On this episode, we meet with Professor at the University of British Columbia and Founder of Sea Around Us, Dr. Daniel Pauly.

Dr. Pauly shares the role warming sea water plays in fish migration. How do warming temperatures affect water oxygen levels and fish behavior?

Dr. Pauly explains that the world has passed peak fish, and why contemporary metrics do not always paint a complete picture of our dire situation.

About Daniel Pauly

Dr. Daniel Pauly is a Killam Professor at the University of British Columbia, the Founder of the Sea Around Us, and author of more than a dozen books.

Show Notes & Links to Learn More

00:45: Daniel Pauly Info + Works
https://www.seaaroundus.org/daniel-pauly/
https://oceans.ubc.ca/daniel-pauly/

Vanishing Fish: Shifting Baselines and the Future of Global Fisheries -
https://www.amazon.com/Vanishing-Fish-Shifting-Baselines-Fisheries/dp/1771643986


02:14: Peak Oil Podcast
https://www.thegreatsimplification.com/episode/03-arthurberman
02:31: Peak Fish Catch Worldwide in 1996
https://www.nature.com/articles/ncomms10244

03:31: Global fisheries statistics
https://www.seaaroundus.org/data/#/global?chart=catch-chart&dimension=taxon&measure=tonnage&limit=10

04:07: Understated declines because of more fisheries opening, making up for declining catches

04:38: Declined fish catches of 1 million/metric tons per year

05:03: Fisheries catch 80-90 million tons/year, but real catch of 130 million tons/year
https://www.nature.com/articles/ncomms10244

05:28: 15% declines in catch since 1996 in salt water fish
https://www.sciencedirect.com/science/article/pii/S0308597X17306334

10:20: Early humans migrated along coastlines
https://www.worldhistory.org/article/1070/early-human-migration/

11:04: When moving inland, humans wiped out most large mammals

12:05: We then shifted to agriculture which shifted vegetation on the landscape

12:28: Beginning of fossil energy use exploded fishing practices and accessibility

13:12: Daniel Pauly paper on peak oil and peak fish (2013)
https://www.nature.com/articles/494303a

13:41: Heavy subsidies enable fisheries in the high seas
Are bad subsidies linked to slavery in fisheries?

14:22: Smaller scale fisheries could produce the same amount of fish as large scale ones, and do it better

15:08: Activism initiatives supporting small scale fisheries (WTO)

https://www.wto.org/english/tratop_e/rulesneg_e/fish_e/fish_e.htm
16:08: The amount of time to recover fish stocks

16:48: The US has been very successful at replenishing fishery stocks, mostly due to privilege
https://www.pnas.org/doi/10.1073/pnas.1604982113

17:34: Shifting Baselines

21:35: 1950 as a baseline for fisheries
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1636108/

23:09: Discount rates
https://read.realityblind.world/view/975731937/96/

23:49: Climate change’s effects on the ocean (Put podcast in here as well)
https://www.nhm.ac.uk/discover/quick-questions/how-does-climate-change-affect-the-ocean.html#:~:text=Climate%20change%20warms%20the%20ocean,Salinity%20of%20the%20ocean%2C%20respectively.

https://www.thegreatsimplification.com/episode/08-peter-ward

25:46: Fish need to work to breathe the oxygen out of the water and they need it to digest
https://oceanconservancy.org/blog/2020/01/17/gills/

26:18: Gills extract 80% of oxygen
https://en.wikipedia.org/wiki/Fish_gill#:~:text=The%20effect%20of%20this%20is,oxygen%20available%20in%20the%20water.

27:10: Ocean oxygen has dropped 2%
https://www.iucn.org/resources/issues-briefs/ocean-deoxygenation#:~:text=Globally%2C%20oceans%20have%20lost%20around,is%20predicted%20to%20vary%20regionally.

27:26: As ocean temperature increase, fish need more oxygen

27:34: Ocean temperature increasing
https://www.iucn.org/resources/issues-briefs/ocean-warming

27:51: Gill Oxygen Limitation Theory
https://www.science.org/doi/10.1126/sciadv.abc6050

28:39: Homeostasis
https://www.scientificamerican.com/article/what-is-homeostasis/

29:05: Temperature is 1-1.5 degrees Celsius warmer globally
https://www.climate.gov/news-features/understanding-climate/climate-change-global-
Temperature: August 2021

Highlights, land areas were record warm.

29:33: Fish populations have moved polewards

32:22: Equator countries will be hit the hardest by these changes
https://www.science.org/content/article/warming-oceans-are-hurting-seafood-supply-and-things-are-getting-worse

32:48: Salmon in California are gone

33:38: Over forecast of fossil fuels remaining
https://read.realityblind.world/view/975731937/270/

33:42: Bio-feedbacks are underestimated
https://www.climaterealityproject.org/blog/how-feedback-loops-are-making-climate-crisis-worse

34:10: Pauly’s paper on changes mean temperature of the catch

37:28: Map of how fish have migrated over the years

38:04: Methane release in the tundra
https://en.wikipedia.org/wiki/Arctic_methane_emissions#

38:53: High temperature tolerant fish

43:02: Trawling and other destructive fishing practices

43:22: Marine protected areas
https://marineprotectedareas.noaa.gov/understanding.html

44:37: Steven Magnuson Act

47:45: Sea Around Us
https://www.seaaroundus.org/

47:56: Rachel Carson The Silent Spring
http://www.rachelcarson.org/SilentSpring.aspx
49:33: Small scale fisheries are ⅓ of all fisheries

53:24: Fish farms
https://en.wikipedia.org/wiki/Fish_farming

53:41: Carnivorous fish do not reduce pressure on fisheries
https://news.stanford.edu/pr/00/fishfarms628.html

54:49: Colorant added to salmon
https://qz.com/358811/heres-why-your-farmed-salmon-has-color-added-to-it/

55:12: Sardines in the North Sea are getting smaller
https://www.dailymail.co.uk/sciencetech/article-7978947/Sardines-two-thirds-SMALLER-12-years-ago-climate-change.html

Link to the podcast’s website:
https://www.thegreatsimplification.com/episode/15-daniel-pauly