**Global Change Biology (BIOL 411, 2023)**

This list will be updated through the course and changes will be highlighted in yellow.

**Recommended journal papers** (many of which could be good seminar papers – review them to get a sense of the type and quality of primary research paper that would be appropriate – and then use Web of Science to identify other literature options before making your final choice. And do remember that there are MANY global change issues – not just climate change and biodiversity loss – see list in initial lecture PDF)

Altieri, A., et al. 2012. A trophic cascade triggers collapse of a salt-marsh ecosystem with intensive recreational fishing. *Ecology* (93)6:1402-1410.

Barnosky et al, 2011. Has the Earth’s sixth mass extinction already arrived? *Nature* 471:51-57.

Bradshaw et al, 2014. Human population reduction is not a quick fix for environmental problems. *Proceedings of the National Academy of Sciences* 111(46):16610-16615.

Bradshaw et al, 2021. Underestimating the Challenges of Avoiding a Ghastly Future. *Frontiers in Conservation Science* 1:615419.  <https://doi.org/10.3389/fcosc.2020.615419>

Ceballos et al, 2017. Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. *PNAS* 114 (30) E6089-E6096; <https://doi.org/10.1073/pnas.1704949114>

Ceballos et al, 2020. Vertebrates on the brink as indicators of biological annihilation and the sixth mass extinction. *PNAS*117 (24) 13596- 13602; <https://doi.org/10.1073/pnas.1922686117>

Diaz, S. et al 2019. Pervasive human-driven decline of life on Earth points to the need for transformative change. *Science* 366(6471), eaax3100.

Foley, J et al. 2011. Solutions for a cultivated planet. *Nature* 478: 337–342.

French, 2010. The Continuing Crisis in Antibiotic Resistance. *International Journal of Antimicrobial Agents* 36(Suppl. 3):S3-7.

Geerts, A. et al. 2015. Rapid evolution of thermal tolerance in the water flea Daphnia. *Nature Climate Change* (5):665-668

Grogan, P. 2013. Our Anthropocene Future - What can biology tell us? *Free Inquiry*. February/March issue. Vol. 32(2):16-19. Council for Secular Humanism. New York. This paper is available directly at: ([PDF](https://www.queensu.ca/terrestrial-ecosystem-ecology/sites/teelwww/files/uploaded_files/Publications%20and%20Outreach/Grogan%20Free%20Inquiry%202013%20-%20What%20can%20biology%20tell%20us.pdf))

Hoegh-Guldberg, O. et al. 2008. Coral Reefs Under Rapid Climate Change and Ocean Acidification. *Science* 318(5857): 1737-1742.

Jones, K. et al. 2008. Global trends in emerging infectious diseases. *Nature* 451: 990-993.

Koh, L. and Wilcove, D. 2008. Is oil palm agriculture really destroying tropical biodiversity? *Conservation Letters* 1(2):60-64

Moritz, C. et al. 2008. Impact of a century of climate changes on small-mammal communities in Yosemite National Park. *Science* 261-264.

O’Rourke, D. 2012. The science of sustainable supply chains. *Science* 344(6188): 1124-1127.

Penn, D. 2003. The Evolutionary Roots of Our Environmental Problems: Toward a Darwinian Ecology. *The Quarterly Review of Biol*ogy 78(3): 275-301.

Potts, G. et al. 2010. Global pollinator declines: trends, impacts and drivers. *Trends in Ecology and Evolution* 25(6): 345-353.

Rees, W. 2010. What’s blocking sustainability? Human nature, cognition, and denial. Sustainability: Science, Practice and Policy, 6(2):13-25. <https://doi.org/10.1080/15487733.2010.11908046>

Reynolds, M. et al. 2017. Dynamic conservation for migratory species. *Science Advances* 3:e1700707

Ripple, W.J. et al. 2017. World Scientists’ Warning to Humanity: A Second Notice. *BioScience*, 67(12), 1026–1028. <https://academic.oup.com/bioscience/article/67/12/1026/4605229>

Ripple, W.J. et al 2020. World Scientists’ Warning of a Climate Emergency. BioScience, 70(1), 8–12. <https://doi.org/10.1093/biosci/biz088>

Rockstrom et al. 2009. A safe operating space for humanity. *Nature* 461, 472–475.

Rockstrom et al. 2009. Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society* 14(2), Article 32

Rodriguez-Cabal, M. et al. 2013. Node-by-node disassembly of a mutualistic interaction web driven by species introductions. *Proceedings of the National Academy of Sciences* 110(41):16503-16507.

Root, T. et al. 2003. Fingerprints of global warming on wild animals and plants. *Nature* 421 57-60.

Rundlof, M et al. 2015. Seed coating with a neonicotinoid insecticide negatively affects wild bees. *Nature* 521(7550): 77-80.

Schuur, E.A.G., J. Bockheim, et al. 2008. Vulnerability of permafrost carbon to climate change: Implications for the global carbon cycle.*BioScience*58: 701-714

Scranton, R. 2015. Learning to Die in the Anthropocene – Reflections on the end of a civilization. City Lights Books. New York Times initial article (2013) [https://archive.nytimes.com/opinionator.blogs.nytimes.com/2013/11/10/learning-how-to-die-in-the-anthropocene/](https://can01.safelinks.protection.outlook.com/?url=https%3A%2F%2Farchive.nytimes.com%2Fopinionator.blogs.nytimes.com%2F2013%2F11%2F10%2Flearning-how-to-die-in-the-anthropocene%2F&data=05%7C01%7Cgroganp%40queensu.ca%7C6cf49cd2228144299f2f08db32402d9a%7Cd61ecb3b38b142d582c4efb2838b925c%7C1%7C0%7C638159023436864693%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=GNasofdVB%2FfHKtZoEsG5dyfv8bLCNipZlIpbTAencRU%3D&reserved=0)

Steffen, W., et al 2015. Planetary boundaries: Guiding human development on a changing planet. *Science* 347(6223), 736-746

Steffen, W., et al 2015. The trajectory of the Anthropocene: the great acceleration. *The Anthropocene Review*, 2(1), 81-98.

UN 2023 Climate Change Report Summary <https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_SPM.pdf>

Vitousek et al, 1997. Human domination of Earth’s ecosystems. *Science* 272:494-499.

Voigt C., et al. Warming of subarctic tundra increases emissions of all three important greenhouse gases – carbon dioxide, methane and nitrous oxide. *Global Change Biology* (23)8: 3121-3138

Waters, C. et al 2022. Defining the onset of the Anthropocene. *Science* 272:706-708

Wigley, T. 2005. The Climate Change Commitment. *Science* 307:1766-1709

Wynes, S and Nicholas, K. 2017. The Climate Mitigation Gap: education and government recommendations miss the most effective individual actions. *Environmental Research Letters* 12: 074024

Xie, J. et al 2011. Ecological mechanisms underlying the sustainability of the agricultural heritage rice–fish coculture system. *Proceedings of the National Academy of Sciences* 108 (50): 1381-1387

**Books (I have copies of these if you cannot locate them in the library):**

Aarssen, L. 2015. What are we?  Exploring the evolutionary roots of our future. Especially Chapter 12 – Becoming the solution.

Bree Rosenblum, E. 2021. Global Change Biology – the study of life on a rapidly changing planet. Oxford Univ. Press.

Brown, L. R. 2009. Plan B 4.0: Mobilizing to save civilisation. Earth Policy Institute.

Brown, L. R. 2011. World on the Edge: How to prevent Environmental and Economic collapse. Earth Policy Institute

Diamond, J. 1991. The Third Chimpanzee: The Evolution and Future of the Human Animal

Harari, YN. 2015. Sapiens:  A Brief History of Humankind

Homer-Dixon, T. 2006. The Upside of Down: Catastrophe, Creativity and the Renewal of Civilisation. Island Press.

Kimmerer, R. W. 2014. Braiding Sweetgrass: Indigenous wisdom, scientific knowledge

and the teachings of plants. Milkwood books.

Macy, J and Johnstone, C. 2012. Active Hope : How to Face the Mess We're in without Going Crazy. New World Library.

McKibben, B. 2006. The End of Nature. Random House.

Ponting, C. 2007. A New Green History of the World: The Environment and the collapse of great civilisations. 2nd edition. Penguin.

Suzuki, D. and H. Dressel 2010. More Good News: Real solutions to the global eco-crisis. Vancouver, Greystone.

Wright, R. 2004. A Short History of Progress. New York, Carroll and Graf. (An excellent and very readable description of the rises and falls of earlier civilisations, and the major over-riding causes.) As an alternative to reading, you could listen to the 2004 CBC Massey lectures of this book: <https://www.cbc.ca/radio/ideas/the-2004-cbc-massey-lectures-a-short-history-of-progress-1.2946872>

**Films/Documentaries**

**A Life on Our Planet** (2020)~80 minute documentary by David Attenborough (available on Netflix <https://www.netflix.com/browse?jbv=80216393> , and <http://www.documentarymania.com/player.php?title=David%20Attenborough:%20A%20Life%20on%20Our%20Planet>)

**Food Inc.** Documentary film about the industrialisation of food production. Excellent. HIGHLY RECOMMENDED. Available via Queen’s library video collection entitled Criterion on Demand at <https://media3-criterionpic-com.proxy.queensu.ca/htbin/wwform/006?T=AL111097>

**Surviving progress** (2011) Available via Queen’s library video collection (NFB) at: <https://www-nfb-ca.proxy.queensu.ca/film/surviving-progress/>

**Quest for Fire**. (1981) Set 80,000 years ago, a human tribe depends on an ever-burning source of fire. After it eventually extinguishes, and lacking the knowledge to start a new fire, the tribe sends three warriors on a quest to find a new source. Review at: <https://www.nytimes.com/1982/02/12/movies/quest-for-fire-a-prehistoric-odyssey.html>

Available via Queen’s library video collection (Criterion on Demand) - <https://media3-criterionpic-com.proxy.queensu.ca/htbin/wwform/006/wwt770?kw=quest+for+fire>

**The Social Dilemma** A documentary examining how social media apps foster dependency and addiction. Available via Netflix, and at: <https://vimeo.com/462049229>

**The Day After** (1983). An American TV film focussing on the impacts on Kansas residents of a postulated full-scale nuclear exchange between the United States and the Soviet Union.Reviews at:

<https://www.tvguide.com/movies/the-day-after/review/2000276295/>

<https://www.nytimes.com/1983/11/20/arts/tv-view-the-day-after-tv-as-a-rallying-cry.html>

Available at: <https://www.dailymotion.com/video/x88sxqq>

**Force of Nature** – David Suzuki’s retrospective documentary film (~ 2 hours). Available from Queen’s library (NFB), and commercially as DVD.

**An Inconvenient Sequel**: Truth To Power (Documentary sequel to the original film entitled An Inconvenient Truth – by Al Gore on climate change)

**What a way to go – life at the end of empire**. Highly rated documentary film (2 hours) <http://topdocumentaryfilms.com/what-a-way-to-go-life-at-the-end-of-empire/>

**Anthropocene – The Human Epoch**. A new documentary film by Burtynsky et al. Available via Queen’s library video collection at <https://queensu.kanopy.com/product/anthropocene-human-epoch>

**Manufactured landscapes**. A really excellent documentary film (~ 1.5 hours) about the work of photographer Edward Burtynsky as he observed social and industrial activities in China and elsewhere. Available via Queen’s library video collection (NFB), and <http://www.youtube.com/watch?v=SZnZOe_tKCs&feature=related>

**Colonization Road:** The path of reconciliation is long and winding – An excellent documentary on the history and impacts on settler colonisation on Canadian indigenous communities (CBC Documentaries PointOfView) <https://www.youtube.com/watch?v=u03qLJ50bf4>

**The Call of the Mountain**: Arne Naess and the Deep Ecology Movement (full version ~ 50 mins) <https://www.youtube.com/watch?v=Wf3cXTAqS2M>

**The Story of Stuff** - <https://www.youtube.com/watch?v=9GorqroigqM>

**Planet of the Humans** – by Michael Moore “A documentary that dares to say what no one else will — that we are losing the battle to stop climate change on planet earth because we are following leaders who have taken us down the wrong road — selling out the green movement to wealthy interests and corporate America.” <https://www.youtube.com/watch?v=Zk11vI-7czE>

**Video: Planet Earth The future episode 1 Saving species** <https://queens-only-library-queensu-ca.proxy.queensu.ca/video/video-planet-earth-the-future-episode-1-saving-species>

**Video: Planet Earth The future episode 2 Into the Wilderness** <https://queens-only-library-queensu-ca.proxy.queensu.ca/video/video-planet-earth-the-future-episode-2-into-the-wilderness>

**Video: Planet Earth The future episode 3 Living Together**. David Attenborough. <https://queens-only-library-queensu-ca.proxy.queensu.ca/video/video-planet-earth-the-future-episode-3-living-together>

**Interesting electronic media links:**

From DDT to Climate Change: How warnings about environmental hazards have been ignored, dismissed, and disparaged by Dr. Naomi Oreskes March 16, 2022. An excellent talk available at:

<https://can01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.nfu.ca%2Fnfuniversity%2Fpast-classes%2F&data=05%7C01%7Cgroganp%40queensu.ca%7C5ab71f3d155141fa745508db2f0e9c0f%7Cd61ecb3b38b142d582c4efb2838b925c%7C1%7C0%7C638155512025020103%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=tvotfRxIIktIrPZVv%2FQgXNX40FID0ypJjzix8RwLbM4%3D&reserved=0>

and on the NFU’s YouTube channel in English at <https://can01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fyoutu.be%2FhzcTGNTqwDw&data=05%7C01%7Cgroganp%40queensu.ca%7C5ab71f3d155141fa745508db2f0e9c0f%7Cd61ecb3b38b142d582c4efb2838b925c%7C1%7C0%7C638155512025020103%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=mjksgQNqDuXvv%2BudxtdxQeBv6rWQ1crHPILs3X0913w%3D&reserved=0>

Project Drawdown: Excellent resources focussed on developing climate change solutions <https://drawdown.org>

Forget Taking Shorter Showers – the video I mentioned in the context of personal versus organizational level change:  <https://www.youtube.com/watch?v=m2TbrtCGbhQ>

The ‘Pale Blue Dot’, and Carl Sagan quote:

<https://www.planetary.org/explore/space-topics/earth/pale-blue-dot.html>

<https://solarsystem.nasa.gov/resources/536/voyager-1s-pale-blue-dot/>

The Stockholm Resilience Centre – Sustainability Science for Biosphere Stewardship <https://www.stockholmresilience.org>

Future Earth: <https://futureearth.org>

Will we survive this century? TedTalk by Martin Rees who served as Britain’s Astronomer Royal (14 minute talk) <http://www.ted.com/talks/lang/eng/martin_rees_asks_is_this_our_final_century.html>

Jared Diamond on why societies collapse (20 minute talk) <http://www.ted.com/talks/jared_diamond_on_why_societies_collapse.html>

Bjorn Lomborg – Which of our civilisation’s problems should get highest priority? <http://www.ted.com/talks/bjorn_lomborg_sets_global_priorities.html>

<http://theconversation.com/how-mindfulness-can-help-the-shift-towards-a-more-sustainable-society-79127>

Wilhelm Streeck is a political economist who is very accessible and has strong ideas on capitalism. He is interviewed in an excellent CBC radio ‘Ideas’ documentary: <http://www.cbc.ca/radio/ideas/surviving-post-capitalism-coping-hoping-doping-shopping-1.3973042>

Dr Henry Rosling explaining the past 200 years of world progress in terms of life expectancy and wealth, drawing an optimistic conclusion (4 minute video). <https://www.youtube.com/watch?v=jbkSRLYSojo>