

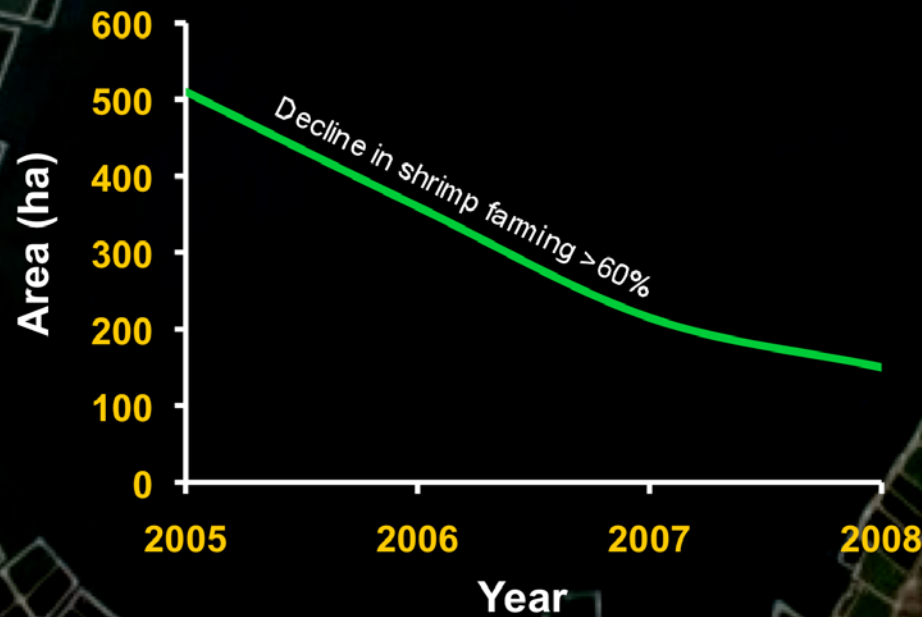
# Pond farming and co-culture options in Vietnam

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# Pond farming in Vietnam

- Around a dozen farmers
- Producing 2-3 t/ha/annum
- Seed from RIA 3 hatchery at 2 sizes
- Farmers sell to local dealers gutted only





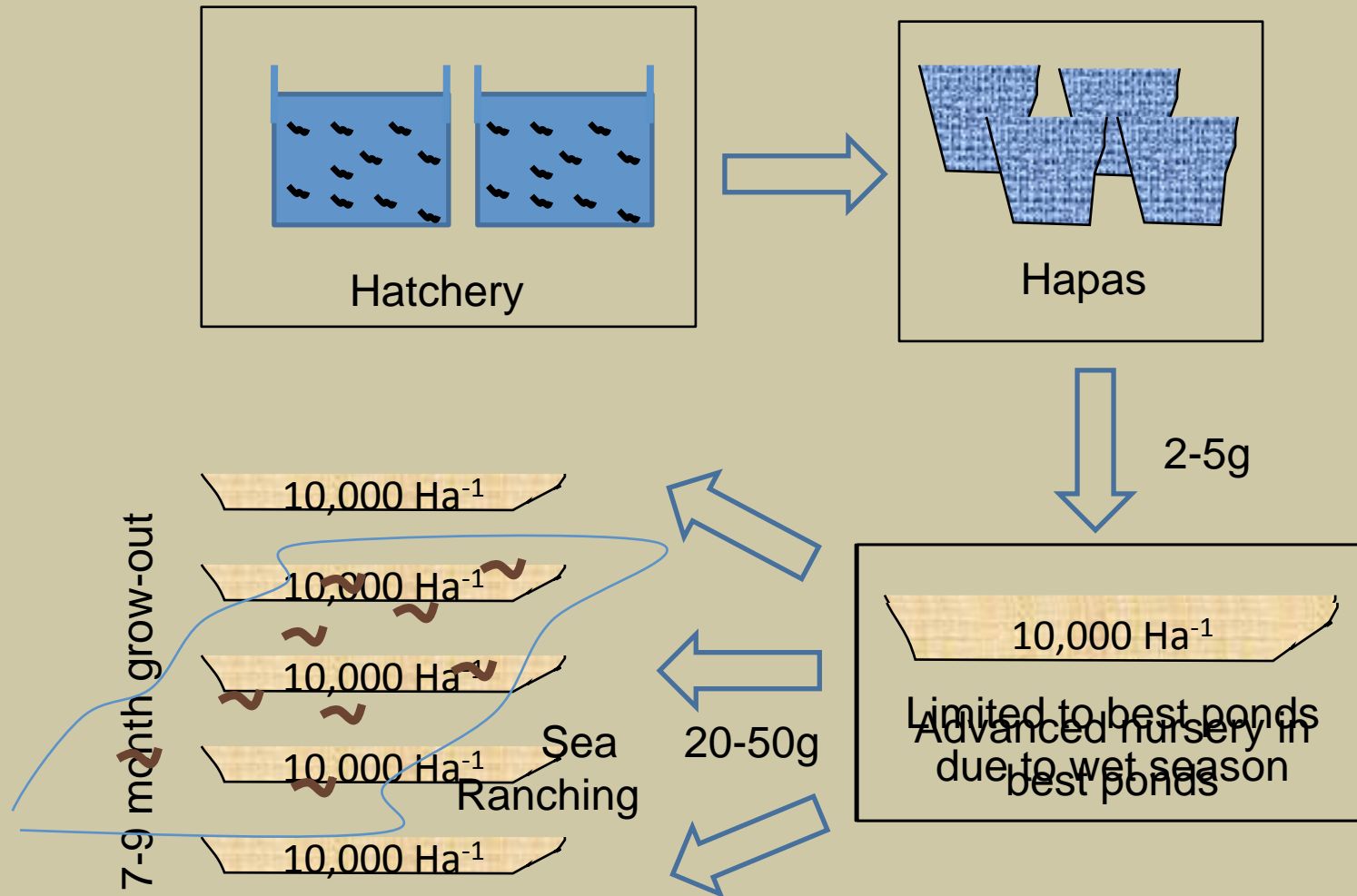


## Current constraints to further uptake

- Hatchery production capacity
  - The balance between density dependence and price realised for harvested product
  - Time taken for growout
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# Advanced Nursery – partial solution





# Advanced Nursery – pond use



-  = nursery ponds
-  = growout ponds







## Premise for new shrimp co-culture trials?

- Hasn't it already been done to death? (Pitt, Duy et al – *monodon*, Bell, Purcell et al – *stylirostris*)
  - *Vannamei* has different behaviour patterns – less burying/more swimming than *monodon*, and greater reliance on natural productivity in pond
  - Different approach to sizing
    - Sandfish at 40g+ (from advance nursery) with *vannamei* post-larvae
    - Potentially allows for concurrent harvest
  - Direct comparison with rotation
  - Interest by farmers – but high risk
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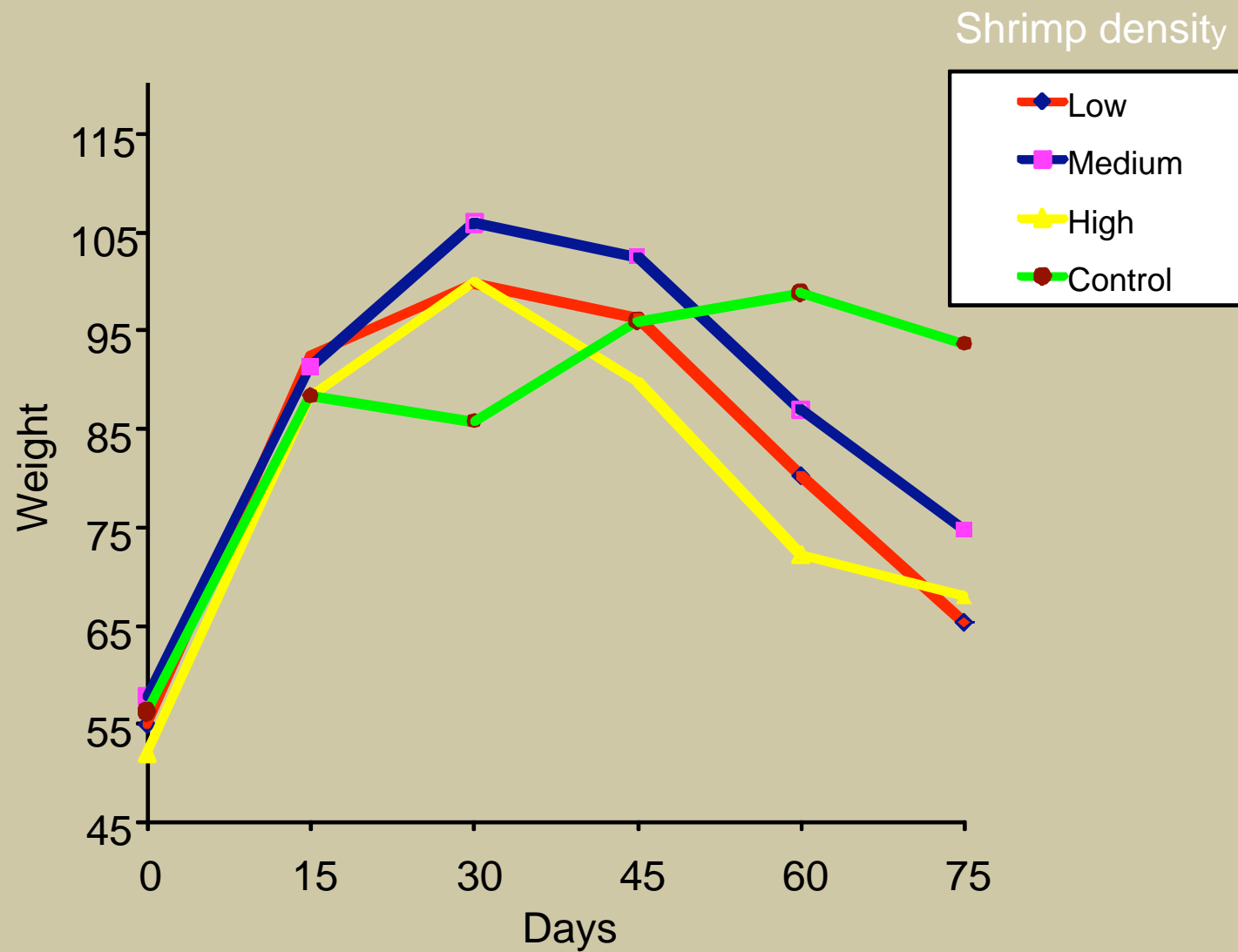


# Co-culture tank trials

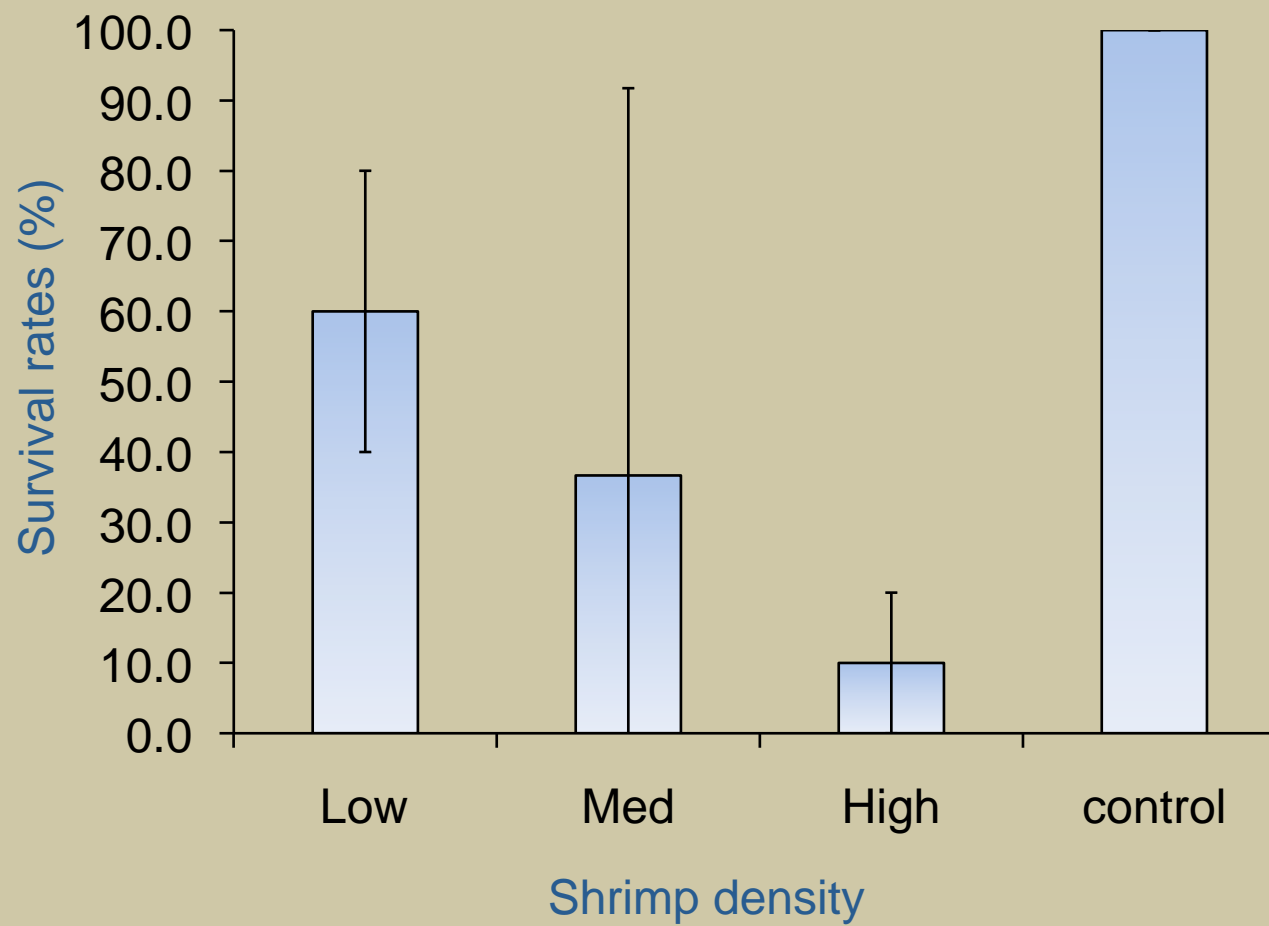
- 10 sandfish of ca. 50g per tank (high density!)
- Shrimp @ three densities
  - Low =  $15 \text{ m}^{-2}$
  - Med =  $25 \text{ m}^{-2}$
  - High =  $50 \text{ m}^{-2}$
- Shrimp treatments fed according to standard procedures



# Co-culture tank trials

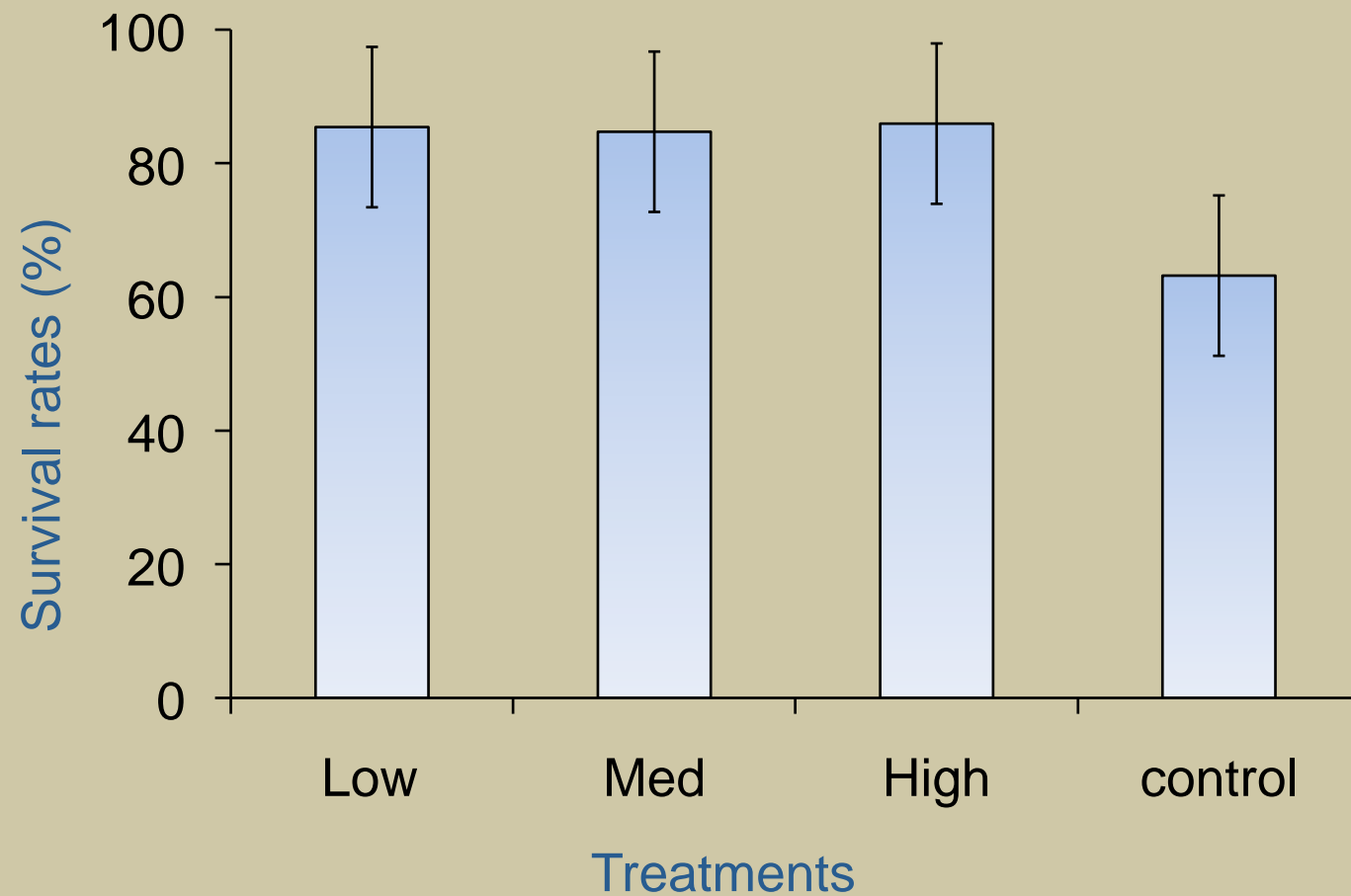


# Sandfish survival rates





# Shrimp survival rates



# The victims





# The culprit!





Sweet revenge!





# Pond trials – rotation & co-culture





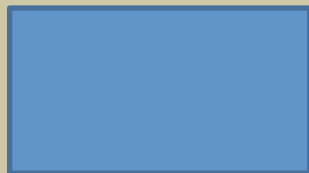
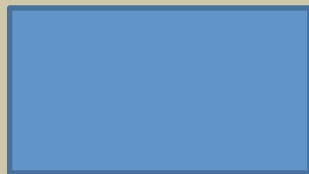
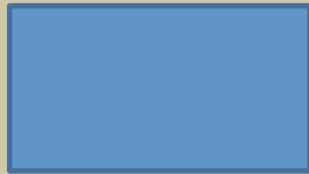
# Refurbished ponds



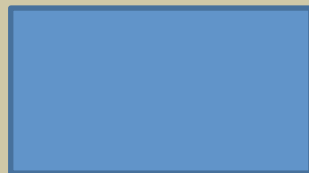
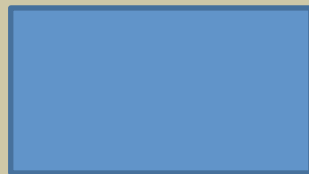
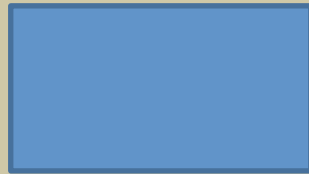


# Pond trials – experimental design

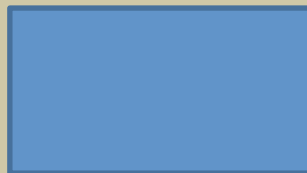
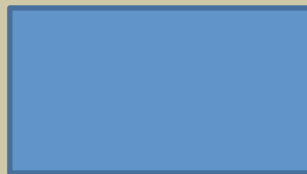
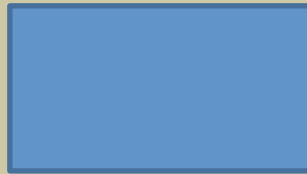
Co-culture  
Sandfish 0.5/m<sup>2</sup>  
Shrimp 25/m<sup>2</sup>



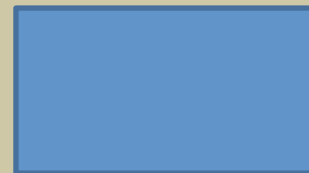
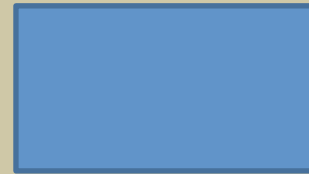
Rotation  
Sandfish 1/m<sup>2</sup>  
Shrimp 50/m<sup>2</sup>



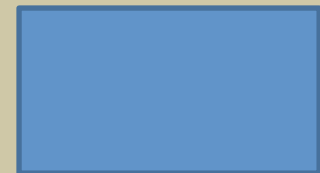
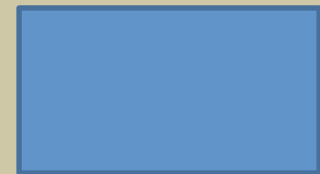
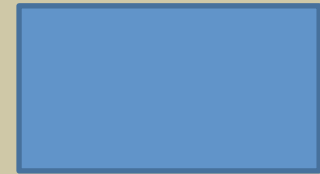
Co-culture  
Sandfish 1/m<sup>2</sup>  
Shrimp 15/m<sup>2</sup>



Sandfish 1/m<sup>2</sup>



Sandfish 15/m<sup>2</sup>



Direct comparison

'Most likely....'



Controls

5400 juveniles in first phase

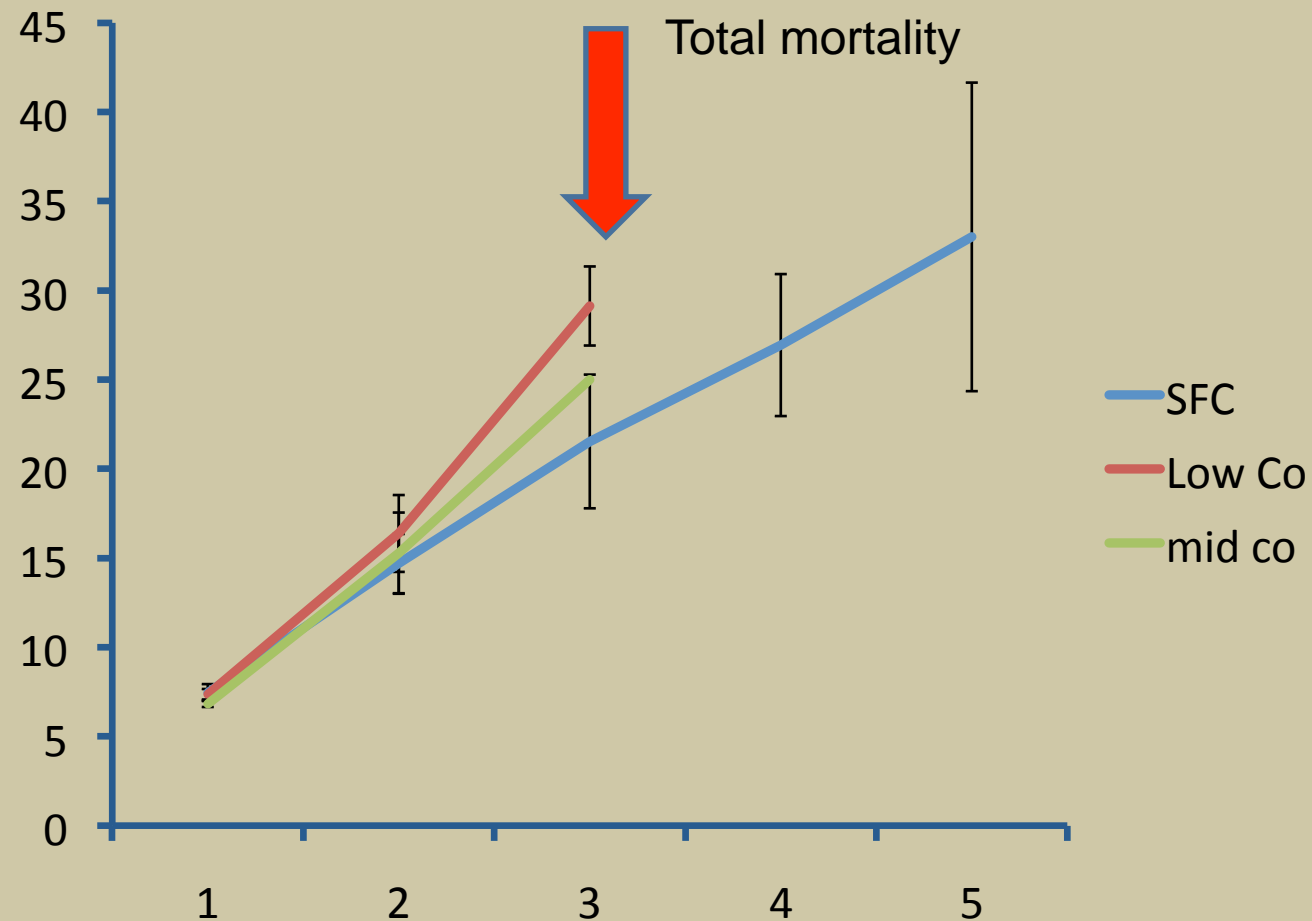




# Harvesting shrimp

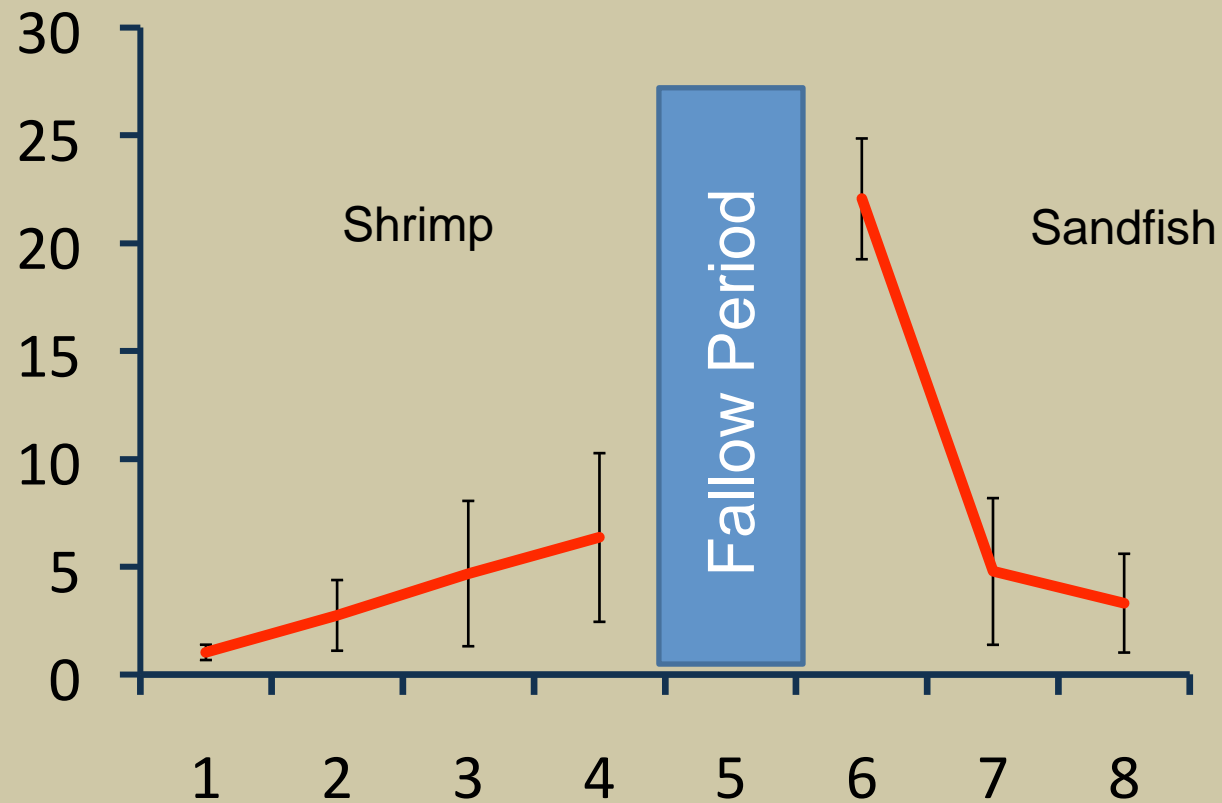


# Growth - sandfish





# Rotational culture - sulphur





## Conclusions

- Advanced nursery very effective at overcoming issues with grow-out period and wet season
  - Will pay substantial survival dividends for ranching
  - Co-culture with *vannamei* is NOT an option
  - Rotational culture appears to work well and long-term advantages should be monitored
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Thanks