REGULATORY PROCESS OF THE GE SALMON DEVELOPMENT IN PANAMA

AquAdvantage® SALMON

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Regulatory Process for the GE Salmon in Panama

- Import Permit (Animal Health Directorate - MIDA).
- Quarantine Release Permit (Animal Health Directorate – MIDA)
- Environmental Risk Assessment (ANAM).
- Supervisory visits to the project (DINASA and ARAP)
- Analysis at the National Commission on Biosafety for GMOs and the Sectorial Committee on Biosafety for Agriculture
- Periodical reports to ARAP
- Absolute confination of the GE Salmon. No escapes during 600+ days of research and development.
- Destruction of 100% of the animals.
- Zero Environmental Impact

Risk Analysis – *AquAdvantage*® Salmon doesn't represents an environmental risk for Panama

Biological and Physical Biosecure Measures:

1. Sterile Fish
2. Mono-sex fish
3. Cultivated in land (> 100 km over the sea level)
4. Multiple (21) physical containment barriers
5. Biological control (depredadores) at the Caldera River
6. Natural thermical barrier (lethal temperature for the fish)
7. Build – in barriers (hydro-power facilities)
8. Competitive disadvantage (in relation to wild fish)
9. Insufficient experimental populations to achieve a minimum "critical mass" to procreate

Geographic and Geophysics' Barriers – Panamá

- The facilities where alevine and fish are rise, are highest (5,000+feet), far a way from the Pacific Ocean.
- The water temperature is limited to >26ºC on low ground (near to sea level) and in the ocean
- - Lethal Range Temperature: 26 – 28ºC
  - Females Feeding cease close to 23ºC
- Calderas River waters, run downstream, is very sinuous flowing into the Pacific Ocean.

The geographic and geophysics' conditions limit the survival and spread of salmons to other places.

AquAdvantage® Salmon in Panama – Conclusions

1. Long-term research for ***AquAdvantage***® Salmon
2. The project investigated the salmon growth and feeding Panamanian products rather than imported products.
3. The salmon are sterile and only females, which would preclude reproduction in experimental facilities or the natural environment.
4. We have taken steps to control salmon, including:
5. 21 physical containment barriers
6. Monitoring 24 hours, 7 days a week
7. Counting daily mortalities
8. Dead fish are buried in a deep pit according to protocol
9. Natural and physical barriers preclude Panama salmon survival in the event of escape.

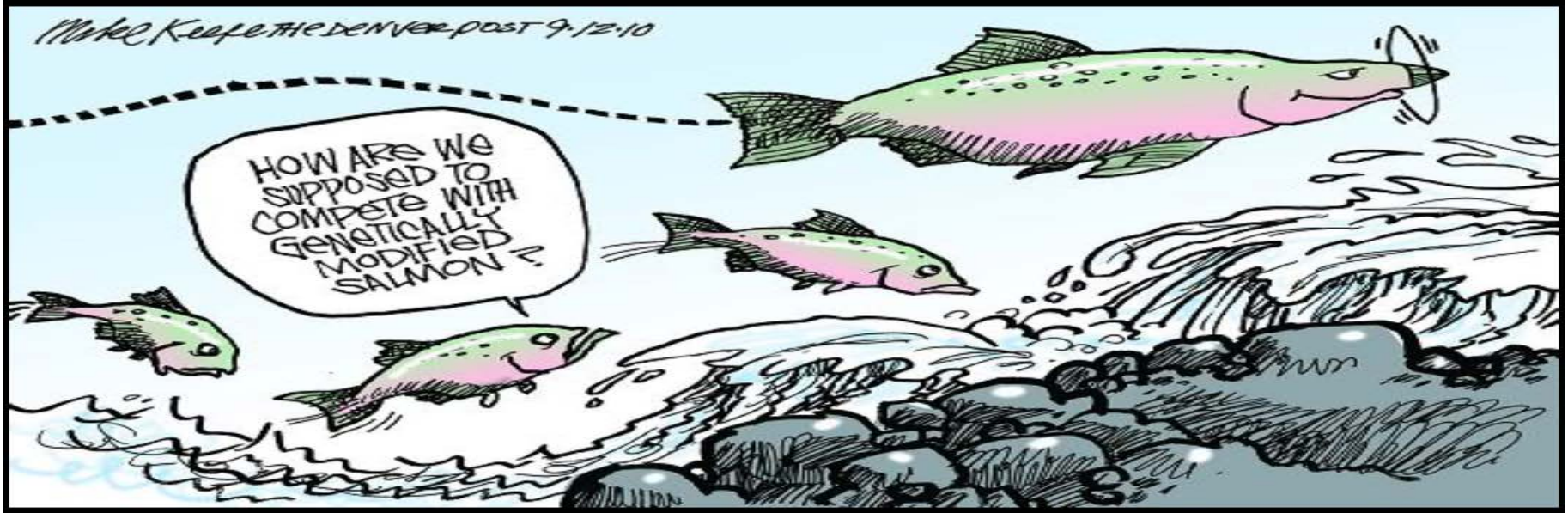
AquAdvantage® Salmon - Conclusions (cont.)

6. Panama's natural conditions are optimal for growing Genetically Engineered salmon in confined systems.
7. There are scientific, commercial and workforce opportunities for Panama as a major producer of Aqua Bounty salmon technology.
8. GE salmon cultivation, which are sterile, single-sex, on biosafe confined facilities is actually more environmentally friendly than traditional salmon farming.
9. Aquaculture Producers and Panamanian scientists would benefit from the knowledge developed.
10. Aqua Bounty has collaborated and continue to collaborate with the National Commission on Biosafety for GMOs and its Sectorial Committees; as well with Competent Authorities: ARAP, MIDA, ANAM and others, for the development of the project.

Environmental Risk Analysis – Open Questions

- What is the probability of escape of the GE salmon?
- What would be the chance of survival if the escape happened?
- What would be the chance to establish themselves and reproduce?
- Consequences / potential effects associated with the escape?

THANK YOU!


Mike Keefe the Denver Post 9-12-10
HOW ARE WE SUPPOSED TO COMPETE WITH GENETICALLY MODIFIED SALMON?!