BUSINESS INCUBATION IN MAINE FOR MARINE FINFISH AQUACULTURE: 20 YEARS OF IMPROVEMENT AND LESSONS LEARNED

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The Center for Cooperative Aquaculture Research (CCAR) was established in 1999 by the University of Maine as a place where aquaculture research, development, and business incubation could be carried out at commercially relevant scale. The site had been previously developed as a privately-operated hatchery supplying salmon smolts for Maine’s salmon aquaculture industry. It had access to fresh and salt water, along with six functional recirculating aquaculture systems (RAS) previously used to rear salmon and Arctic charr. The largest of these RAS consisted of two 300,000 gallon (1,100m3) in-ground tanks, each supported with an independent RAS. Located about an hour from the University of Maine campus, the facility appeared well suited for collaborative research between university scientists and industry.

In its early years (2000 – 2008), CCAR activities were directed towards development of what were perceived to be ‘alternative’ or ‘new’ aquaculture species: Atlantic halibut, cod, and marine polychaetes. These cold-water species were chosen as viable alternatives to salmon because they were native to the Gulf of Maine, the wild stocks were depleted, they had high market value, and hatchery and culture methods were developed or under development in other regions. Parallel with these activities, aging and obsolete infrastructure was renovated or replaced and new infrastructure was developed, including a 24,000ft2 (2,230m2) dual-species (halibut and cod) marine hatchery and an 11,500ft2 (1,068m2) aquaculture business incubator building. The CCAR worked with four industry partners during this period to produce cod, halibut, and the marine polychaete *Nereis virens*. These species were reared in CCAR hatcheries from captive wild broodstock and raised to market size in existing and newly developed CCAR production units. While the companies incubated their aquaculture start-ups at CCAR they developed plans to build production facilities and worked to finance their efforts through public and private funding. Public support at the state level was essential and came through entities such as the Maine Economic Improvement Fund (MEIF) established by the legislature in 1997; the Maine Aquaculture Innovation Center (MAIC); and the Maine Technology Institute (MTI). This support is ongoing and remains critical today.

Ultimately, however, these early ventures all failed. Although failure can be attributed in part to the Great Recession of 2007-09, other underlying causes played as great, and perhaps greater, of a role, and valuable lessons were learned. These lessons include, but aren’t limited to, the importance of having established sound aquaculture infrastructure as a foundation for success and having the backing of private investors with a long-term view. For a period of about three years CCAR business development slowed and attention shifted to new species such as green sea urchins, seaweed, and California yellowtail *Seriola lalandi*.

Today, in 2020 and twenty years after its founding, the Center for Cooperative Aquaculture Research is a thriving hub of activity as Maine experiences a resurgence of interest in land-based aquaculture. Three companies are using CCAR business incubation space and aquatic systems to commercialize aquaculture of marine ornamentals, American eels *Anguilla rostrata*, and California yellowtail. Green sea urchins *Strongylocentrotus droebachiensis,* marine macroalgae, and lumpsucker *Cyclopterus lumpus* are also under commercialization development at CCAR. Along with this activity, three other companies recently announced plans to build large salmon RAS facilities in Maine. These developments have led to consideration of expanding the CCAR’s scope to include workforce training and development to train the anticipated need for marine hatchery and RAS expertise.

In this presentation we describe the twenty-year history of the CCAR and how it functions in greater detail. We examine issues of facility cost recovery; causes of commercialization failure and conditions for success; the critical role a broad public infrastructure plays in supporting aquaculture business development; species selection; and other factors.