A transformational approach to regenerate the marine ecosystem and address climate disruption by employing the aggrotech sector and increasing crop productivity by using olivine.

Howard Dryden; www.seahorsepoint.org 5th January 2026

The state of the Oceans

The World Wildlife Fund's (WWF) latest **Living Planet Report 2024** indicates a catastrophic **73% average decline** in monitored wildlife population between 1970 and 2020. The figure equates to an estimated 90% since 1900. Terrestrial as well as marine life continues to decline at a rate of 1% to 2% year on year.

The Potsdam Institute, and Plymouth Marine Laboratory confirm that we past the tipping point for ocean acidification in 2020. A high percentage of marine life is composed of aragonite and magnesium calcite which will completely dissolve over the next 20 years as the pH drops to pH7.95.

HNLC (High Nutrient Low Chlorophyll) or **dead zones** now cover 25% of all oceans and 83% of the Southern Ocean. HNLC zones continue to expand at a rate of 2% year on year. 50% of the worlds coral reefs have been lost and the remaining 50% are under stress from pollution and climate disruption. It is estimate that 90% will be lost by 2050, 25% of all marine life in the world's ocean depend upon coral.

The survival of nature and humanity depends upon maintaining high species diversity and ecosystem stability. Given the current rate of decline, and tipping point status a trophic cascade ecosystem collapse will occur over the next 10 to 20 years.

The destruction of nature is simply, and very sadly, an existential threat to humanity unless urgent action is taken to reverse the decline. Climate disruption is linked to toxic-forever chemical pollution and other biogenic factors which have been overlooked or ignored in the search for solutions to climate disruption. Catastrophic climate disruption events will increase and become the new norm, meantime we 'neglect' the opportunity to address the main threat which is the loss of biodiversity on the land and in the sea. We stand like rabbits in the headlamps suffering from base line syndrome while ecosystems silently collapse everywhere.

Is there any hope going forward……absolutely?

Terrestrial biomass (trees) doubles every 60 years, marine productivity / biomass (plankton) doubles every 5 days. If we can put the break on chemical pollution on land, marine ecosystems could recover super-fast. While there are of course, many threats to marine life from over exploitation, pollution and ocean acidification there are initiatives that could and must be prioritised to ban the very worst of the toxic forever chemical spectrum. Priority areas should of course include personal care and cleaning products, industrial wastewater, municipal and agricultural effluent , BUT there is another option and here's why we need to reframe our climate-disruption solution portfolio:

1. There are over 15,000 toxic-forever chemicals, and some States in the USA have taken action and banned chemicals such as PFOS (https://tinyurl.com/2d8wsyjt).

2. 80% of the world has no wastewater or sewage treatment, and only a few systems remove the toxic forever chemicals. There is no possibility of dealing with these issues in time to protect marine life.

Ocean acidification is due to atmospheric carbon dioxide dissolution through the ocean surface interface, pollution and regime shifts with the loss of carbon sequestration. Alkalinity has been in decline for the last 60 million years, dropping from 1200mg/l to the current concentration of 100 to 140mg/l. The oceans would have suffered from ocean acidification but with anthropogenic input, this has accelerated the process by hundreds of years. Humanity cannot survive without marine life, but most marine life will simply dissolve over the next 20 years. Trying to raise the pH and alkalinity of oceanic water is an almost impossible challenge. It would take 50% of the worlds shipping industry and over 10% of the worlds GDP. Irrespective of the catastrophic consequences, it is unlikely that there will be any remedial action.

An option – a global Olivine initiative

80% of pollution is produced on land, arising from municipal wastewater, diffuse pollution, industrial discharges and agriculture. Olivine is one of the most common and lowest cost minerals on the planet, often used as a soil conditioner. The mineral can absorb its own mass in terms of carbon dioxide.

- 250kg of olivine can be spread on agricultural land every year, cost is approximately $40/1000kg,
- If 25kg/acre is spread on 10% of the worlds agricultural land it would be equivalent to 10 billion tonnes
  This volume of mineral would absorb 10 billion tonnes of carbon dioxide which is equivalent to 100% of carbon from anthropogenic sources.
- **Olivine** slowly dissolves, ends up in the global aquatic environment. To release iron and silicates Silicate removes inorganic carbon and helps to raise the pH (reducing acidity). Ferric will help promote the growth of phytoplankton which, in turn, sequesters more carbon dioxide. Ferric also acts as a coagulant and drop zeta potential and increases redox potential.
- Most iron fertilisation trials have failed due to excessive growth of dinoflagellates and cyanobacteria. However, the silicate will selectively promote the growth of diatoms which are more beneficial, and the extremely low concentrations will help ensure the systems remain stable.
- A proportion of the ferric silicate complex will be bound up in organic matter and will float in the surface micro layer (SML) the SML covers 100% of the world's oceans and regulates the transfer of all gases (across the air water interface) including water vapour by as much as 50%. The SML regulates atmospheric humidity, temperature and aerosols responsible for cloud formation. Every litre of rainwater contains microplastic, toxic for ever chemicals, pesticides and pharmaceuticals. Lipophilic chemicals are the most toxic, they reside in the SML and end up in aerosols. The ferric will act as a photo-catalyst and will raise the oxidation potential when exposed to UVc irradiation. This will be sufficient to oxidise many of the chemicals, including micro-plastics, ferric could also be added to the plastic polymer during manufacture to promote photo-oxidation.

The potential net consequences of the addition to Olivine to agricultural land include;

1. Improvement of soil condition, health and growth of plants
2. Reduction / elimination of toxic for ever chemicals and microplastic
3. Reduction/ elimination of anthropogenic carbon dioxide
4. Elimination of oceanic pollution, reduction of ocean acidification (may also require calcium carbonate or limestone on agricultural land where appropriate)
5. Increased oceanic productivity
6. Regeneration of the SML, reduction in the extremes in humidity and amplitude of climate swings
7. Reduction / elimination of pollution in rainwater, and the elimination of pollution on land that receives the rainwater.
8. It will kick starts the regeneration of nature on land and in the world's oceans and may give us some extra time to deal with the root causes of ecosystem destruction and pollution.

Bocas Del Toro, Panama – A possible test bed for evaluation?

Almirante Bay

Bocas del Toro is subject to pollution from Almirante, Changuinola and agriculture for the cultivation of bananas. A survey would be required of the agriculture and catchment areas. A test is proposed to spread olivine on agricultural land on the area that drains into Almirante Bay. The ecology and biodiversity of marine life is well understood in the bay. Water quality analysis will also be required to fully establish the baselines.

Bocas del Toro; the area covers 446 km2 with depths 20m to 50m, if successful in Almirante Bay, the trial could be extended to cover the semi enclosed bay of Bocas del toro.

Caribbean coast of Panama;

There is a semi closed circulation between Panama and Colombia, if the trials could be extended to Caribbean coast of Panama and Columbia, it should be possible to start to influence the weather patterns in Panama and the catchment area for the Panama Canal.

Conclusion.

A global olivine application strategy, beginning with targeted regional trials, offers a low-cost, scalable, and potentially self-financing approach to: reduce pollution, restore marine and terrestrial ecosystems, sequester carbon, moderate climate instability. This strategy may provide the critical time needed to address root causes of ecosystem collapse and establish long-term regenerative systems. It will also place Panama as a leader on the world stage as the first country to start to reverse anthropogenic destruction of nature and disruption of global climate systems.

Restoring Ocean Health With a Simple Natural Mineral

Public Summary

The Crisis

The oceans are under pressure from pollution, declining marine life, shrinking coral reefs, and climate change.

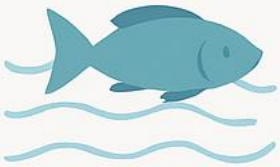
The Solution

A mineral called olívine can be used to regenerate oceans.
A new pllot project will take lace in Bocas del Toro, Panama.

The Pilot Approach

Olivine will be added to farmland, with particles ultimately reaching the bay.

Potential Benefits



Healthier oceans

Reduced pollution

More productive soils

Less carbon in the atmosphere

If successful, the project could be expanded to help restore the ocean and stabilize the climate on a larger scale.