Mariculture and the Blue Economy

The Maritime Alliance
Michael B. Jones – President

The Future of Hawaii’s Blue Economy “Organizing for 2020”
November 16, 2017
Kailua Kona, Hawaii
Global **Blue Economy**: Enormous and growing

**OECD* 2016 study:**
**The Ocean Economy in 2030**

2010 – US $1.5 trillion (conservatively)
2030 – US $3.0 trillion (conservatively)

“The ocean economy is essential to the future welfare and prosperity of humankind...only recently begun to garner attention and move up the international policy agenda.”

**Comparison:**
2010 global water industry = $500 B
2015 space industry = $355 B

*NOTE: The OECD is a Paris-based organization with 35 democratic country members founded in 1960 to stimulate economic progress and world trade.
Comparative industry clusters in San Diego

- **Advanced manufacturing:** 2,800 manufacturers with 100,000+ workers
- **Sports & Active Lifestyle Industry:** 4,000+ jobs
- **ICT:** 64,000 jobs & $8.5 billion “in GDP annually”
- **Defense Industry:** 108,000 employees & $28.7 billion annually
- **Aerospace industry:** 35,000 jobs
- **Cybersecurity:** 3,500+ jobs & $1.5 billion “in total economic impact”
- **Cleantech Industry:** 8,000 jobs
- **San Diego Lifesciences:** 34,000 jobs & $14.2 billion “in direct economic impact”
- **Maritime Industry (2011):** 46,000 direct jobs & $14 billion revenue

Source: San Diego Regional Economic Development Corporation 2016

TMA leading U.S. BlueTech cluster & leading intl. cluster
The largest, most organized BlueTech cluster in the U.S. & one of largest in the world

Our Mission:
“Promote sustainable science-based ocean & water industries”

Our Tagline:
“Promoting BlueTech and Blue Jobs”®

Just began 11th year

We bring together academia, industry, and policy makers to promote innovation and economic development in the Blue Economy

Create a Blue Voice via information sharing, national & international outreach, networking, research, & workforce development

Non-profit industry association & cluster organizer for the SD maritime (ocean & water) technology community
TMA is all about collaboration across Academia, Industry and Policy to create a regional Blue Voice & promote Blue opportunity.
Members

[Logos of various companies and organizations]
BlueTech Cluster Alliance

- **Mission of BTCA:** promote sustainable investment & growth of the knowledge-based ocean and water industries, to the mutual benefit of all Parties, through active regional, national and international collaboration.

- **Goal:** Work together in areas where members of participating clusters can share information, collaborate on research and development initiatives, and jointly pursue business development opportunities.

**Charter Members of BTCA:**
- Forum Oceano (Portugal)
- Marine Institute (Ireland)
- Oceans Advance (Canada)
- PLOCAN (Spain)
- Pôle Mer Mediterranée (France)
- The Maritime Alliance (U.S.)
- UK Blue Growth Network (UK)

**Regular Members of BTCA:**
- Pôle Mer Bretagne Atlantique (France)
- To be determined
Process to join BlueTech Cluster Alliance:

Criteria to join BTCA

• It needs to be a formal, industry-oriented, BlueTech “cluster” organization (not a general association, government entity, university, or the like); and,

• There should be a history of and budget for attending leading international shows, which is where most BTCA meetings will take place; and,

• There should be a history of demonstrable collaboration between international clusters, including promoting business-to-business opportunities.

The process will be:

• A member cluster needs to recommend a new member based on past and/or on-going collaboration; and

• Review and approval by majority of the seven BTCA Charter Members (representing 7 countries)
Cluster promotion over next 12 months:

**International events: (collaboration with BTCA and non-BTCA clusters)**

June 5-9, 2017: 1st UN “Ocean Conference” in NYC (Sweden & Fiji co-presidents)

Oct. 5-6, 2017: 4th “Our Ocean” conference in Malta (EU and US Dept. of State)

Nov. 6-10, 2017: 9th annual **BlueTech Week** in San Diego (**TMA**)

Nov. 22-23, 2017: OECD “Blue Economy” economic analysis seminar in Paris

March 7-9, 2018: *The Economist’s* “World Ocean Summit” in Playa del Carmen, Mexico


June 28-29, 2018: SeaFest (Galway, Ireland)

Nov. 5-9, 2018: 10th annual **BlueTech Week** in San Diego (**TMA**)

**On-going academic, b2b and cluster collaboration (examples):**

- Attracting funding to the industry
- Capacity building across Triple Helix
- Internships at different clusters and cluster member companies
  - Possible 2-year secondment to **TMA** funded by Irish Research Council
- Linking accelerators, b2b opportunities, incubators, publicity, etc.
THE NEXT WORLD OCEAN SUMMIT
Fairmont Mayakoba, Riviera Maya, Mexico;
March 7th-9th 2018

Register to attend or enquire about sponsorship opportunities at oceansummit.economist.com.
OECD: The Ocean Economy in 2030

- Marine bio-resources:
  - US $2.8 billion in 2010
  - Projected to grow to US $4.6 billion by 2017

- Two sectors:
  - Medical related: development of new antibiotics, antibacterial and anti-fungal pharmaceuticals, cosmeceuticals and nutraceuticals
  - Biofuel potential: A theoretical production volume of 20,000 to 80,000 liters of oil per hectare per year can be achieved from micro-algal culture (European Science Foundation Marine Board, 2010), higher than biofuel from terrestrial crops.

Source: The Ocean Economy in 2030, April 2016, p. 197
Pierre Erwes, Chairman of BioMarine estimates:

- US $168 billion market and growing
- Marine Biotech represent 6% of current Biotechnology market
- Marine Pharmaceuticals no more than 3% of current market
- Marine cleantech represents 15% of current cleantech market
- Marine nutraceuticals account for 33% of global market
- Marine cosmetics represent only 12% of the cosmetics market
- Marine Bio energies represent 1% at most of the energy market
- Aquaculture represents 48% of total catch and 2% of the global animal protein market

Ocean Biotech

COUNTRY EXAMPLES:

- **Iceland Ocean Cluster**: “Fish & Ships”. “Our 100% Fish project emphasizing full utilization of seafood products currently used as landfill in many countries...”. Uses: aquatic proteins, cosmetic products, leather from fish skins, medical devices, natural ingredients for food, pharmaceuticals, skincare, vitamins

- **Norway**: In March 2015, Norwegian government drew up a national bioeconomy strategy focused on 4 focus areas where they have a strategic advantage including aquaculture, seafood, & management of the marine environment
ICELAND: Total utilization of the cod

- Canned products made from cod liver: Smoked liver and liver paté
- Fish skin transformed to collagen
- Fish skin transformed to leather
- Natural fish stock for food processing
- Heads and bones dried and exported
- Enzymes from intestines used for medical products
- Cosmetics made from enzymes from inner organs
- Liver oil used for Omega-3 and capsules
- Hand- & foot creams with omega 3
- Caviar from roe
- Fish skin as medical device

USD 50-60
The Incredible Fish Value Machine

The incredible fish value machine made in Iceland

- Cod roes
- Fish leather
- Collagen human skin replacement from fish skin
- Fish collagen from fish skin
- Calcium from fish bones for soups
- Dried heads for soups
- Geothermal power
- Filet
- Fish protein
- Liver omega oil
- Medicine from fish liver and intestine
- Zero waste
Measuring water quality
Assure Controls

1. QwikLite™ Biosensor 200 System, provides rapid detection of contaminants at biologically harmful levels. Environmental or coastal water quality testing at low cost based on bioluminescent marine organisms.

2. The Ballast Water Channel™ provides IMO & USCG compliance to new regulations. BW Personal, and My Port featured offerings.

URL: https://www.assurecontrols.com
Aquatics research housing  
Aquaneering

1. Created and perfected the Process Flow for Fluidized Bed Biofilter Systems that has become Research Industry standard

2. Promoted the no-maintenance Fluidized Bed Biofilter for highest water quality with non detectable levels of ammonia (less than 0.1 ppm)

URL:  [http://www.aquaneer.com/](http://www.aquaneer.com/)
Additional revenue sources for ports

Pacifico Aquaculture

- First commercial striped bass hatchery in the world in Ensenada harbor
- Using advanced production techniques.
- 179 hectares near Isla de Todos Santos, eight miles west of Ensenada.
- The company analyzes the ocean water column on a regular basis to ensure water quality.

URL: [http://www.pacificoaquaculture.com/](http://www.pacificoaquaculture.com/)
Hopefully...Hawaii **BlueTech** Cluster

- **Attributes and assets:**
  - **Attributes:**
    - San Diego: Ocean; Border; and Weather.
    - Hawaii: Ocean, Remoteness, Weather...??
  - **Assets:**
    - Testing facilities (asset inventory for what can be shared)
    - Deep ocean

- **Areas of potential focus:**
  - Aquaculture
  - Blue biotech
  - Maritime cyber & IoT
  - Ocean observation
  - Ocean renewable energy
  - Port & maritime safety and security
  - WaterTech

- **Process:**
  - Blue Economy study (including asset inventory)
  - Marine Innovation Center plan (Port of Seattle)
  - International outreach (BlueTech Cluster Alliance & intl. shows)
"If you want to go quickly, go alone. If you want to go far, go together."

an African proverb

We need each other. We need to collaborate. Thank you!