

# Can Red Mud Geo Polymers Promote Abundant Sea Life ?

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Background – Why I am here today? - Our project

- Entrepreneur – Xponential
- Emergency Management/ EMS / FAR 135 aviation/ logistics/transportation/
- Internet/Technology/software development
- Marine Ecosystems captive and wild/Aquaculture RAS design/coastal erosion and protection.

## Our project : Overview

Is a collaboration between 9 different organizations, to create a rapid infrastructure in coastal erosion protection in the Gulf of Mexico, by merging exponentials, off the shelf technology and well developed sciences. Geo Polymer - 3D shotcrete printing

Products - Marsh Armor, Marsh Crete, Marsh Matts, Marsh Tubes, Marsh Mender -Products and Delivery methods to bring coastal erosion infrastructure.

Submitted to C.P.R.A. as a demonstration project, was well received but did not meet the qualifications for 2016 process. 2017 outlook is excellent, there is interest from engineering, environmental and Wildlife and Fisheries members of C.P.R.A.

Testing and development stages.



# Customized Geo polymers can create Exponential abundance in the oceans and on the planet!

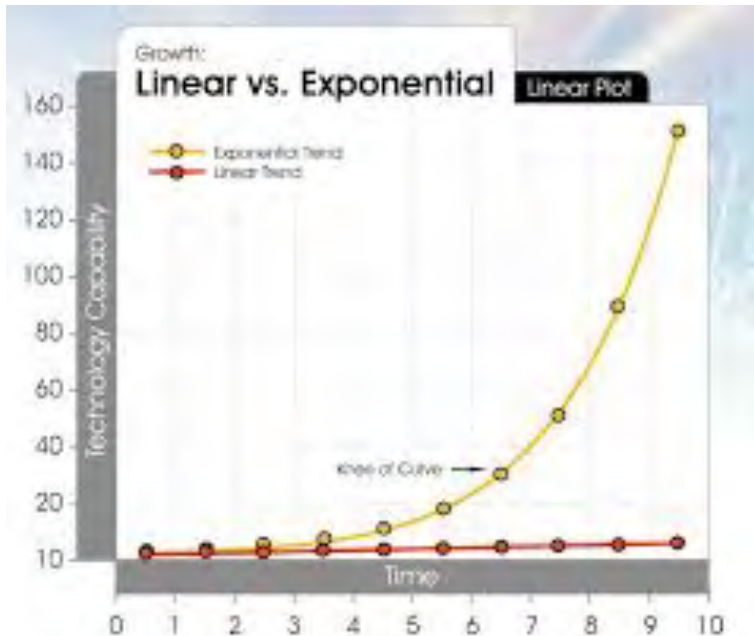
- Why it can create Exponential abundance
- Why it hasn't yet
- Why- Exponential Abundance is being created everyday by merging technologies and new discoveries
- Why- Macromolecular structures of silicates and aluminosilicates are a well established well defined Science
- Why- Identifiable Exponential technology, set for explosive new growth in Marine construction and big disruption of the construction industry
- Why- Meets the 5 of the 6 D's of an exponential growth industry

# Where we are ?

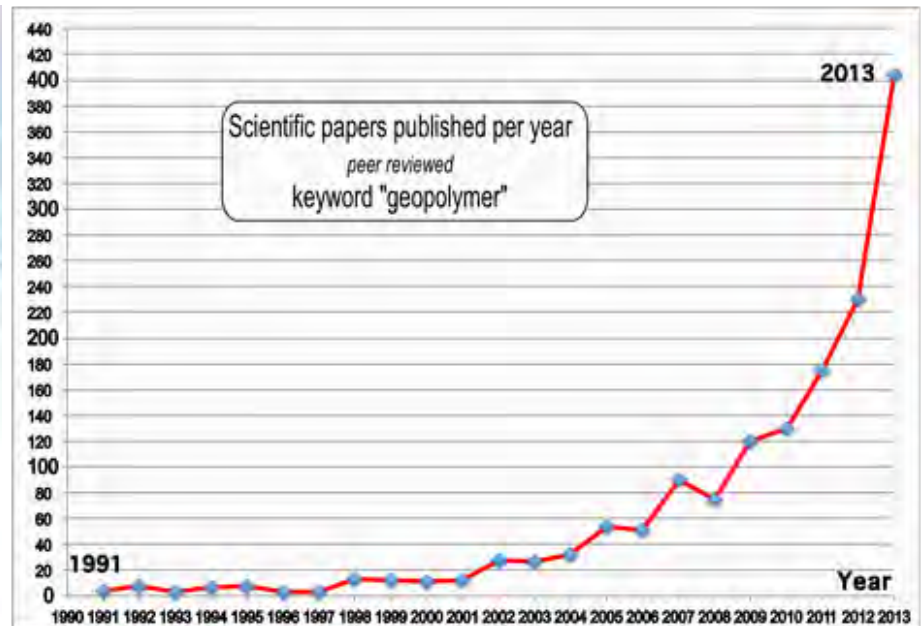
- Geopolymers are in between the deceptive and disruptive stages of an Exponential, below the knee of the J curve on an industry growth chart .
- Deceptive stage is- Period of growth that goes unnoticed because doubling of numbers are so miniscule it is mistaken for linear growth- Industry just doesn't notice.
- Disruptive stage- Period of massive growth when a deceptively growing technology hits the knee of the curve or the point where its exponential growth allows new market creation or industry transformation. (Custom Marine Concrete)

# Graph Indicators

## Exponential indicator



## Exponential increase in GP research



# Known Planetary Issues

- Oceans are in decline, sea levels are rising, it isn't improving,
- Coastlines are threatened, populations are displaced
- Wetland habitat loss worldwide is unsustainable for planetary homeostasis
- Habitat loss /fisheries loss/economic loss/quality of life issues
- Dissolved Hydro carbons /heavy metals in the water column in many of the seas
- Poor quality of materials for Marine Hard structures.
- Marine Construction methods cost are restrictive ,
- Stockpiles of Red Mud, fly ash and other waste streams are not sustainable for the planet in there current disposal plans. Need mineral restoration

# Proposed Planetary Rx

- Rapid deployment of Customized geo polymer hard armor structures for coastal erosion projects through exponential technologies
- Benefits
- Adsorbent, removes heavy metals and hydrocarbons
- Superior Marine concrete, protection from corrosive ions
- Bio accretion proliferates calcium building organisms
- 3D printing (exponential) merged as a delivery system allowing the same structures to be digitally replicated anywhere on the planet, reducing design and production time and costs significantly.
- Reclamation of lands used for industrial waste storage/reduced greenhouse emissions, mineral restoration



# How do we know it works ?

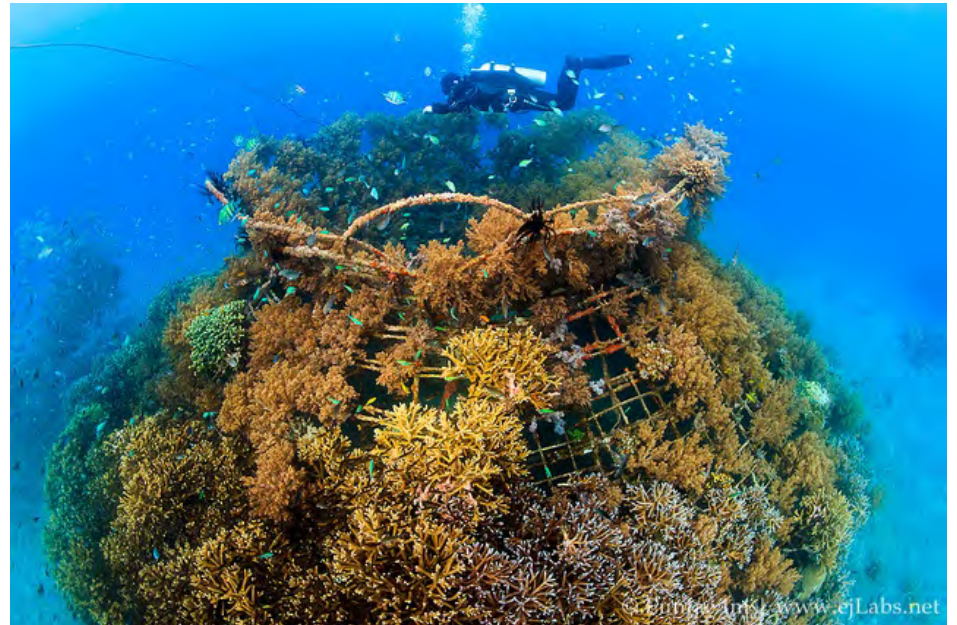
- From the Research – Geo Polymers thank you to all the work from researchers and scholars.
- RM was immersed in sea water as a method of curing, quenching the alkaline with sea water.
- Calcium coatings were covering the outer portion of the specimens, reducing caustic to a hard less alkaline coating.
- It was concluded that the specimen was generating the monolithic coating with NaOH interacting with  $\text{Ca}^{+}$  in the sea water forming calcium carbonate .
- In It was also found that the Ferrous that was bound created a negative discharge. This was reproduced in our own samples @  $-.22$  between  $-.96$  volts , this is important
- Research also noted a reaction that protects iron reinforcement making it impenetrable to the sodium ion and many corrosives, in effect making it a Marine concrete that was is far superior to Portland in the marine environment. and on actual bridge construction.

# Other Industries and Sciences

- Cathodic protection of Oil Rigs
- Oil platform structures have created prolific abundant reef habitat in areas of the gulf that are otherwise nonproductive or barren
- Oil Platform Structures are engineered to accommodate an additional 5 inches of calcium carbonate coating or bonding referred to as fouling.
- This calcium bonding by accretion is pulled directly from sea water by a low voltage negative transfer between the cathode and anode. It is engineered this way, the effects are well known.
- This has a direct effect on calcium building organisms, contributing to prolific growth and reproduction, by assisting the organism in calcium production. This is not well known
- The Calcium Carbonate produced contains Aragonite and Calcite. Aragonite will buffer the PH if it drops below 7.1 . Calcite adds additional strength and can withstand a much lower ph and is more durable.

# Bio Rock™

- Bio Rock ,an electrified metal grid system promotes reef abundance peer reviewed studies corals had
- 8x times the growth rate
- 20x more resistant to breaking
- 50x more resistant to environmental stresses .
- They are built world wide and widely recognized by coral researchers as a restoration tool



# Show me the money

## Where do we see Exponential Opportunity?

- New target market, Coastal erosion and the marine environment is an exponential growth area
- 21 billion US gulf coast has been funded and allocated to coastal erosion
- Exponential technologies 3d shotcrete printer /marsh master , can be used to rapidly prototype and do large scale production reducing costs of construction
- Exponential sea life proliferation – 8X productivity 20X strength and 50x resistance to environmental stress
- Exponential growth in fisheries production. changes desolate water bottoms into biological nurseries
- Long term protection for coastal areas/ stability and comfort level/decrease in disruption.
- Stabilizing local economies, eliminates economic disruption of strategic areas.
- Exponential economic growth – allows economic growth where rising waters and risk don't
- Abundant worldwide supply of inexpensive base material
- As a superior marine concrete it becomes more widely accepted,

# Obstacles, Suggestions, Questions

- Acceptance, ignorance of well intentioned self proclaimed environmentalist
- Standardized optimal and user friendly formulas
- Standardized SOP's and testing.
- Funding and structure to promote demonetization
- Lack of Industry certification process
- Mindset, Collaborate, GeoPolymer/nanotech