PROGRESS REPORT

YEAR TWO OF OPERATIONS

Eric Hobson, Chair | **Garry Ullstrom**, CEO

KUTERRA™

Land Raised™ Atlantic salmon

Seafood Watch

SeaChoice.org for healthy oceans Recommended Best Choice

vancouver aquarium ocean wise™

FISH WISE

KUTERRA

Why we're doing this

Why we're doing this

KUTERRA

Land Raised™ Atlantic Salmon farm

Who is involved

Project partners

Lead funders

Advisors

Marketing partner

Our mission

Assess
technical, biological, economic
feasibility

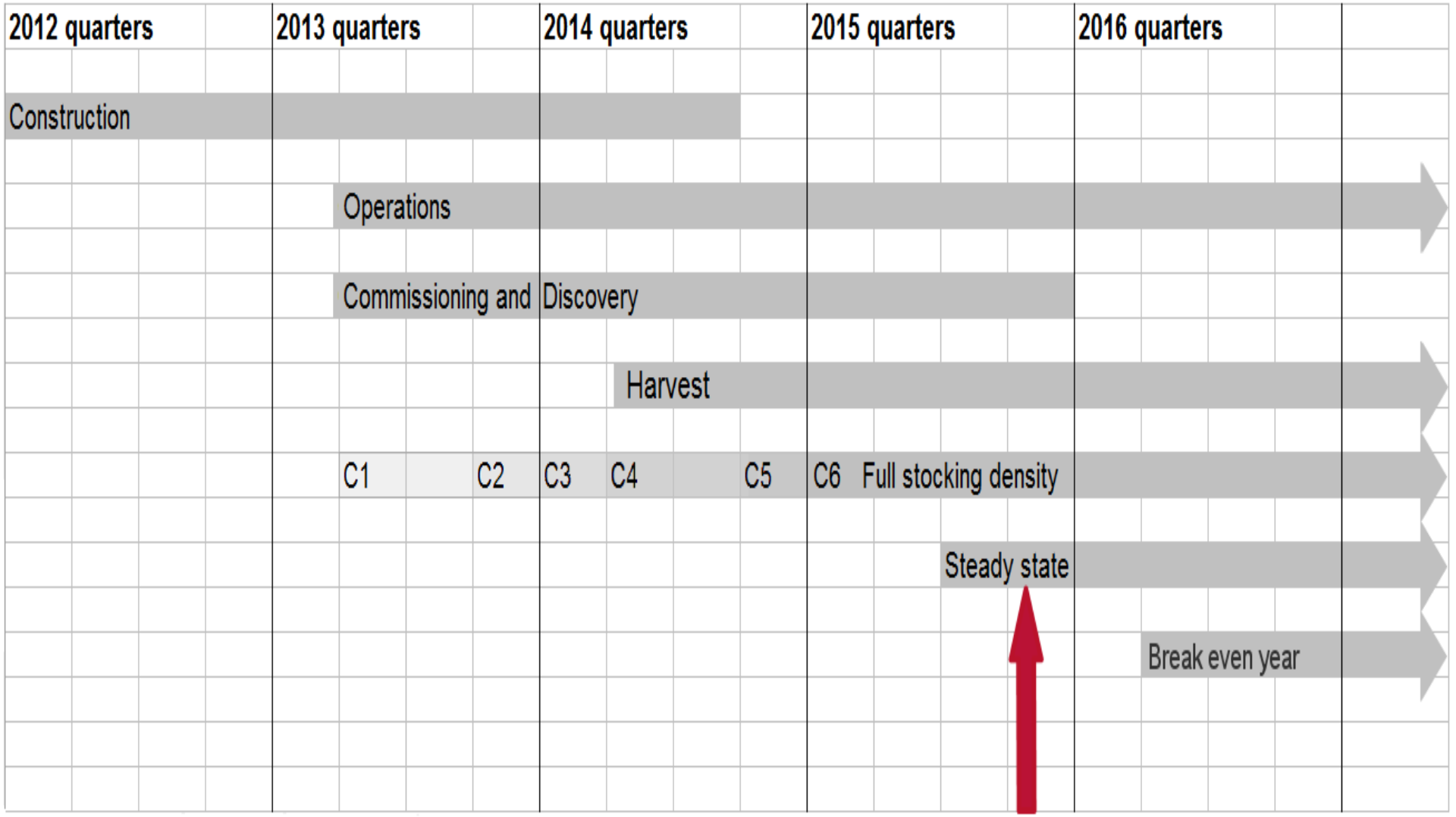
of raising Atlantic salmon to harvest size using land-based RAS.

Final reporting

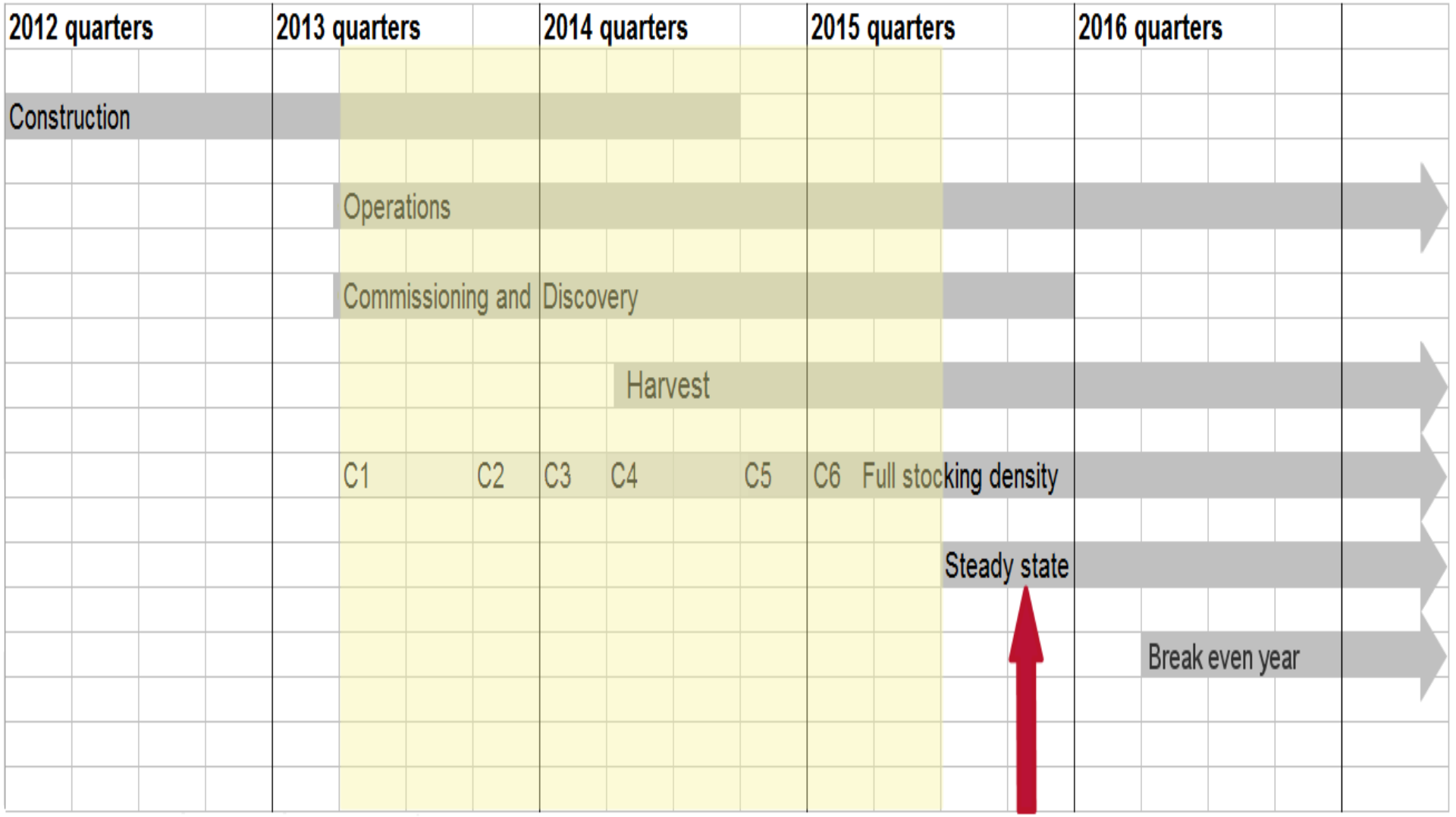
http://tidescanada.org/programs/salmon-aquaculture-innovation-fund/

- Final milestone report
- Capital cost retrospective report
- Addendum on Cohort 4, expansion assumptions
- IEMP final report from Pacific Salmon Foundation

Stages and milestones

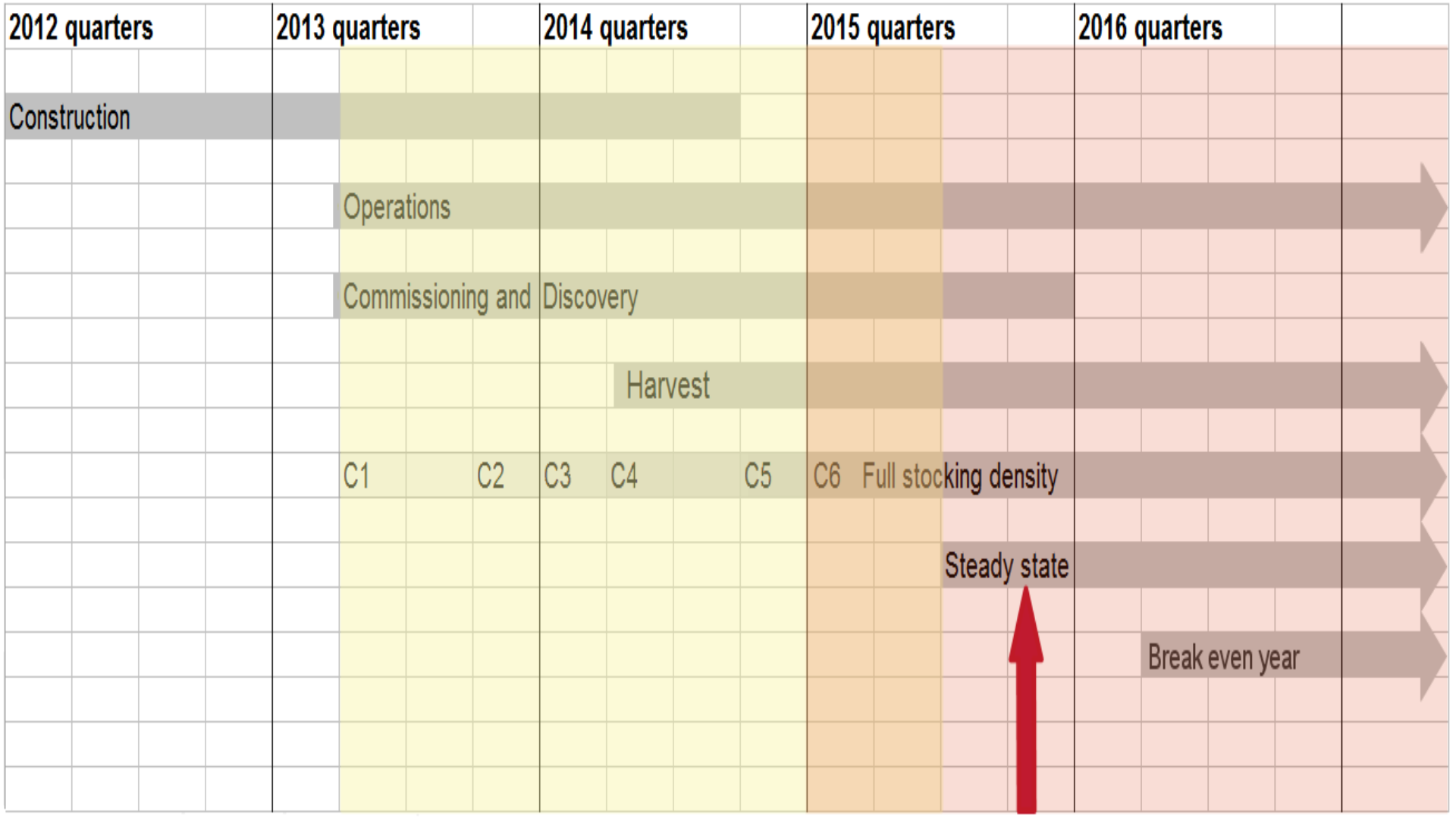


Stages and milestones



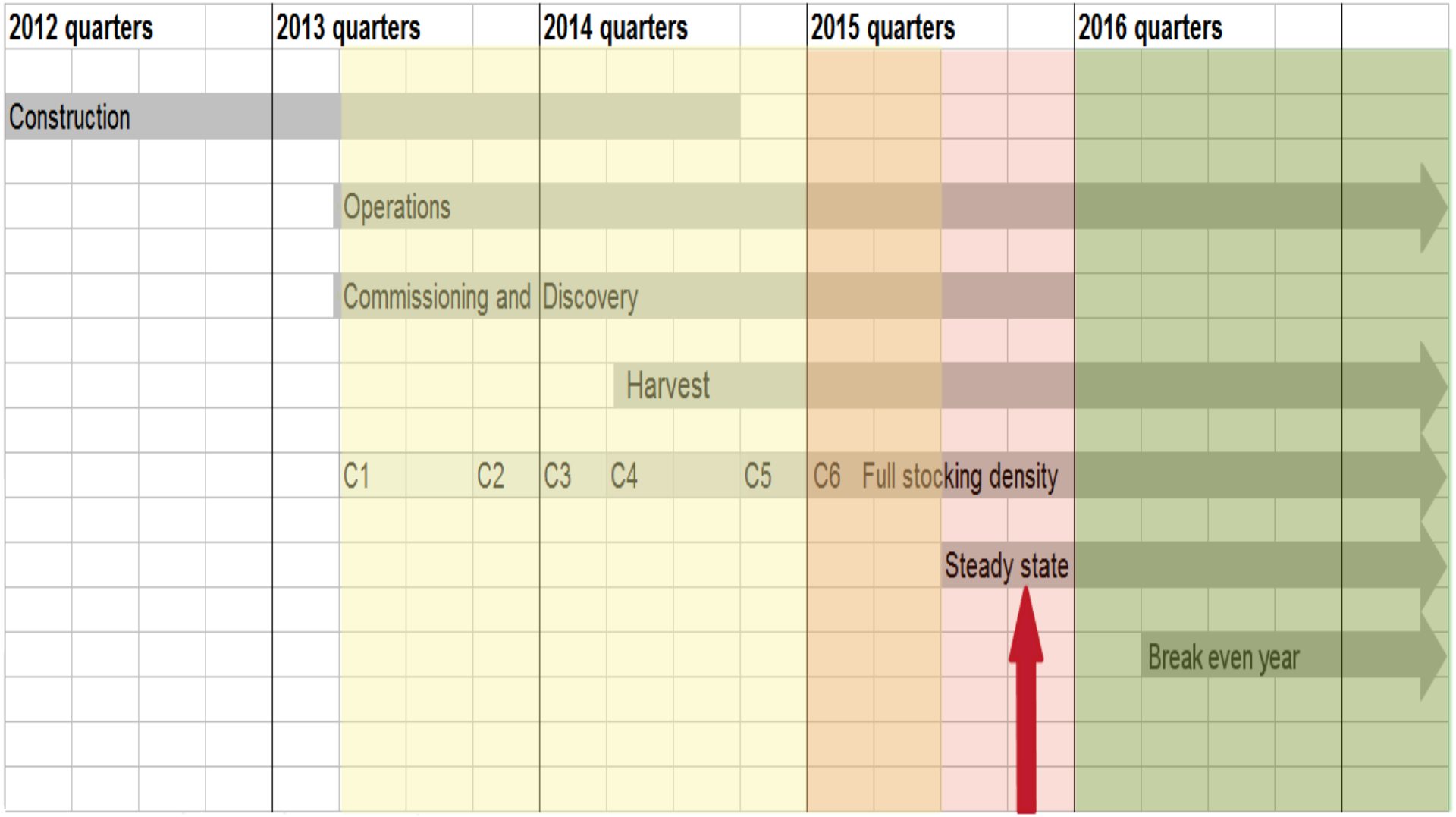
Technology focus

Stages and milestones



Biology focus

Stages and milestones



Technological feasibility

DEFINITION: Create an environment that can grow and harvest healthy fish. **DONE** ✔

Optimizing technology

Reduce
CAPEX per kilo

Improve technology
to improve fish
performance

Reduce operating
costs

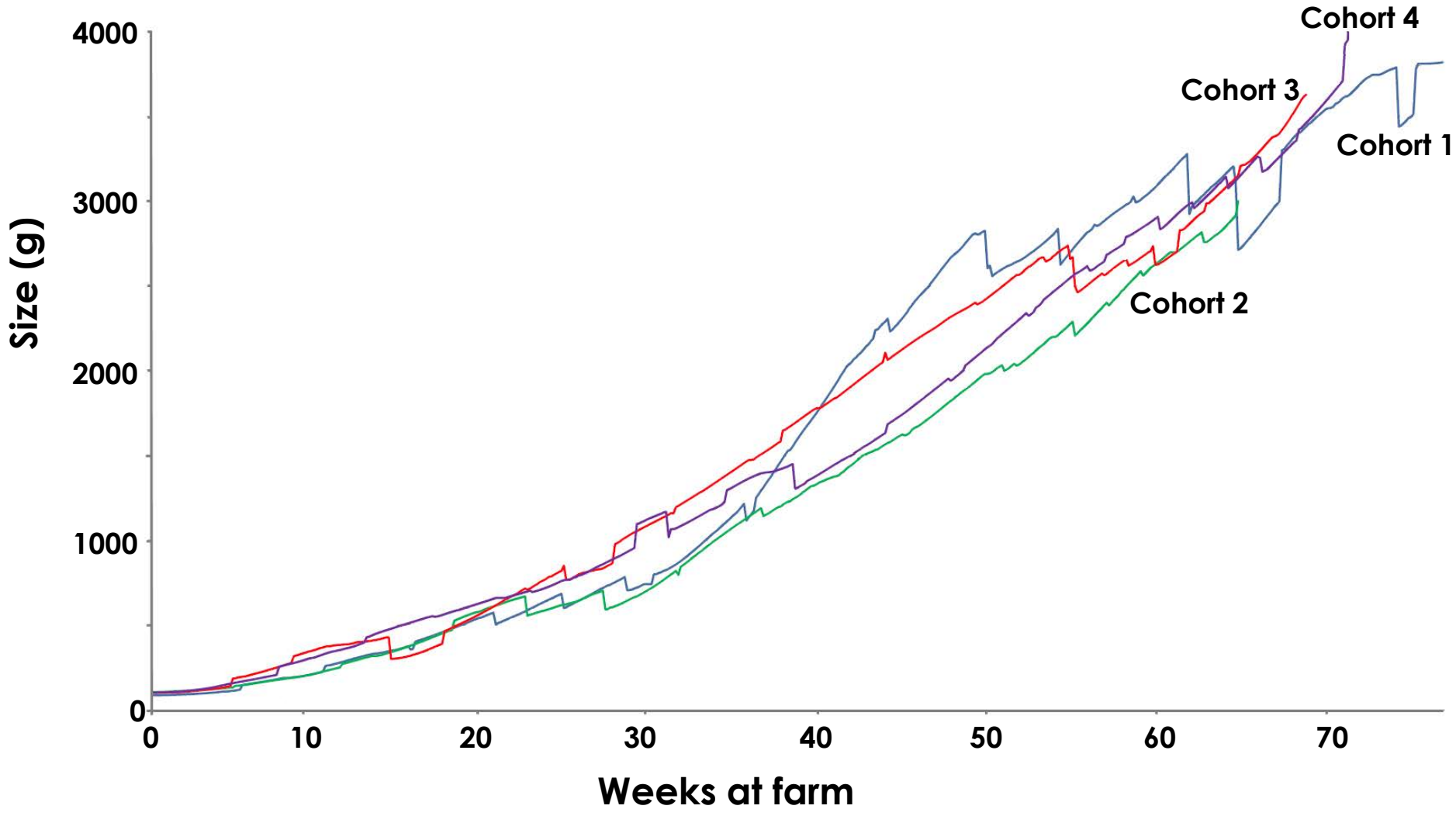
Biological feasibility

DEFINITION: Efficiently grow high volumes of healthy, premium quality fish. **STEADILY IMPROVING.**

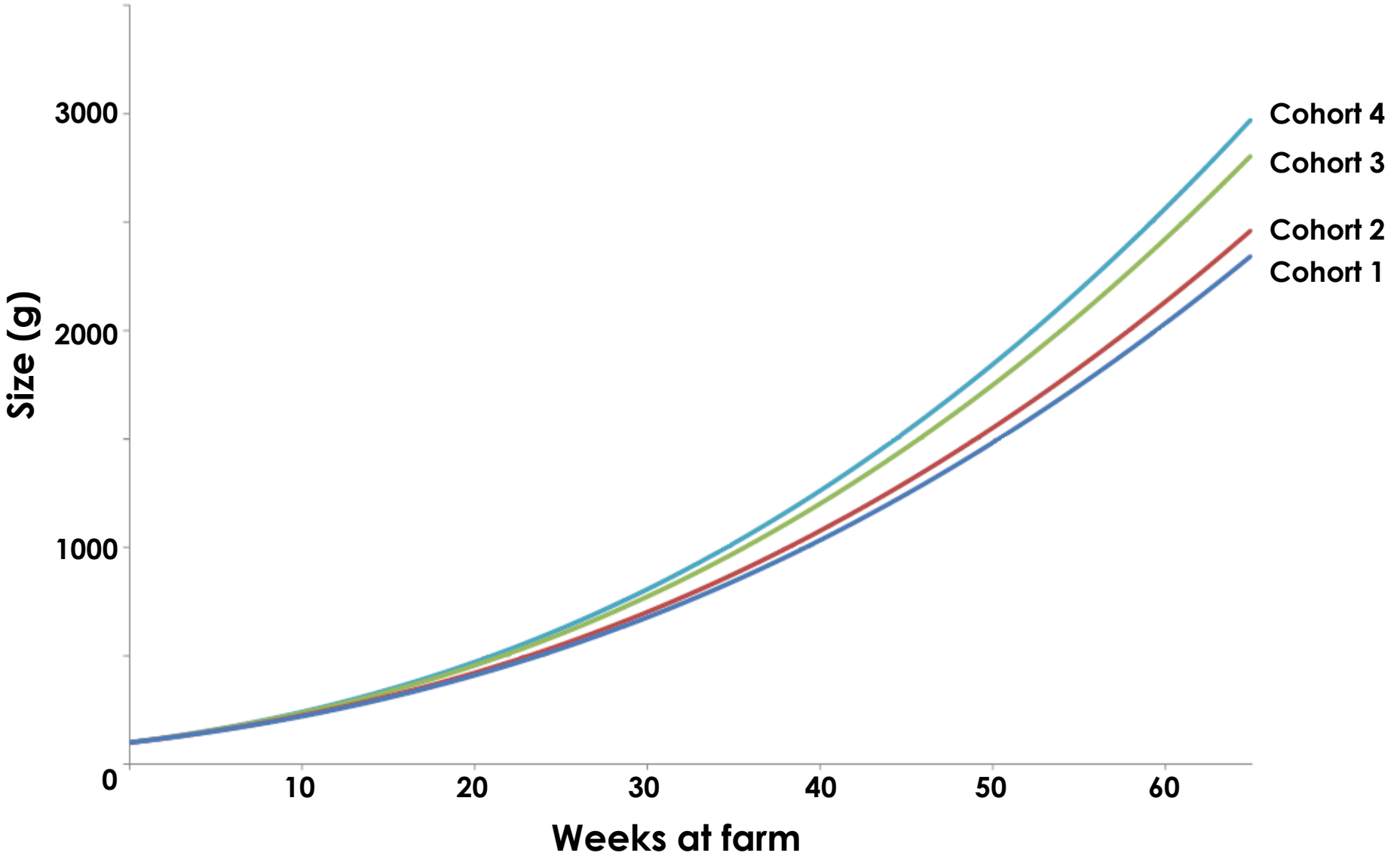
Five key metrics

1. Growth (TGC)
2. Feed conversion (FCR)
3. Mortality
4. Density
5. Early maturation

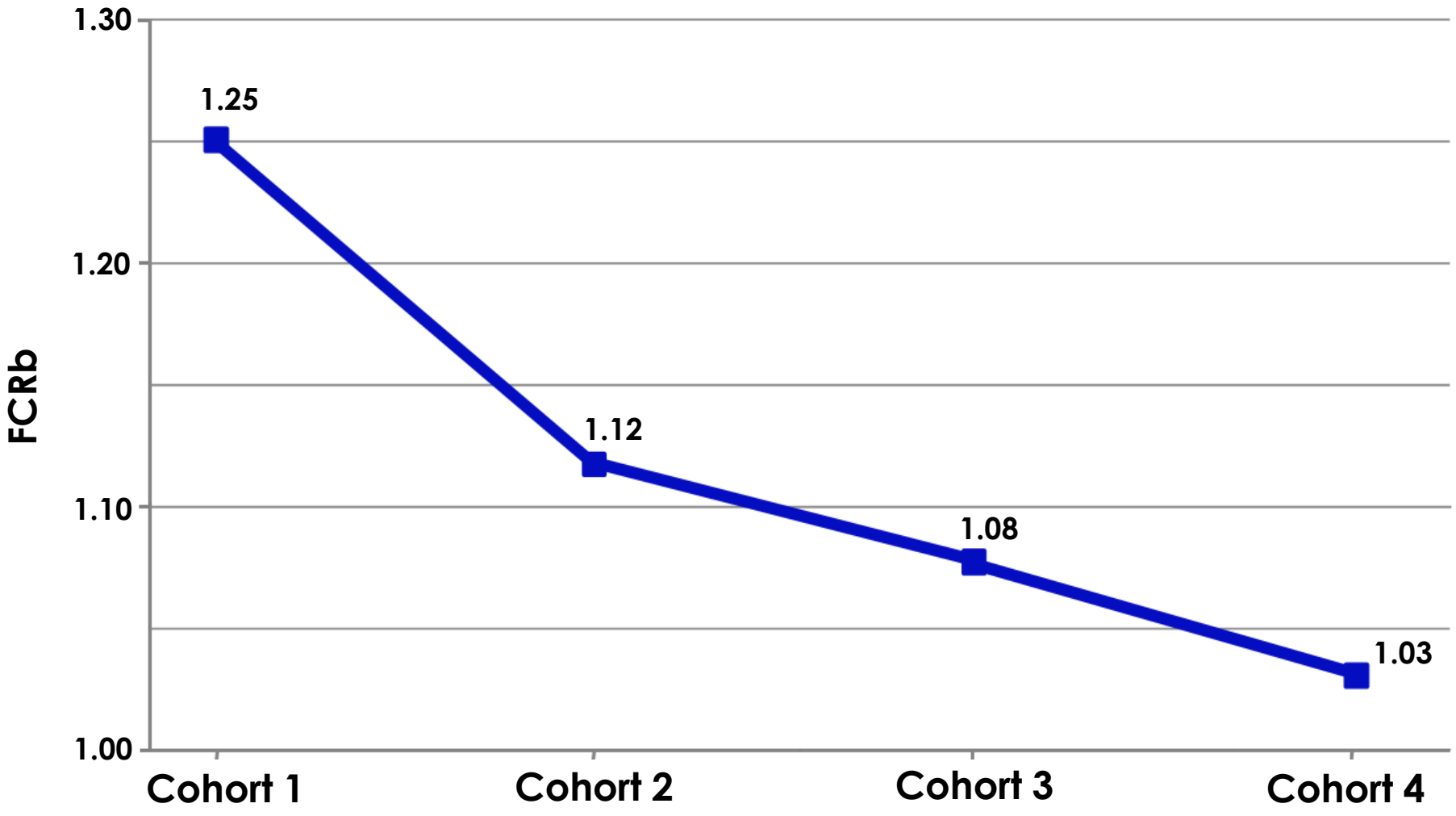
Growth


Cohort 4
Cohort 3
Cohort 1
Cohort 2
4000
3000
2000
1000
0
Size (g)
0
10
20
30
40
50
60
70
Weeks at farm

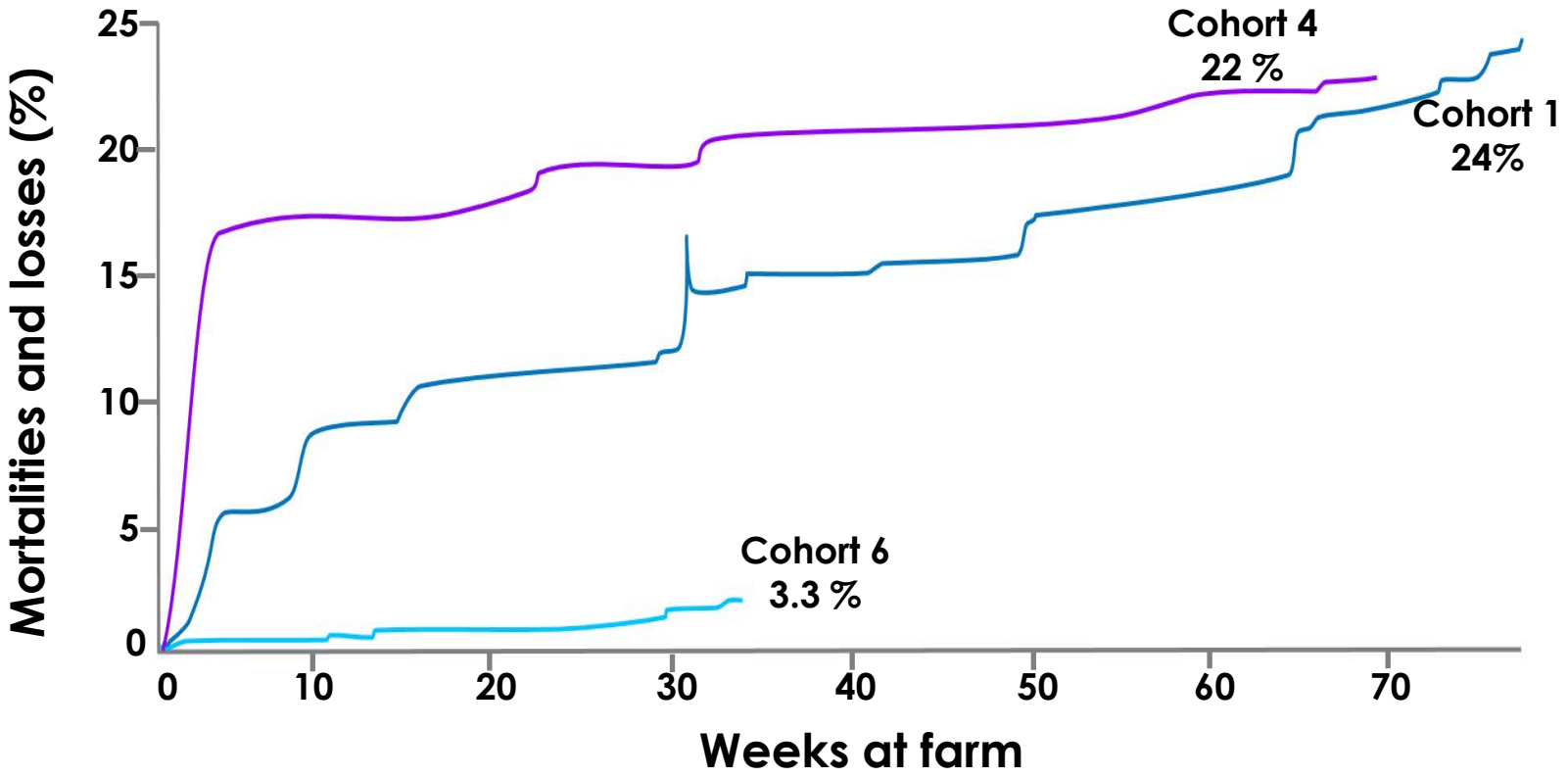
Growth (actual TGC)



Feed conversion ratio FCR

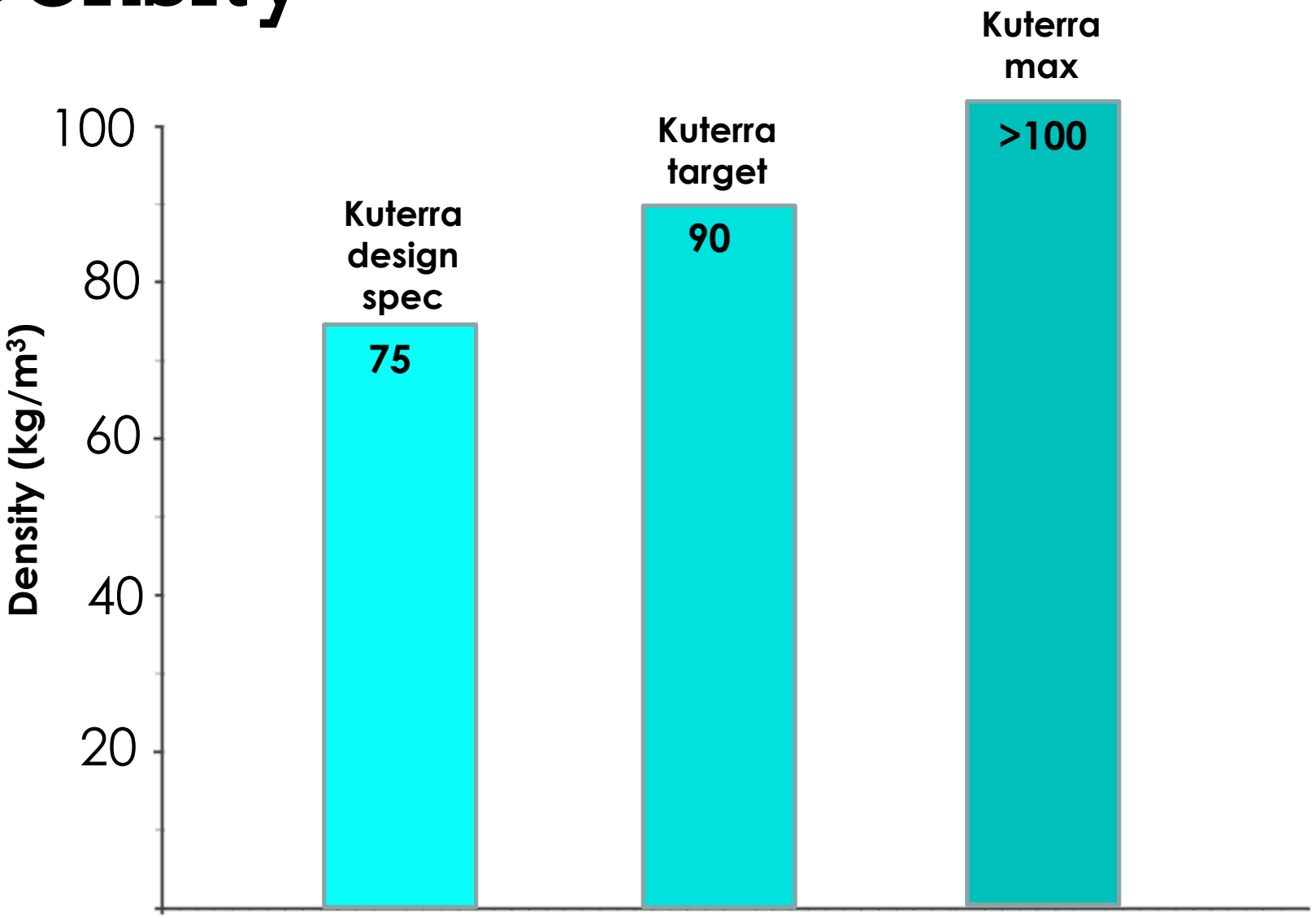


Mortality

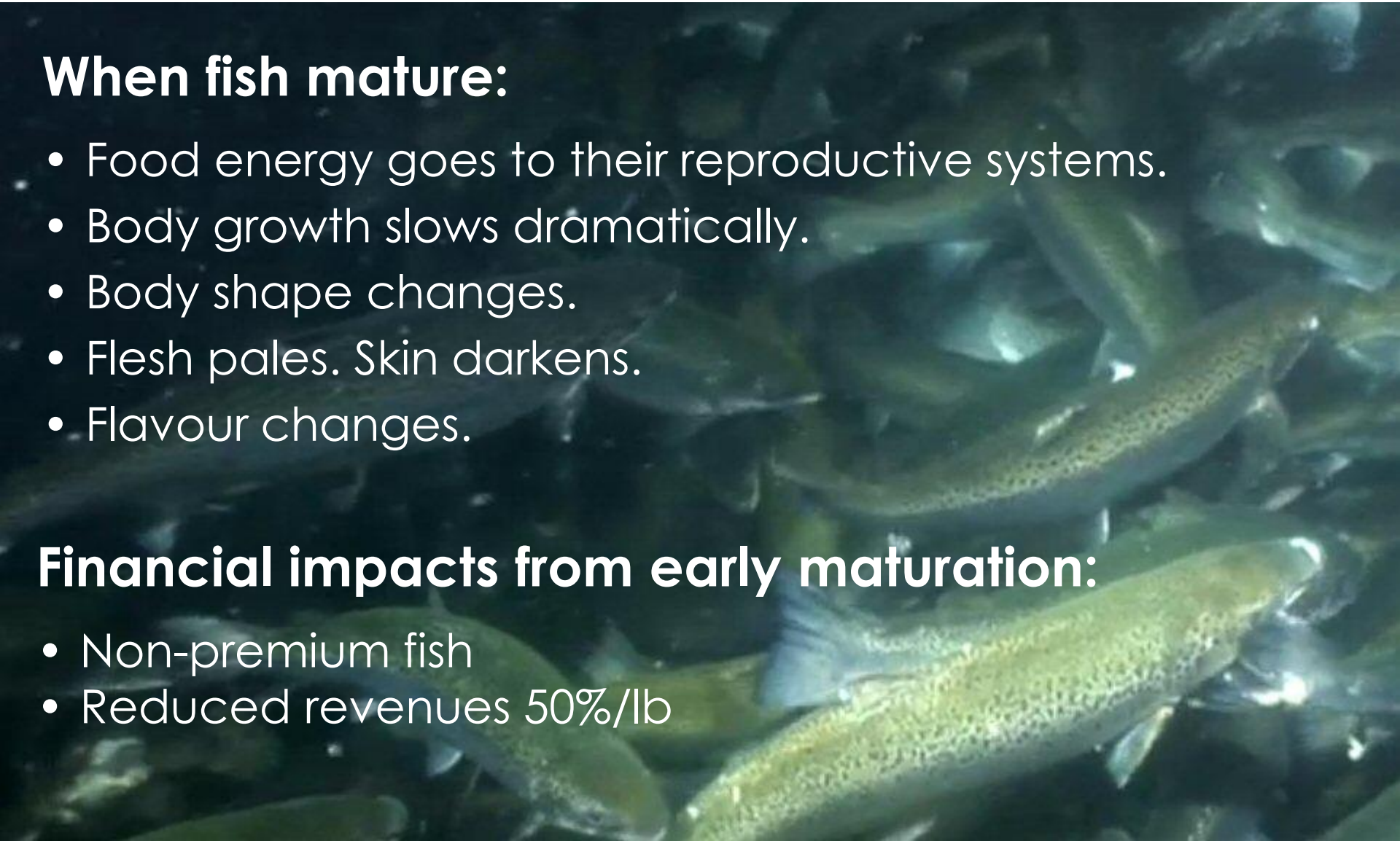


Cohort	1	2	3	4	5	6	7
Mortality (%)	24	13	29	22	6.4	3.3	3.4
Weeks at farm	harvest	harvest	harvest	harvest	50	39	27

Density


Kuterra max
>100
Kuterra target
90
Kuterra design spec
75
100
80
60
40
20
Density (kg/m³)

Early maturation



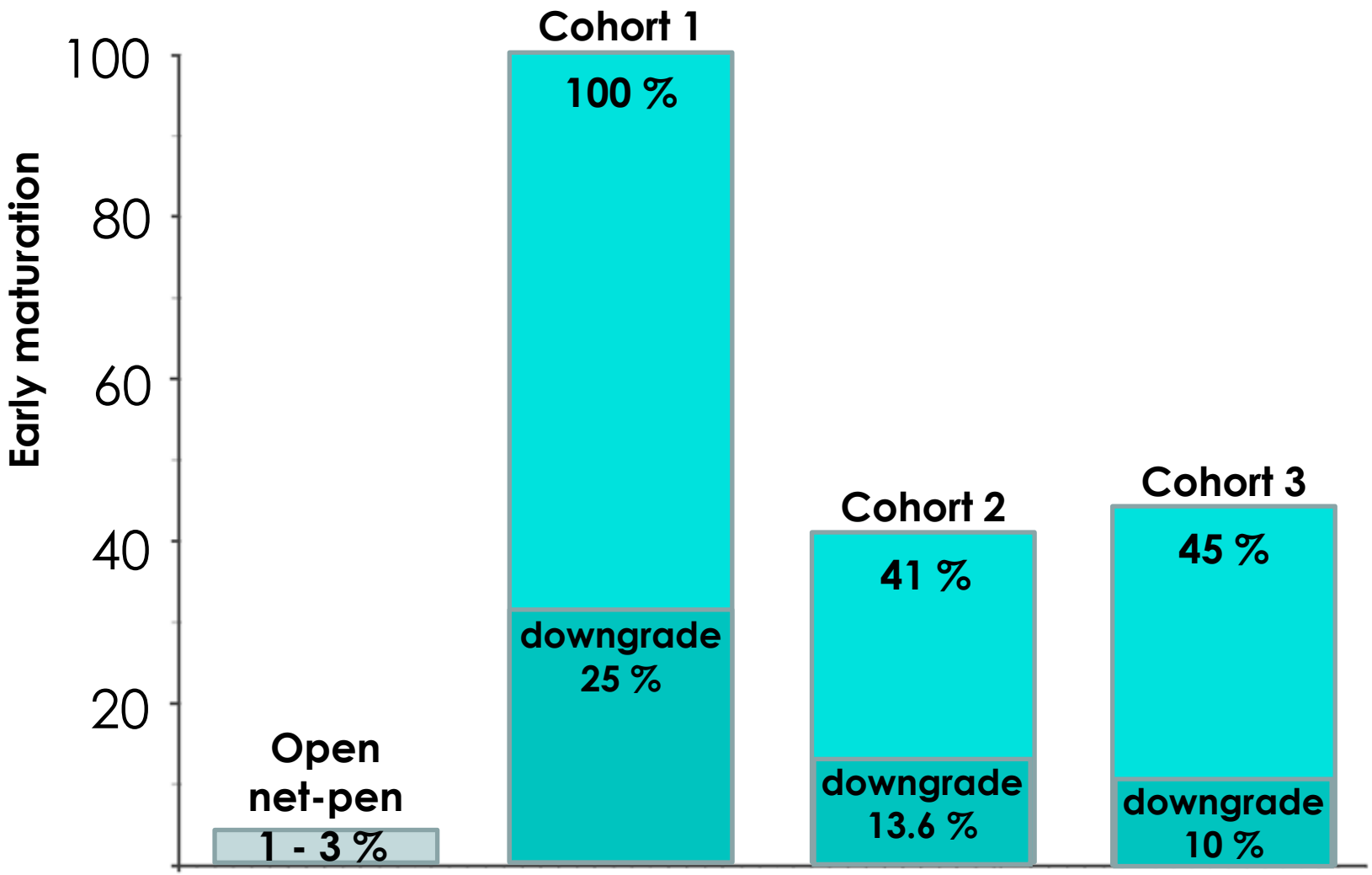
When fish mature:

- Food energy goes to their reproductive systems.
- Body growth slows dramatically.
- Body shape changes.
- Flesh pales. Skin darkens.
- Flavour changes.

Financial impacts from early maturation:

- Non-premium fish
- Reduced revenues 50%/lb

Early maturation



Metrics review

2011 projected vs 2015 actual performance metrics

	2011 projected	2015 actual
TGC	2.50	1.64
FCRb	1.05	1.03
Mortality	7.6 %	6.4 %
Density	90 kg/m^3	>100 kg/m^3
Harvest size	3-6 kg	3 kg

Optimizing performance

- Improve growth
- Reduce early maturation
- Reduce cataracts
- Determine optimal salinity

Economic feasibility

DEFINITION: Return on capital > 20 %

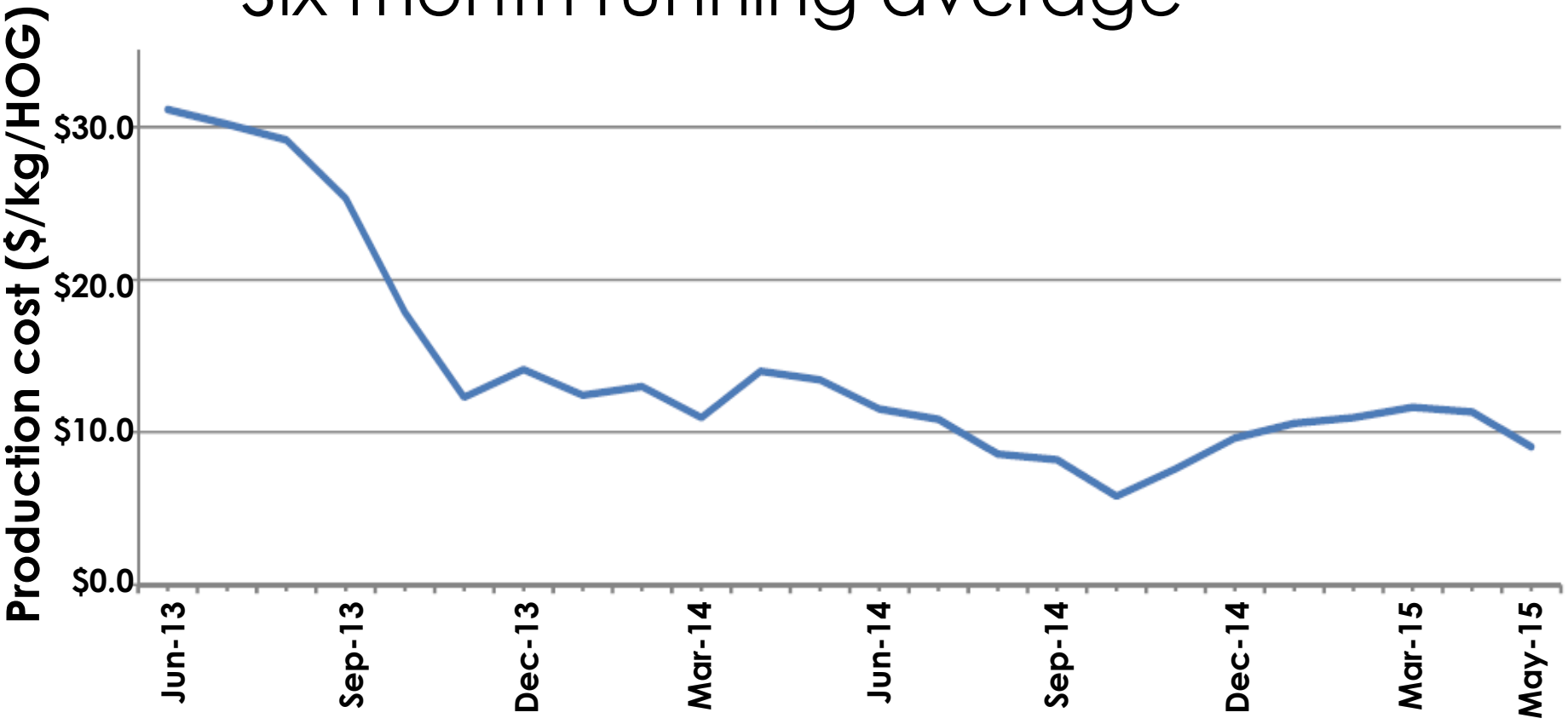
LOOKS PROMISING AT SCALE.

Next steps

1. Steady state
2. Performance optimization
3. Hatchery
4. Scale-up

Production costs

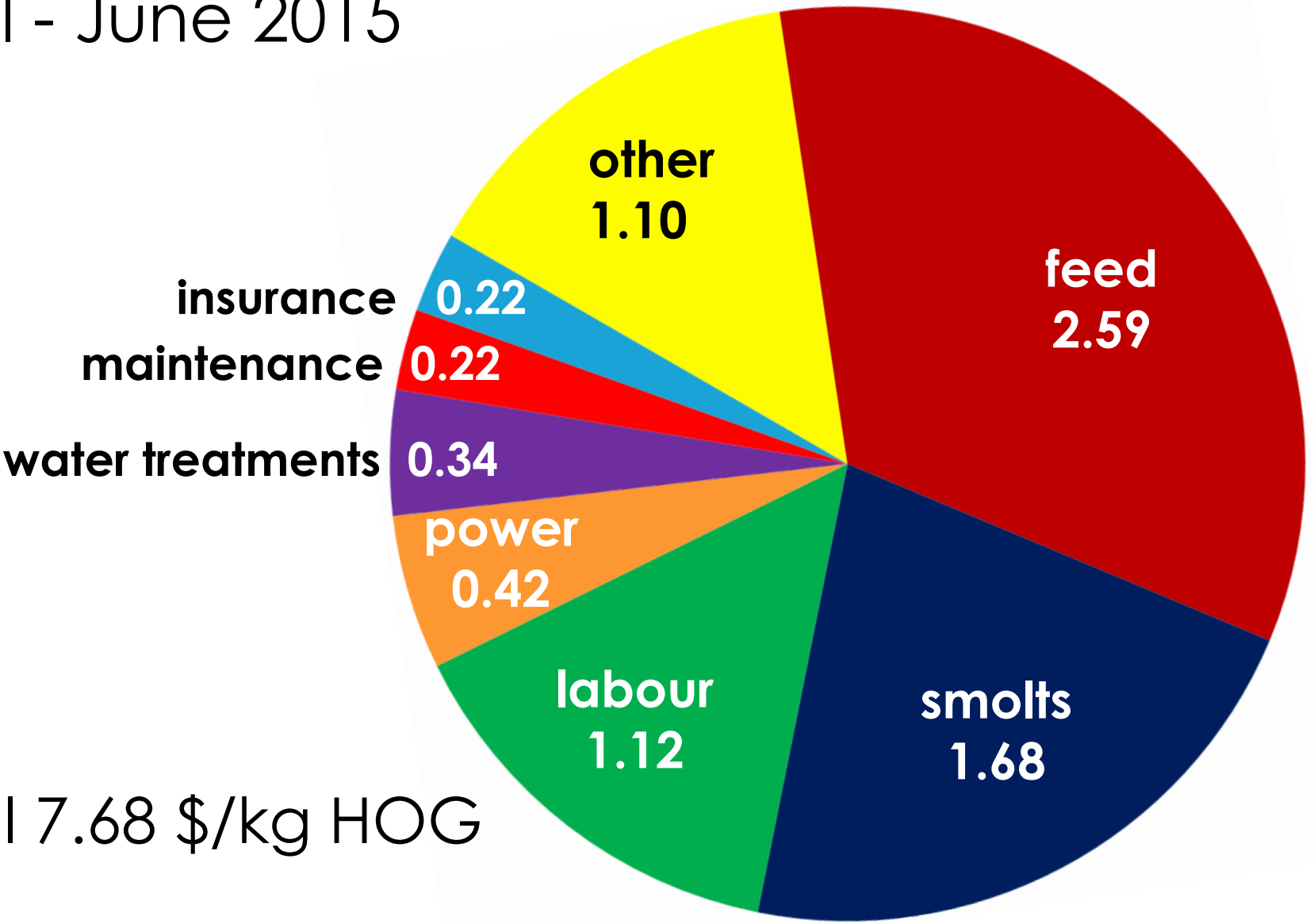
Six month running average



* $ CDN are used throughout this presentation.

Production costs

April - June 2015



Total 7.68 $/kg HOG

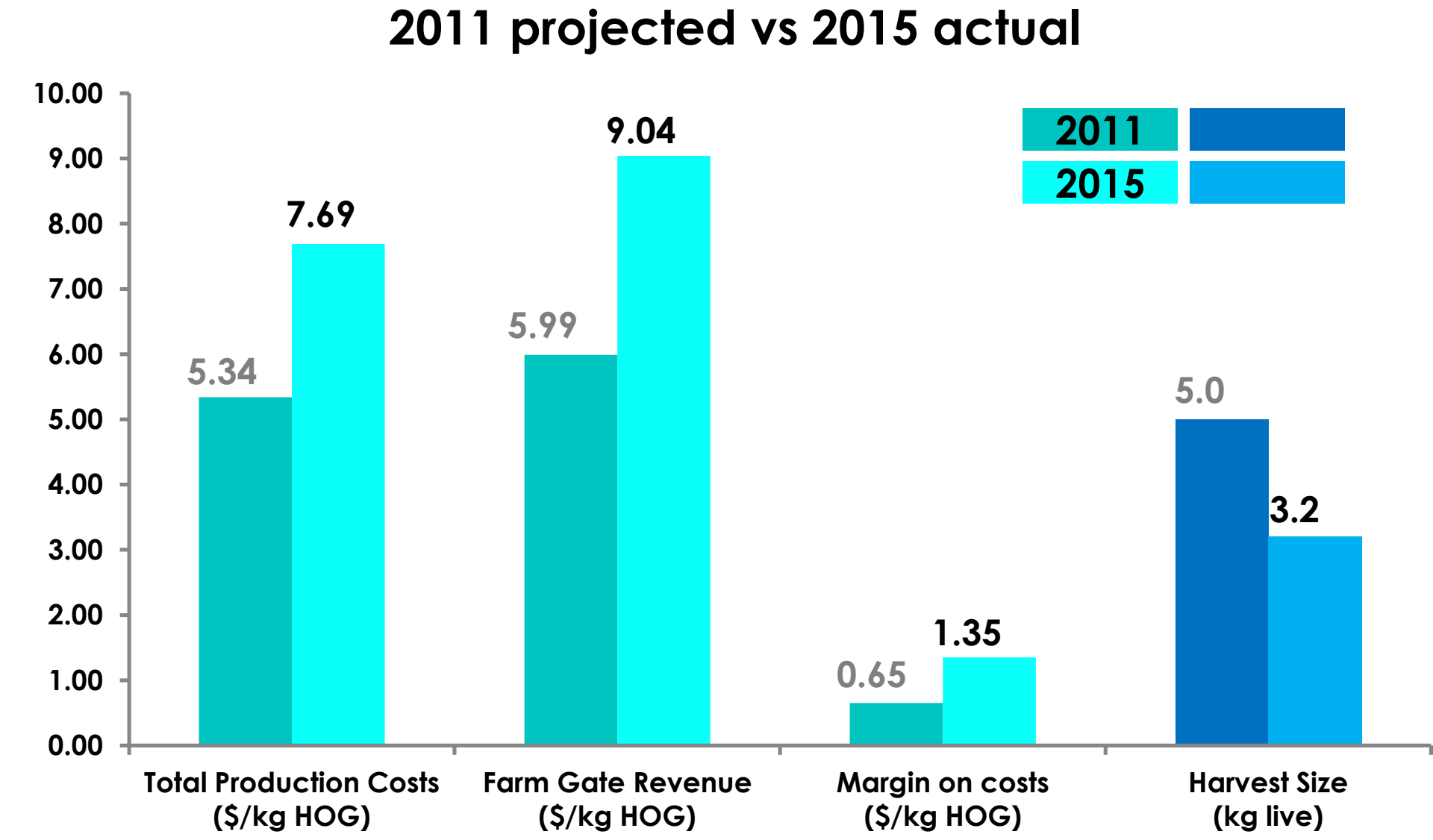
Economics review

2011 vs 2015 costs ($/kg HOG)

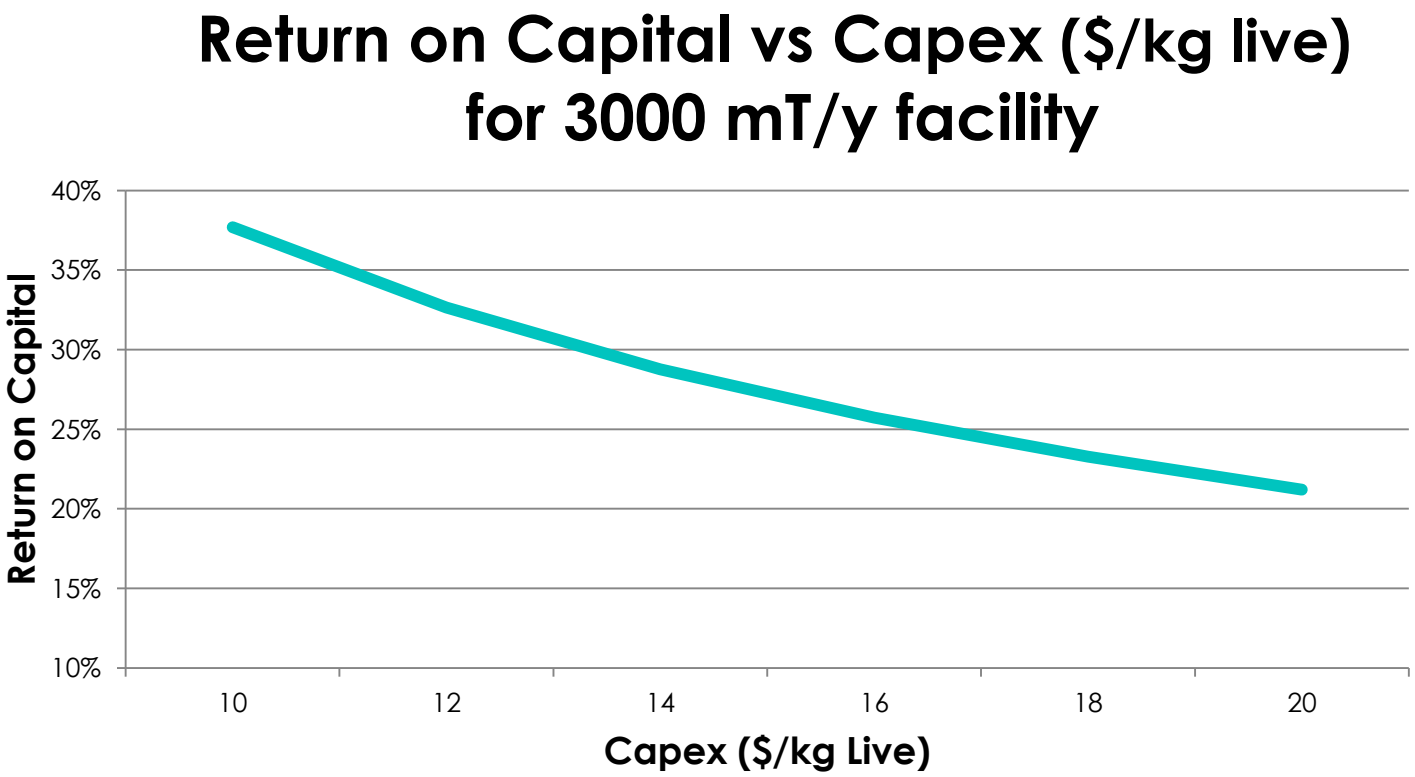
	2011 projected	2015 actual
Capital cost	$17/y	* $24/y
Revenue	$5.99	** $9.04
Feed	$ 2.10	$ 2.29
Labour	0.90	1.12
Smolts	0.87	1.68
Power	0.43	0.42
Other	1.04	1.88
Total production	5.34	7.69

* For 400 mt/y
** Blended (premium and downgrades)

Economic review



Preliminary projections



Capex ($/kg live)	10	12	14	16	18	20
Return on capital	38%	33%	29%	26%	23%	21%

ASSUMPTIONS

Capex: Construction cost (includes inventory build up)

Harvest: 6 kg live Downgrades: 5 % Smolts: $2.50 ea

Product pricing

Substantial premium possible >30%

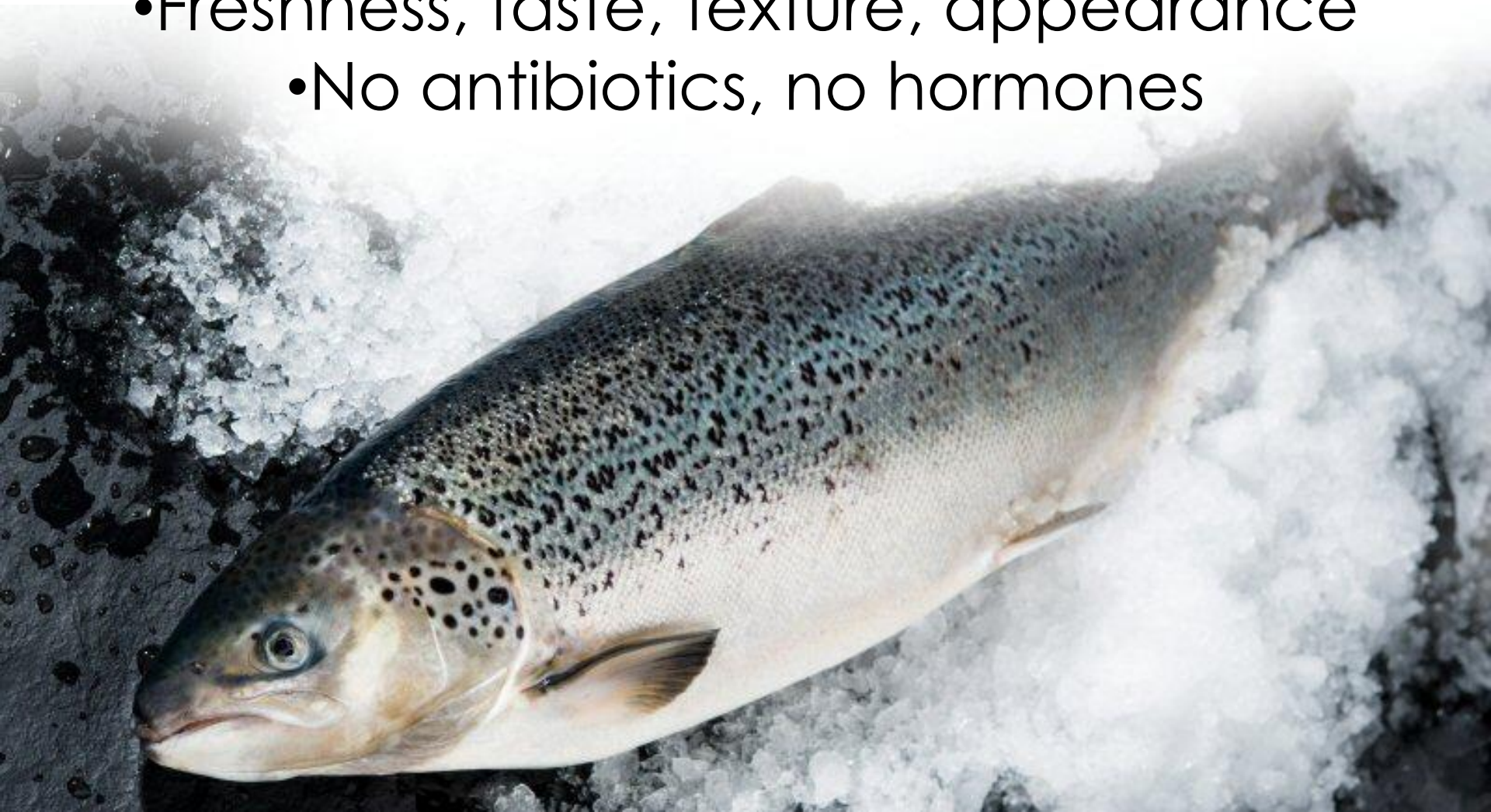
Pricing risks:

- downgrades
- market saturation

Chef Dan Norcott
Catch The Oyster Bar, Calgary

Product qualities

- Freshness, taste, texture, appearance
- No antibiotics, no hormones



Feed

Key issues for customers:

- Effect on nutrition
- Effect on food safety
- Wild fish content
- GMOs and animal byproducts
- Impact on taste

Environment

Impacts and benefits

We've also busted myths

Land

Water

Power

Fish Husbandry

What we've learned

It is possible to grow top quality Atlantic salmon for which consumers and chefs are willing to pay a premium price.

What we've learned

Land-based RAS farming of Atlantic salmon:

1. Can be environmentally benign
2. Is technologically feasible
3. Is biologically feasible
4. Is expected to generate returns of > 20% per year at scale, once technological and biological elements are optimized.

KUTERRA.com

http://tidescanada.org/programs/salmon-aquaculture-innovation-fund/

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