### GreenFeed

**Sustainable, High Quality Fish Feed at Reasonable Prices**

### Summary
At GreenFeed, we utilize scientific and engineering innovations to convert retail food waste into a sustainable, scientifically formulated fish feed for the aquaculture industry.

### The Problems

<table>
<thead>
<tr>
<th>Retail Food Waste</th>
<th>Feeding Fish with Fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Each year, <strong>133 billion lbs. (31%) of retail food are wasted</strong> in the US, with 95% of it ending up in landfills.</td>
<td>The production of feed for the aquaculture industry presents another environmental problem: The primary ingredients in fish feed—fish meal and fish oil—are largely made from small species of fish such as anchovies, herring, and sardines. The <strong>overfishing of these feed fish</strong> has negative impacts on other marine life that depend on them as a food source.</td>
</tr>
<tr>
<td>• Wasted produce alone costs the supermarket industry <strong>$15 billion/year in losses</strong>.</td>
<td>For this reason, NOAA and the USDA have partnered to create an Alternative Feeds Initiative that aims to “identify alternative dietary ingredients that will reduce the amount of fishmeal and fish oil contained in aquaculture feeds while maintaining the human benefits of farmed seafood.” GreenFeed fits within this framework.</td>
</tr>
<tr>
<td>• Landfill food contributes <strong>23% of methane emissions</strong> in the US.</td>
<td></td>
</tr>
</tbody>
</table>

### The GreenFeed Solution
At GreenFeed, we use our engineering expertise to convert food waste into scientifically formulated fish feed for the aquaculture industry. We have developed a database that compares nutritional profiles of received food waste to that required for fish feed formulations so that we can ensure our feed will meet industry nutritional standards regardless of the specific food waste we receive. Our database computes formulations for salmon, trout, and catfish feed that scale with fish size.

<table>
<thead>
<tr>
<th>Fish weight (g)</th>
<th>Pellet diameter/length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>1</td>
</tr>
<tr>
<td>10-20</td>
<td>2</td>
</tr>
<tr>
<td>20-50</td>
<td>3</td>
</tr>
<tr>
<td>50-100</td>
<td>4</td>
</tr>
<tr>
<td>100-200</td>
<td>5</td>
</tr>
<tr>
<td>200-300</td>
<td>6</td>
</tr>
<tr>
<td>300-500</td>
<td>7</td>
</tr>
<tr>
<td>500-1000</td>
<td>9</td>
</tr>
<tr>
<td>1000-1250</td>
<td>11</td>
</tr>
<tr>
<td>1250-2000</td>
<td>13</td>
</tr>
<tr>
<td>2000-2500</td>
<td>15</td>
</tr>
</tbody>
</table>

*Pellet size is a function of fish size*
A More Sustainable Solution for Food Waste

According to EPA guidelines, converting human food waste into animal feed is a better solution than those more commonly in place at the food retail level: making fertilizer and biofuel.

Furthermore, fish feed is a higher value product than fertilizer and biofuel.

The EPA’s Food Recovery Hierarchy places animal feed above industrial uses like fuel conversion and composting

GreenFeed mitigates the negative environmental impacts of retail food waste and overfishing

Market Opportunity

The production of aquaculture feeds is the most rapidly expanding market in the animal feed production sector, increasing at a rate of 6-8% each year.

Fish feed is the single largest expenditure for fish farms. Fishmeal, the primary ingredient in fish feed, has been steadily increasing in price since 2000.

Market Scope

Our target markets are the US and Canada aquaculture industries.

GreenFeed’s formulations include salmon, trout, and catfish feed to enter these markets.

In the US, catfish is a $411 million industry, with feed cost taking up 35% of catfish sales revenue. After catfish, trout and salmon are the second most extensively farmed food fish, accounting for an estimated 8.0% and 4.0% of the total industry revenue respectively.
Market Scope

US Fish and Seafood Aquaculture Industry

Products and Services

<table>
<thead>
<tr>
<th>Products and services segmentation (2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catfish 27.4%</td>
</tr>
<tr>
<td>Sport fish 1.7%</td>
</tr>
<tr>
<td>Bait fish 2.1%</td>
</tr>
<tr>
<td>Ornamental fish 3.0%</td>
</tr>
<tr>
<td>Miscellaneous aquaculture 9.6%</td>
</tr>
<tr>
<td>Mollusks 24.0%</td>
</tr>
<tr>
<td>Other food fish 26.0%</td>
</tr>
</tbody>
</table>

Total $1.5bn

Canadian Market:
Salmon is $60 million industry in the US, while in Canada it is a $668 million industry accounting for approximately 70% of the total aquaculture revenue of the country. 76% of Canadian salmon is farmed in British Columbia.

2015 Canadian Aquaculture Production Statistics ($000)

<table>
<thead>
<tr>
<th></th>
<th>Nfld</th>
<th>PEI</th>
<th>NS</th>
<th>NB</th>
<th>Que</th>
<th>Ont</th>
<th>Sask</th>
<th>Alta</th>
<th>BC</th>
<th>CANADA (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finfish - Salmon</td>
<td>..</td>
<td>..</td>
<td>x</td>
<td>x</td>
<td>0</td>
<td>0</td>
<td>x</td>
<td>x</td>
<td>8 470,09</td>
<td>668,655</td>
</tr>
<tr>
<td></td>
<td>..</td>
<td>..</td>
<td>x</td>
<td>..</td>
<td>7,95</td>
<td>23,20</td>
<td>0</td>
<td>x</td>
<td>0 0</td>
<td>40,264</td>
</tr>
<tr>
<td></td>
<td>..</td>
<td>..</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>x</td>
<td>x</td>
<td>2,495</td>
<td>2,495</td>
</tr>
<tr>
<td></td>
<td>..</td>
<td>..</td>
<td>8,349</td>
<td>0</td>
<td>213</td>
<td>2,200</td>
<td>x</td>
<td>x</td>
<td>1,862</td>
<td>14,406</td>
</tr>
<tr>
<td></td>
<td>148,53</td>
<td>53,58</td>
<td>8,17</td>
<td>25,40</td>
<td>474,45</td>
<td>477,856</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finfish - Other</td>
<td>6</td>
<td>0</td>
<td>x</td>
<td>x</td>
<td>0</td>
<td>0</td>
<td>x</td>
<td>x</td>
<td>5 40,69</td>
<td>89,586</td>
</tr>
<tr>
<td></td>
<td>12,847</td>
<td>2,395</td>
<td>x</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>x</td>
<td>x</td>
<td>x 161,38</td>
<td>967,441</td>
</tr>
<tr>
<td>Shellfish - Total</td>
<td>161,38</td>
<td>55,97</td>
<td>162,58</td>
<td>9,85</td>
<td>25,40</td>
<td>0</td>
<td>x</td>
<td>x</td>
<td>x 3</td>
<td></td>
</tr>
<tr>
<td>Total Aquaculture</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

potential Customers

BC Salmon Farms:
- Marine Harvest Canada - the world’s largest aquaculture company and producer of farmed salmon.
- Creative Salmon
- Grieg Seafood BC Ltd.
- Cermaq Canada Ltd.
- Cooke Aquaculture

US Catfish Farms (located in MS, LA, and AL):
- America’s catch
- Heartland Catfish
- Pride of the Pond
- Guidry’s
- Country select
- Freshwater Farms Products, LLC
Potential Customers

US salmon and trout farms and hatcheries:
- Icicle Seafoods
- The Washington Department of Fish and Wildlife (WDFW). The WDFW operates 83 hatchery facilities, of which 75-80% are dedicated to producing salmon and/or steelhead and another 20-25% rear trout and other gamefish. Fifty-one tribal hatcheries (45 NWIFC facilities, three Colville Confederated Tribes and three Yakama Nation) and 12 federal hatcheries also contribute to the statewide salmon harvest.

Methods we’ll employ to reach our customers
- Ads and Promotions to Industry Associations such as:
  - National Aquaculture Association
  - Catfish Farmers of America
  - BC Salmon Farmer’s Association
- Direct mail and samples to aquaculture companies
- Discount promotions to aquaculture companies
- Tradeshows such as Aquaculture America

Competitors
GreenFeed is well positioned to sell in the price range of our primary competitors ($400-700/tonne).

BC-based salmon feed competition:
- Cargill Aqua-Nutrition Canada/EWOS Feeds
- Skretting
- Taplow Feeds

US-based fish feed competition:
- BioMar
- Aller Aqua

Financial Projections

Our Cost:
We incur a one-time cost of capital investment in setting up our factory. However, our operational expenses are low as manufacturing fish food is not a labor-intensive process. Additionally, our product cost is zero since we are using waste as our input product. Our COGS includes the nutrient enrichment additives that we would be purchasing and adding to fortify our feed.

Fixed Cost = Investment in setting up a factory = $200,000
Cost of packaging and producing each unit (tonne) of the fish food = $150

Our Price:
Average sale price per unit of feed (tonne) = $400
This is very competitive pricing in an industry where average salmon fish feed is sold for $500 per tonne.

Our Profit Margin:
= ((Price - Variable Cost)/Price) %
= $(400-150)/400$
= 63%

Incentive for supermarkets to give us their waste food:
GreenFeed will pick up waste food from our suppliers on site, which will mitigate costs incumbent upon supermarkets to have their waste shipped to composting and garbage facilities.
Financial Projections

Our Breakeven quantity:
= Fixed Cost/(Price – Variable Cost)
= $200,000/(400-150)
= 800 tonnes

Based on our projections, we will break even in our first year of operation.

Our Revenue Projection:

Customer Lifetime Value for 5yrs of operation:
Average customer lifetime = 5 yrs
LTV: Revenue per customer over 5yr lifetime = $500,000
Financial Projections

Customer Acquisition Cost (CAC):
We project our Customer Acquisition Cost (CAC) to be about $4,000 per customer
- Booth rental at a conference/trade show: $2,000
- Travel cost and promotion material cost for each conference: $3,000
- Conferences/Tradeshows in next year: 4
- Tradeshows costs = $20,000
- Direct mail brochures + samples to potential customers = $2000
- Initial order discount promotions total budget = $18,000
- Total Customer Acquisition spend for 1 year = $20k+$2K+$18k = $40k
- Number of customers acquired in yr1 = 10

Customer Acquisition Cost CAC per customer = $40k/10 = $4k

Hence, LTV = 500k and CAC = 4k. Revenue LTV vs. CAC = 11.5x
Our projected Customer Lifetime Value (LTV) is 11.5 times our CAC.

Therefore, GreenFeed is a very healthy business to invest in

Our Team

GreenFeed consists of five seniors in the chemical engineering department with a wide variety of independent research experience:
- Mihyun Kim
- Katherine Schultz
- Jiachun Shi
- Leyan Wang
- Mengjia Zhu

and
- Pallavi Sharma, an MBA candidate and Electrical Engineer with prior business development and high-tech experience at Intel Corp.

Advisor: Prof. Lilo Pozzo, UW Chemical Engineering