# Farm of Qi — TimberFish Expansion Plan

Permaculture Aquaponics & Clean Water Integration

## Vision

Farm of Qi is expanding its permaculture operations to include integrated aquaponics and clean water processing through a partnership with TimberFish Technologies. The TimberFish system converts locally available organic waste — weeds, wood chips, and agricultural residues — into a microbial biomass that feeds fish and crustaceans in a closed-loop recirculating aquaculture system. This approach aligns with the farm's ethos of working with the natural wetland ecology of the site rather than against it.

## Founder: Jere Northrop

Jere Northrop is a microbiologist and environmental engineer whose career spans five decades of work at the intersection of microbial ecology, water treatment, and aquaculture. His path began in 1973 at the Center for Theoretical Biology at SUNY Buffalo, where he worked with the Relational Systems group on theoretical biology. In his spare time he built the first prototype of what would become TimberFish — fermenting weeds in barrels to produce a microbial biomass and feeding it to minnows.

Northrop went on to serve as chemist and process superintendent at the Town of Amherst, NY Advanced Wastewater Treatment Plant (1979–1989), a 36 MGD facility where he developed biomonitoring systems using trout, fathead minnows, and daphnia grown in plant effluent. He then founded Bion Environmental Technologies (1989–2008), developing patented nutrient management systems for agricultural operations across the eastern United States.

In 2008, Northrop launched TimberFish Technologies with a new focus: building economically self-sustaining systems that integrate fish production with waste conversion, removing dependency on regulatory markets. The technology has been validated through independent third-party trials at the Freshwater Institute (a program of The Conservation Fund), one of the world's premier recirculating aquaculture research centers.

## The TimberFish Small-Scale System

The TimberFish system is a modular, scalable technology designed to operate at small-farm and homestead scales. It converts lignocellulosic organic matter (wood chips, weeds, crop residues) into a nutrient-rich microbial biomass through controlled fermentation in bioreactors. This biomass then enters the aquaculture loop as supplemental feed for fish and crustaceans.

### Core System Components

| Component | Function |
|---|---|
| Bioreactor | Aerobic fermentation vessel where organic matter is inoculated with microbial cultures and irrigated with recirculating effluent to produce biomass |
| Solids Ecoreactor | Composting bed that processes settled solids into a beneficial soil amendment (BionSoil) for permaculture use |
| Fish Growth Tanks | Recirculating tanks for growing fish and crustaceans; water is filtered through wood-chip biofilters mounted above each tank |
| Wood Chip Biofilter | Biological filtration layer atop fish tanks that removes ammonia and nitrites; doubles as aquaponics growing medium (watercress, herbs) |
| Worm Farm | Vermiculture beds fed with microbial biomass; worms serve as live feed supplement for fish |

### Species Successfully Grown

| Species | Type | Notes |
|---|---|---|
| Rainbow Trout | Coldwater fish | Grown to market size in proof-of-concept outdoor systems year-round including winter |
| Channel Catfish | Warmwater fish | Grown in enclosed facility at Five & 20 Spirits site, Westfield, NY |
| Yellow Perch | Coolwater fish | High-value species suitable for northeast markets |
| Largemouth Bass | Warmwater fish | Demonstrated in prototype system |
| *M. rosenbergii* | Freshwater prawn | Giant river prawn; high market value crustacean grown alongside fish |

## Alignment with Farm of Qi

The Farm of Qi site in Southampton Township, NJ is classified as 100% freshwater wetlands with hydric Mullica fine sandy loam soils and a water table at the surface. Conventional agriculture and permanent construction are heavily restricted. The TimberFish system is uniquely suited to this environment for several reasons:

| Site Constraint | TimberFish Compatibility |
|---|---|
| 100% wetlands coverage | System uses above-ground tanks and bioreactors; no excavation or grading required |
| Hydric soils / high water table | Recirculating closed-loop design minimizes ground contact and nutrient discharge |
| 50-ft riparian buffer zone | Modular footprint can be positioned outside buffer; zero-discharge operation |
| Temp structures <32 sq ft permitted | System components can be configured as multiple small modular units |
| Native Coastal Plain Hardwood Swamp | Organic feedstock (fallen branches, native plant trimmings) sourced on-site supports habitat management |

## Proposed Expansion Phases

**Phase 1 — Bioreactor Pilot**

Install a small-scale bioreactor using on-site woody debris and native plant trimmings as feedstock. Establish microbial cultures and begin biomass production. Integrate worm farm for secondary protein conversion. Estimated footprint: two modular units under 32 sq ft each.

**Phase 2 — Aquaculture Integration**

Add recirculating fish tanks with wood-chip biofilters. Begin with species suited to the site's temperature profile — yellow perch and channel catfish for warm months, with potential for trout in cooler seasons. Aquaponics layer (watercress, native herbs) grown on biofilter surfaces.

**Phase 3 — Closed-Loop Permaculture**

Connect system outputs to existing permaculture zones: BionSoil amendment for raised beds and food forest plantings, nutrient-rich water for irrigation (within regulatory limits), harvested fish and prawns for on-site food production and local market. Watercress and herbs as additional crop revenue.