MARINE FINFISH AQUACULTURE PEIR
PRELIMINARY DISCUSSION BRIEFING
APRIL 3, 2018

A. Short Summaries (256 words total, 2-4 minutes spoken)

1. *Why is Marine Finfish Aquaculture (MFA) suited to California and what is its benefit to California?*

MFA is growing fish in cages located offshore in the ocean. The **unique conditions** that indicate Marine Finfish Aquaculture is a practical and beneficial activity in California. Especially the Southern California Bight where a combination of sea conditions, coastal infrastructure, and one of the largest concentrated seafood markets in the world, create a potential for California MFA. Ironically, the United States and California lag far behind the rest of the developed world in seafood self-sufficiency and aquaculture production. All of Asia produces more than half of its seafood with aquaculture and the European Union produces 20% of its seafood even with its stringent environmental regulations. Elsewhere, MFA is practiced widely throughout the world except in the United States.

MFA also brings with it the opportunity to not only provide an abundance of fresh daily fish enhancing consumer choice and quality at a comparatively lower price, it can do this while at the same time shifting animal protein production to the most efficient production system available while doing it on the smallest carbon footprint possible. It therefore has positive global environmental results and contributes to solving the global food production challenge. We need to make more fish in California

2. **What is the potential economic contribution of MFA to the California Economy?**

In the coming decades, the potential **economic dimensions** of a modestly implemented MFA industry using less than 1% of state waters in the Southern California Bight and based on statewide market opportunities for fresh finfish can be projected in terms of billions of dollars of production value, thousands of jobs, and stimulation of new activity on coastal waterfronts. When the indirect and induced economic consequences for related production support activity, salaries, processing, distribution, and retail restaurant sales are considered, the total GDP contribution to the California economic product is conservatively of 4 to 5 times of the primary production values and totaling between 5 and 6 billion dollars.

3. The **future environmental, health, and social costs** of not permitting development of an MFA industry are both very real and significant. They are essentially the reversal of it benefits. The scarcity and cost of seafood will

inevitably increase and likely reduce US seafood consumption, a result that indicates that both health and general quality of life in our state and nation will decline. California will continue to buy imports at rising prices and shift their animal protein consumption to less environmentally efficient production systems with much larger carbon footprints. Rather than contribute to improving the environment, California will export its global environmental responsibility elsewhere in the world and fail to contribute to challenge of feeding a human population expected to reach 9 billion by 2032.

A. Expanded Summaries

1. ***What is opportunity for Offshore Marine Finfish Aquaculture and why is not practiced in California***

The first issue of importance predisposing justification for this PEIR is a rationale for the implementing of commercial MFA. The essential driving force for creating this industry is the convergence of sustainable technology, market demand, and physical resources. Without the PEIR, there is no legal framework to grow any fish in California state waters. While the is ample technical and scientific capability, equipment and feed fabrication industries, and the entrepreneurial will to establish an MFA, there is no practical legal framework for access to the ocean in California or Federal waters.

These **unique conditions** present an opportunity for MFA that is a practical and beneficial activity in California. Especially in the Southern California Bight, there is a rare combination of sea conditions, coastal infrastructure, and one of the largest seafood market concentrations in the world. These conditions create a realistic and sustainable prospect for California MFA. There are many other potential environmental, economic, and social benefits that would be a result of project implementation, but the essential driving forces for MFA is the aggregation of well-developed sustainable technology, sufficient natural resources, and local market demand for high quality fresh daily fish.

As many emerging economies are shifting their aquaculture production to feed a more prosperous middle-class population, foreign aquaculture production for export that now provides about half of US imports will diminish. As the global scarcity of seafood increases in the future, our country imports 92% (and increasing) of its seafood and runs a 14-billion-dollar seafood trade deficit. Without increasing its own fish production from MFA, the inevitable result is growing scarcity and higher prices in our country. Consequently, our consumption of heart healthy and nutritious seafood will decline, and prices will rise. Conversely, supplied by MFA, California might accomplish what the EU countries have with their stringent environmental laws and produce an additional 10% to 15% of our seafood supply with aquaculture.

Further, this industry would develop in the context of increasing relative scarcity of high quality seafood, a large foreign trade seafood deficit ($14 billion/year) in the United States where well over 92% of seafood is imported and only 8% is produced by US fisheries and aquaculture combined. and is ultimately part of the solution to feeding 9 billion human beings on the earth in 2032, only 14 years away. We need much more fish and it is recognized that MFA is the apparent way to provide it.

2. The Potential Economic Benefit

Using values similar to those estimated for Rose Canyon project near San Diego in Federal water and supported by other references and publications we have independently estimated the production yields and revenues expected from typical proposed farms in a potential industry. These assumptions are thought to conservative by comparison to existing operational systems. The typical annual production rate for operating and proposed MFA systems is about 100,000 pounds per farm surface acre of 50-meter diameter cages 8 meters deep in arrays where the actual cage surface is about 20% of the farm surface area. Using these values, a 200-acre farm would produce 200 x 100,000 = 20,000,000 pounds. per year. A future industry (envisioning a 20-year time horizon) with 10 such farms would produce 200,000,000 pounds/year (200,000 tons) with an estimated production market value of $1.2 billion at a modest market price of $6.00/pound whole fish which is a reasonably conservative price for high value culture species such as Yellowtail or Striped Bass.

The first additional direct value is the actual production cost, typically about 60% of the market value or about $720 million. This value would include all the expenditures related to fish production including feed (about 60% of production cost) and salaries (10%), amortization of value of the facilities, hatchery expense, and all the other production supplies and expenses. Another direct cost associated with the farm are the regulatory costs that we might provisionally suggest at 1% of production cost of $12 million for regulatory fees and services such as inspections, monitoring, and permit administration Note that the GDP subtotal before even leaving the farm is a little more than $2.0 billion.

When the fish goes ashore, whether it is retained by vertically integrated farm owners or is sold to processors and wholesalers, we can expect they will extract roughly 30% of the production value in their margin received for cold storage, processing, and transportation to intermediate customers such as supermarkets, fish stores, and restaurants. Our $6.0-dollar fish is now worth about $8.00 to make it available to the terminal users, typical retail customers. The supermarket will then mark up their wholesale price and another 30% and will put it on iced display with a price tag of about $11.00 (sounds about right).

Because of the labor-intensive nature of restaurants, we can expect that the value added to the cost of their entrée ingredients will be at least 40% of wholesale. The intermediate costs add up to at least $800 million. All together we can expect the end user will spend about twice the harvested farm value or about $2.4 billion. The total California GDP contribution is then about $5.2 billion without even sharpening a pencil.

Now let's talk about jobs and salaries. If each farm and hatchery unit employs about 80 persons, the aggregate direct employment for 10 farms is 800 persons. If as suggested above, 10% of the production cost is allocated to salaries, that is $72 million or an average of about $90,000 salary costs per person inclusive of all taxes, childcare, and medical insurance. There is more. The San Diego economic impact studies indicate that for every direct production job, indirect employment will generate an additional 2.5 jobs bringing, the number of local jobs to about 2,800 and even if the indirect salary cost is only half of the direct employment salaries, their induced GDP contribution is $90 million or a total of $160,000,000 for salaries that will be contributed to the economy. That brings the GDP calculation to $5.36 billion without even considering the economic stimulation those salaries will induce in the community. This independently prepared estimate is in close agreement with the projected economic impact of the Rose Canyon project in San Diego.

3. The Consequences of Not Approving MFA PEIR

Summing up the consensus of distinguished California scientists evaluating MFA at a forum sponsored by the Aquarium of the Pacific, Dr. Steven Gaines (Dean of the Bren School of the Environmental Science and Management, University of California, Santa Barbara) describes the global consequences of rejecting or accepting offshore marine aquaculture:

> *By driving aquaculture to other countries that have lower environmental standards or by driving consumption to land based protein, the environmental impacts of our future protein production increase substantially. California can lead the nation and demonstrate to the world how to reduce the impact of increasing global food production.*

In combination with these serious environmental results of not implementing MFA and foregoing the very significant economic benefits described above lead to a reduction of the quality of life in California from a loss of fish quality and quantity, less choice of seafood and higher prices, fewer jobs, and all the other opportunities that we might never experience.

References Listing of Recent Scientific Information
On Marine Finfish Aquaculture (internet access)

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2013 **Marine Cage Culture and the Marine Environment** (152 pages) NOAA Carol Price and Morris: Twenty-First Century Science Informing a Sustainable Industry. A comprehensive review of recent scientific publications evaluation water quality, benthic effects, marine life, and chemicals. Reference: (https://repository.library.noaa.gov/view/noaa/2712)

2014 **Environmental Performance of Marine Net-Pen Aquaculture in the United States.** NOAA, Michael B. Rust, Kevin H. Amos, April L. Bagwill, Walton W. Dickhoff, Lorenzo M. Juarez, Carol S. Price, James A. Morris Jr. & Michael C. Rubino. A comprehensive review of the status of marine cage culture by leading NOAA aquaculture scientists citing improvements in feeding efficiency, use of fishmeal, large reduction in the use, of medications, reduction of fish

escapes, and general improvement management systems, concluding that the existing U.S. laws provide effective environmental protection. Reference: (https://www.tandfonline.com/doi/pdf/10.1080/03632415.2014.966818)

2015/2016 **Offshore Aquaculture in the Southern California Bight, Workshops 1 and 2,** proceedings published by Aquarium of the Pacific and sponsored by NOAA and SeaGrant. A comprehensive series of workshops involving invited Federal, State, and university marine scientists, State and Federal regulators, and aquaculture practitioners representing a wide selection of professional expertise related to California marine aquaculture. These workshops engaged over 80 professionals in a full four-day agenda that produced specific recommendations including the following topics the importance of marine finfish aquaculture, necessary demonstration of the technology, management and regulatory organization, risk analysis, and confidence in research and regulatory capabilities. References: #1(http://www.aquariumofpacific.org/mcri/info/offshore_aquaculture_in_the_southern_california_bight)

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2016 **Offshore Aquaculture: Spatial Planning Principles for Sustainable Development,** Rebecca Gentry, Sarah Lester, Carrie Kapple, Crow White, Tom Bell, Joel Stevens, and Steven Gaines (Dean of the Bren School of Environmental Science and Management, UC Santa Barbara). State of the art scientific approach to marine spatial planning integrating multidisciplinary scientific information, bioeconomic analysis, and analysis of competitive applications connected to marine finfish and other aquaculture technologies. Reference: (http://www.tomwbell.net/uploads/5/6/9/7/56976837/gentry_et_al-2017-ecology_and_evolution.pdf)

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1. **Fish Story** written and narrated by Jerry Schubel. A dazzling introductory narrative and video about MFA in the United States and California (12 minutes) Reference: (https://video.search.yahoo.com/yhs/search?fr=yhs-adk-adk_sbnt&hsimp=yhs-adk_sbnt&hspart=adk&p=aquarium+of+the+pacific+aquaculture+videos#id=4&vid=7204489e650e71e68239956c9bdabfb8&action=click)
   Or you can find it on U-tube

2. **Perspectives on Marine Aquaculture in the United States and California** is a roundtable of presentations by scientists and other stakeholders including Dr. Steven Gaines (UCSB), Dr. Paul Olin (California Sea Grant), Dr. Michael Rust (NOAA), Don Kent (President, Hubbs-SeaWorld Research Institute), Christy Walton (philanthropist, investor) Sam King (seafood restaurant owner), Peter Kareiva (Director of the UCLA Institute of the Environment)
   Reference:
   (https://vimeo.com/211721422)