

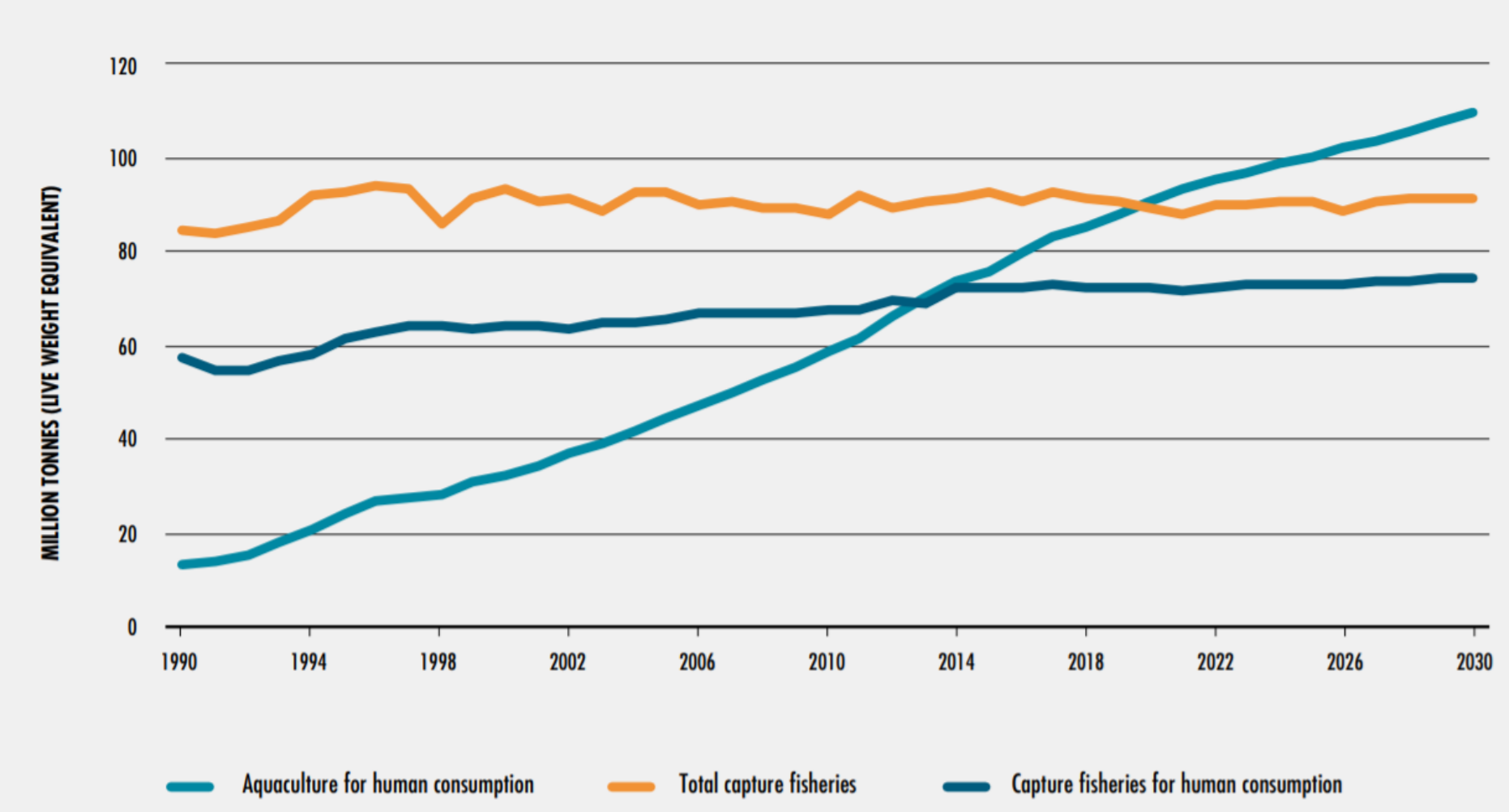
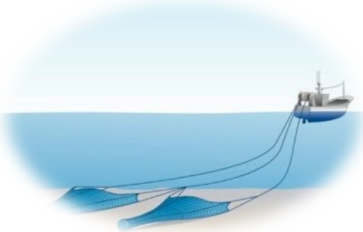
Fish Welfare Mini Symposium 2019

WELFARE IN AQUACULTURE

Edson Panana Villalobos



GLOBAL CAPTURE FISHERIES AND AQUACULTURE PRODUCTION, 1990–2030





GOOD AQUACULTURE PRACTICES



FAO.ORG



fox-aquaculture.com

Different species = different requirements



- Water quality is considered to be one of the most important factors contributing to fish health.

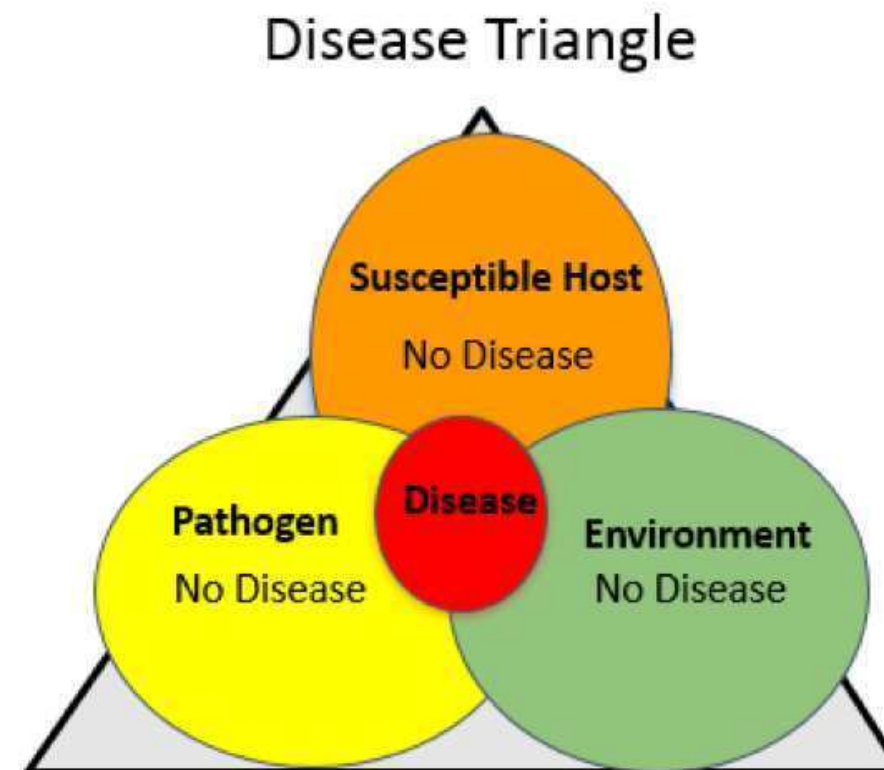


| PARAMETERS | CONCENTRARION (mg/L) |
|--------------------------------|----------------------|
| Alkalinity (CaCO_3) | 50-300 |
| TAN | <1.0 |
| NO_2 | <0.5 |
| NO_3 | 0-400 |
| pH | 6.5-8.5 |
| CO_2 | 60-20 |
| Dissolved oxygen | > 80% |



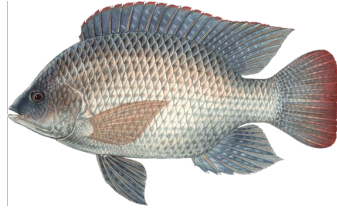
Prevention better than treatment

- Antibiotics
- Hydrogen Peroxide
- Formalin
- Salt / Fresh water



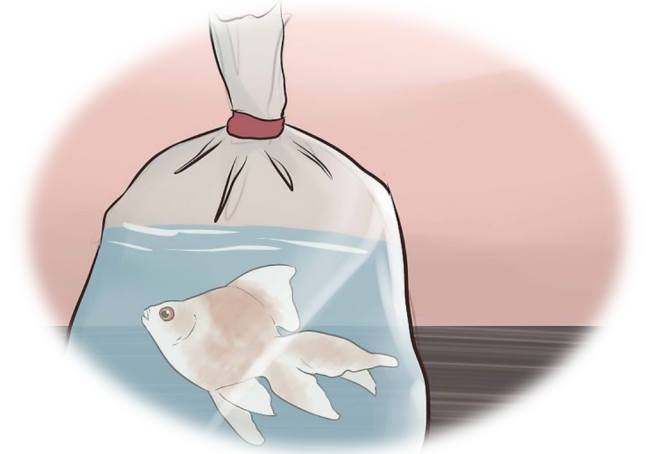
<https://www.novusag.com/>

- Every species is different in this respect — no one density ratio works for all
- **High stocking densities** can lead to aggression between fish and result in injury
- **Low stocking densities** can also cause problems, including increased aggression.



-Hierarchy
-Stress
-Need of periodical grading





- Protocols are important
- Life stage/species specific

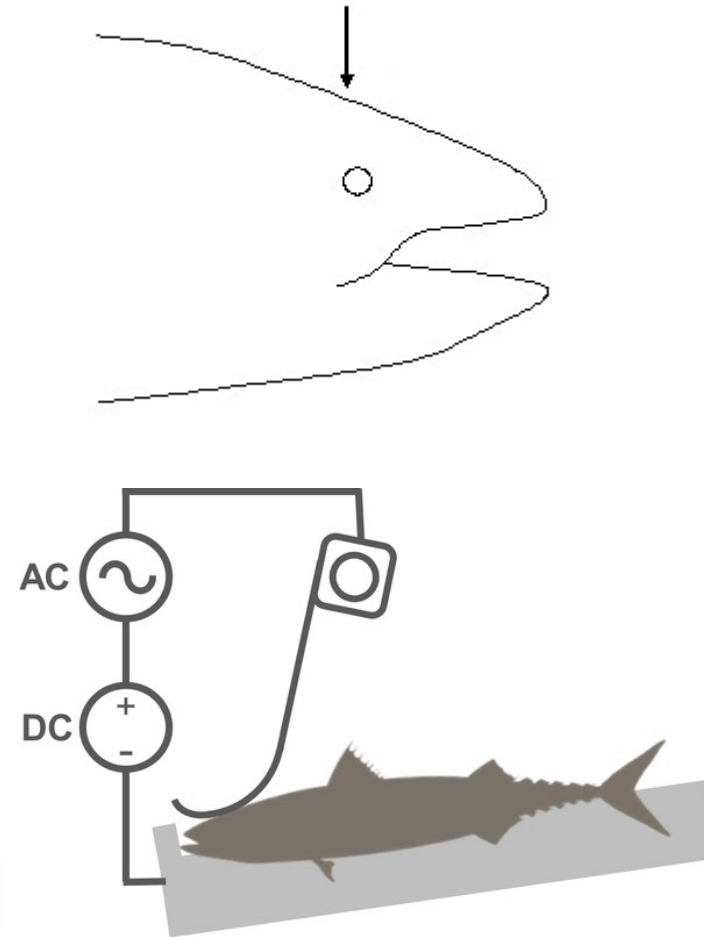
NO BODY LIKES IT



<https://www.bairdmaritime.com/>

□ Systems with potential to deliver humane slaughter

- Percussive stunning
- Spiking
- Free bullet
- Electrical stunning followed, if necessary, by a separate killing method



Farmed fish welfare during slaughter 2017
The Aquaculture Advisory Council (AAC)

❑ Welfare in Aquaculture;

- Is complex (but not impossible)
- Has achieved Important progress recently
- Will play an important role in the future of the industry
- Is related to aquaculture good practices
- Also needs to take into account the producers
- Has to be cautious in the dissemination of the information



Thank you