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EARTH ROOT

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“THE ACTIVIST IS NOT THE MAN WHO SAYS THE RIVER IS DIRTY. THE ACTIVIST IS THE MAN WHO CLEANS UP THE RIVER.” - ROSS PEROT



About E-magazine

“Earth Root” is an open access e-magazine in the discipline of Environmental sciences published by Earth Root Foundation. The aim of the e-magazine is to provide information and upgradation of knowledge about environmental issues on wider scale and to share ideas and resources to the readers. Using essential knowledge people can lead a healthy life, which is more sustainable and can connect with ongoing efforts for stopping catastrophically the climate change. E-magazine caters to all related environmental aspects ranging from big issues like climate change, renewable energy and pollutants in the atmosphere to the health of human and living beings on Earth. We also take topics of water resources and efforts and measurement to provide optimum use of it; including large scale atmospheric circulation linked with oceans and ecology.

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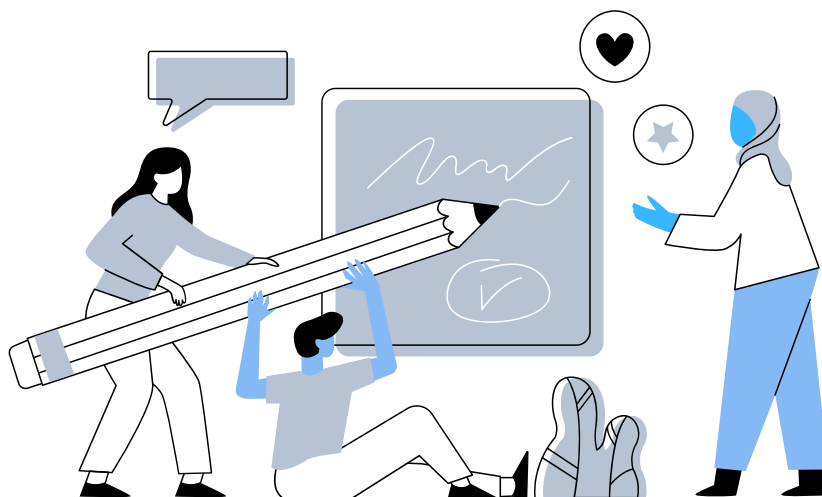
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GREEN MEDICINE: THE POWER OF MEDICINAL PLANTS FOR PEOPLE AND PLANET

Medicinal plants known for their therapeutic properties are an integral part of modern-day medicine (Fan et al. 2023) and find humongous uses in traditional medicine date back thousands of years, and their therapeutic properties are well-documented. These plants contain various bioactive compounds known as Subsidiary Metabolites or Secondary Metabolites such as alkaloids, terpenoids, flavonoids, and phenolic acids produced by plants as part of their natural defence mechanisms they are not directly involved in plant growth and development, but they play a crucial role in the interaction between plants and their environment and have pharmacological actions such as anti-inflammatory, antioxidant, antimicrobial, and pain-relieving effects, among others, assure health benefits. The role of secondary metabolites in environmental sustainability is significant and multifaceted, as these compounds have a range of ecological functions that contribute to the stability and health of ecosystems.

Since they grow naturally in the environment, and their use can help to reduce the negative impact of synthetic drugs on the environment which would ultimately promote biodiversity and support the conservation of natural resources. In addition, secondary metabolites have significant potential for their use in various applications, such as pharmaceuticals, food additives, and cosmetics also they can be used as natural alternatives to synthetic chemicals, which can have adverse environmental impacts.

Worldwide recognition of medicinal plants as a reliable and affordable substitute for manufactured chemotherapeutic compounds and their potential for low-cost applications in greener economies and lifestyles is growing. However, like all living organisms, these plants are susceptible to environmental factors that can impact their growth, quality, and availability. Environmental factors such as climate change, air pollution, deforestation, habitat destruction, soil erosion, soil quality, heavy metal toxicity and water pollution can significantly impact the growth and availability of medicinal plants.

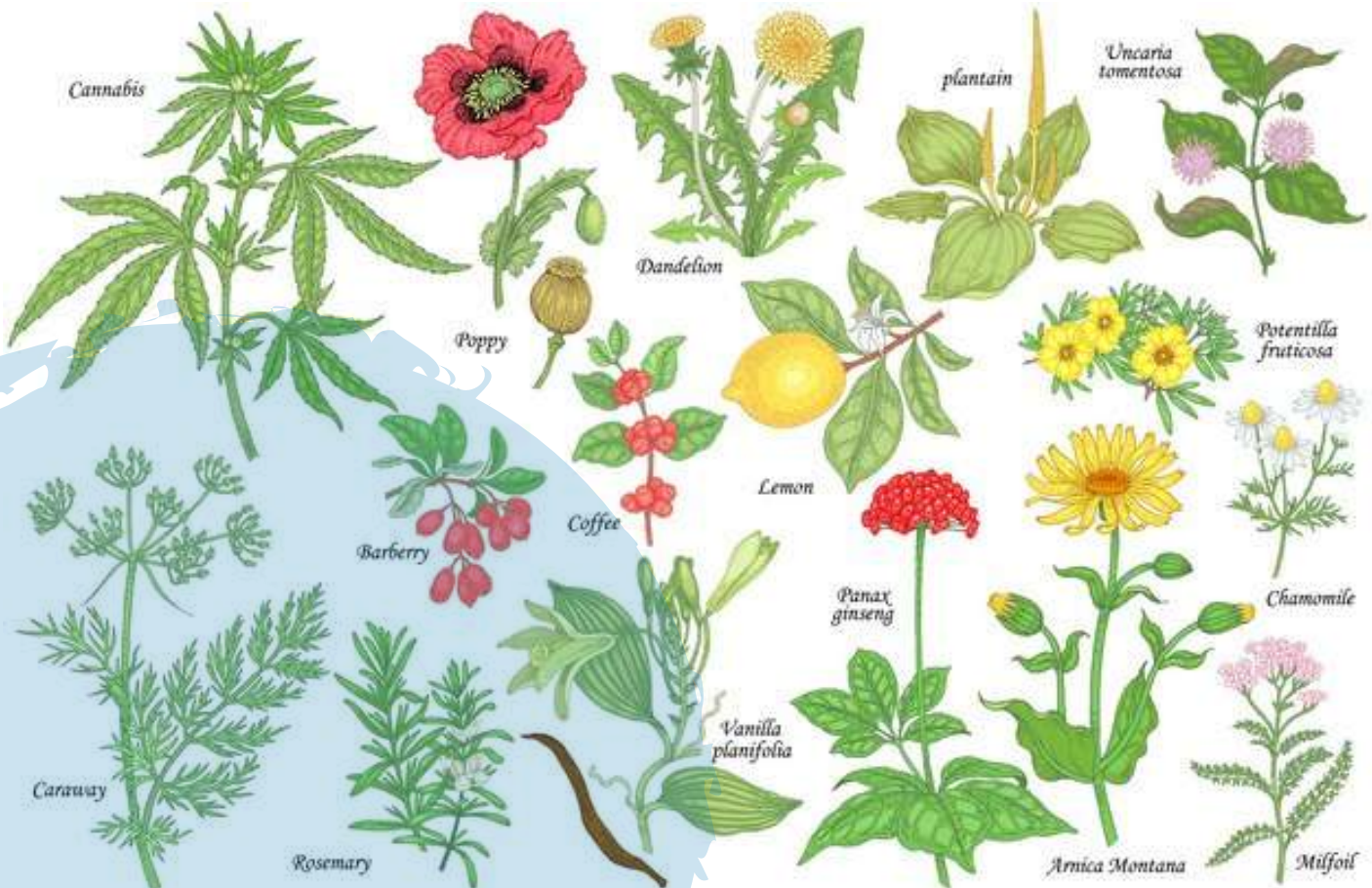
The impact of environmental factors on medicinal plants can have significant consequences for human health, loss of biodiversity can lead to the extinction of medicinal plants, which can result in the loss of potential cures for diseases. Changes in the quality and availability of medicinal plants can also affect the efficacy of herbal remedies and modern medicines derived from plant sources. In addition, environmental degradation can reduce the supply of medicinal plants, leading to increased prices, making traditional medicines inaccessible to many people. Since numerous species of medicinal plants are in danger of going extinct due to unrestrained commercialization, habitat loss, and degradation, the National Medicinal Plants Board's establishment has sped up and provided momentum for the sustainable use of medicinal plants throughout the nation.

Meanwhile, recent developments in “omics” research, biotechnology, and tissue culture hold the potential to become an effective tool for conservation and identifying features with significant economic implications in the future.

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FASHION'S TOXIC FOOTPRINT: UNVEILING THE ENVIRONMENTAL COST, AND THE PATH TO SUSTAINABLE STYLE

In a world where trends can change overnight, and fashion is often synonymous with excess and extravagance, a new movement is quietly reshaping the industry. Imagine a fashion world where style isn't just about aesthetics but also about ethics—a place where clothing isn't merely a reflection of personal taste, but a statement of responsibility. As our planet faces the ever-pressing challenges of climate change and environmental degradation, the fashion industry has undergone a remarkable transformation. It's no longer solely about sartorial splendor; it's about embracing a moral imperative—looking good, feeling good, and doing good.

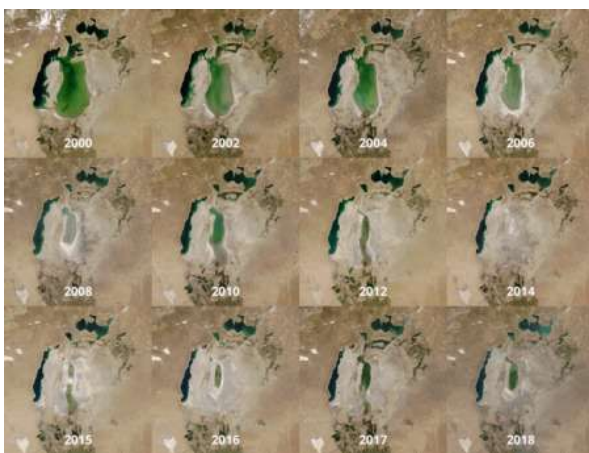
Beneath the glamour and allure of the industry lies a trail of environmental havoc that traditional fashion practices leave in their wake. From the deployment of ecologically damaging pigments to the unbridled proliferation of waste, the environmental footprint of the fashion domain is nothing short of staggering, demanding our immediate scrutiny.

However, this article doesn't seek to apportion blame; rather, its mission is to illuminate the burgeoning undercurrent within the fashion sphere—a movement that not only acknowledges its culpability in exacerbating these environmental challenges but is actively engaged in engineering a more sustainable, conscientious, and scientific approach to fashion's future.

[The Environmental Toll of Fashion: Unraveling an Industry's Impact](#)

The fashion industry exacts a multifaceted environmental toll, with water pollution, greenhouse emissions, deforestation, and habitat destruction at its core. Textile dyeing and finishing processes discharge chemical-laden wastewater, contaminating water sources and ecosystems. The production and transportation of garments contribute significantly to greenhouse gas emissions. Fashion's demand often fuels deforestation, endangering wildlife habitats.

This environmental quagmire calls for a paradigm shift towards sustainability and responsible production practices. Moreover, it contributes to resource depletion, land degradation, and intensified waste generation, highlighting the urgency of addressing these interconnected ecological challenges to pave the way for a more sustainable sartorial future. For instance, the Aral Sea has drastically shrunk due to excessive water use in textile production. Meanwhile, the Citarum River in Indonesia suffers from severe pollution caused by textile factories. These examples highlight fashion's role in environmental degradation.



The Aral Sea and Cotton

(Source: <https://impakter.com/fast-fashion-desolates-future-shop-salvage-sabotage/>)

Fast Fashion's Environmental Toll: Unmasking its Ecological Impact

Fast fashion, while celebrated for its affordability and trend turnover, exacts a heavy toll on the planet. The rapid production cycles, driven by consumer demand for quick and inexpensive clothing, lead to increased resource consumption, massive water usage, and substantial carbon emissions. The industry's reliance on synthetic materials and chemically intensive processes further contributes to environmental degradation, while the disposal of vast amounts of clothing adds to landfills and pollutes ecosystems. This unsustainable model necessitates urgent attention and transformative action to mitigate its profound ecological impact, urging a shift towards more responsible and sustainable fashion practices.

For instance, the disposal of fast fashion items leads to overflowing landfills and contributes significantly to textile waste worldwide. Urgent action is imperative to transition towards sustainable fashion models, curbing this destructive trend and fostering environmentally responsible practices within the industry.

Fashion for Climate Action: Stylish Solutions to a Global Crisis

The fashion industry has long been associated with a significant carbon footprint, from textile production to garment manufacturing and transportation. However, in recent years, many fashion brands have committed to reducing their environmental impact. Gucci, an iconic luxury brand, is committed to achieving carbon neutrality by offsetting its greenhouse gas emissions and investing in sustainability initiatives. Similarly, Nike, a prominent sportswear giant, is dedicated to reaching 100% renewable energy use in its facilities by 2025, contributing significantly to the broader sustainability drive.

Call to Action: Be an Agent of Change in the World of Sustainable Fashion

Embracing sustainable fashion isn't just a choice; it's a crucial step towards a better future for our planet. As consumers, we hold immense power to drive change in the fashion industry by making conscious decisions. It starts with educating ourselves about the environmental and social impacts of our clothing choices. Supporting brands committed to sustainability, opting for timeless and durable pieces, embracing second-hand shopping, and demanding transparency in supply chains are actionable steps to foster a more ethical and eco-conscious fashion landscape. Each decision we make contributes to a collective movement, signaling the industry to prioritize sustainability and paving the way for a more responsible and vibrant fashion future.

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A GUIDE TO SUSTAINABLE GARDENING FOR A GREENER TOMORROW

Introduction

In an era marked by the urgency of environmental conservation, sustainable gardening emerges as a beacon of responsible living. It is a harmonious dance with nature, a "give and take" where our efforts to nurture the environment are reciprocated with flourishing landscapes and reduced ecological footprints. In this exploration, we delve into the essence of sustainable gardening, its manifold benefits, and actionable steps to cultivate an eco-friendly oasis in our backyards.

The Call for Sustainability

Sustainability has become a rallying cry in our collective efforts to preserve the delicate balance of our planet. With finite resources depleting and environmental challenges escalating, the imperative for sustainable living reverberates across various facets of our lives. Gardening, a practice often associated with beauty and tranquillity, has evolved into a pivotal arena for environmentally conscious choices.

Did You Know?

- While nearly 70% of the planet is covered by water, only 2.5% of the water on Earth is freshwater.
- There is only enough oil on the planet to supply the current demand for another 46 years.
- More than 12 million hectares of forest have been cut down or burned in 2023 so far.

The alarming facts underscore the critical need for change, and small adjustments in our gardening practices can contribute significantly to a sustainable future.

Understanding Sustainable Gardening

Sustainable gardening transcends the act of planting and encompasses a holistic approach to outdoor spaces. It involves making earth-friendly choices, utilizing natural resources judiciously, and repurposing existing materials. It is a commitment to creating and maintaining gardens that thrive in tandem with the environment.

Benefits of Sustainable Gardening

1. Considerate of Local Wildlife:

Opting for local plants and pollinator-friendly choices supports the ecosystem, contributing to the well-being of beneficial insects, birds, and various species, thereby enhancing local biodiversity.

2. Combatting Climate Change:

Choosing drought-tolerant plants and adopting sustainable gardening practices reduces resource consumption, minimizes waste, and mitigates the generation of greenhouse gases, thus playing a role in combating climate change.

3. Economic Savings:

Sustainable gardening can save money in the long run. Growing your own produce, creating homemade compost, and utilizing rainwater through water butts are economically savvy practices.

5 Ways to Garden Sustainably

1. Conserve Water:

Embrace drought-tolerant plants like succulents, cacti, and lavender. Install water butts to collect rainwater or utilize grey water from your home. Water your garden during non-peak hours to prevent evaporation.

2. Go Peat-Free:

Choose peat-free growing mediums that utilize coconut fibre or wood bases instead of traditional peat moss, contributing to the reduction of carbon emissions associated with peat farming.

3. Say No to Patios:

Replace paved patio areas with shrubs or trees to aid carbon absorption. Alternatively, opt for reclaimed decking, set paving slabs in sand for water permeation, or use second-hand or permeable materials.

4. Plant Pollinator-Friendly Flora:

Support pollinators like bees and butterflies by cultivating plants rich in pollen, such as lavender, zinnia, sunflowers, asters, and foxgloves. Embrace initiatives like No Mow May to encourage wildflowers and pollinator habitats.

5. Choose Electric or Hand-Powered Tools:

Prioritize electric or rechargeable gardening tools over petrol options. For a truly sustainable touch, embrace hand-powered tools, minimizing reliance on finite resources.

The Time Has Come

While systemic changes across various industries are indispensable for mitigating climate change, individual actions resonate profoundly. Sustainable gardening is not merely a trend; it is a collective endeavour to safeguard the planet we call home. As we make conscientious choices in our gardens, we contribute to a larger narrative of environmental stewardship.

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CARBON EMISSIONS THROUGHOUT HISTORY AND FUTURE TRENDS

Introduction

Carbon dioxide (CO₂) emissions have undergone a remarkable evolution throughout history, leaving an indelible mark on the Earth's climate. This article traces the historical trends of CO₂ emissions, delineating key periods and events that have shaped the contemporary environmental landscape.

1. Pre-Industrial Era (Before 18th Century):

Before the industrial revolution, human activities made a negligible impact on CO₂ levels. Natural processes, including volcanic activity and animal respiration, were the predominant sources of atmospheric carbon dioxide. The Earth's carbon cycle maintained a delicate equilibrium, with natural sinks effectively absorbing emitted carbon.

2. Industrial Revolution (18th Century):

The advent of the industrial revolution marked a turning point as societies embraced mechanized manufacturing and widespread coal usage.

Steam engines, powered by coal combustion, became central to industrial processes, resulting in a substantial increase in CO₂ emissions. The industrial landscape transformed, setting the stage for a new era of anthropogenic emissions.

3. Early 20th Century:

The early 20th century witnessed the continued rise in CO₂ emissions, propelled by increased industrialization and the growing use of coal. The expanded use of oil and natural gas in transportation further contributed to the upward trajectory. Despite these changes, global awareness of the environmental consequences of CO₂ emissions remained limited.

4. Post-World War II (Mid-20th Century):

The aftermath of World War II saw a surge in economic growth and technological advancements, particularly in developed nations. This period witnessed an exponential increase in CO₂ emissions due to the widespread adoption of fossil fuels for energy and the expansion of manufacturing and transportation industries.

5. Late 20th Century:

The latter half of the 20th century marked a significant shift in public awareness regarding environmental issues. Scientific research increasingly linked CO₂ emissions to climate change, prompting the emergence of environmental movements. International efforts to address climate concerns gained momentum, culminating in the Kyoto Protocol (1997), the first global attempt to curb greenhouse gas emissions.

6. 21st Century:

The 21st century brought a heightened focus on sustainable practices and clean energy solutions. Technological advancements in renewable energy, such as solar and wind power, gained prominence. However, despite these strides, global CO₂ emissions continued to escalate due to factors like rapid industrialization in developing nations and persistent reliance on fossil fuels.

Forecasting Future Trends in CO₂ Emissions

1. Continued Industrialization in Developing Nations:

The burgeoning industrialization in developing nations is anticipated to contribute significantly to future CO₂ emissions. As these countries strive for economic growth, increased energy consumption and reliance on fossil fuels may lead to a surge in greenhouse gas emissions, mirroring the patterns observed during the industrial revolution.

2. Transition to Renewable Energy:

A promising trend for the future lies in the accelerated transition to renewable energy sources. Advances in technology and growing environmental consciousness are expected to drive increased adoption of solar, wind, and other sustainable energy alternatives. This transition could serve as a pivotal force in mitigating future CO₂ emissions.

3. Technological Innovations and Carbon Capture:

The development and implementation of innovative technologies, such as carbon capture and storage (CCS), could play a crucial role in shaping future CO₂ emission trends. These technologies aim to capture emitted carbon at its source, preventing it from entering the atmosphere. If successfully deployed on a large scale, CCS could be instrumental in curbing emissions from various industries.

4. International Cooperation and Agreements:

Global efforts to combat climate change, as demonstrated by initiatives like the Paris Agreement, will likely influence future CO₂ emission trends. Collaborative measures and shared commitments to reduce emissions on a global scale may result in concerted actions that contribute to a sustainable and low-carbon future.

5. Policy and Regulatory Measures:

The enactment and enforcement of stringent environmental policies and regulations by governments worldwide can significantly impact CO₂ emission trends. Policy measures that incentivize clean energy adoption, penalize carbon-intensive practices, and promote sustainable development could shape a more environmentally conscious future.

6. Public Awareness and Behavioral Changes:

Increasing public awareness of the environmental consequences of CO₂ emissions may drive behavioral changes on both individual and corporate levels. A growing demand for sustainable practices, coupled with consumer preferences for eco-friendly products and services, could incentivize businesses to reduce their carbon footprint.

MOVIE RECOMMENDATION

ARTIFISHAL (2019)

A look at the challenges ecologists and conservationists face in the lucrative salmon-hatchery industry.

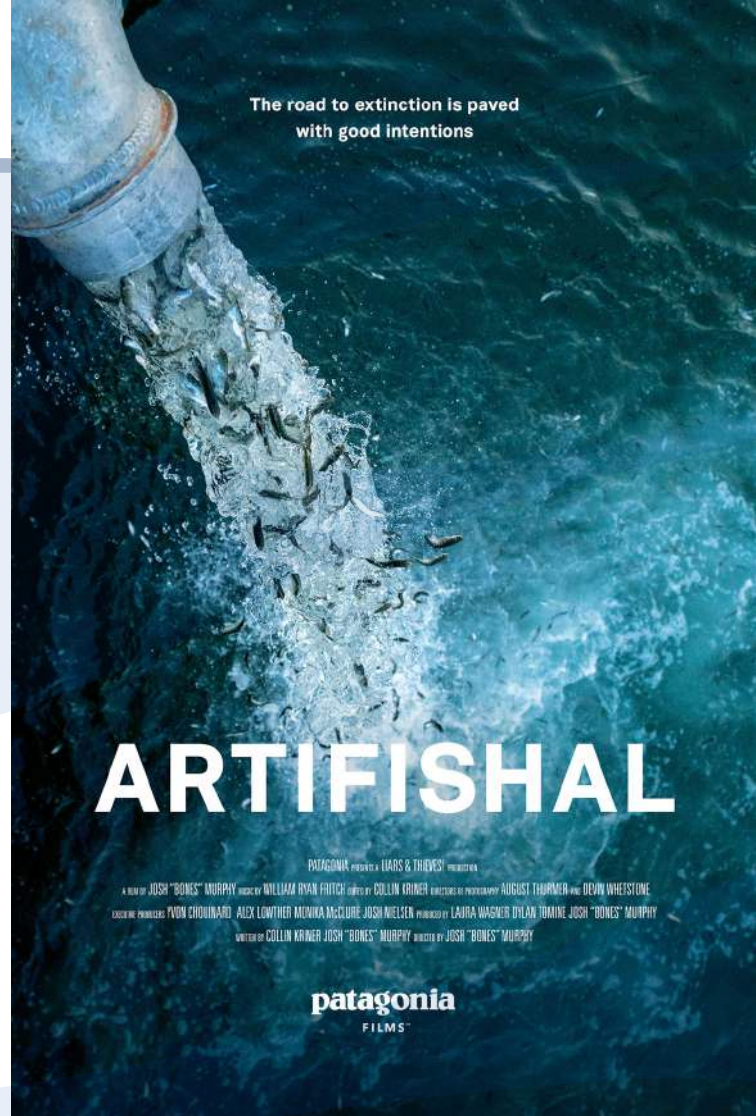
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 - [Josh Murphy](#)
- Writers
 - [Collin Kriner](#)
 - [Josh Murphy](#)
- Stars
 - [Brett Galyean](#)
 - [Yvon Chouinard](#)
 - [Jim Lichatowich](#)

Synopsis

Artifishal is a film about people, rivers, and the fight for the future of wild fish and the environment that supports them. It explores wild salmon's slide towards extinction, threats posed by fish hatcheries and fish farms, and our continued loss of faith in nature. Salmon have long been an icon of wild, but in our rush to meet demand and mask the larger root environmental issues, we've forgotten the true value of wild. Ultimately the film sets two ideologies at odds, those who embrace the power of nature to heal and those who believe in a world that requires continued control. Hopefully the film leaves viewers wrestling with a disquieting question, have we reached the end of wild?

Through factual and character driven vignettes, the film explores competing world views and the extraordinary amount of public money that has been spent on an industry that is killing native fish, polluting our rivers and contributing to the very problem it claims to solve. In addition, ARTIFISHAL examines the negative effects of open-water fish farms--another failed technological solution we turned to in the face of plummeting fish populations--and their devastating impacts on remaining wild salmon stocks.

Wild salmon have been driven to the brink of extinction by habitat destruction, overharvesting and dams blocking access to spawning grounds. Hatcheries and fish farms originally promised an easy fix, comforting us with the promise that these keystone species could be preserved through artificial propagation. We were wrong. Mass producing domesticated fish has only hastened the demise of wild fish-and if there's a future for these irreplaceable species and the communities that rely on them, it's in the realization that the best hatchery is a healthy river.



"Whispers of the Deep"

Beneath the vast expanse where waves hold sway,
A silent tragedy in the sea's ballet.
Echoes of pollution, a muted plea,
As once azure waters yield to debris.

Plastics drift, a shadow on the tide,
A perilous dance where sea creatures hide.
Oil-stained rainbows mark a desolate dream,
Nature's reflection in a polluted stream.

Creatures of the deep, tales of despair,
Corals bleached, life's vibrant hues wear.
In the silence of the sea's lament,
A plea emerges, a call to repent.

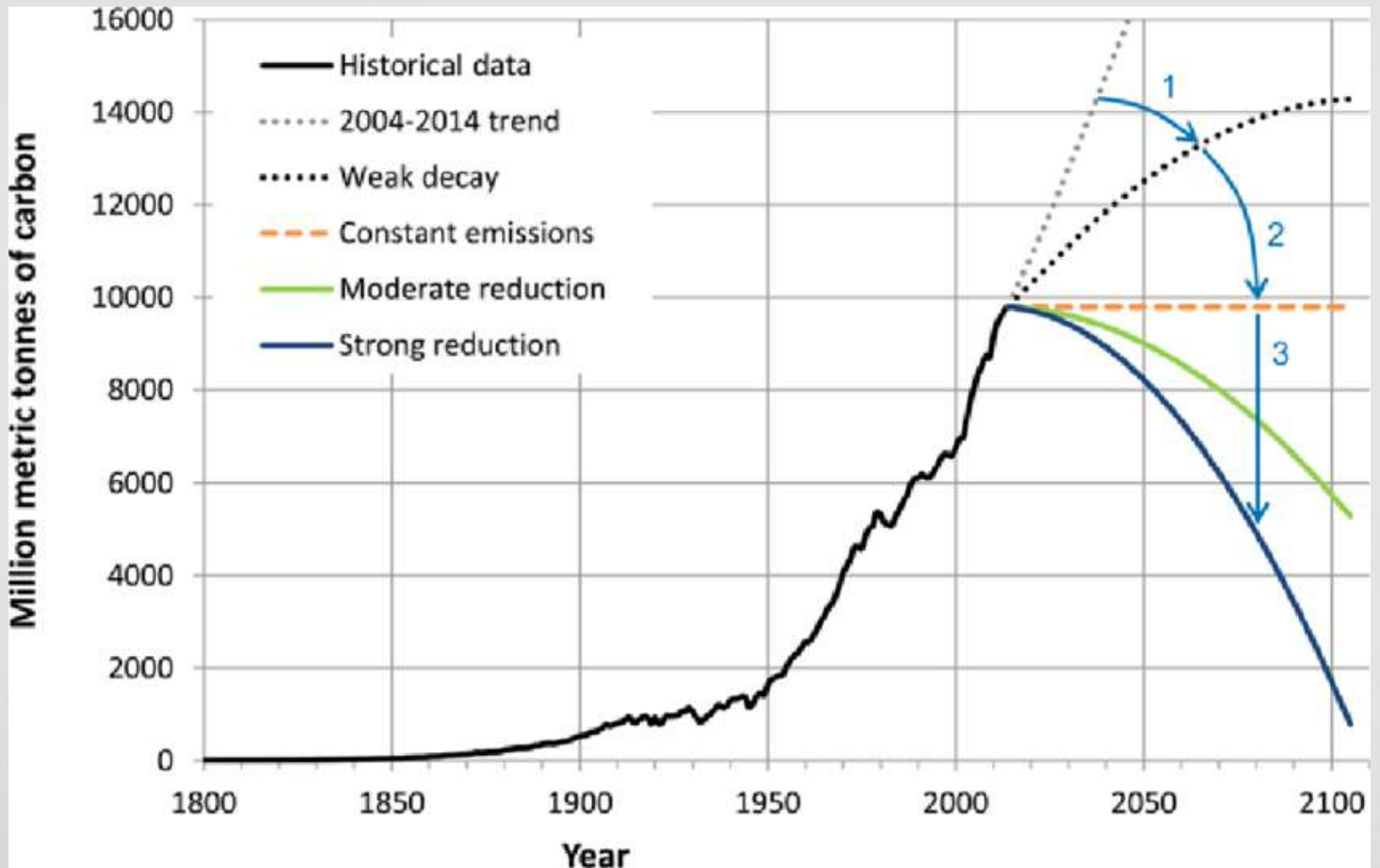
Yet, amid the darkness, a flicker of light,
A call to action, to make it right.
In unity, as stewards of the tide,
Let's restore the sea, where life abides.

For every bottle adrift, every plastic tide,
A promise we make to turn the tide.
To cleanse the seas of the human stain,
And gift the ocean its rhythm again.

In the symphony of waves, let hope be heard,
For every dolphin, every seabird.
Let our hands be the tide that heals,
In the whispers of the deep, life reveals.

As sunsets linger on horizons afar,
Let the oceans be, once again, our guiding star.
In the embrace of the sea, may we find,
A harmony renewed, a legacy enshrined.

History of global carbon emissions



(source: cdiac.ornl.gov) compared with a set of projected curves based on various annual emissions reduction rates

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<https://www.fashionrevolution.org/climatecrisis/>

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