Encouraging Successful Recirculating Aquaculture and Aquaponic Systems

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from

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in partnership with

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Executive Summary

This report follows a one-year study begun in February 2023 by TerrAqua Environmental Science and Policy, LLC that evaluated the status of and potential in the Atlantic states for two types of recirculating aquaculture systems (RAS), one producing finfish and/or shrimp, and another, "aquaponics," which combines that system with hydroponics to also produce vegetables.

We documented each system's current and potential status and benefits, including but not limited to food production, employment, income, economic and community development, and its social, ecological, and sustainability impacts.

1. **We derived information from extensive discussions with stakeholders such as:**

    - Aquaculture and aquaponics industry leaders
    - Current RAS growers
    - Growers using aquaculture systems other than RAS (e.g., biofloc, offshore net-pens, onshore flowthrough)
    - Land farmers (soil, greenhouse, conventional, organic, IPM, biodynamic, etc.)
    - Aquaculture and related trade groups
    - Federal, state, and county Sea Grant & Co-op Extension leaders and staff, and their K-12 and university-level educator-partners
    - Federal, state, and county, domestic and foreign, government officials, who promote, regulate, and fund RAS
    - Federal, state, and county government R&D labs that provide tech transfer
    - Academics who provide tech transfer
    - Environmental non-governmental organizations (eNGOs), including private foundations, charities, and venture-capital philanthropists
    - Seafood sellers: retail, wholesale, food service, etc., and their trade groups and associations

- Seafood shippers

2. **We reviewed the literature on RAS/RAS aquaponics**, which has exploded over the last 5-10 years, including peer-reviewed journals and technical reports ("grey literature"), books, trade journals, and the media

3. **We participated in conferences and workshops**, such as the Aquaponics Association Conference, Albuquerque, NM Sep 14-17, 2023, and the Sustainable Aquaculture Systems Supporting Atlantic Salmon (SAS2) 2nd Conference, Baltimore, MD Oct 17-19, 2023

Findings

- We identified situations in which RAS should be strongly encouraged, overseen, and funded. We also identified specific situations in which RAS is unlikely to produce the desired results

- We demonstrated how developing RAS technology and training individuals to work in the field would promote and diversify regional economic development

- We found that consumer education, marketing, infrastructure development, trade shows, government regulation of inexpensive fishery imports, etc. can be useful in supporting efforts to promote RAS

- We concluded that more federal, state, and local government investment in RAS would encourage potential entrepreneurs and investors (banks, venture capital groups, *vulture* capital groups, angel investors, etc.)

Recommended Next Steps for the ASMFC

- Establish the pro-bono RAS Advisory Panel that we developed and curated. We also identified a Panel chair who, if approved, is eager to lead it, with plans to include representatives from diverse:
    - Atlantic Coast regions
    - Fish and shrimp producers, researchers, educators, etc.
    - Edible lettuces and other plants producers, researchers, educators, etc.
    - Operational sizes and kinds

- Work with local, state, and federal government to support RAS and RAS-aquaponics by ensuring that elected and appointed officials (and their staffs) understand that the issues and benefits extend far beyond seafood and produce

- Help to control imports of inexpensive, unsustainable wild-harvested and farmed seafoods, which unfairly compete with RAS products and pose greater environmental and human-health risks

- Request increased aquaculture-related funding from NOAA and other agencies

- Follow up this study with more detail on successful commercial farms of different sizes and locations to better understand commonalities in financial success, and when and why performance was not as expected
    - What species, approaches, technologies, business plans, etc. might work best among the ASMFC's constituents?
    - How to tap infrastructure, labor, educational and other opportunities in promoting RAS
    - Which infrastructure—highways, trains, water, electricity, abandoned buildings, etc. (1) exists, (2) should be fortified, or (3) should be built outright?
        - Expanding the RAS industry and its infrastructure will benefit many other sectors

- Encourage growers and commercial fishers to share processing facilities (also infrastructure)
    - Proximity to markets, trained (and trainable) employees, etc.

- Build more legislative and administration support at the local, state, federal and international level for sustainable aquaculture, with which we or any number of other consultants and/or the Advisory Panel can help you

- Educate environmental NGOs on the <u>environmental</u> benefits of supporting RAS and RAS-aquaponics and encourage them to support both

- Help expand domestic and international seafood markets for East Coast-grown RAS- and RAS-aquaponics products

- Support RAS and RAS-aquaponics R&D

Conclusion

RAS operators and regional networks can be strengthened and expanded significantly with reasonable support from ASMFC and other impacted entities, leading to better economic, environmental, and social outcomes for the region, and for its future sustainability.