

# Complete RAS Aquaculture Design

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# It all starts with the Fish

Expertise for the Aquaculture Industry. Regardless of the species, we have the RAS experts for your project.

NIRAS has strengthened its food and beverage team by adding two specialists in Recirculating Aquaculture Systems (RAS) design, specifically to target and provide services to the aquaculture industry. With existing expertise in fish processing, this new production-side knowledge enhances the comprehensive, circularity of our service offerings.

NIRAS extensive pool of professionals enables us to assemble cross-functional teams tailored to your specific needs.

## RAS GENERAL



### Species

- Steelhead Salmon
- Rainbow Trout
- Yellowtail Kingfish
- Hybrid Grouper
- Atlantic Salmon



### Facility Designs

- Broodstock
- Hatchery
- Nursery
- Growout
- Processing



### System Foundation

- Species biology
- Growth model
- Logistic plan
- Tank Design
- Bio dimensioning
- Water chemistry
- Feed parameters

## RAS SPECIFIC



### Broodstock

- Genetic Selection
- Spawning
- Egg Collection
- Broodstock WTS



### Hatchery

- Egg incubation
- Egg Development
- Hatching and Larval development
- Start Feeding (Copepod, Artemia, Rotifer, Algae and fish pellet)



### Nursery

- Fry to Juvenile
- Smolt
- Grading strategy
- Vaccination
- Fish pump, fish handling equipment, counter, grader, etc.



### Growout

- Market size fish
- Portion size
- Fish meat refinement
- Purge
- Harvest strategy



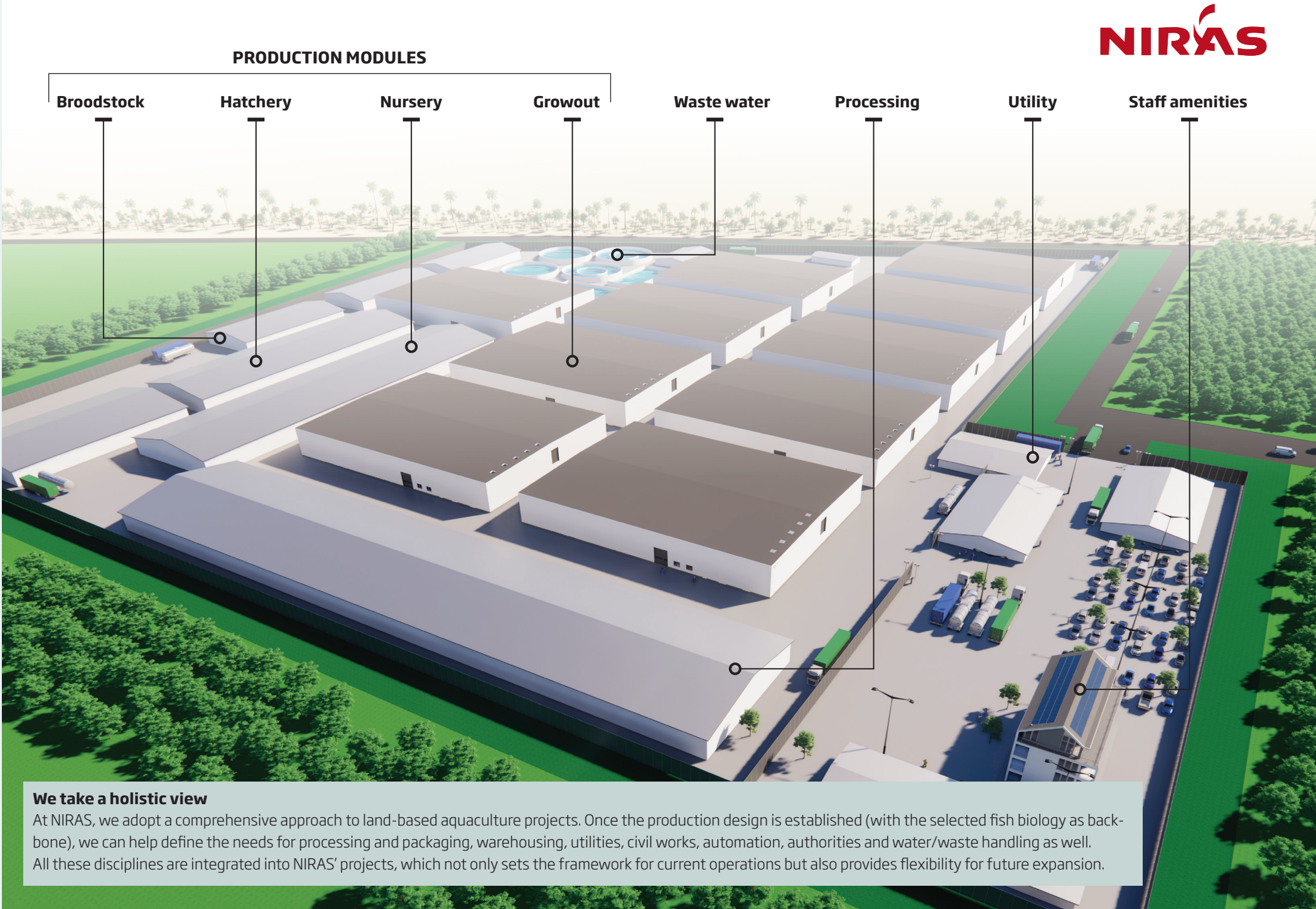
### Processing

- Humane stunning and bleeding
- Transport
- Gutting and filleting
- Packaging and cold storage



### Water Treatment WTS

- Intake Water
- Mechanical Filter
- Biofilter
- UV & Ozone
- Degasser (CO2 Stripper)
- WWTS



### We take a holistic view

At NIRAS, we adopt a comprehensive approach to land-based aquaculture projects. Once the production design is established (with the selected fish biology as backbone), we can help define the needs for processing and packaging, warehousing, utilities, civil works, automation, authorities and water/waste handling as well. All these disciplines are integrated into NIRAS' projects, which not only sets the framework for current operations but also provides flexibility for future expansion.

### From Initial feasibility evaluation to operational land based fish farm

NIRAS has the resources to support RAS projects from initial capex pre-studies over design phases to project execution. NIRAS adapts and customizes deliverables from project to project. We offer project managers with different back ground and level of experience, always to fit the project best.



### Analysis

- Strategic analysis
- Business & Technical
- Analysis



### Planning & Design

- Project Possibilities
- Project Definition
- Project Planning
- Design



### Tender & Contract

- Tendering
- Contract



### Execution

- Design follow up
- Follow up on contract design
- Change management
- Site Management



### Test & Acceptance

- Commissioning
- Test & Training
- Acceptance & Hand-Over



### Optimize

- Production optimization
- Process and utility optimization



### Operation

- Operation
- Maintenance
- Integration in organisation



## Strong Coverage in Northern Europe

NIRAS has a strong coverage in Scandinavia and Northern Europe with offices in Norway, Denmark, Sweden, Poland, The Netherlands and UK.

RAS projects will be supported with knowledge and resources from Norway and Denmark and other offices if needed. The set-up will be agreed from project to project.



### Sustainable operation

NIRAS has a long tradition of working with large international Food and Beverage Groups on sustainable topics and projects. Whether it is sustainable factory layout for a greenfield or brownfield project, or energy optimization in an existing operation, feel free to reach out to NIRAS for an inspirational talk.

### Safety awareness

NIRAS has a strong safety awareness in every project whether it is a design aspect or relate to project execution. It is always a goal to execute projects with zero accidents and incidences. NIRAS has a proven track record of safety focused project and site management.

### Get access to the experts

The persons below are NIRAS' primary contacts for RAS. Want to know more? If you want to know more about the solutions that NIRAS can offer, please feel free to contact us.



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