SUSTAINABLE AQUACULTURE SYSTEMS SUPPORTING ATLANTIC SALMON (SAS^2)

IMET

UMBC

www.SalmonOnLand.org

Imports of Atlantic salmon, the most consumed finfish in the US, contribute over 20% to the nation's $16.8B trade deficit in edible seafood, with ~ 96% of US consumed Atlantic salmon (and 90% of all US consumed seafood) coming from imports. Thus, there is an urgent need and an opportunity to promote domestic aquaculture development and increase US Atlantic salmon production. ***The goal of the SAS^2 project, led by UMBC's Institute of Marine and Environmental Technology (IMET), is to facilitate the development of an innovative and sustainable US Atlantic salmon production platform, land-based recirculating aquaculture systems (RAS), that will transform the US food and aquaculture systems, and secure and increase high-quality and affordable seafood production.***

Next generation land-based RAS tanks (above) at UMBC-IMET's Aquaculture Research Center provide full environmental control, biosecurity against disease, pollution and escapes, and waste remediation without environmental impact.

Drs. Zohar (above right) and Wong (left) spawning an Atlantic salmon female at UMBC-IMET's Aquaculture Research Center for the SAS^2 program.

The national public-private-federal SAS^2 program (see program partners on reverse side) addresses the challenges, barriers and needs that currently inhibit US salmon aquaculture production, and potentially the industry's future success, via R&D, education, extension, and workforce development initiatives. Critical areas of research include (i) development of methods to reliably produce eggs year-round, (ii) enhancement of biosecurity against genetic "pollution" (via induced sterility of farmed fish), (iii) formulation of ecologically-responsible fishmeal-free diets, (iv) maximization of water reuse (i.e., minimized discharge), (v) remediation of fish wastes (conversion to biofuel), (vi) mitigation of off-flavor that can ruin the harvested product, and (vii) analysis of market/economic factors.

Commercial pelleted diets (far left) use fishmeal from wild-caught fish, a detrimental practice that threatens fisheries. SAS² researchers and industry partners develop ecologically friendly diets using insect larvae meal (left) as a protein source.

IMET's anaerobic digester (above) uses methanogenic bacteria to convert solid wastes (uneaten food, feces, etc.) into a fuel-grade, combustible biogas (above right) that can be used as an energy source for power (right) or heat to offset facility energy costs.

Fillet off-flavor caused by naturally occurring bacteria can adversely affect the product's taste and smell. SAS² scientists are working with the industry to develop novel technologies to eliminate the unwanted flavor compounds prior to harvest, resulting in premium fillet taste (above).

Research Universities

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Government/NonProfit

USDA Agricultural Research Service NCWMAC, Franklin, Maine · THE CONSERVATION FUND FRESHWATER INSTITUTE Shepherdstown, WV · MARINE & FRESHWATER RESEARCH INSTITUTE ICELAND

Industry Partners

AquaCon™ · AquaBounty · SKRETTING a Nutreco company · SUPERIOR Fresh · New York STEELHEAD HUDSON VALLEY Fisheries · Benchmark Genetics · EXCITON CLEAN · intralytix SAFETY BY NATURE · INNOVASEA · KENNEBEC RIVER BIOSCIENCES

Industry Supporters

WHOLE OCEANS MAINE SUSTAINABLE SALMON · NORDIC AQUAFARMS SUSTAINABLE AQUACULTURE · ATLANTIC SAPPHIRE · BioMar

The UMBC-led SAS² consortium (above) is comprised of 12 partnering institutions and 10 industry collaborators.

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