

ENVIRONMENTAL LIFE CYCLE ASSESSMENT OF THAI SHRIMP PRODUCT



Mungkung R., Clift R., and Cowell SJ.
Centre for Environmental Strategy (CES)
University of Surrey



TALK OUTLINE

Shrimp Production System in Thailand

Rationale

Research Objectives

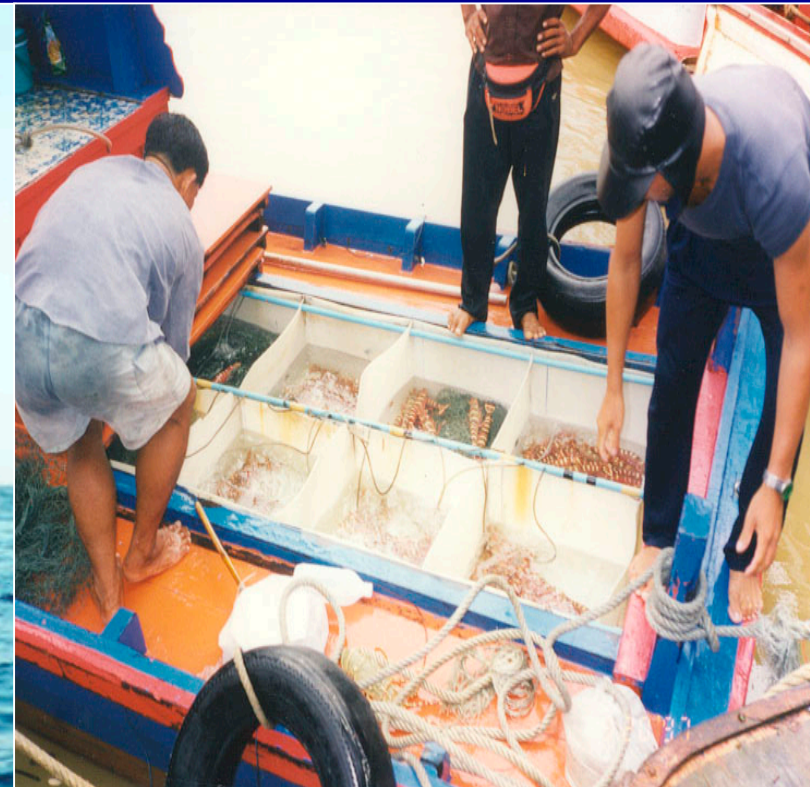
Methodology

Results

Concluding Remarks

SHRIMP PRODUCTION SYSTEM IN THAILAND

TRAWLING: WILD BROODSTOCK CAPTURE



SHRIMP PRODUCTION SYSTEM (CONT)

HATCHERY: POST-LARVAE REARING



SHRIMP PRODUCTION SYSTEM (CONT)

FARMING: GROW-OUT FROM POST-LARVAE TO ADULT SHRIMPS

1. Pond Construction



SHRIMP PRODUCTION SYSTEM (CONT)

FARMING: GROW-OUT (CONT)

2. Pond Preparation



SHRIMP PRODUCTION SYSTEM (CONT)

FARMING: GROW-OUT (CONT)

3. Post-Larvae Stocking



SHRIMP PRODUCTION SYSTEM (CONT)

FARMING: GROW-OUT (CONT)

4. Grow-Out



SHRIMP PRODUCTION SYSTEM (CONT)

FARMING: GROW-OUT (CONT)

5. Harvest



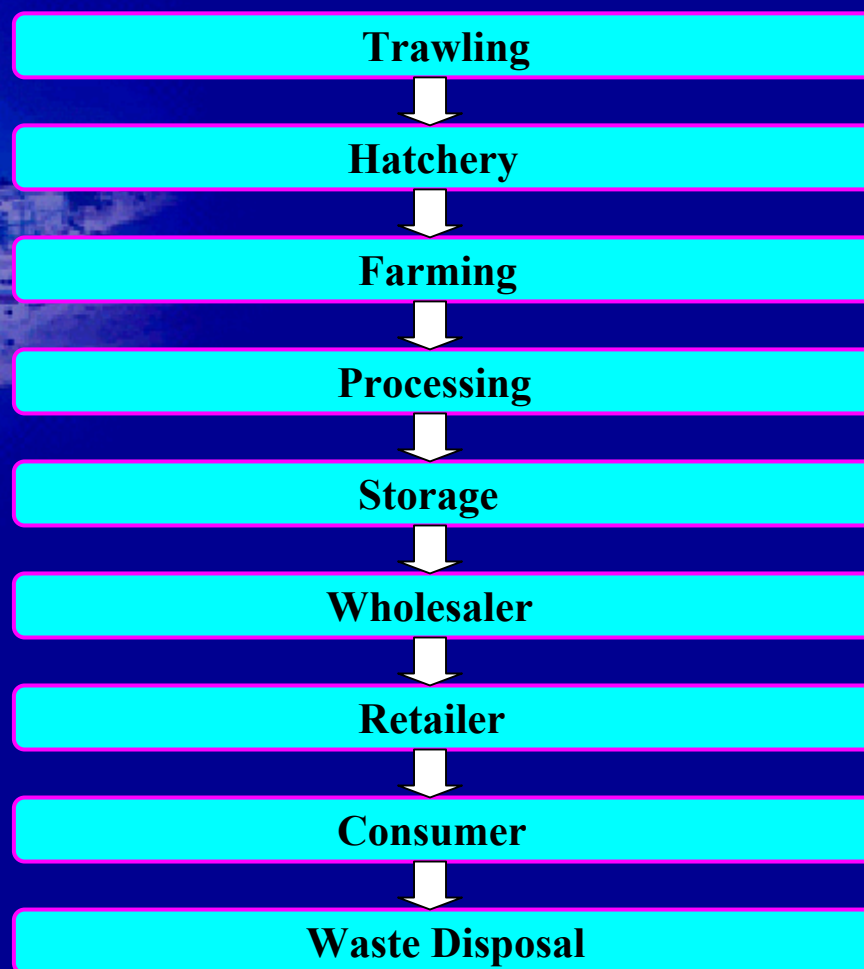
SHRIMP PRODUCTION SYSTEM (CONT)

FARMING: GROW-OUT (CONT)

6. Pond Preparation After Harvest



LIFE CYCLE OF SHRIMP PRODUCTION



RATIONALE

Negative image of Thai shrimp (black tiger prawn)

Environmentally unsustainable aquaculture practices

Interactions of aquaculture and fisheries systems

Import control measures imposed by importing countries





**Is it OK to eat tiger prawns?
Read this before you answer**

SOURCE: *The Guardian* (19.06.03)

RESEARCH OBJECTIVES

(1) Development of LCA methodology applicable to shrimp production in Thailand

(2) Application of the LCA methodology to systematically evaluate and quantify the environmental interventions of block-frozen shrimp production chains



METHODOLOGY

Specific types of shrimp farms, with diverse culturing techniques and farming management systems, were selected in different areas

Site visits of hatcheries, farms, and walking through the processing line

All environmental interventions in every stage along the block-frozen shrimp production chains including transportation were identified





RESULTS FROM QUALITATIVE LCA

SUBSYSTEMS

Trawling

Hatchery

Shrimp Farm

Processing Plant

Transportation

KEY ISSUES

Marine ecosystem Energy use

Water use

Wastewater Energy use

Land use impacts

Ecotoxicity Biodiversity

Energy use Water use

Air emissions Ecotoxicity

QUALITATIVE LIFE CYCLE IMPACT ASSESSMENT OF FIVE DIFFERENT FARMING SYSTEMS

| IMPACTS | FARMING SYSTEMS | | | | |
|--------------|-----------------|----------------|-------------|--------------|-----------|
| | Bio & CoC | (Convlt & CoC) | (Probiotic) | (Ecological) | (Organic) |
| Land use | 1 | 2 | 3 | 4 | 5 |
| Water use | 3 | 4 | 5 | 1 | 2 |
| Energy use | 3 | 4 | 5 | 2 | 1 |
| Wastewater | 3 | 4 | 5 | 1 | 2 |
| Ecotoxicity | 3 | 5 | 4 | 1 | 1 |
| TOTAL | 13 | 19 | 22 | 9 | 11 |

Note: CoC is the Code of Conduct for Marine Aquaculture; **5 is the highest impacts; and 1 is the lowest impacts**

PRELIMINARY QUANTITATIVE LCA RESULTS

Bio & CoC Farm

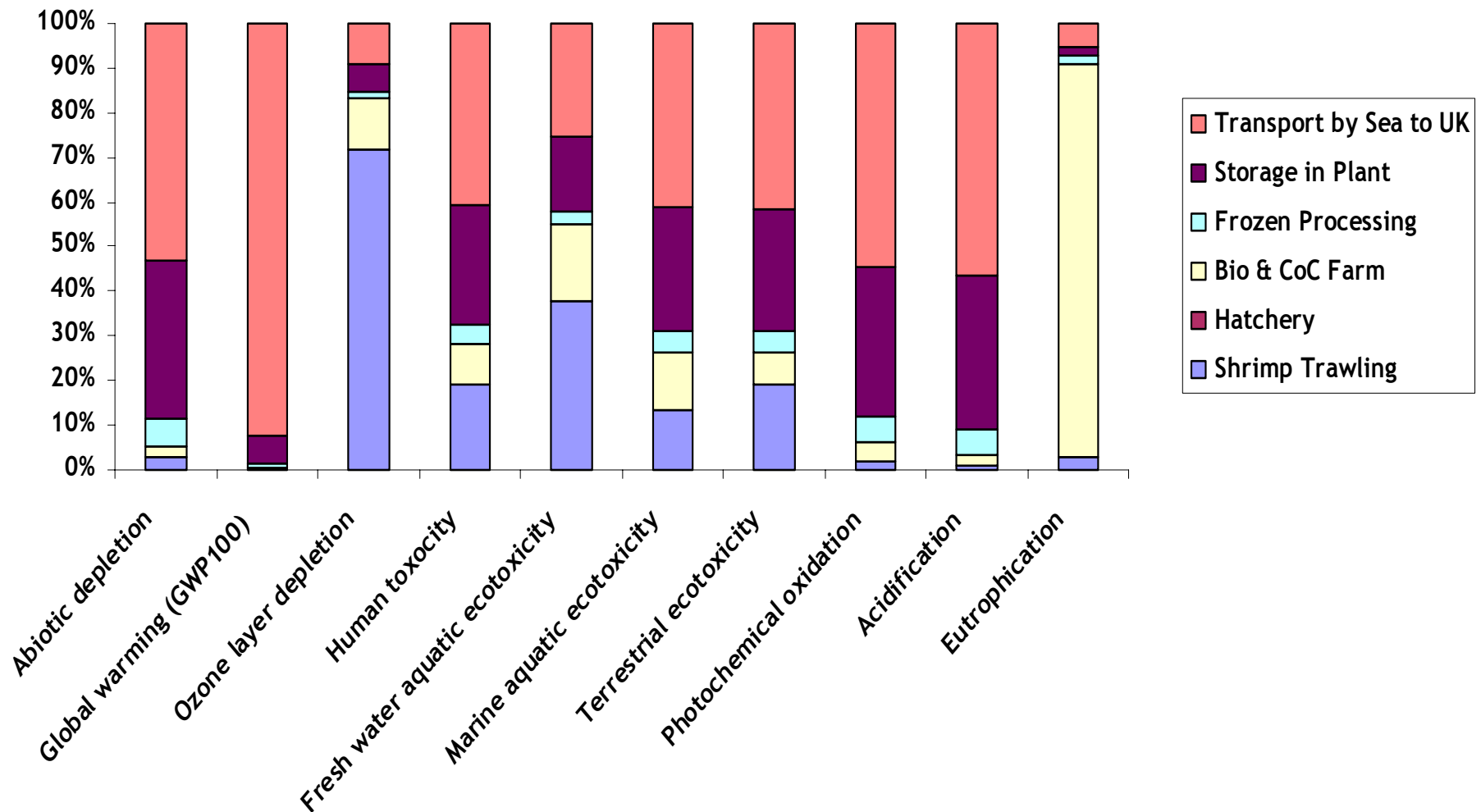
Functional unit = 1.8 kg of block-frozen shrimp

Impact Assessment Method: CML 2 baseline 2000/ World, 1995

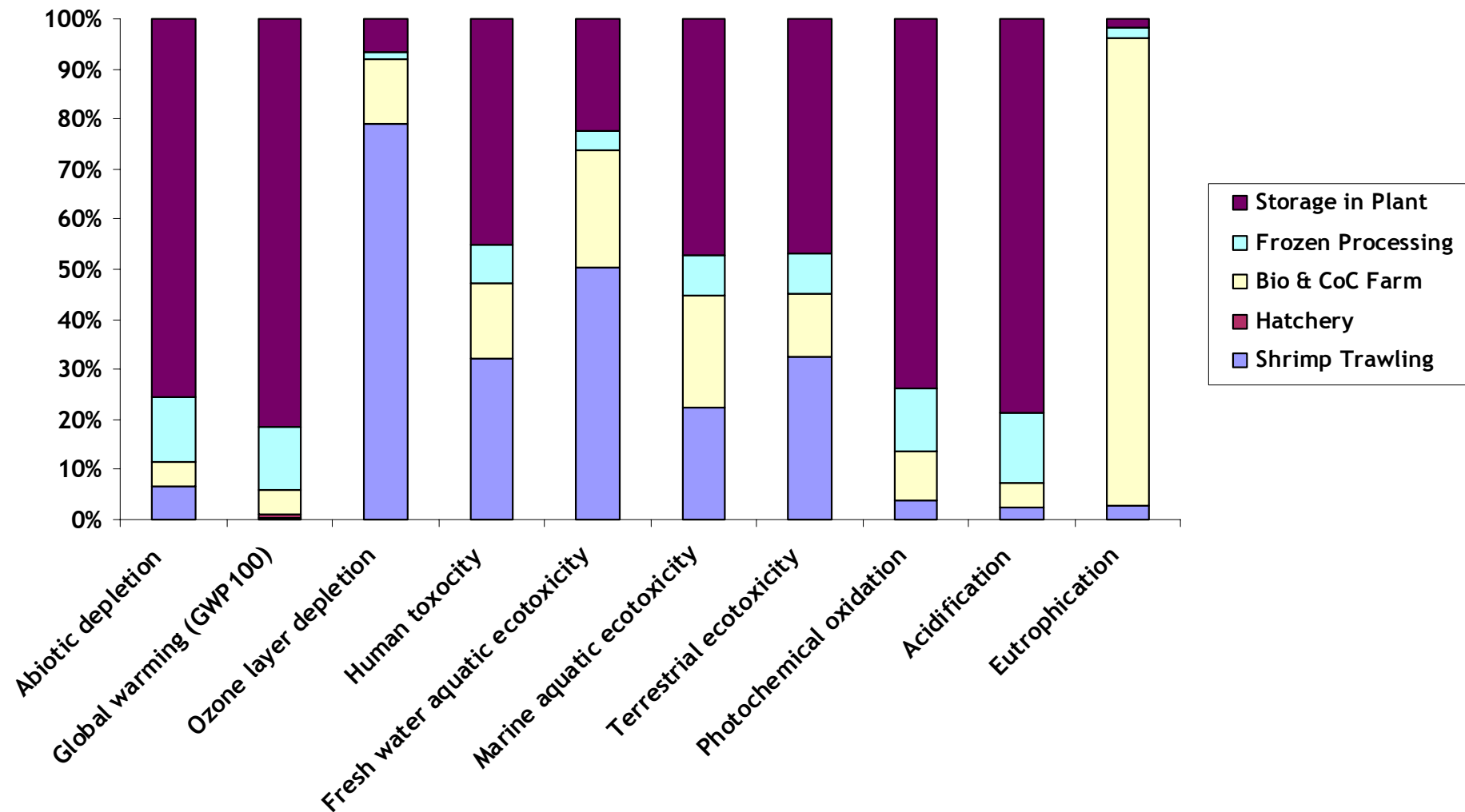


[Please visit DOF website for more details of CoC, <http://www.thaiqualityshrimp.com>]

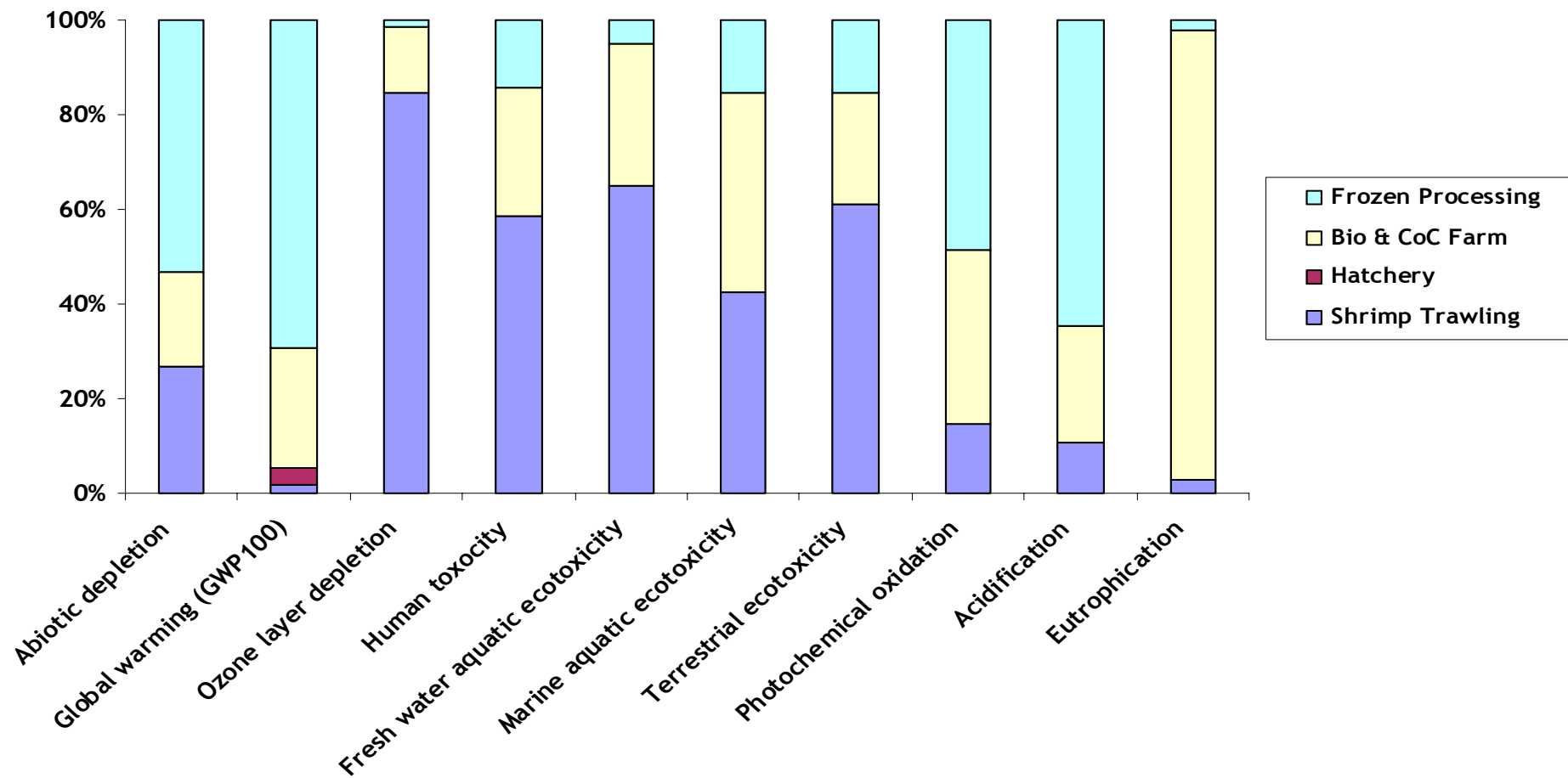
Bio & CoC Farm: Life Cycle



Bio & CoC Farm: Excluding Transportation



Bio & CoC Farm: Excluding Transportation and Storage





CONCLUDING REMARKS

The environmental impacts associated with shrimp aquaculture are dependent on the characteristics of the site, the choice of culturing practices and management strategies

Practical approaches permitting the quantification of environmental impacts attached to aquaculture need to be further investigated

Application of LCA studies of different farming systems and sites will identify the practices with the least environmental impacts to make the shrimp industry more sustainable

THANK YOU FOR YOUR ATTENTION

