## WELCOME

Planktos Science is a privately held ecorestoration and ocean biotechnology company. We call San Francisco our home port, though our mission is the restoration of damaged habitats worldwide and as such we have offices also in Vancouver Canada and Budapest.

Simply put we restore SEAS and TREES, but as we do this vital work our scientific teams discover priceless new knowledge and understandings of the blue world that covers most of this planet.

By replenishing and restoring plankton ecosystems in the oceans and growing 'newforestation' projects on land, worldwide, we are able to help mitigate impacts of human society.

We engage in active ecorestoration because mere conservation and reduction of our footprint on the planet will not be sufficient to leave a healthy planet to our children.

The harm our society has caused already is nearing a point of no return and must be healed. It will take an immediate, determined, and intelligent stewardship effort to accomplish this.


**Jenna, one of our biologists, searches for salps in the Mid-Atlantic, these gossamer creatures are best studied free diving.**

**Why We Must Replenish and Restore The Oceans Now**

The greatest peril facing the planet today is the overdose of CO2 already spewed into our atmosphere over the course of our 200 year love affair with fossil fuel and with each other. Our population has risen from a few hundred million to over 6 billion in that time and we are collectively and individually using more and more energy every day.

Reports, almost monthly in frequency, continue to raise the alarm regarding lowering ocean pH, acidification, adding acid flames to the raging global warming of fossil CO2. What is usually missing, save here, is mention of effective means to fight ocean acidification. Since the real problem is not tomorrows CO2 but yesterdays CO2 we must turn our attention to the more than 1000 gigatonne carbon bomb, two centuries of emitted CO2, still mostly in the air as it takes centuries for airborne CO2 to equilibrate with the rest of the planet.

Today about 500 gigatonnes of yesterdays CO2 has reached the oceans and Revelle's Rule tells science that 80% of CO2 ends up there. The rest of that deadly already airborne carbon bomb will continue to explode with devastating effects in the ocean for more than a century even if we were to stop the emission of all new CO2 today. No amount of switching to alternative energies, recycling, bicycling, or "clean coal" will tend to the lethality of the first carbon bomb. Sure lets reduce the size of the second bomb but first things first. Here's how!

ONLY through ocean replenishment and restoration can we enlist as allies the most powerful force of nature on earth, the ocean plants, the bloomin plankton'. But the high and rising CO2 in the air is not only responsible and harming the ocean via acidification, worse it has fed green plants on land making them greener, bushier, and helps them live longer making what we call "good ground cover." Ground cover improvements have reduced the amount of dust blowing in the winds by 1/3 in just a few decades. For the oceans dust in the wind brings vital mineral micro-nutrients to the oceans, that dusty terrestrial Yin is just as important as rain, the Yang, that blows from sea to land nurturing plant life. Since earth and ocean observing satellites went aloft 30 years ago we've measured multifold decimation of ocean plant life, 10% and more is gone from the Southern Ocean, 17% from the N. Atlantic, 26% from the N. Pacific, and 50% from the tropical seas. Just yesterday, those few decades ago, the ocean pastures were more verdant consuming 4-5 billion tonnes more CO2 each year than they do today.

So today, as stewards of this blue planet, we must replenish ocean micro-nutrients to restore the ocean pastures. If we manage, and we surely can, to bring the ocean plankton blooms back to levels seen 30 or more years ago, those plants will annually convert billions of tonnes of CO2 into ocean life instead of a starving acid ocean death. In the bargain the restored oceans will feed everything from tiny krill to the great whales and everything and everybody in between - fish, seabirds, penguins, seals and us.

**Our Work At Sea**

At sea, Planktos is engages in research and development of methods of natural mineral micro-nutrient replenishment. Replenishment of key micro-nutrients, esp. iron, will restore the declining phyto-plankton. Our plans are careful and cautious and will begin with a series of small steps, pilot scale projects far from land on the distant high seas. One unexpected but most significant consequences of our burning fossil fuels, and adding hundreds of billions of tonnes of CO2 to the atmosphere, is the diminishment of natural dust in the wind. Like water in the wind, rain - the oceans gift to the land, dust

in the wind is the lands gift to the oceans.

**Jenna's Salps, she found them!**

By mimicking natural dust deposition we restore and replenish small amounts of the natural iron rich (hematite) dust our human activities have denied the oceans. Iron is a critical micronutrient needed, in incredibly tiny amounts, by phyto-plankton for photosynthesis. The amount of natural wind-borne iron-carrying dust from arid lands has fallen dramatically, 30% over the past 30 years alone. This has resulted in massive declines in plankton biomass that the science community has been able to measure with the benefit of the first earth observatory satellites launched in the 1970s.

Ocean iron ecology studies date back as far as 80 years but have been the subject of intensive study for only the last 20 years. This work has benefitted from the farsighted investment of hundreds of millions of dollars of publicly funded and now privately funded research over the past two decades. The result of this work have shown that adding tiny amounts of iron we can restore and potently regenerate natual plankton blooms, the ocean forest. Continuing and wisely scaling this work is a recognized international ecological priority. The size and scale of our planned pilot project series of up to six iron additions range in the tens of tonnes for each project, while tiny efforts compared to the hundreds of millions of tonnes of dust that blows to the oceans in the wind, will provide the critical data required for a comprehensive understanding of this new planet saving biotechnology. read more ...

**Our Work On Land - Newforestation**

**Native Hungarian Beech Forest**

On land, Planktos Science is working to plant new mixed native species forests in a number of locations worldwide. A company we helped start in Hungary, KlimaFa, will over the next decade restore upwards of 100,000 hectares of Hungarian lands to native mixed forests. These forests will regenerate the ancient forest grandeur and environmental health of Hungary and will be incorporated into the Hungarian National Park System as strictly protected lands. On land, Planktos Science is working to plant new mixed native species forests in a number of locations worldwide, we call these projects newforestation. KlimaFa will alone, over the next decade, plant hundreds of millions of trees to restore upwards of 100,000 hectares of Hungarian lands to native forest in national parks protected forever.

In Canada, in partnership with the Haida First Nations village of Old Massett, another company we have helped create, Haida Climate, seeks to engage in ecorestoration of the Haida Gwaii homelands through the planting of mixed native species forest in old growth patterns in riparian zones (stream sides) devastated by decades of destructive clearcut logging. More newforestation ecorestoration projects will soon be developed.

**Mission & Objectives**

Through our pioneering efforts we develop and deliver the biotechnology and business elements these fields of planetary ecorestoration require and define. In this we engage in research and development of science, technology, and eco-asset market potential of ecorestoration at sea and on land. We are charting new courses involving credible accounting of this work in terms of the generation of verified certified ocean biomass carbon sequestration. Our work, done in accordance with the transparency of global treaties such as defined in the Kyoto Protocol, will show whether ecorestoration can offer environmentally sound and cost effective mechanisms to mitigate climate change impacts in a sustainable, innovative, cost-effective and even profitable manner.

**Our Commitment**

For more than 30 years our committment to ecorestoation has remained constant and substantive. Our present opportunity to engage in this work proceeds by the grace of and within the framework of a broad spectrum on international, national, regional, and local laws, treaties, and policies. A major part of our efforts are engaged in working within the provisions of this eco-governance to insure our activities are fully and transparently compliant with and synergistic all such laws. Our work proceeds with all of the scientific safeguards and protections required by myriad laws, professional codes of conduct, deep seated moral dedication to saving the planet, and is conducted under close review by our scientific peers and the many regulating agencies. The creation of the Kyoto treaty and the emerging carbon market is being built on a foundation of transparency and multi-level governance and is by all accounts the most openly visible and intensively regulated field of work ever created. It needs to be as what hangs in the balance of this system of justice and checks and balances is the ability of this planet to sustain life.

**LATEST NEWS**



**Sockeye Salmon in Canada and Alaska in Dire Straits**

Four years ago Fisheriies managers recorded record numbers of young Sockeye Salmon leaving rivers of Canada and Alaska. Hundreds of millions of young salmon were counted heading out to graze on the vast North Pacific ocean pasture. This should have set the stage for tens of millions of the bright silver fish to return this fall in top condition. But something has gone terribly wrong.

In Alaska's famed Bristol Bay the Sockeye salmon returning are smaller in size (by 25% or more) than ever before. Clearly at sea they were not thriving as normal.

In British Columbia's largest river system the Fraser, where 12-13 million adult fish were expected barely a million returned. Closures of all commercial, native, and sport fisheries were put into place. The salmon pundits now are talking that this could be the beginning of a mass extinction of Sockeye salmon from the Fraser and its many tributary watersheds.

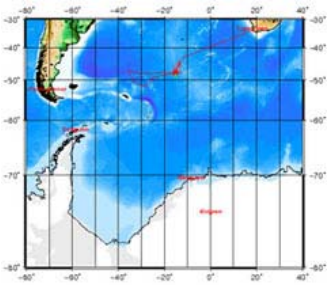
While fisheries managers, commerical and native fishers, and concerned citizens engage in circular firing squad behaviour each blaming the other for the collapse no one seems willing to share the blame.

Clearly the long observed collapse of the North Pacific ocean pasture which by 2000 had been observed to have lost 17% of its productivity and of recent has been reported to be down by 40% is simply unable to sustain the vast schools of feeding salmon.

Only a determined effort to engage in the simpliest of pasture management and ocean stewardship can save the Sockeye Salmon, the species of salmon most dependent on healthy ocean pastures.

**European Union / Indian Ocean Replenishment and Restoration Project Underway**

Beginning in mid January 2009 a large multi-national team of scientists from around the world aboard the German research ship PolarStern, began the latest and largest to date ocean mineral micro-nutrient replenishment and restoration project in the Southern Ocean midway between South Africa and South America.



Location of PolarStern 49S 16W
6 March 2009

The team of ~50 scientists aboard ship was headed by Dr. Victor Smetacek of the Alfred Wegner Institute and Dr. Wajih Naqvi of India's Ocean Research Station in Goa. Around the end of January they deployed 5-10 tonnes of iron sulphate to replish in a 20km2 patch of ocean. As this patch expanded over weeks and months a vastly larger area of ocean has seen its plankton blooms restored.

**ADDITIONAL LINKS**

On The Shoulders of Giants

Iron Fertilization Blog

Treehugger Report

Open letters to Recent Media Critiques

**Watch An Episode of The TV Show Modern Marvels On The Work Of Planktos Science**

## Visit some of the ecorestoration projects we support on land.

**KlimaFa kft. based in Budapest**
**read more...**


**HaidaClimate based in Old Masset & Vancouver, Canada**
**read more...**

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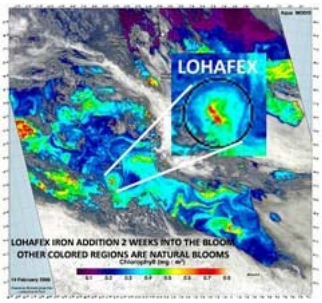
**Check Out Some of Our Multimedia Resources**

**BBC 4 Special Broadcast June 2008**

**The Planktos story on Modern Marvels television series November 2007**

**Dr. Noel Brown, former director UN Environment Program introduces Planktos at National Press Club**

**YouTube video of Dr. Noel Brown**




**Which Of These Blooms Is Not Like The Others**

The LOHAFEX Bloom on 14 Feb 2009
Arrow points to bloom

Measurements of the productivity of the bloom is already showing up in early satellite data. The boom is growing a bumper crop of plankton on this restored ocean pasture. As the bloom continues to grow for months to come it will sustain a large population of krill and other zooplankton which in turn will feed Southern Ocean great whales and thier young for whom this patch of the Scotia Sea is their whale nursery. Vast amounts of CO2 destined to convert into deadly ocean acidification will instead become ocean life. According to the late great John Martin who first envisioned ocean replenishment and restoration each tonne of iron converts 367,000 tonnes of CO2 into ocean biomass.

**So Long And Thanks For All The Fish!**
LOHAFEX Ocean Replenish and Restore Research Ship Sails For Home

Yesterday, March 09, Polarstern was on her way home having left her newly restored ocean pasture. read more ....

**DAILY NEWS FEED**

**Giant plankton-eating fishes roamed prehistoric seas, fossil evidence shows**
Giant plankton-eating fishes roamed the prehistoric seas for over 100 million years before they were wiped out in the same event that killed off the dinosaurs, new fossil evidence has shown.
Science daily *Sun, 28 Feb 2010 17:00:00 EST*

**Difference, Not Diversity**
In tropical forests, as in the ocean plankton, thousands of species may compete for the same resources. How they succeed in coexisting remains one of the central paradoxes in the … [Read more]
Sciencemag.org *Wed, 24 Feb 2010 11:26:54 EST*

**Fossil Evidence of Giant Ancient Fish**
Giant Plankton-eating Fishes said to have Diet Akin to today's Baleen Whales, Basking Sharks and Manta Rays
CBS News *Fri, 19 Feb 2010 17:52:01 EST*

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**Greenhouse Gases Meet Your Worst Nightmare: Plankton**

Discover June 26, 2008


PICOPLANKTON

Call it a happy accident: Phytoplankton in tropical areas of the Atlantic Ocean are helping

*Join Us, lend a hand, bend a line.*
*Help take care of this small blue planet.*

*"Twenty years from now.*
*You will be more disappointed by the things you did not do*
*than by the things you did do.*
*So, throw off the bowlines.*
*Sail away from safe harbor. Catch the trade winds in your sails.*
*Explore. Dream. Discover* - M.Twain

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to break down greenhouse gases.

After analyzing data gathered by airplane and in a lab at Cape Verde, a chain of Atlantic islands not far from West Africa, a team of British researchers was pleased but puzzled to find that ozone in the atmosphere near the islands had decreased 50 percent more than climate modelers had predicted. read more...

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**Marine life faces 'acid threat' - 20 times faster than previously thought** BBC 25 November 08

Man-made pollution is increasing ocean acidity at least 10-20 times faster than previously thought, a study says. Researchers say carbon dioxide levels are having a marked effect on the health of shellfish.

They sampled coastal waters off the north-west Pacific coast of the US every half-hour for eight years. The results, in the journal PNAS, suggest that earlier climate change models may have under estimated the rate of ocean acidification.

Professor Timothy Wootton University of Chicago, says such dramatic results were unexpected as it was thought that the huge ocean systems had the ability to absorb large quantities of CO2. "It's been thought pH in the open oceans is well buffered, so it's surprising to see these fluctuations," he said.

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**British Royal Society and New Ocean Science Papers Call For Ocean Restoration Research Identical To Planktos Science Plans**

**Sept 3, 2008**

In July & August two major scientific papers have described the need to study 'iron fertilization' , what we more accurately refer to as ocean ecorestoration.

First the British Royal Society blue ribbon team released their initial report titled "Ocean Fertilization: a potential means of geoengineering" states that the potential of this method requires "more extensive targeted fieldwork."

Second a paper authored by an international team titled "Designing the next generation of ocean iron fertilization experiments" states that research to date is lacking due to the small scale briefly studied bloom projects and that to answer uncertainties in this field " longer duration (i.e. months) and larger scael observations (100-200 km length scale) are required." read more here...

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Our Friend Pico, the smiling plankton seen above, has penned a message to us all. **His Plankton Manifesto** is linked on this Google Knol

**Share our site on any of many Social Networking Sites. Your help is needed.**