

Presentation to :

## Marine Aquaculture Task Force 2006



January 19th, 2006

# Kona Kampachi™

Development of the first “hatch-to-harvest”™  
open ocean fish farm in the U.S.

Presentation by:

Neil Anthony Sims, M.Sc.

President, Kona Blue



**Kona Blue's mission is to expand the environmentally sound production of the ocean's finest fish.**

- Pioneering and promoting sustainable aquaculture;**
- Producing and selling nutritious marine fish; and**
- Building Kona Blue as the world's leading brand of premium farmed fish.**





# KONA KAMPACHI™

1. Open ocean aquaculture? - ...*blue water ... blue sky ...*
2. The permit process – *Consultation, conciliation*
3. Hatch-to-harvest – *Key to sustainability and quality*
4. Cage deployment – *Innovative engineering*
5. Offshore operations – *Ensuring superb quality*
6. Kona Kampachi™ - *Healthy eating never tasted so good*



# KONA KAMPACHI™

1. Open ocean aquaculture?

*...blue water ... blue sky ...*



## Seafood supplies are dwindling :

Fisheries closed or economically extinct include :

- Georges Bank cod,
- New England groundfish,
- West Coast rockfish,
- Louisiana redfish,
- Pacific albacore,
- swordfish,
- Orange roughy, ... and now Patagonian toothfish?

*...blue water ... blue sky ...*

## Demand is growing :

**There is growing demand in the U.S. for  
healthful, sustainable protein foods**

- U.S. seafood consumption worth \$52 billion p.a. (1999)
- U.S. seafood imports worth \$10.1 billion (2000)
- U.S. seafood imports growing at 12% p.a.

*...blue water ... blue sky ...*

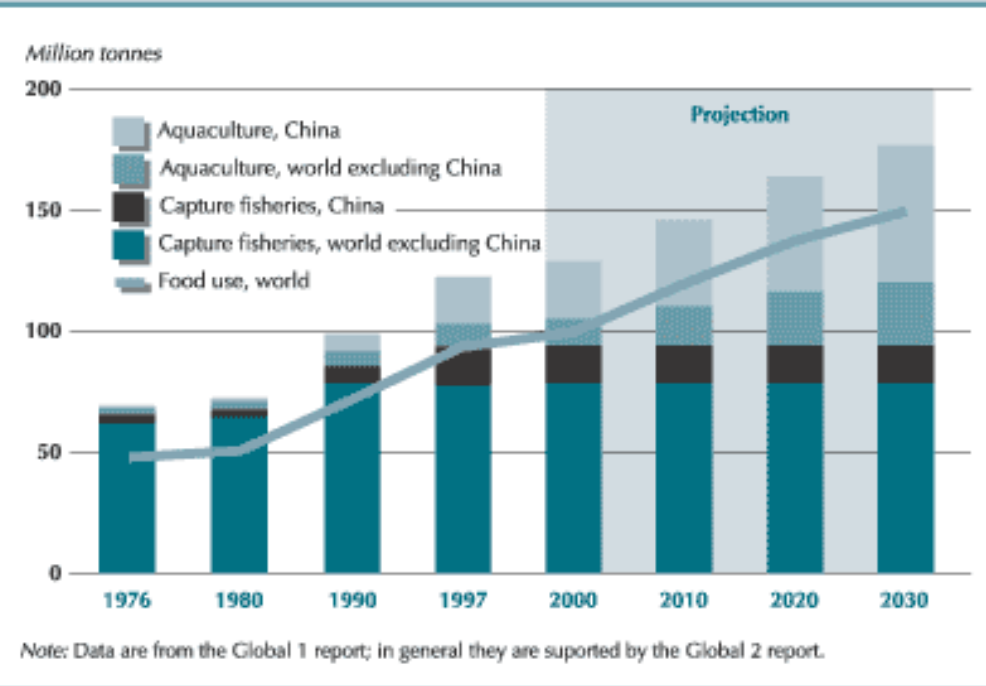


# Mega-Trends

Kona Blue is at the confluence of several mega-trends in both US and global markets:

- **Seafood consumption:**
  - US consumption rose in 2004 for the 3<sup>rd</sup> straight year
  - \$150B global market, has doubled over the past 25 yrs with prices increasing over 500%
- **Depleted Ocean Resources:**
  - wild caught supply is flat since 1990
  - 75% of wild caught fish are either over-fished or at sustainable limit

FIGURE 47  
World fish production and food use consumption 1976–2030



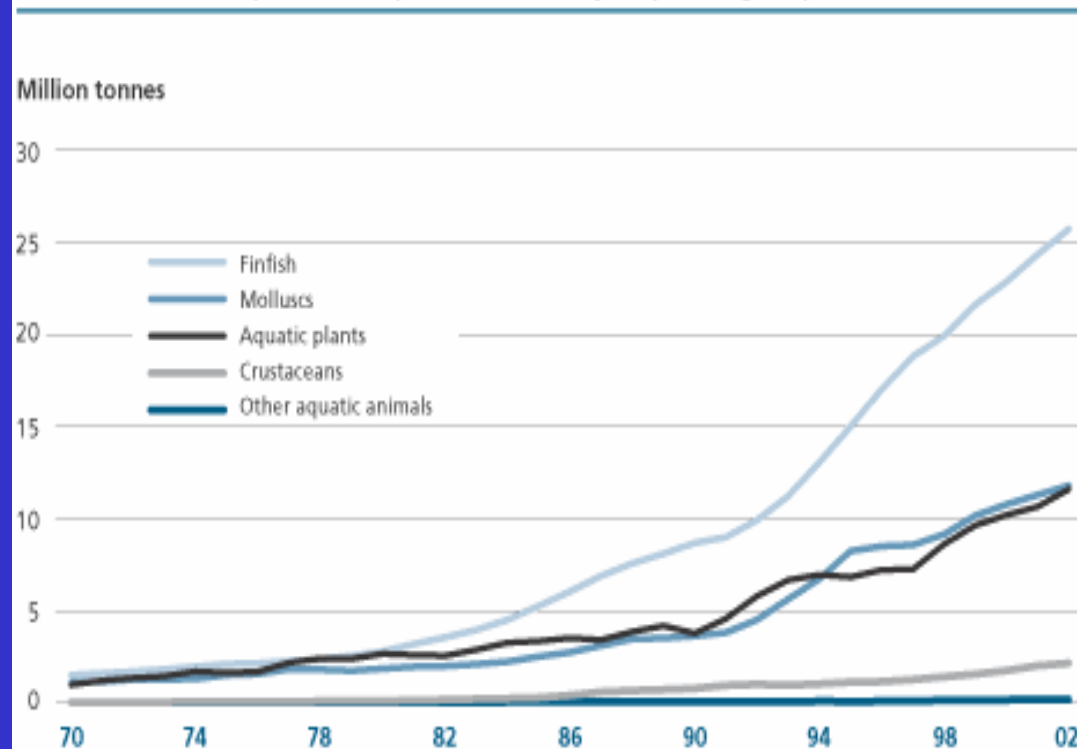


# Mega-Trends

**Kona Blue is at the confluence of several mega-trends in both US and global markets:**

- **Aquaculture:**
  - average annual growth of 9.2% since 1970; now 1/3<sup>rd</sup> of all seafood
  - \$50B global market, projected to double by 2030 (FAO)
- **Healthy/Sustainable products:**
  - US Organic food & beverage market has grown from \$1B in 1990 to \$12.2B in 2004
  - \$23B global market

Trends in world aquaculture production: major species groups



There is only one viable solution ...

Offshore aquaculture



*...blue water ... blue sky ...*

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## Offshore aquaculture offers:

- Improved water quality – healthy, high-quality fish
- Deeper water – minimal environmental impacts
- Submersible cages – protected from storms
- Minimal conflicts with other user groups

= The opportunity to culture superb  
in pristine waters

*...blue water ... blue sky ...*





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## 2. The permit process

*... consultation, conciliation ...*

*... consultation, conciliation ...*

## THE PERMIT PATHWAY

**1998: Revising Hawaii's ocean leasing legislation**

**2000: First public meetings with Kona community**

**March, 2003: Filed permit applications**

**March, 2004: All Federal and State permits in hand**

**September, 2004: \$4.0 million investment in Kona Blue**

**1<sup>st</sup> September, 2005 : First harvest from offshore cages**





## Kona Blue site attributes :

1. 200 - 220 ft of water
2. 2600 ft offshore (0.8 km)
3. Outside of fishing grounds
4. Beyond diving range
5. Clear of fringing reef
6. Strong currents
7. Sand bottom

*... consultation, conciliation ...*





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## 3. Hatch-to-harvest

*The key to sustainability and quality*



**Hatch-to-harvest .....**



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**The key to sustainability and quality**



**Hatch-to-harvest .....**



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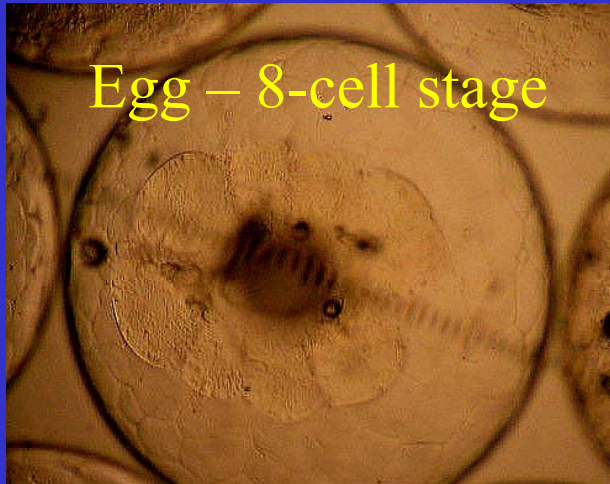


**The key to sustainability and quality**



# Hatch-to-harvest ...

... from fertilized egg to fingerling ...



Egg – 8-cell stage



Egg – late embryo



Larvae – day 1



Larvae – day 10

# Hatch-to-harvest ...



Fingerlings, Day 40

Nursery culture

Day 30 – Day 60

Fingerlings, Day 60



The key to sustainability and quality





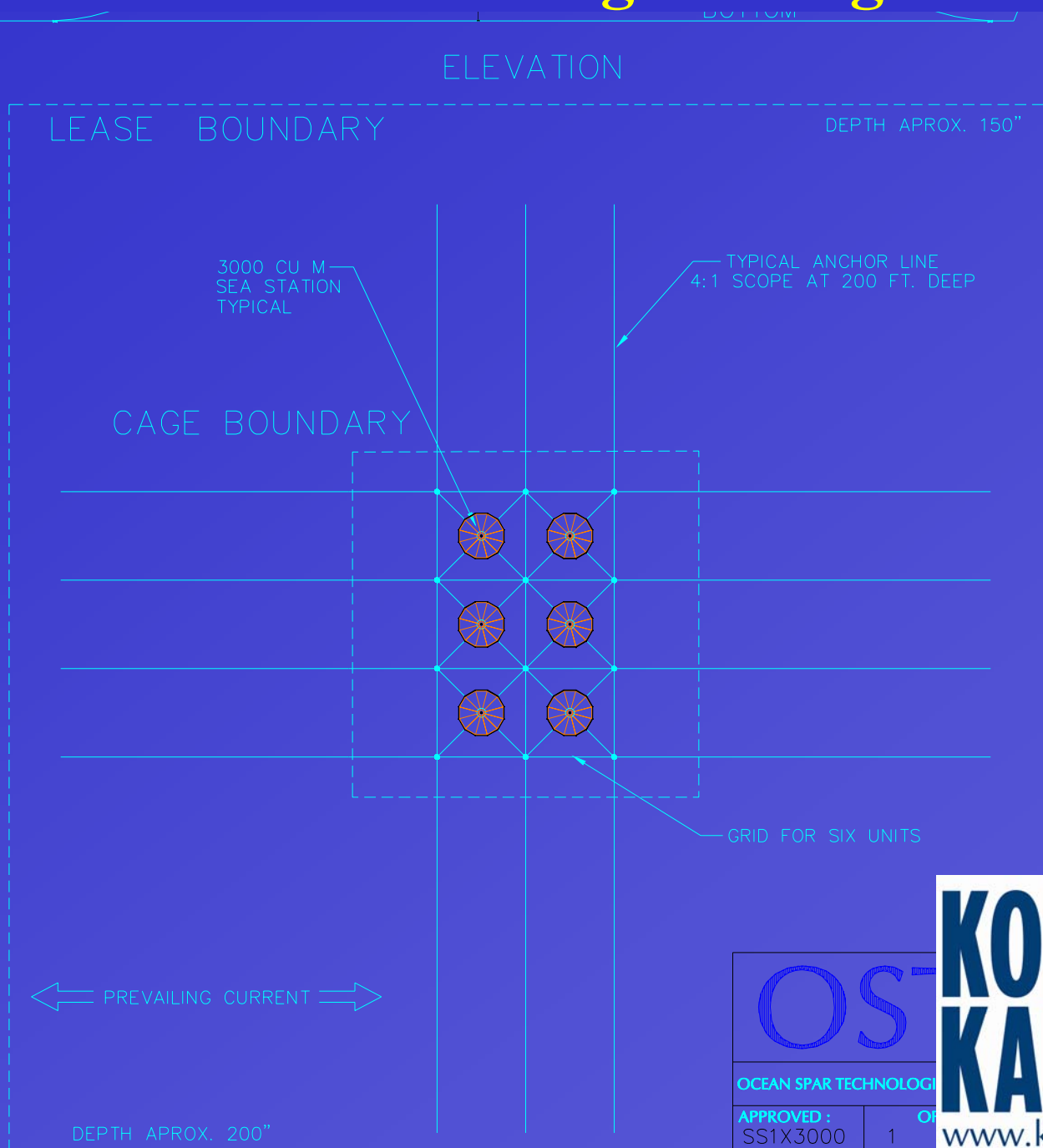
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## 4. Cage deployment

*Innovative engineering*



# Innovative engineering



**OST**  
OCEAN SPAR TECHNOLOGIES  
APPROVED :  
SS1X3000 1 OF

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The mooring array required  
14 steel embedment  
anchors, each 7,500 lbs,  
and over 10 ft long



**Innovative engineering**

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Each anchor was weighted with a ton of chain (90 ft lengths). Mooring lines connected to 1"-thick steel grid plates.



**Innovative engineering**

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Mooring lines were of 2" diameter braided nylon, and around 800 ft long. The scope was around 4:1



The chain and anchor was laid along side of the deployment vessel, and tied off with breakaway lines



**Innovative engineering**





Buoys are suspended above the chain plate, to provide stability to the grid



**Innovative engineering**

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The cage components (steel spar, steel rim, kevlar net) were then assembled on-site



**Innovative engineering**



Kona Blue's submersible cages can be raised to half-emergent.



**Innovative engineering**



The cage usually lies 30 ft below the surface, submerged in the “silent world”.



**Innovative engineering**

Six cages are now on site: two nursery cages, and four submersible Sea Stations. Two more Sea Stations will be deployed this year.



**Innovative engineering**







# KONA KAMPACHI™

## 5. Offshore: from stocking to harvest

*Ensuring superb quality*

Fingerlings were stocked into an inner nursery net for the first cage.



*Ensuring superb quality*



Around 27,000 fingerlings were pumped through a 3" hose into the nursery net.



*Ensuring superb quality*



The same hose was used to pump feed down to the fish



*Ensuring superb quality*



As they reached a size around 100 g, the fish were released into the outer cage



*Ensuring superb quality*



**Total of 140,000 fish stocked in offshore cages to date**

**Ongoing monitoring of :**

- fish health,**
- water quality,**
- an adjacent coral reef ecosystem (fishes and benthos), and**
- marine mammal interactions.**

**To date: No detectable environmental impacts at any level of significance**

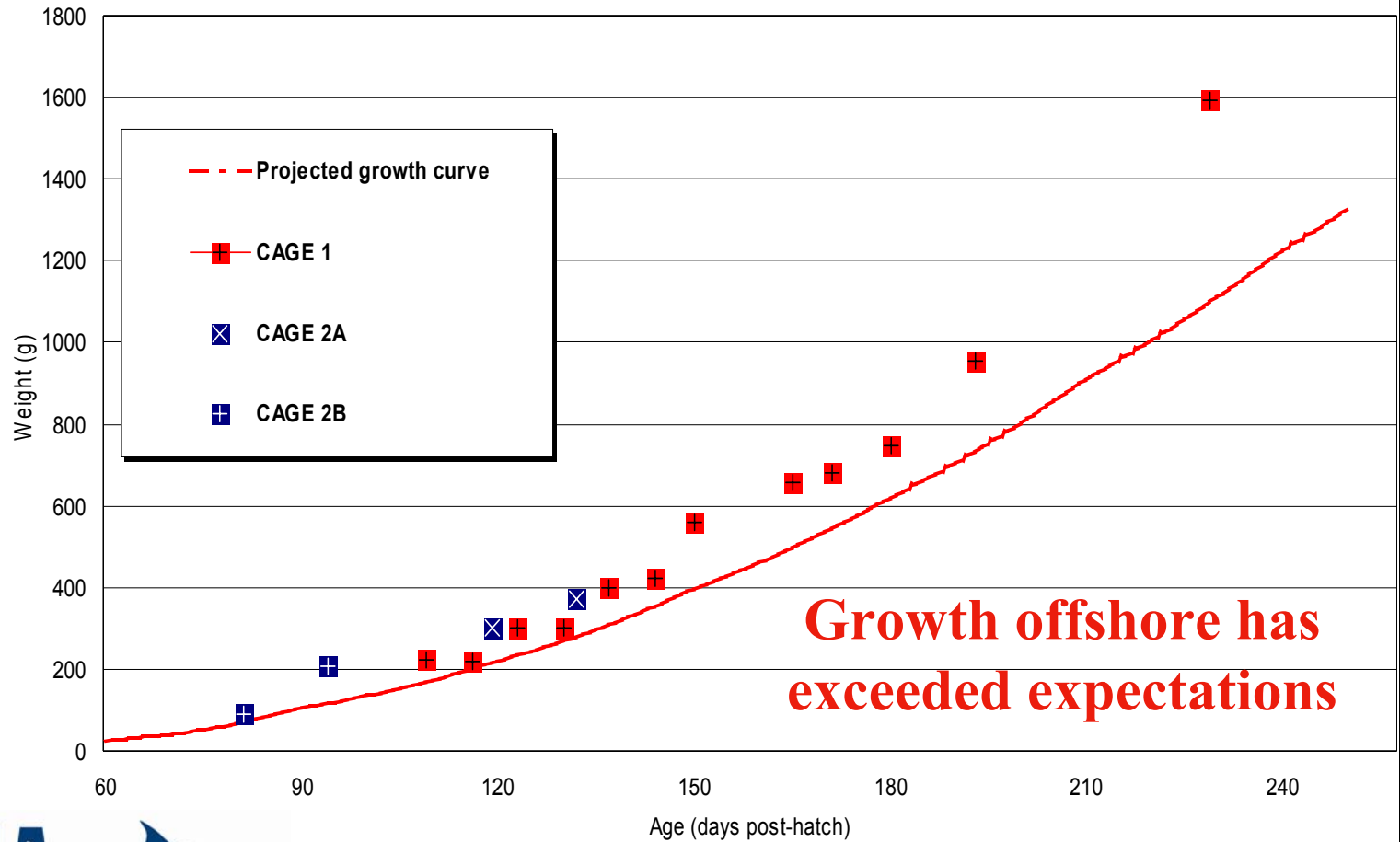


*Ensuring superb quality*



# Cages 1 and 2 growth performance

Actual v.s projected



First harvest occurred on  
schedule, September 1<sup>st</sup>, 2005

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Average weight  
= 3.5 lbs

*Ensuring superb quality*







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## 6. Kona Kampachi™

*Healthy eating never tasted so good*

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# KONA KAMPACHI™

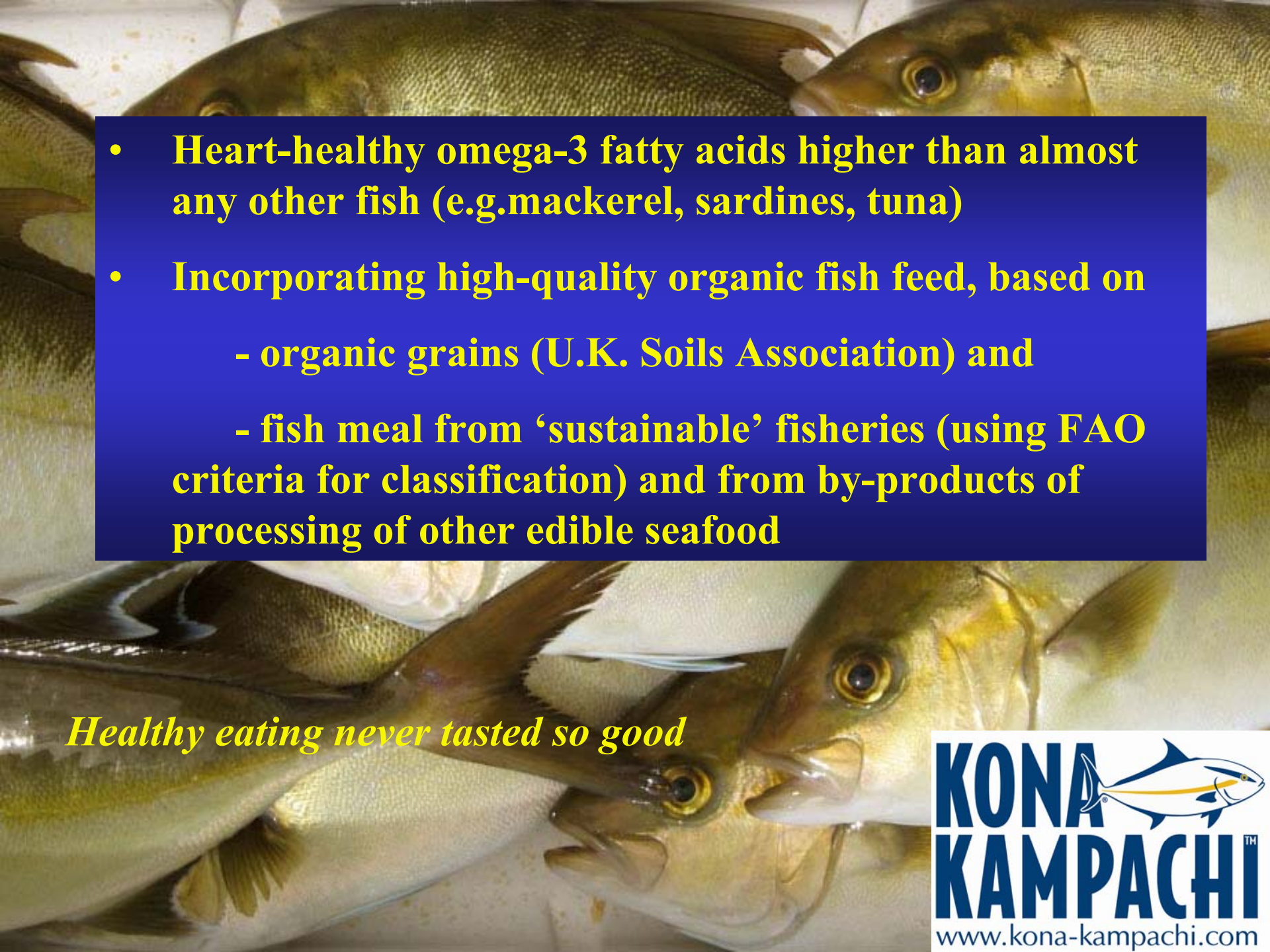
- **Fish diet controlled from hatch-to-harvest**
  - **Undetectable levels\* of Mercury**
  - **Undetectable levels\* of PCBs**

(\* = at sensitivity levels of more than 20 times EPA's allowable limits)

*Healthy eating never tasted so good*





- 
- **Heart-healthy omega-3 fatty acids higher than almost any other fish (e.g.mackerel, sardines, tuna)**
  - **Incorporating high-quality organic fish feed, based on
    - **organic grains (U.K. Soils Association) and**
    - **fish meal from ‘sustainable’ fisheries (using FAO criteria for classification) and from by-products of processing of other edible seafood****

*Healthy eating never tasted so good*

Ladies and gentlemen, prepare your palates ....



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... superb Kona Kampachi™ ...



*Healthy eating never tasted so good*