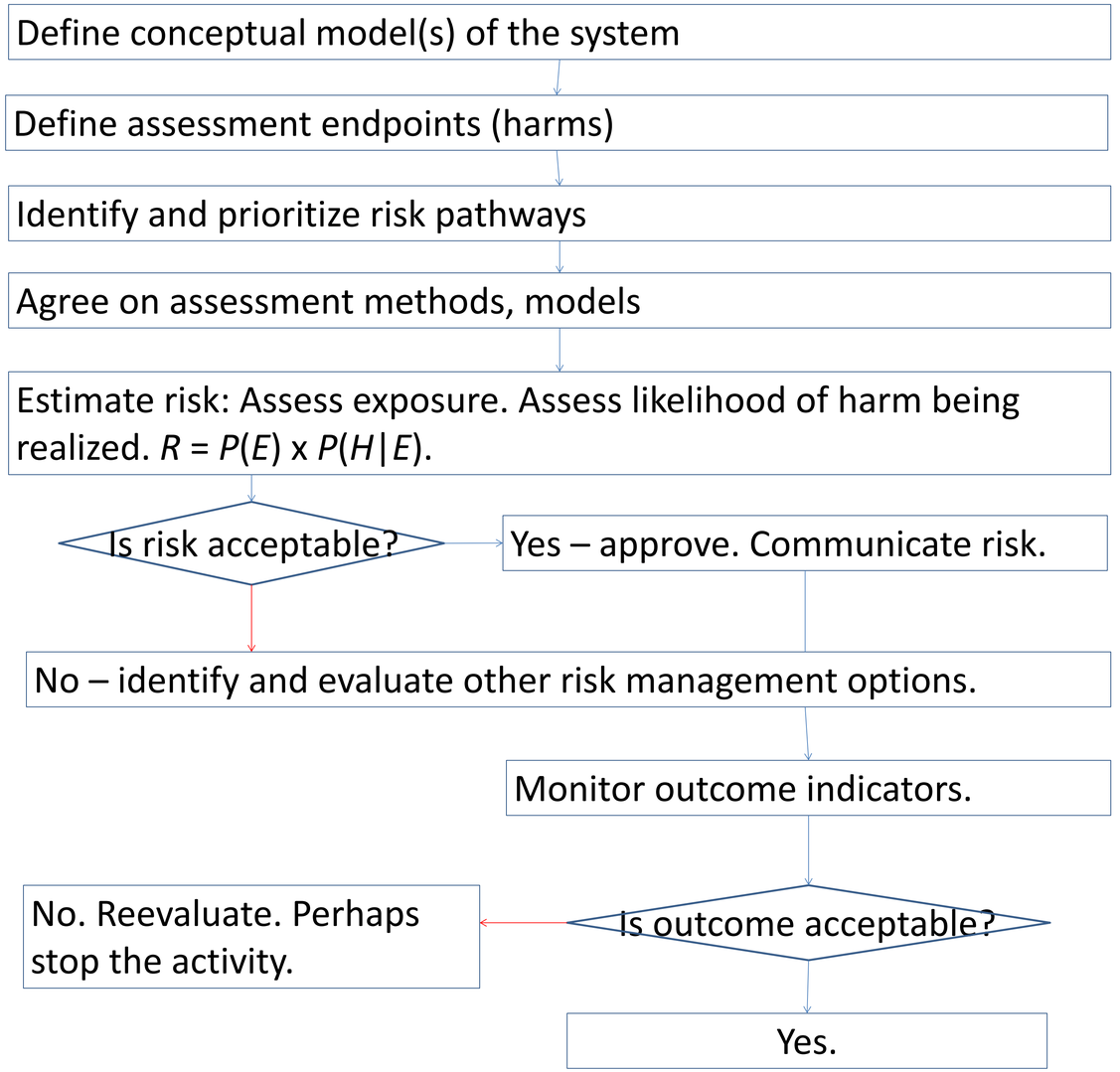
GH-transgenic Nile tilapia case study

About the fish

- This line expresses a single copy of an op*AFP*cs*GH* (ocean pout antifreeze polypeptide promoter - Chinook salmon growth hormone) transgene (Rahman et al. 2001).
- In a growth trial, the transgenic tilapia showed a 2.5-fold increase in growth compared with non-transgenic siblings.

- Food conversion efficiency was >20% greater in the transgenic fish.
- A digestibility trial suggested that transgenic tilapia were more efficient utilizers of protein, dry matter and energy.
- A company has purchased the license to market this line, and now wants to market it to commercial producers in your country.
- *Would you approve? If so, with any restrictions?*
- Rahman et al. 2001. Growth and nutritional trials on transgenic Nile tilapia containing an exogenous fish growth hormone gene. Journal of Fish Biology 59:62-78.

Simplified risk assessment – risk management framework



Risk assessment

Pathway for assessing genetic harm

Assess probability of transgenic fish escaping from aquaculture facility

If fish are farmed in an open system, esp. if that species lives there, an option is to **assume** that escape will occur

Assess probability of survival to maturity in wild

If transgenic fish can escape into a system where that species lives, an option is to **assume** that survival will occur

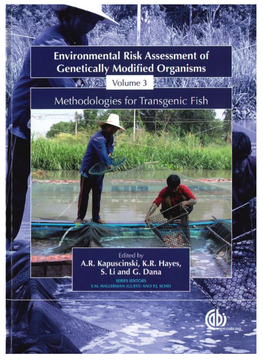
Assess probability of encounter of mature transgenic and wild fish

If transgenic fish can escape into a system where same species lives, an option is to **assume** that encounters will occur

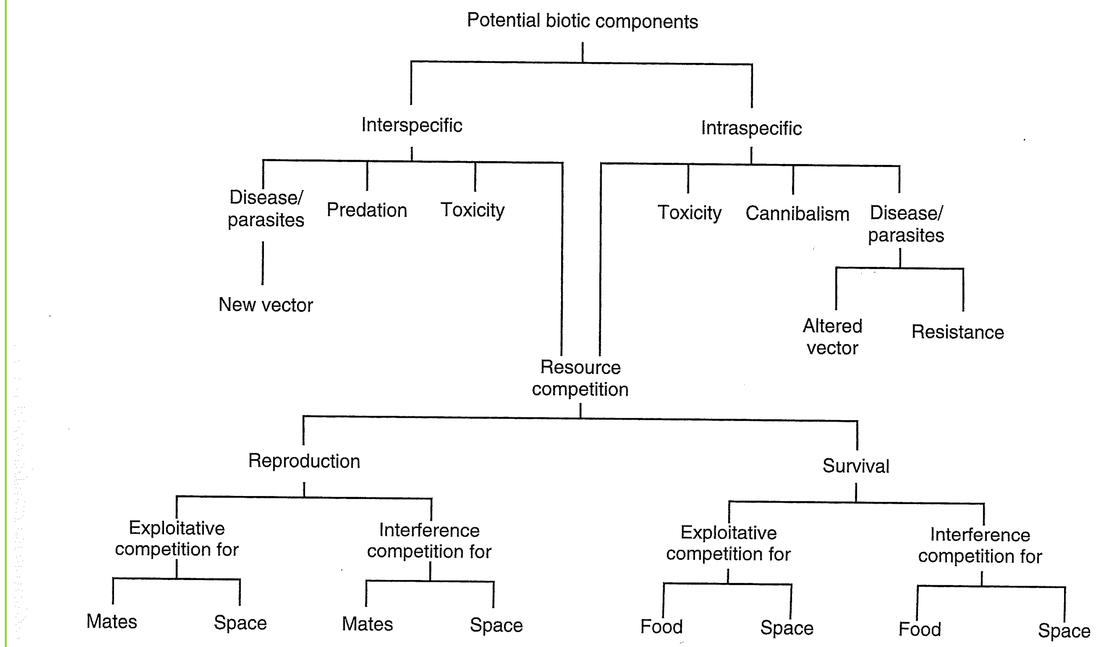
Assess probability of successful mating

Assess probability of offspring survival to reproduction

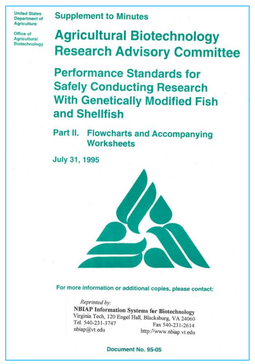
Assess probability of survival and reproduction in subsequent generations



Pathways for assessing ecological harm



Risk management



Physical/chemical barriers (temp, pH)

Biological barriers (→ survival or reproduction of GM fish)

Mechanical barriers (screens, filters)

Operations management (fish handling procedures, limited access, maintenance)