



RIVERENCE  
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# Challenging The Status Quo: A Farmer's Perspective on Feed Ingredients

Aquaculture Innovation Workshop 2017  
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Jason Mann, Evaqua and Riverence Farms



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# Evaqua Farms, Idaho



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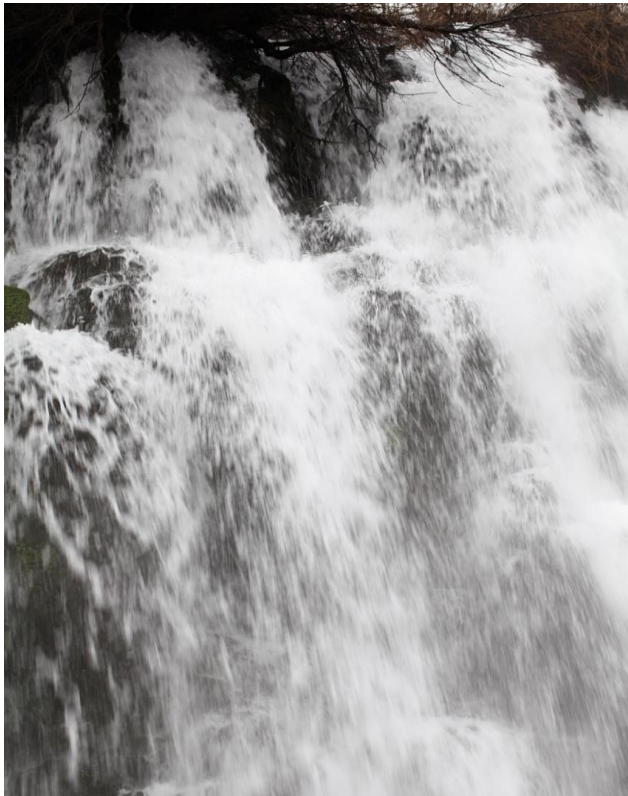
# Idaho's pristine Hagerman Valley...





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# Has natural springs at ideal 58F





# Magic Springs



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# The Snake river runs through...

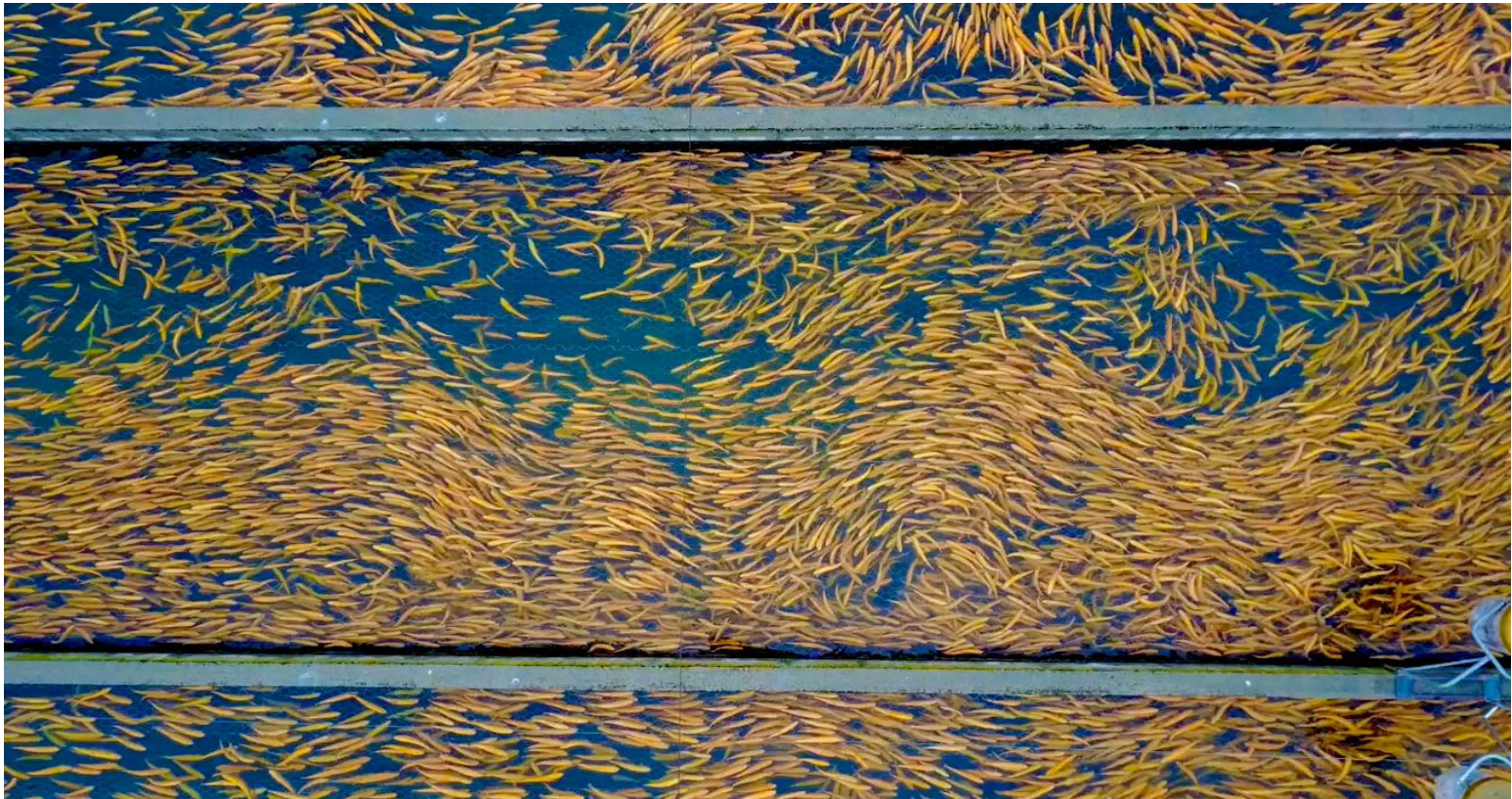






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# Produce two-thirds of USA's Trout







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# Indigenous Steelhead Strains





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# Native Golden trout







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# The Potential is Enormous

- The USA Seafood Market is large and growing
- Average USA seafood consumption is still only ~15 lbs per year
- Japan and South Korea: consumers eat ~120-140 lbs per year
- EU consumers eat ~48 lbs per year
- Less than one-tenth of seafood consumed in the USA is home-grown
- In 2016 Salmon and Trout consumed in USA was 900 million lbs
- Domestic production of salmon and trout was only 80 million lbs



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# Salmon and Trout Feed Markets

- The NA salmon + trout feed market is about 300,000 tonnes
- Norway's salmon + trout feed market is about two million metric tonnes
- Scotland is over 250,000 tonnes
- Chile is over 800,000 tonnes





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# Early 1950s mills made fish feed





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# Common ingredients used in aquaculture

- fish meals, fishoils, shrimp meal, squid meal
- poultry meal, blood meal, feather meal, meat meal
- corn gluten meal, wheat gluten meal, soy protein concentrate, corn protein concentrate
- soybean meal, canola meal, sunflower meal, pea concentrate, barley protein, flax meal
- peas, beans, lentils, nut meals, guar meal, lupin meal
- wheat, wheat flour, tapioca, potato starch, gelatin
- canola oil, poultry oil, animal tallow, soybean oil, flax oil





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# Important: caring about our oils

- Species
- Sustainable source and Omega 3 levels
- With low oxidation, fresh
- Highest digestibility
- No residues
- Traceable
- North American preferred



**30-40% of food is WASTED**

**= 1.3 billion tonnes globally each year**

**= 3.3 billion tonnes of greenhouses gases**

Source: United Nations Food and Agriculture Organization





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# West Coast Reduction Ltd.



SUPPORTING AGRICULTURE, STRENGTHENING THE ECONOMY, PROTECTING THE ENVIRONMENT

## WHAT MATERIALS ARE RENDERED?

Canadian Packing Plants

**25 MILLION**

cattle, hogs & sheep are slaughtered annually



**685 MILLION**

chickens and turkeys are processed each year in Canada



**Up To 50%**

of the animal is considered inedible by North Americans and goes to renderers including bones, fat, blood, feathers & some internal organs

## Farms

Some animals die on the farm from injury, old age, or other issues. Renderers prevent this from becoming a public health hazard by eliminating pathogens in the rendering process. Fallen animals only represent about 4.5% of rendered product.



## THE CANOLA INDUSTRY EXPORTS



**2.5 MILLION TONNES**  
of Canadian canola oil per year

## GROWING DEMAND

The canola industry projects that production will increase by

**85%**  
by the year 2025

## West Coast Reduction exports:

**65%**



of Canada's canola oil destined for Asia Pacific markets

## WHAT ARE THE PRODUCTS WEST COAST REDUCTION MAKES?

We recycle:  
**1 BILLION POUNDS**  
of raw material every year  
in Western Canada



If this raw material was sent to the landfill, it would be enough to fill BC Place Stadium:  
**1000 TIMES**

## West Coast Reduction recycles these materials into:

**202 MILLION POUNDS**  
of fat and oil products



**208 MILLION POUNDS**  
of protein products annually



## Rendered products are ingredients in:



Pet & Livestock Feed

Biofuel

Fertilizer

Plus other products like soaps, lubricants, detergents, and more

## RENDERING IS *Recycling!*

Rendering is:

the process of breaking down animal by-products into fats & proteins



## RENDERING IS SAFE & SUSTAINABLE

- Protects the environment
- Protects human health
- Protects animal health
- Produces useful by-products
- Essential, sustainable link in the food chain



People



Planet



Prosperity

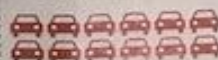
## West Coast Reduction collects & recycles:

**62 MILLION POUNDS**



of used cooking oil per year

Rendering these materials has the same effect on greenhouse gas emissions as removing



**150,000 CARS FROM THE ROAD**



West Coast Reduction Ltd. • 1292 Venables Street, Vancouver, British Columbia, Canada V6A 4B4 • (604) 255-9301 • [www.wcrl.com](http://www.wcrl.com) • [info@wcrl.com](mailto:info@wcrl.com)

# Meet nature's nutrient renewal expert



Common name: **black soldier fly (BSF)**

Scientific name: *Hermetia illucens*



# THE INSECT ADVANTAGE

- ✓ Excellent source of protein and fat
- ✓ Source of essential amino acids
  - e.g. isoleucine, methionine
- ✓ Natural feed ingredient for animals
- ✓ High digestibility and palatability
- ✓ Sustainably produced
  - Lower CO<sub>2</sub>/MT than fishmeal
  - Lower land requirement than soy
  - Upcycles nutrients from food waste that would otherwise be lost
- ✓ Low mycotoxins and anti-nutritional factors
- ✓ Made in Canada
- ✓ Consistent pricing





# PROCESS OVERVIEW



99%

PUPAE

1%

ADULTS

EGGS

*Point of harvest*

LARVAE  
(PREPUPAE)

lifecycle of the  
black soldier fly

LARVAE

LARVAE

LARVAE

LARVAE





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# Novel Feed Ingredients coming

Company or Partnership	Protein Source	Ingredients	Production Capacity and Start Date
<b>Corbion*</b> and <b>Bunge</b>	Algae grown with agricultural inputs	Protein and omega-3 (DHA)	100,000 metric tons (active)
Archer Daniels Midland and Synthetic Genomics	Algae grown with agricultural inputs	Protein and omega-3 (DHA)	20,000 metric tons (active)
<b>Intrexon</b> and <b>Darling Ingredients</b>	Black soldier fly larvae	Protein	Modular (2018)
Cargill and Calysta	Algae grown with methane from natural gas	Protein	200,000 metric tons (2019)
<b>Royal DSM</b> and <b>Evonik</b> (NASDAQOTH: EVKIF)	Algae grown with agricultural inputs	Omega-3 (EPA and DHA)	150,000 metric tons (2019)



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# SuperSmolt

A good smolt is half the battle won

by Europharma

**S**uperSmolt Original is a patented biotechnology programme that combines a functional feed and mineral bath treatment to induce optimal smoltification of Atlantic salmon without need for a winter photoperiod.

Europharma, one of the world's leading developers of fish health and welfare programmes, is helping customers save time and money whilst improving the health of their stocks, thanks to their proprietary smoltification programme, SuperSmolt.

The feed and salts act together to stimulate special cell receptors that pre-acclimatise fish to seawater while still in freshwater, providing and maintaining a uniform smoltification. The result is a high quality smolt that delivers numerous benefits in both the freshwater hatchery and on-growing at sea.

Following the success of the SuperSmolt Original programme, Europharma introduced "SuperSmolt Feed Only" as a new improved programme variation which reduces effort with no need to include additional mineral treatments alongside the functional feed and can therefore also be applied to freshwater cages.

The Clydebank-based company noted a 100 percent uptake of the new programme from existing programmes thanks to its superior benefits and success of SuperSmolt Original.

SuperSmolt Feed Only is simple to implement and takes away the need for daily salt dosing, reducing overall costs and the number of hours committed to dosing tanks.

Hatcheries or freshwater loch sites using the SuperSmolt Feed Only programme have found that their fish never desmoltify meaning staff have greater flexibility over sea transfer dates, especially when circumstances dictate a later transfer to sea is

required (well boat or sea site delays for example).

The programme brings all the benefits of SuperSmolt Original, thus also allowing earlier transfer of fish due to extra growth from having fish on non-stop 24 hour light from first feeding onwards.

The results of the optimised smoltification achieved by the use of SuperSmolt programmes have been seen in hundreds of millions of fish treated in Scotland, Chile, Canada and Norway, showing better performance at sea compared with those not treated with SuperSmolt. Feed uptake, survival and growth are improved in the post transfer stage.

Europharma supports the SuperSmolt programmes with the integration of in-house ATPase analysis - an important tool in determining the right time to transfer fish to sea.

Laboratory analysis of ATPase levels in salmon gills during smoltification helps assess how far the process has come. The Europharma team use their extensive experience in the use and interpretation of ATPase analysis and together with other smolt parameters such as smolt index, condition factor and behaviour it can provide the best basis for choosing the right time for sea transfer - making sure that fish populations will be hitting the bulls-eye of the smoltification window every time.

To support the SuperSmolt programme users on site, Europharma employ a highly skilled team of experts. Ross Beedie is the SuperSmolt Technical Support, and works with the team of fish vets and technicians at Europharma to ensure the best use of the programme and service for customers.

He works closely with farms ensuring the best practices are being used during the SuperSmolt programmes, in order to achieve the best in fish health and welfare.

Ross comments, "I have worked at Europharma for four years, allocating most of my time visiting farms. This gives me the opportunity to speak to our customers and find out their specific needs. Talking face-to-face allows me to discuss any problems on the farms and find the best solutions to ensure optimum fish health.

"Since introducing SuperSmolt Feed Only, the feedback has been fantastic. It saves customers time and money and the benefits to fish health are great. We are seeing larger fish thanks to having no winter photoperiod and overall improved health. We will now continue to work with fish farms to help better the aquaculture industry as a whole, identifying issues and providing solutions."

Farms who feel they could benefit from the use of SuperSmolt are encouraged to get in touch with Ross to discuss how the programme can be used to produce an optimal and prolonged smoltification window with the subsequent benefits on growth and survival in the next stage in seawater.



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# A Farmer's View on Raw materials

- Treat by-product Feed Ingredients as Food
- Ensure that Feed Ingredients are Safe (testing)
- Have complete traceability with a simple recall system
- Tell us about: Source, GMO, Organic, Freshness



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# A Farmer's View on Raw materials

- Transparency and support from feed suppliers
- Adopt natural antioxidants in protecting feed
- Compete less with the human food basket
- Source ingredients nearby (domestically)
- Help Farmers educate consumers, proactively





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# A Farmer's View on Raw materials

- Refine feed ingredients to suit RAS systems
- Increase digestibility to maintain water quality
- Be sustainable (ethically, financially, environmentally)
- Value small, medium and large farmers



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# A Farmer's View on Raw materials

- Want good value (price and quality stable), always
- Meet all regulations
- Help support domestic seafood farming's growth
- Develop new, innovative ingredients which are feasible



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# A Farmer's View on Raw materials

- Source ingredients from origin (producer) partner
- Certification or equivalent
- Do practical research and development
- Utilize alternatives for better Fish Health





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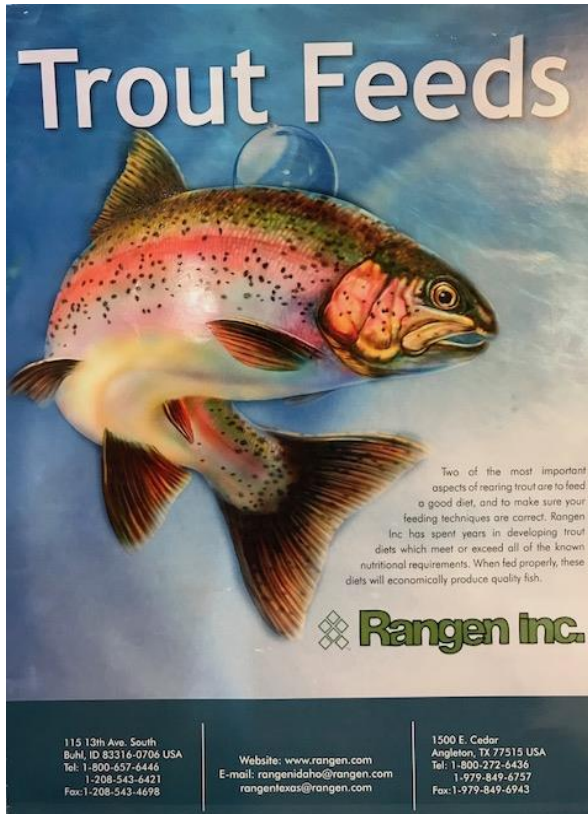
# Monitor protein digestibility (Aller Aqua , Internatiional Aquafeed)





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# Recommend functional feeds if beneficial



## Trout Feeds

Two of the most important aspects of rearing trout are to feed a good diet, and to make sure your feeding techniques are correct. Rangen Inc. has spent years in developing trout diets which meet or exceed all of the known nutritional requirements. When fed properly, these diets will economically produce quality fish.

**Rangen Inc.**

115 13th Ave. South  
Buhl, ID 83316-0706 USA  
Tel: 1-800-657-6446  
1-208-543-6421  
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## EWOS®

### SUPPORTING FISH HEALTH MAKES THE DIFFERENCE

Solutions for your stock at every life stage

EWOS diets are formulated for the nutritional needs of your fish. Functional feed additives support fish health during environmental, production and life stage challenges.

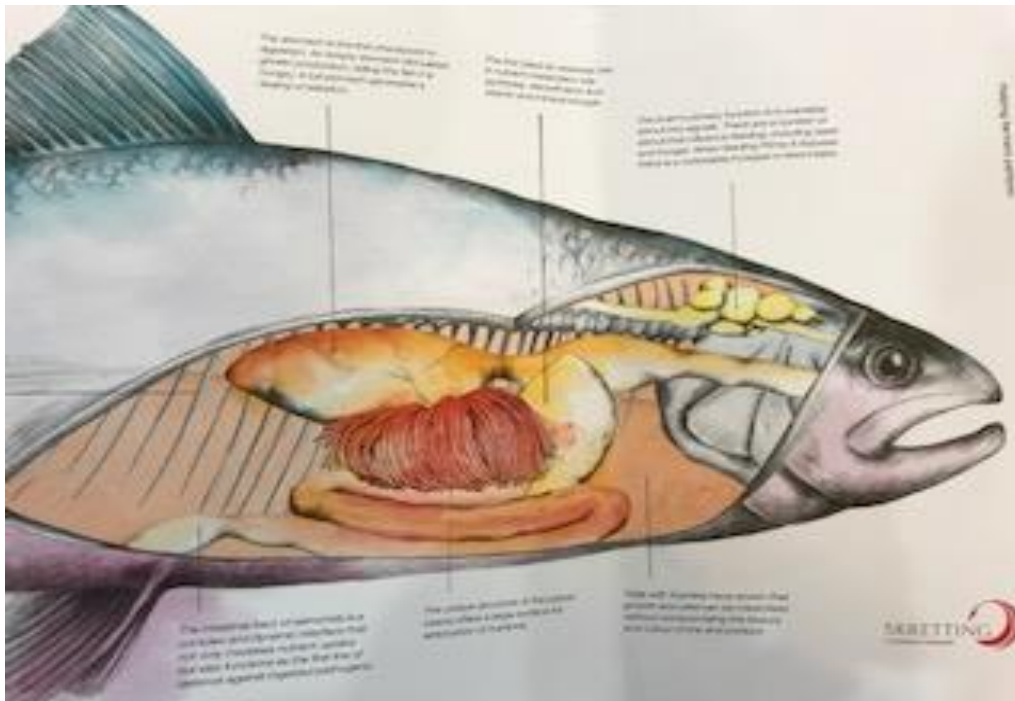
1110-11200 Street, Surrey BC Canada V3V 6M9  
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Tel: 1-800-272-5436 Fax: 1-979-849-6943  
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**Cargill**



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# Explain and Field-Validate New Feeds





# Food for thought ...



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- Feed is the largest operating cost (>55%) for fish farmers
- At times, we compete with humans' food to make feed
- One-third of food goes uneaten, creating potential for good, food-grade feed ingredients to be developed or refined further, from inedible waste-streams

# Food for thought ...



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- Clean Fresh Water is so precious, creating opportunities for RAS and new, specialty feed ingredients requiring less water
- USA supplies only 9 % of own seafood demand, even at humble consumption levels of 15 pounds per year
- We have a large, seafood consumer end-market, good raw materials, the highest food safety regulations and standards
- We have the science on RAS, local ingredient development technology and companies engaged, the forum to talk

# Food for thought ...



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- A golden opportunity to work closely together to raise the profile of the seafood sector in North America
- Give people what they want: Salmon and Steelhead that tastes and looks great
- Tell your story: it's locally-produced, healthy, safe, how and where it is produced and the people behind it all



# Food for thought ...



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- Increase supply of homegrown, premium-quality, farmed Steelhead and Salmon for more people to enjoy and stay healthy !
- Support the preservation of our Wild Salmon and public water resources .



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# Thank you !



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