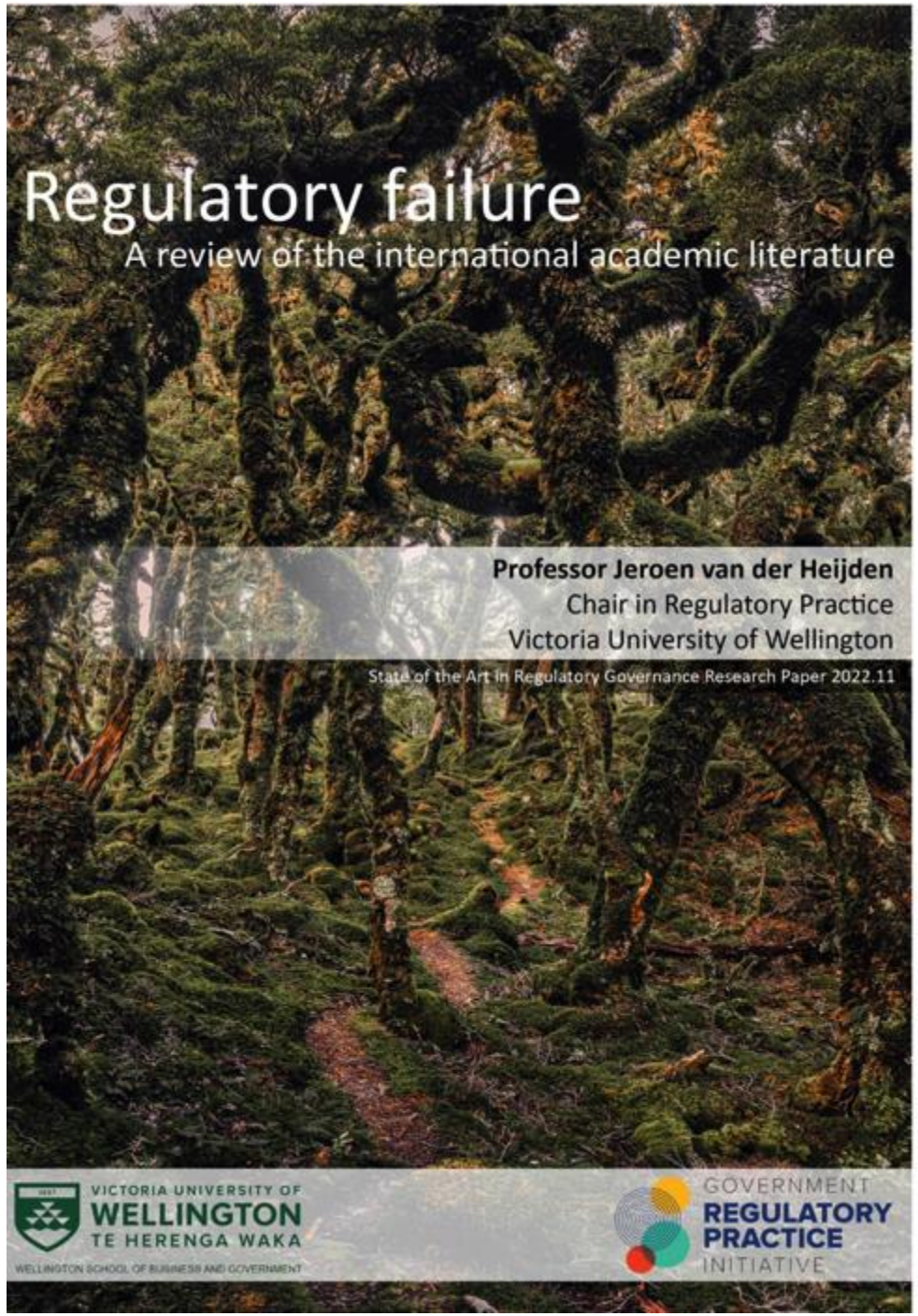
Leading expert on Regulatory Failure - Jeroen van der Heijden

Regulation: government intervention that seeks to achieve desirable societal outcomes

Failure: lack of success

Regulatory failure: lack of success in realizing the desirable societal outcomes that a piece of regulation was developed to achieve

Source: van der Heijden, Jeroen (2022). *Regulatory failure: A review of the international academic literature. State of the Art in Regulatory Governance Research Paper – 2022.11.* Wellington: Victoria University of Wellington/Government Regulatory Practice Initiative.



Regulatory failure:
A review of the international academic literature

State of the Art in Regulatory Governance Research Paper – 2022.11

Professor Jeroen van der Heijden

February 2022

VICTORIA UNIVERSITY OF WELLINGTON TE HERENGA WAKA

GOVERNMENT REGULATORY PRACTICE INITIATIVE

Features of Regulatory Failure

- Three broad themes:
  - failure in the design of regulation
  - failure in the implementation of regulation
  - failure due to a perception of excessive economic costs (and lack of benefits) of regulation.

With respect to regulating toxic chemicals, we see this last problem as a communications problem because the benefits of illness and cancer prevention and pollution prevention are very significant

Lack of infrastructure or the power to enforce regulation

- Regulatory failure is likely to occur when the agency in charge lacks either the infrastructure or the power, or both, to enforce regulation.
- Likewise, regulatory failure may result from the wrong sort of implementation.
  For example, an over-coercive stance in implementation runs the risk of animosity on the side of regulatees and a diminished willingness to comply

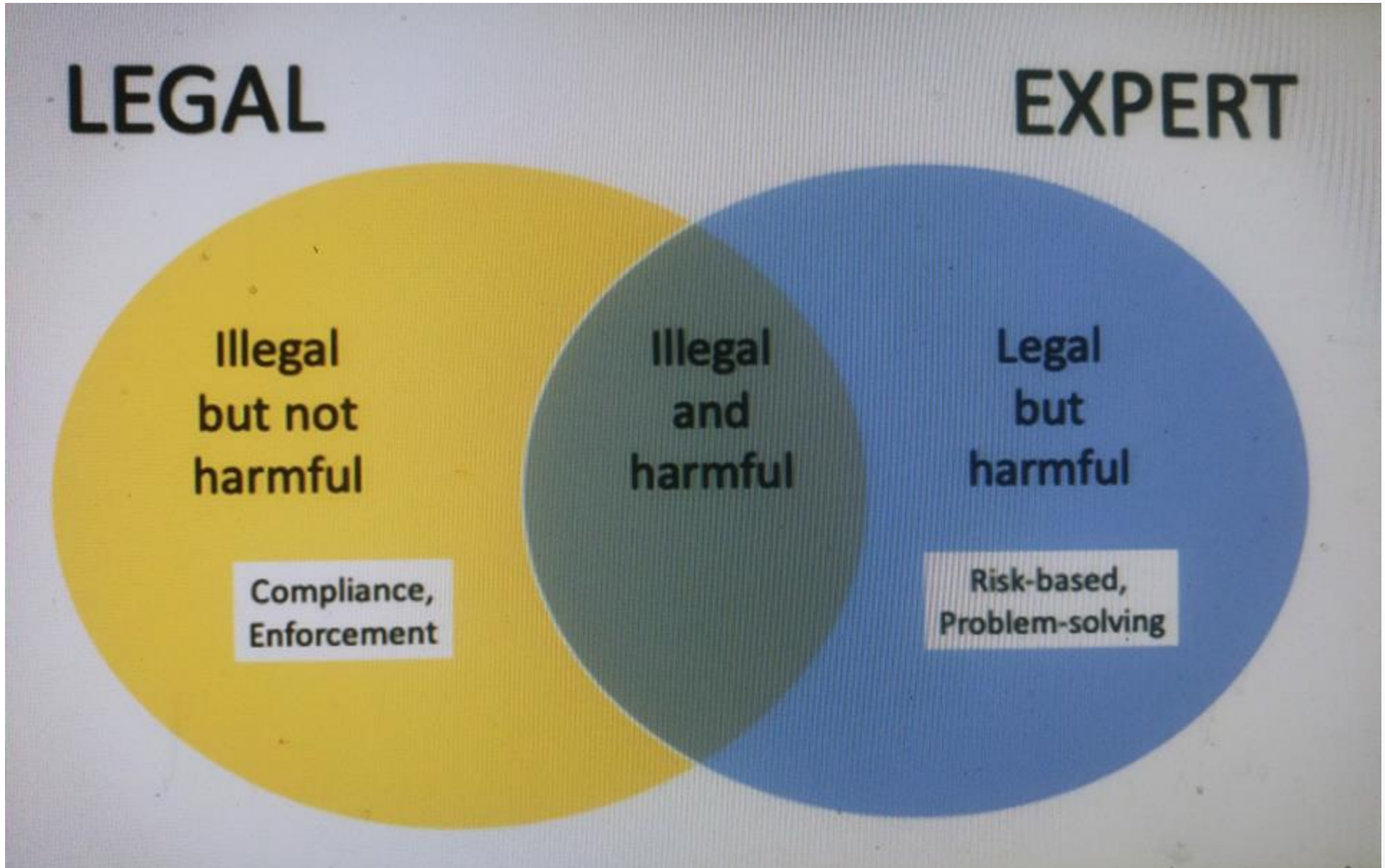
Failure to Re-train and Empower staff

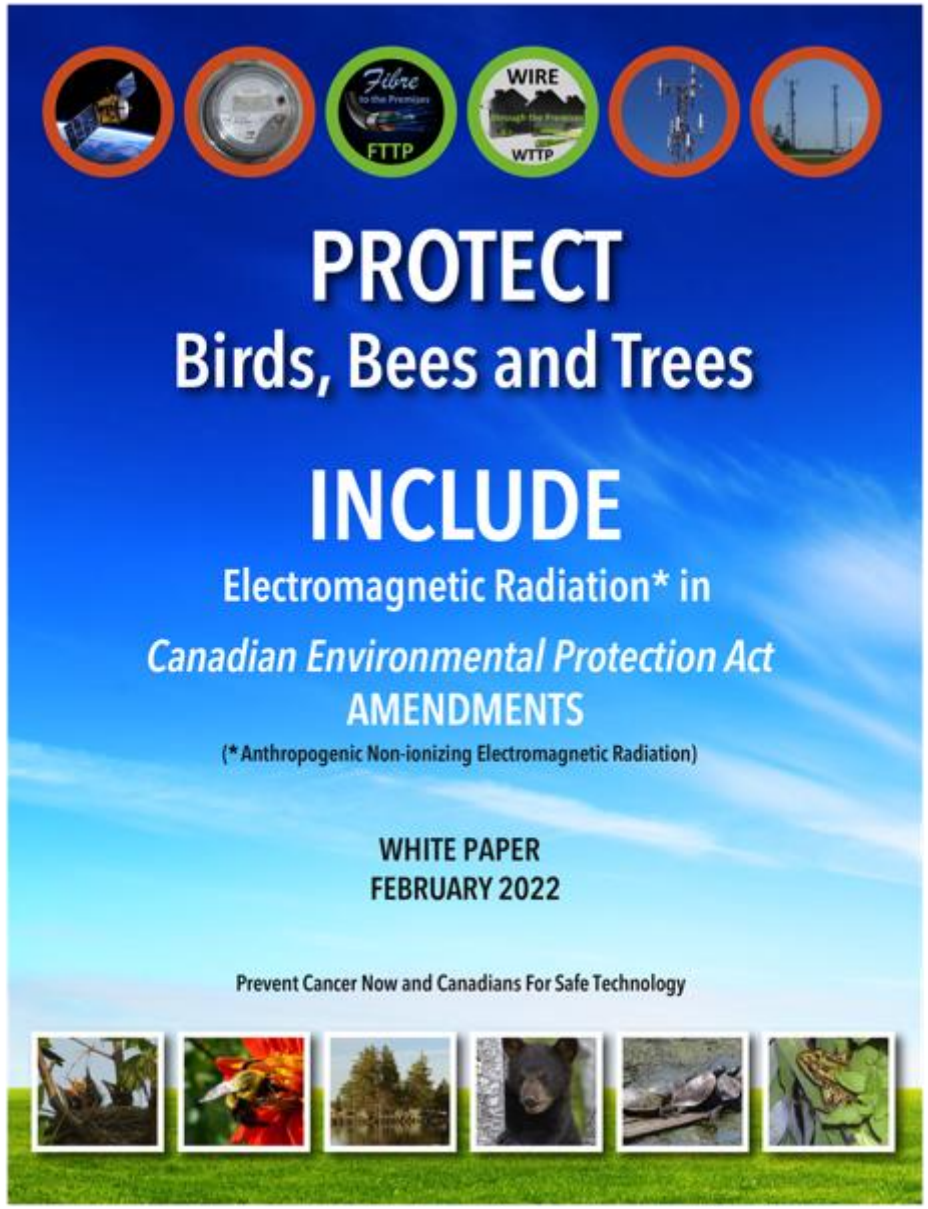
- A regulator may modernize ‘on paper’ by embracing risk-regulation or performance-based regulation
- If it does not modernize its staff through training and up-skilling they are unlikely to be able to implement the modernized regulations well.

Failure to engage in timely, smart regulation

- Regulators may
  - not respond sufficiently promptly,
  - take a reactive stance and ‘wait’ for a violation to happen,
  - let minor violations slip through too often, or
  - let regulatees get away with increasingly more significant violations.
- Need to build consensus on appropriate approach

What is regulated, and how?





https://preventcancernow.ca/canada-has-no-due-process-in-law-to-assess-and-regulate-wireless-radiation/

Bringing attention to an escalating regulatory failure

- Some types of non-ionizing radiation

  A lesser known agent that would be new to CEPA is radiation for "wireless" telecommunications.

- There is no consideration of environmental effects of wireless radiation by Environment and Climate Change Canada, and environmental effects are addressed in no federal statute.
- Scientists found adverse effects in every species adequately studied, at exposures well below Health Canada guidance to protect humans.
- This non-ionizing radiation may be a preventable co-factor in dramatic declines of insects and birds, along with pesticides and climate change.

Novel non-ionizing radiation – Some key background

- The atmosphere blocks much solar and cosmic radiation
- Evolution occurred without radiation from technologies
- Telecommunications is increasing exposure levels and diversity
- “Microwave catalysis” is one mechanism leading to biochemical effects (e.g., oxidative stress, genetic damage, sensitization of cellular receptors)
- Biochemical and receptor-mediated effects explain observed adverse effects in humans, including cancers, sperm damage, neurological effects
- Radiofrequency radiation magnifies toxicities of chemicals
  - cancers in laboratory animals
  - attention deficit in children

Assessment and Regulation of Novel Non-ionizing Radiation

- Health Canada publishes a ***guideline*** Safety Code 6 (SC6), that prevents over-heating of human tissues (non-thermal effects).
- SC6 exposure limits were **originally for federally mandated workplace**s, with higher exposures permitted for specialists working in “controlled environments”
- SC6 is now the **standard for all devices, infrastructure**, via regulation
- Unlike for pesticides, and substances under CEPA, there is no legislation or regulation contemplating scientific processes, consultation or transparency
- Little monitoring of real-life exposures
- No accounting for extraordinary pulsed signal characteristics

Wireless radiation regulation only for people

- Innovation, Science and Economic Development (ISED) sells spectrum, administers approvals to implement Health Canada's Safety *Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz: Safety Code 6* (SC6)
- *Radiation Devices Act* applies mostly to medical equipment, tanning beds, etc., and does not mention radiofrequency radiation, telecommunications, etc.
- Health Canada held a little-known consultation on expanding scope of the RDA - there were very few responses
- Cell tower siting procedures reference SC6, as well as CEPA, *Migratory Birds Convention Act*, and *Species at Risk Act*. There is no mention of radiation for telecommunications in these acts.

Contested Hazards – e.g., Carcinogenicity

Health Canada

Radiofrequency radiation **does not** cause cancer

(or COVID-19 – which is correct)

International Agency for Research on Cancer

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

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

Environmental effects of modern EMR not regulated in Canada

- Flora and fauna, particularly birds and insects, that are already declining, are at increasing risk with increasing wireless deployment*
- After large court case with 1000s of pages of scientific documents, US Federal Communications Commission was ordered to review environmental effects
- Despite findings of 2015 Parliamentary Committee and subsequent Government Commitment, ECCC does no assessment, monitoring or research into environmental effects of radiofrequency radiation (confirmed, 2021)

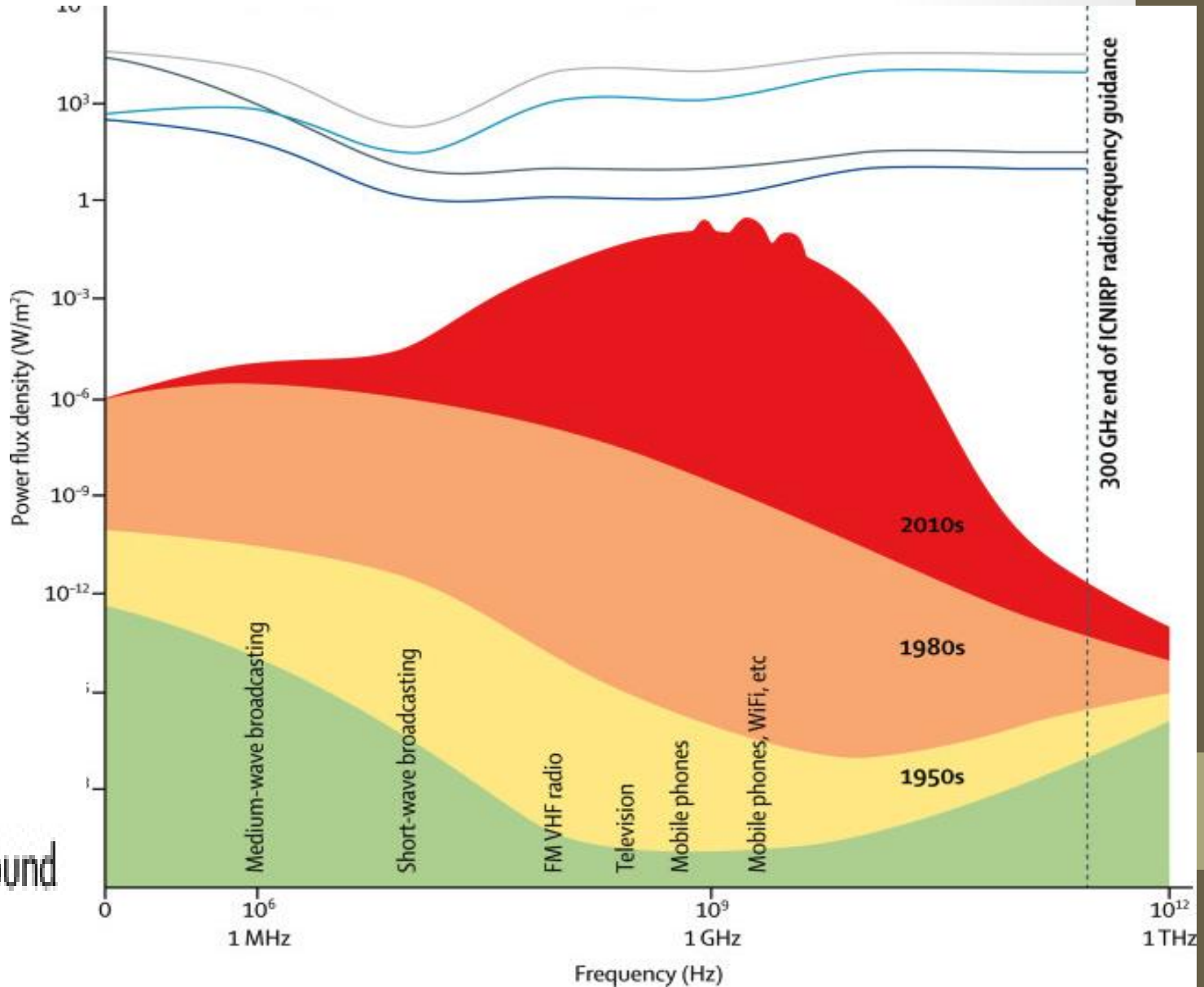
Include EMR assessment and regulation in CEPA

*Levitt et al. Effects of non-ionizing electromagnetic fields on flora and fauna.
1. Rising ambient EMF levels in the environment
2. Impacts: how species interact with natural and man-made EMF
3. Exposure standards, public policy, laws, and future directions

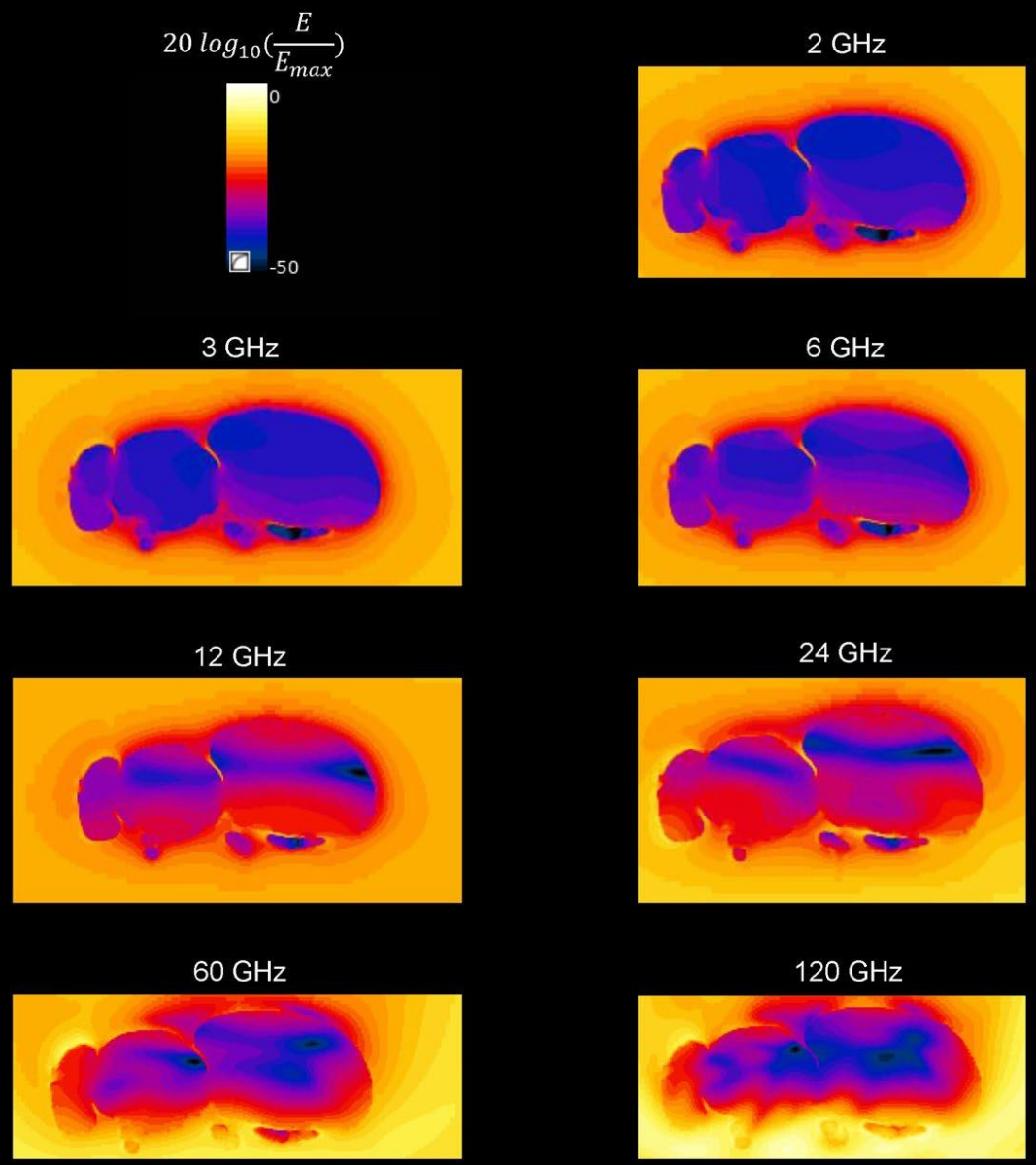
Reviews on Environmental Health, 2021

Typical maximum daily exposure to radiofrequency electromagnetic radiation in comparison with International Commission on Non-Ionizing Radiation Protection (ICNIRP) safety guidelines

Bandara & Carpenter (2018). **Planetary Electromagnetic Pollution: It Is Time to Assess Its Impact.** The Lancet Planetary Health 2, no. 12: e512–14. https://doi.org/10.1016/S2542-5196(18)30221-3.

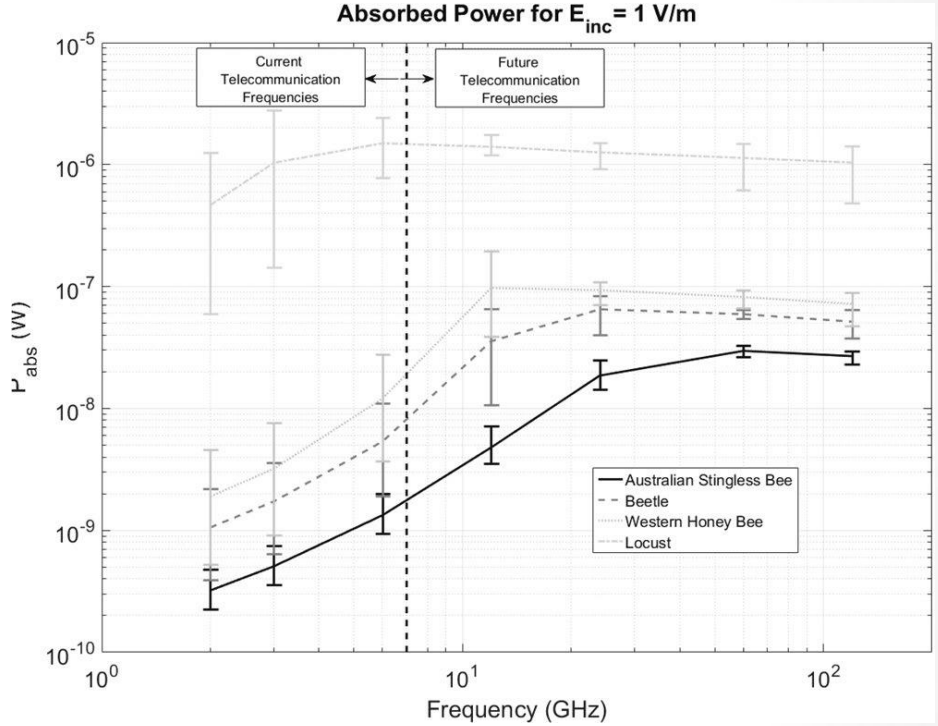


ICNIRP (occupational peak)
ICNIRP (occupational)
ICNIRP (public peak)
ICNIRP (public)
2010s, typical
1980s, typical
1950s, typical
Natural background



Protective policy making regarding RF-EMF exposure for one species will not guarantee protection for other species.

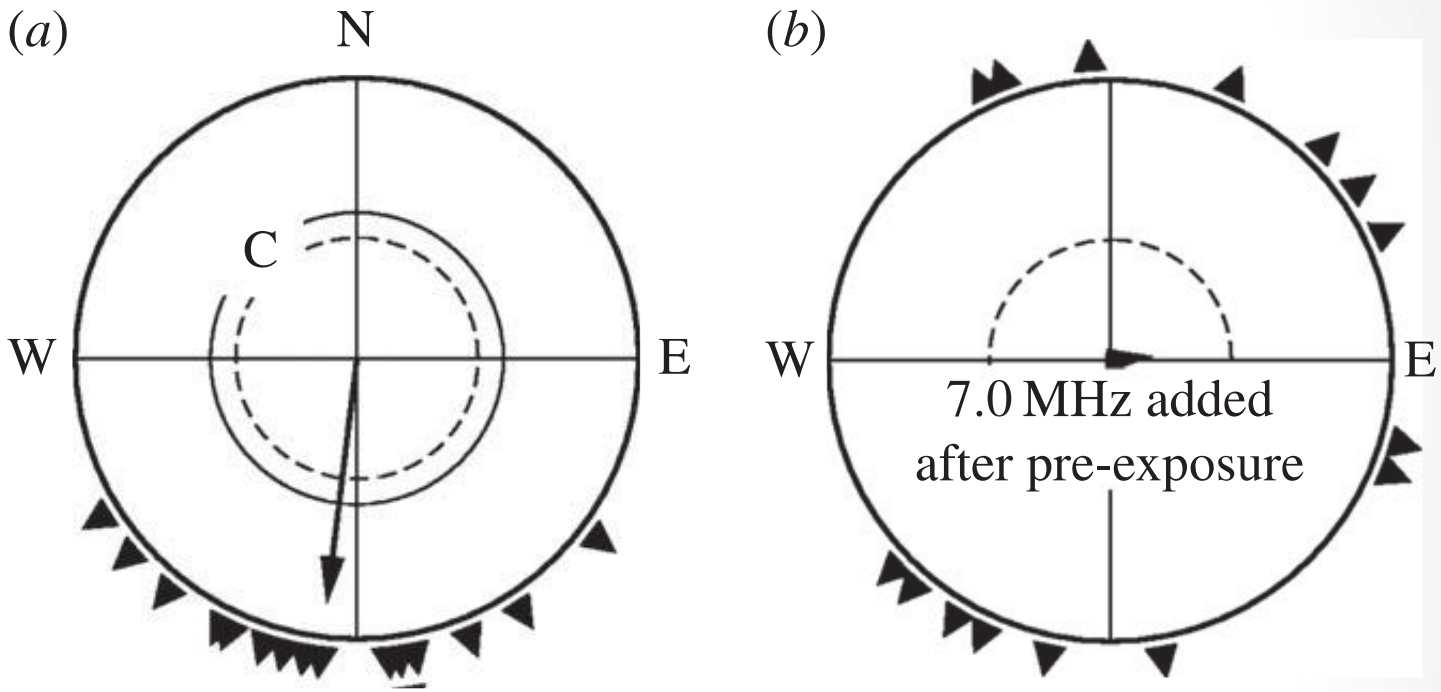
Exposure of Insects to Radio-Frequency Electromagnetic Fields from 2 to 120 GHz (5G)



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

Birds and insects get lost – magnetoreception impaired

Cryptochrome in birds and insects 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

Biota affected a very low levels of wireless radiation

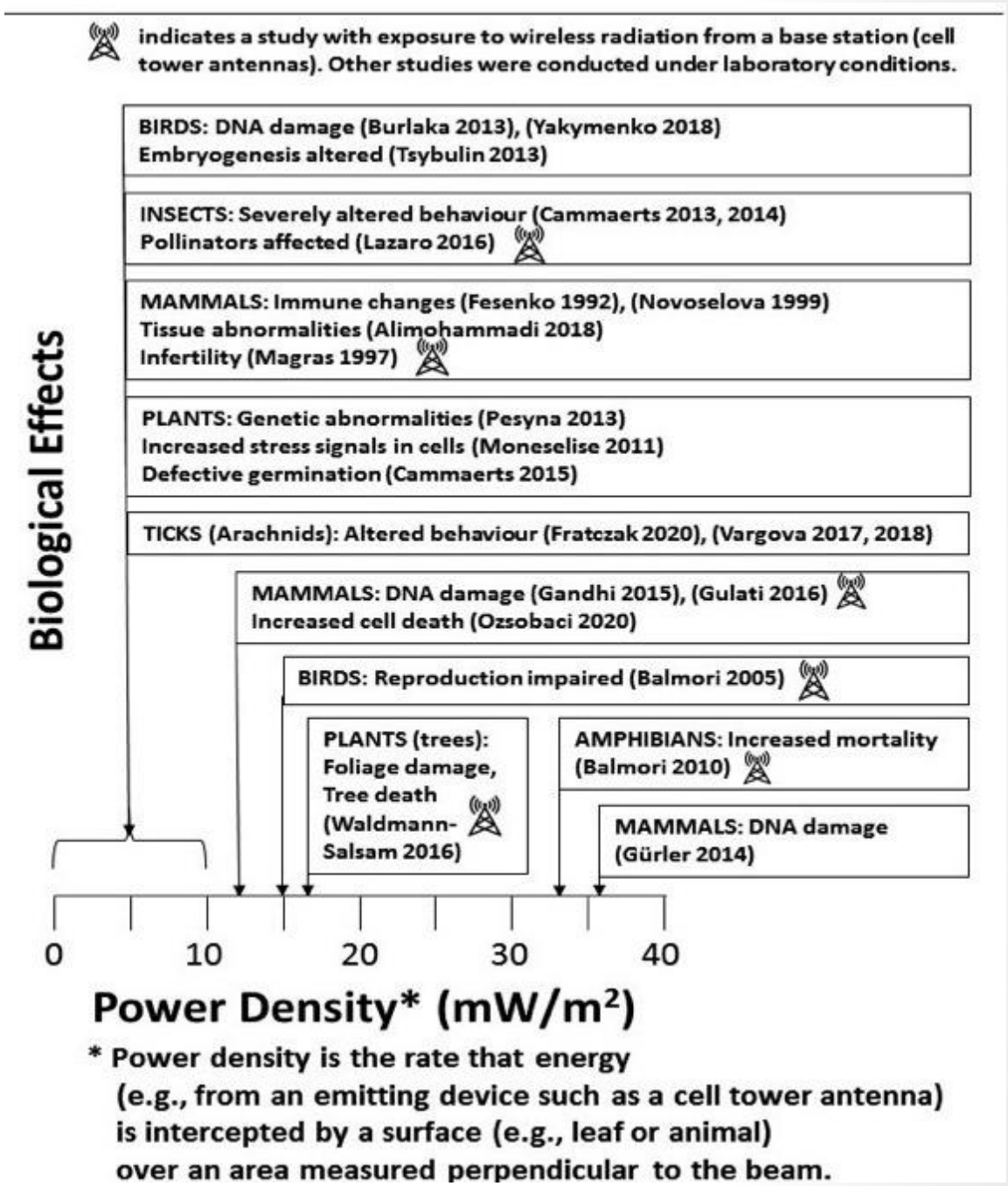
Figure from White Paper

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).

https://preventcancernow.ca/wp-content/uploads/2022/03/SomeEMRinCEPA-Feb2022.docx



Summary: Why non-ionizing radiation for telecommunications should be added to CEPA

Canada has no monitoring, assessment, or research on environmental effects of wireless radiation, yet this radiation is:

- Bioactive
- Has increased by *many* orders of magnitude in recent decades
- Is now rapidly increasing, and possibly more harmful at least for insects
- Every species adequately studied was affected by everyday levels of wireless radiation
- Potential co-factor in rapid declines of birds and insects (the most-studied species). **This is an existential threat.**
- Guidance and limits are to protect human health, but do not apply to other species and natural environments.

Qualities of Highly Effective Regulators

Will an amended CEPA help them to do a better job?

1. **Clarity** of issues to be tackled, clear focus on overarching purpose
2. **Agility** to apply best regulatory task to each issue rather than relying on past practices, agility to respond to emerging or novel issues
3. **Trustworthiness** through demonstrating competence, reliability, and honesty
4. **Curiosity** to examine new evidence, strengthen evidence-based decision-making processes
5. **Humility** to recognize where external expertise and knowledge is required
6. **Unbiased**, independent, and fair analyses, relative independence from government
7. **Proactive** approach to prevent harm prior to it occurring

Source: Marie Bismark, "The seven qualities of highly effective regulators" (1 December 2014), online: <https://mariebismark.wordpress.com/2014/12/01/the-seven-qualities-of-highly-effective-regulators/>.

Conclusions

- Once in a generation CEPA amendments must do more than “catch up”
- Detailed, widely endorsed proposed amendments have been provided by CELA. More is needed.
- Efficiencies, reduced consumption and least-toxic approaches are climate and public health imperatives – CEPA needs new tools to avert ecological crises.
- Regulation based on toxicity “established” through human epidemiology is ineffective and unethical – use modern methods and regulate by class
- Wireless radiation is a rapidly escalating, bioactive environmental agent. Canada (and other jurisdictions) are turning a blind eye. CEPA is the best place for it.

Thank you

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Dr. Meg Sears
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Resources:

References on CEPA

- Bill S-5, An Act to amend the Canadian Environmental Protection Act, 1999, to make related amendments to the Food and Drugs Act and to repeal the Perfluorooctane Sulfonate Virtual Elimination Act. Feb. 9, 2022. See: https://www.parl.ca/DocumentViewer/en/44-1/bill/S-5/first-reading
- EcoJustice, Breast Cancer Action Quebec, Canadian Association of Physicians for the Environment, Canadian Environmental Law Association, Environmental Defence. Recommendations for strengthening Bill C-28, updating the Canadian Environmental Protection Act. See: https://davidsuzuki.org/science-learning-centre-article/recommendations-for-strengthening-bill-c-28-updating-the-canadian-environmental-protection-act/
- Joseph Castrilli, “CELA Proposes Amendments to Fix Toxic Substances Law” (4 March 2022), online: *Canadian Environmental Law Association*, (includes numerous resources)https://cela.ca/blog-cela-proposes-amendments-to-fix-toxic-substances-law/

  and recommended Amendments https://cela.ca/proposed-amendments-to-bill-s-5-an-act-to-amend-the-canadian-environmental-protection-act/
- Fe de Leon et al, ”Scientific Justification to Address Endocrine Disrupting Chemicals (EDCs): A Roadmap for Action” (7 April 2017), https://preventcancernow.ca/submissions/endocrine-disrupting-chemicals-a-roadmap-for-action/

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- David McRobert et al, Does Bill C-28, the proposed *Strengthening Environmental Protection for a Healthier Canada Act*, Address the Need for Changes to the *Canadian Environmental Protection Act* to protect Canadians and Communitye from the Threats Posed by Toxic Chemicals? OBA Environews, July13, 2021 HTTPS://WWW.OBA.ORG/SECTIONS/ENVIRONMENTAL-LAW/ARTICLES/ARTICLES-2021/JULY-2021/DOES-BILL-C-28-THE-PROPOSED-STRENGTHENING-ENVIRON
- Dave Campbell et al, "The ENGO Agenda For The Review Of The Canadian Environmental Protection Act (1999)" (March 2005) CEPA Webinar Series 2020/21: https://cela.ca/changes_to_cepa/
- David Boyd, Lisa Gue & Elaine MacDonald. Canada must recognize our right to a healthy environment. In Canada's National Observer, June 16,2021 See: https://www.nationalobserver.com/2021/06/16/opinion/canada-must-recognize-our-right-healthy-environment
- Castrilli, J. and de Leon, F. Long Awaited Amendments to CEPA: The Good, The Bad, and the Ugly on Chemicals and Environmental Rights – Blog. April 15, 2021. See: https://cela.ca/blog-long-awaited-amendments-to-cepa-the-good-the-bad-and-the-ugly-on-chemicals-and-environmental-rights/

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References on Non-ionizing Radiation

- Levitt et al. Effects of non-ionizing electromagnetic fields on flora and fauna.
  1. Rising ambient EMF levels in the environment
  2. Impacts: how species interact with natural and man-made EMF
  3. Exposure standards, public policy, laws, and future directions

  Reviews on Environmental Health, 2021
- Balmori
- Miller et al.

- IARC 2011 and 2018?

- Canadians and residents need due process and science, in national law to assess and regulate “wireless radiation”https://preventcancernow.ca/canada-has-no-due-

References on Regulation and Regulatory failure

- Bismark, Marie, "The seven qualities of highly effective regulators" (1 December 2014), online: https://mariebismark.wordpress.com/2014/12/01/the-seven-qualities-of-highly-effective-regulators/
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- Pahl and Norland, (November 2002). A Systemic Framework for Designing Utilization-Focused, Evaluation of Federal Environmental Research, Extending the Focus from Outputs to Outcomes.

Past Criticisms of CEPA

- Joseph Castrilli (Canadian Environmental Law Association) – 2019
  - A chemical considered persistent and bioaccumulative does not meet criteria unless it is deemed inherently toxic, and therefore not considered for further screening/reduction action
  - If Chemicals Management Plan used criteria from other jurisdictions, more chemicals would be regulated under CEPA
  - Health effect assessments consider carcinogenicity, genotoxicity, reproductive toxicity, developmental toxicity, and mutagenicity, but not endocrine toxicity
  - Designated Substances List is outdated and vulnerable to inaccuracies, leading to incorrect assessments and subsequent actions (if any)
  - Data gaps create uncertainty in categorizing chemicals, and life cycle of chemicals not considered
  - Chemicals deemed 'low priority' or 'low use' do not have further assessment work
  - "Risk management options do not focus on phase out, elimination, or use of safer alternatives"
  - Minimal communication with National Pollutant Release Inventory

Sources: Joseph Castrilli, "CEPA: Lessons For Chemical Regulation" (12 December 2019), Canadian Environmental Law Association

Past Criticisms of CEPA

- Prevent Cancer Now and Canadian Environmental Law Association - 2017
  - “Regulatory regimes for chemicals under CEPA rely on traditional toxicological testing, assessment and risk management →this framework is not amenable to reliably detect and respond to scientific evidence related to the long-term health effects of exposures to endocrine disrupting chemicals (EDCs)”
- “The ENGO Agenda For The Review Of The Canadian Environmental Protection Act (1999)” – 2005
  - “Enforcement activities are entirely discretionary and Environment Canada has seemed reluctant to use them”
  - “Environment Canada has failed to seriously use its powers under CEPA concerning biotechnology"
  - “No regularized process for preparation and publication of an evaluation of the implementation of CEPA is in place”
  - “Environment Canada’s and Health Canada’s public participation processes are not as comprehensive or inclusive as they should be”
  - “The CEPA registry has not fulfilled its potential as a tool for public engagement around decision-making”
  - “Public access to information is still very limited”

Sources: Fe de Leon et al, ” Scientific Justification to Address Endocrine Disrupting Chemicals (EDCs): A Roadmap for Action” (7 April 2017), Canadian Environmental Law Association ; Dave Campbell et al, “The ENGO Agenda For The Review Of The Canadian Environmental Protection Act (1999)” (March 2005)

Past Criticisms of CEPA

- “The ENGO Agenda For The Review Of The Canadian Environmental Protection Act (1999)” – 2005
  - “Lack of government commitment and resources to information gathering”
  - “The pollution prevention approach under CEPA does not focus on substitution with safer chemicals or processes”
  - ”The pollution prevention approach is rarely used and even in those cases it is taking too long”
  - “The scope of substances required in pollution prevention plans is too limited”
  - “Full risk assessments are too resource intensive and time consuming”
  - “The burden of proof is on government to prove there is a problem rather than on industry to demonstrate that substances are safe”
  - “The assessment process does not take a precautionary approach if there is not enough data available on the substance”
  - CEPA “does not follow the polluter pays principle”
  - “CEPA has been almost a total failure at providing a framework for environmental protection in the operation of federal agencies and activities on federal lands”
  - “CEPA has not adequately included aboriginal peoples in decision-making that affects their lands"

Sources: Dave Campbell et al, “The ENGO Agenda For The Review Of The Canadian Environmental Protection Act (1999)” (March 2005)