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International Salmon Farmers Association (ISFA) Report to NASCO 2019

President Hansen, Vice President Doucet, Madam Secretary Hatfield, Honorable Commissioners, Delegates and Observers, I am Sebastian Belle Vice President of the International Salmon Farmers Association (ISFA). I bring you greetings and apologies from our president Trond Davidson who is unable to attend NASCO this year. Founded in 1990, ISFA representatives have been attending NASCO meetings for many years. ISFA membership includes the producer's associations from all the major and many of the minor salmon farming regions in the world. ISFA is an association of associations at a global level and as such does not engage in or comment on issues that relate to specific local jurisdictions or individual companies. ISFA's primary focus has been the sharing of information between producer associations to ensure that innovations and lessons learned in one jurisdiction are shared across the sector in an efficient and timely manner.

On behalf of our members I would like to thank NASCO for the opportunity to speak briefly to you today. I understand you had some very interesting presentations during the International Year of The Salmon Symposium on Managing Atlantic Salmon in a Rapidly Changing Environment. Although I was unable to attend the symposium, I look forward to reading the proceedings. I can say unequivocally that the challenge that climate change presents to wild salmon management is shared by the salmon farming community. For example, in some cases changing environmental conditions are altering the geographic distribution of naturally occurring pathogens, pests or parasites. Another example would be how changing weather and current patterns can alter the type of sea state conditions on a site over time. In response to these types of changes the farming community is developing new ways to farm and manage existing sites. Even without these types of environmental challenges our sector has always been characterized by rapid technical evolution. I thought it might be of interest to the NASCO parties and observers to talk about a few recently emerging technical trends in the farming sector.

The Emergence of Large-Scale Land Based Production Units.

For a number of years critics of the ocean based net pen farms have suggested that the solution to many of their environmental concerns is the movement of all salmon farms on land. Small scale, land-based production units have been around for quite a few years. In addition, recirculating aquaculture systems (RAS) have been used by farmers for many years in our fresh water hatchery and broodstock facilities. Within the last 2-3 years we have seen an increasing number of proposals for very large land-based facilities designed to grow salmon to market size. Currently these projects are either raising investment capital, beginning construction or in several cases beginning actual production. These are ambitious projects at scales designed to test the hypothesis that the only reason land-based production has not been economical to date is they have not been big enough. The level of investment going into this trend is quite large and depending on whose estimates you believe they could result in anywhere from 20,000 to several hundred thousand metric tons of production annually. It is early days in the development of farming methods designed for these systems. We have much to learn about how to build and manage these complicated and highly technical systems. Although they may address some potential environmental risks, they will no doubt present other environmental and farming challenges. It should be noted that a major reason the projected economics of these projects appear to currently

work is that salmon prices are at historically high levels. Industry expectations on this trend remain cautious. We will need these projects to complete successful, profitable and repeated production runs in order shift this outlook to optimistic. I look forward to coming back to NASCO and reporting on how these facilities are developing.

The Implementation of large” Post Smolt” Production Strategies.

Another fast-developing trend is the use of land-based facilities to produce much larger “post smolts” for stocking into ocean net pen farms. These facilities use essentially the same technology as the large land-based facilities designed to grow fish to market size. The fish these “post smolt” facilities produce are anywhere between $>.5 - 1$ kilogram. By producing stocking fish that large this production method shortens the time fish are in the ocean cages exposed to any natural risks such as storms or pests, pathogens and parasites such as sea lice. In the case of sea lice this strategy avoids the first possible cycle of exposure, reduces potential total sea lice loads and eliminates the need for at least one treatment. Industry expectations are that this trend will continue and strengthen.

The Move to Offshore Sites.

The final technical trend I will comment on is the movement into more exposed “offshore” sites. These sites are further from shore than current sites and are typically characterized by high energy states and deep water. This is a trend that has been building for some time. Early experiments using submersible cages or highly engineered structures go back to the early 90’s. The current projects although much larger are essentially refinements of these original designs using new materials, manufacturing methods and sophisticated remote monitoring and control technologies.

Moving offshore presents both advantages and challenges. Temperature and water quality offshore are often ideal and more stable than inshore sites. In addition, the scale of the production units and depth of water allow for larger farms driving cost efficiencies without measurable benthic impact. Finally, by moving away from near shore locations potential user conflicts and impacts on migratory species may be reduced. The challenges are obvious. More exposed sites require more highly engineered and robust equipment. Like land-based production facilities this results in very high capital requirements driving production costs up. In addition, although we have not had enough time to test this hypothesis, farms in more exposed high energy sites may have a higher risk of system failure and potential escapes. Certainly, the fact that the individual cages are larger and contain more fish suggests that if a system failure occurs the number of escapes per failure may potentially be higher. As with land-based systems it is early days in the development of this trend but if successful the move offshore could revolutionize the sector. The industry outlook on this trend is cautiously optimistic.

Other technical trends of interest to NASCO would include the level of innovation in methods designed to reduce escapes and effectively manage sea lice. The speed and level of innovation in these areas has accelerated since ISFA last commented at a NASCO meeting. Net and cage designs have improved significantly. National and international engineering and installation standards have become much more rigorous. Most system failures and escapes we hear about in the sector are associated with older outdated equipment or inexperienced operators. The good news is that current economics in the sector are allowing significant investment into equipment upgrades and operator training. Sea lice management methods are evolving dramatically and very quickly. The fastest innovations are currently occurring in non-chemical control methods. “Thermolicers”, underwater lasers, mechanical removal, semi closed cage systems, cleaner fish, genetic selection

for resistant strains of salmon, use of large post smolts and immunoboosters in feeds have all made significant progress in the last couple of years. Of particular note is the progress being made on the genetic selection of strains of salmon resistant to sea lice infestation. Although breeding programs take time, significant gains have already been made and the industry expects breeding to be the most effective medium to long term solution to the sea lice challenge. Although sea lice remain a challenge, we are making good progress and fully expect this challenge to be controlled in the near future.

Finally, I would note that most if not all of these improvements are being driven by risk management strategies demanded by investors, insurance companies and international seafood sustainability certification programs not regulations. Indeed, the certification programs being demanded by our customers are often significantly stricter than most regulations. Different customers use different certification standards and we must comply with them all if we are to sell our product. It is not unusual for farms to have multiple auditors from different certification programs on their farms on a weekly basis. While regulations remain an important tool to maintain minimum standards, the market and our customers are driving innovation and improvements in sustainability at a truly blistering pace.

I thank you for your attention and on behalf of ISFA would like to recognize all the hard work NASCO, it's parties and observers continue to do to conserve the truly amazing animal we all love and respect, the Atlantic Salmon.