

EDITORIAL

Challenges for science and society in an era of rapid environmental change – a role for the NSIS?

This Issue of the PNSIS has contributions on a wide range of topics, from marine chemistry to ecological research in wilderness areas of Nova Scotia. The commentary on ocean health is especially noteworthy, as it brings attention to the region's ocean science sector, and the vital connection between ocean and human health. The papers in the PNSIS and our monthly NSIS talks illustrate the wide range of local scientific expertise and output and how it contributes to our society's knowledge, well-being and productivity.

Science has been the key to the human and social enterprise of the 19th and 20th centuries (Dubos 1970). It has shaped the modern world at a time of a major population increase, brought on by better living conditions and medical care, vaccines and the increase in available food. At the same time, there have been continued human tragedies as a result of wars, pandemics, mass migrations, and starvation related to social unrest and localized food shortages. Despite such challenges, much progress to improve the human condition since WWII has been facilitated by the United Nations and its many front-line agencies.

On this theme, it is well worth reflecting back 50 years to the pivotal conference on the environment, held in Stockholm, Sweden – the 1972 United Nations Conference on the Human Environment (Ward and Dubos 1972). It was the first of its kind to discuss the environment from a global humanities perspective. It came as a result of the waves of public concern about the environment that began in the 1960s. This was spurred on by the over-riding threat of nuclear war, an awareness of the spread of persistent toxic chemicals (Carson 1962), and as already mentioned, concerns about the rapidly increasing human population, at that time being 3.5 billion (Ehrlich 1968, Regier and Falls 1969, Meadows *et al.* 1972, amongst others) and now close to reaching an alarming 8 billion.

At the Stockholm conference, in addition to important discussions of the above global concerns, it was already noted that rising CO₂ levels from man's activities could lead to a significant rise in the

earth's temperature, from 0.5 to 2 °C, i.e. climate change (Ward and Dubos 1972). This conference helped to put the environment on the political agenda and encouraged many countries to establish environment departments. It also led to the establishment of the United Nations Environment Program (UNEP) and important conventions such as MARPOL '73/'78.

The Stockholm conference was successful by most accounts. “The participants adopted a series of principles for sound management of the environment including the Stockholm Declaration and Action Plan for the Human Environment and several resolutions. The Stockholm Declaration, which contained 26 principles, placed environmental issues at the forefront of international concerns and marked the start of a dialogue between industrialized and developing countries on the link between economic growth, the pollution of the air, water, and oceans and the well-being of people around the world” (<https://www.un.org/en/conferences/environment/stockholm1972>).

Since 1972, there have been many follow-up international meetings, notably Rio 1992 (producing Agenda 21), Johannesburg (2002), and Rio 2012 (PEW Environment Group 2012). Progress has been made on some issues, less or none on others. There is a follow-up meeting this year in Stockholm, celebrating its 50th anniversary and emphasizing the need for urgent action on a range of environmental problems, many of which remain the same!

Hence, much more needs to be done and done on a continuous basis. This is especially true where land and water pollution, habitat (e.g., forests) and biodiversity loss, the spread of invasive species, fresh water shortages, and rapid climate change continue unabated (e.g., WWF 2017), despite much effort over past decades.

Fortunately, in recent years in the western world, public figures and writers such as Attenborough (2020), Suzuki (DSF 2008) and others (Wallace-Wells 2020, Wilson 2016, Wadhams 2017) have kept the major environmental issues and opportunities in the public eye, despite other problems that face us (e.g., inflation, new wars, the global COVID pandemic, food shortages, and mass migrations). Caring for the environment and for species other than ourselves is now seen to be in the public interest but it is a constant and seemingly overwhelming challenge to maintain this focus. It is difficult to stay optimistic (Attenborough) and easy to be completely

overwhelmed and pessimistic (Wallace-Wells). On a personal note, I have adopted the philosophy of “the despairing optimist” (Dubos 1970) as one must have hope for the future, despite the challenges.

This editorial is obviously aimed at the readers of the PNSIS and other concerned citizens of our province. How can the NSIS build on the momentum brought on by Stockholm and subsequent conferences, and bring these issues, challenges and discussions of solutions more effectively to public attention? More importantly perhaps, how do we productively engage people, including politicians and decision makers at all levels of government? How can the NSIS and its membership, and its followers as a whole, more effectively consider and debate the key issues related to how science can better serve society in these very turbulent times? How can the NSIS track progress and also work to speed up the process towards solutions?

To ignore the state of the environment, especially climate change, and not act individually and as an organization is to ‘let Rome, i.e. Planet Earth, burn’ and to compromise the well-being of our children and future generations! Climate change in our region in particular must continue to be seriously addressed and without delay (Lane 2020, among others), along with other environmental issues confronting Nova Scotia (see articles in the CSEB Bulletin, e.g., Wells 2022). All of them demand public and political attention and an active interplay of science, information, policy/decision making, and timely and effective management (see www.eiui.ca, Wells 2021).

The broad mandate of the NSIS is to inform society on the advancements and applications of science for a better and sustainable world, with a focus on the Maritime region. Engagement of members and open discussion of our individual and combined roles will show if we are being successful, in the spirit of the 1972 Stockholm meeting and its goals. As well, we could invite provincial Ministers to present their plans for future environmental legislation, followed by a question and answer session, or send an NSIS delegation to the legislature to meet with politicians and senior bureaucrats to express our concerns and argue for more action on the environmental front. New ideas and approaches are needed, especially from the NSIS membership.

To conclude, 2022 is also the 50th anniversary of the International Ocean Institute, established through the efforts of Professor Elisabeth Mann Borgese of Dalhousie University. Her efforts to

establish the UNCLOS III ocean governance treaty in 1982 and to apply it globally in principle and practice, in the interests of global peace and prosperity, have been recognized (Werle *et al.* 2018, Meyer 2022). This underlines the importance of the ocean for living resources (i.e. food), transportation, mineral resources, climate control, international peace, and human health and welfare. It is also noteworthy that the recent G7 meeting in Europe has issued a major statement about its policy commitment to the global ocean (Anon. 2022). It is encouraging that many key politicians are aware now of the climate change crisis and the state of the ocean around the world. Hopefully their administrations will follow such policy statements with meaningful and immediate action. In the spirit of the Stockholm Conference of long ago, let's rally the NSIS and collectively contribute through science and action to a healthier and more sustainable Maritime region and world.

Acknowledgements Many thanks to David Richardson (Assoc. Editor, PNSIS), Mike Butler (IOI-Canada), and Jon Percy (Seapen and Bay of Fundy Ecosystem Partnership) for their helpful reading of the draft manuscript.

REFERENCES

- Anon. (2022).** G7 Germany. Leader's Communique. p. 6-7. Ocean Deal, full document, 5 p.
<https://www.consilium.europa.eu/media/57555/2022-06-28-leaders-communicue-data.pdf>
- Attenborough, D.** (2020). A Life on Our Planet. My Witness Statement and A Vision for the Future. Grand Central Publishing, New York, Boston. 266 p.
- Carson, R.** (1962). Silent Spring. Houghton Mifflin Company, Boston, MA. 368 p.
- David Suzuki Foundation.** (2008). A Passion for the Earth. Greystone Books, Douglas & McIntyre Publishing Group, Vancouver, Toronto, Berkeley. 230 p.
- Dubos, R.** (1970). Reason Awake. Science for Man. Columbia University Press, New York, London. 280 p.
- Ehrlich, P. R. (1968).** The Population Bomb. Ballantyne Books, Inc., New York. 223 p.
- Lane, D.E.** (2020). Responding to the call for climate action. *Proceedings of the Nova Scotian Institute of Science* 50(2): 237-247.

- Meadows, D.H., Meadows, D.L., Randers, J. & Behrens, W.W.** (1972). *The Limits to Growth. A Report to the Club of Rome's Project on the Predicament of Mankind.* The New American Library Inc., New York. 207 p.
- Meyer, T.** (2022). *Elizabeth Mann Borgese and the Law of the Sea.* Brill/Nijhoff, Leiden, Boston. 282 p.
- PEW Environment Group.** (2012). *Ocean Earth: How RIO+20 can and must turn the tide. Policy Recommendations.* Internal Document. UNCSO, 4-6 June, 2012, Rio De Janeiro, Brazil. 27 p.
- Regier, H. & Falls, J.B.** eds. (1969). *Exploding Humanity. The Crisis of Numbers.* Anansi, Toronto, ON. 188 p.
- Wadhams, P.** (2017). *A Farewell to Ice. A Report from the Arctic.* Penguin Books, Random House, London, UK. 240 p.
- Wallace-Wells, D.** (2020). *The Uninhabitable Earth. Life after Warming.* Tim Duggan Books, New York. 361 p.
- Ward, B. & Dubos, R.** (1972). *Only One Earth. The Care and Maintenance of a Small Planet.* W.W. Norton & Company, Inc., New York. 225 p.
- Wells, P.G.** (2021). Considering lag times in environmental science and management – an essay to engage environmental biologists. *Canadian Society of Environmental Biologists Bulletin* 78(3): 6-8. (Autumn 2021). <http://www.cseeb-scbe.org>
- Wells, P.G.** (2022). Atlantic News. *Canadian Society of Environmental Biologists Bulletin* 79(2): 18-19. Summer Issue. <http://www.cseeb-scbe.org>
- Werle, D., Boudreau, P.R., Brooks, M.R., Butler, M.J.A., Charles, A., Coffen-Smout, S., Griffiths, D., McAllister, I., McConnell, M.L., Porter, I., Rolston, S.J., & Wells, P.G.** eds. (2018). *The Future of Ocean Governance and Capacity Development. Essays in Honor of Elisabeth Mann Borgese (1918-2002).* Brill/Nijhoff, Leiden, Boston. 562 p.
- Wilson, E.O.** (2016). *Half-Earth. Our Planet's Fight for Life.* W.W. Norton & Company, Inc., New York. 259 p.
- World Wildlife Fund, Canada.** (2017). *Living Planet Report Canada. A national look at wildlife loss.* World Wildlife Fund Canada, Toronto, ON. 12 p.

Peter G. Wells
Dalhousie University and Editor, PNSIS
Email: oceans2@ns.sympatico.ca