
Fishy Ethics

Fish welfare and moral status in aquaculture

May 16, 2018

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Why sustainable aquaculture?



Aquaculture & sustainability: concerns

- *Efficiency problem:*
 - 1,9 kilo wild fish needed for generating 1 kilo of (piscivorous) fish
- *Environmental problems:*
 - Fish faeces & food pollution, pathogens
 - Habitat destruction
 - Introduction exotic species
 - *Fish welfare problems*



Fish welfare: a interaction between science and ethics

How to implement welfare? In 7 steps



How to weigh welfare vis-à-vis other values?

What does welfare mean?
How do you define it?

Definitions of animal welfare I

- Welfare is a concept that combines moral norms and biological ideas
- How one defines welfare shows moral convictions and biological suppositions
- First: balanced biological functioning or coping
- Later: subjective experiences
 - > absence of pain
 - > positive experiences

Definitions of animal welfare II

- Welfare assessment: emphasis often still on absence of pain
- Farm Animal Welfare Council 5 freedoms:
 - Hunger and thirst
 - Discomfort and pain
 - Injury or disease
 - Fear and distress
 - To express normal/natural behaviour



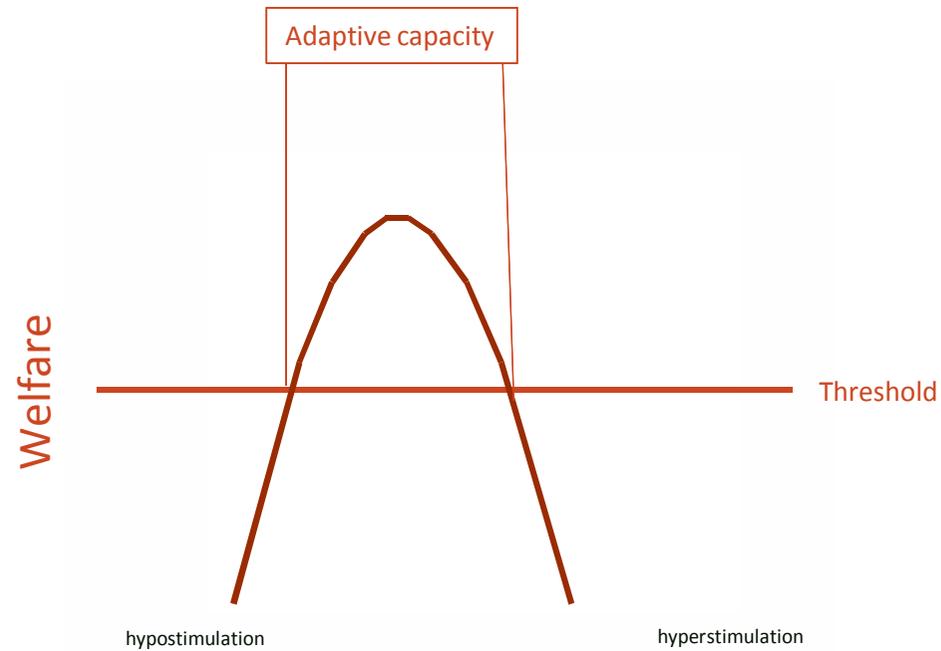
Definitions of animal welfare III

- 3 groups of visions:
 - 1) Based on functioning/ coping
 - 2) Based on feeling/ subjective experience
 - 3) Based on natural behaviour

Someone's moral background determines where one puts emphasis

Welfare:

subjective (emotional) state of an organism which is reflected by its ability to cope with presented challenges



Environmental challenges

Determined and affected by the interaction of:

- **Subject characteristics:** sex, age, genetic make-up, life history, personality
- **Environment characteristics:** enrichment, predictability, duration

Fish welfare: a interaction

**How to implement
welfare?**



How to weigh welfare
vis-à-vis other
values?



What does welfare mean?
How do you define it?



How do you
measure welfare?

How do you measure welfare?

- At first sight seems a purely empirical affair, but value-moments in research
- 2 research groups can reach opposite conclusions about welfare based on same set of data



Preference tests

“ Helpful, but some problems:

- What exactly do you measure?

- Best of 2 evils?
- Familiarity? Curiosity?
- Short-term vs. long-term welfare
- Emphasis on objectively measurable
- Should welfare be measured on the level of the individual or the group?



Welfare:

subjective (emotional)
state of an organism
which is reflected by its
ability to cope with
presented challenges

Welfare

Adaptive capacity

threshold

Environmental challenges

Parameters indicative of allostatic load/state:

- **Behaviour:** cope with challenges, learning, anxiety, fearfulness
- **Physiology:** cortisol base-line, recovery following challenges
- **Gene expression:** *mr*, *gr-alpha*, *gr-beta* and their ratio
- **Disease:** susceptibility, recovery, mortality

Reward system & enrichment

3 weeks of offering enjoyable food
(small crustaceans)



Enriched environment

For quality of life

Boerrigter, et al. (under review)
Manuel, et al. (in prep)

Reward system & enrichment

Enrichment reduces anxiety-like behaviour in **zebrafish** (reduced shelter seeking)

Enrichment and hedonic feeding reduces fear/avoidance for a negative stimulus

Enrichment reduces up-regulation of genes in the brain which are associated with stress

Fish welfare: a interaction

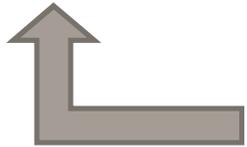
1. How to implement welfare?



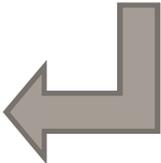
2. How to weigh welfare vis-à-vis other values?

5. Why is welfare important?

3. How do you define welfare?



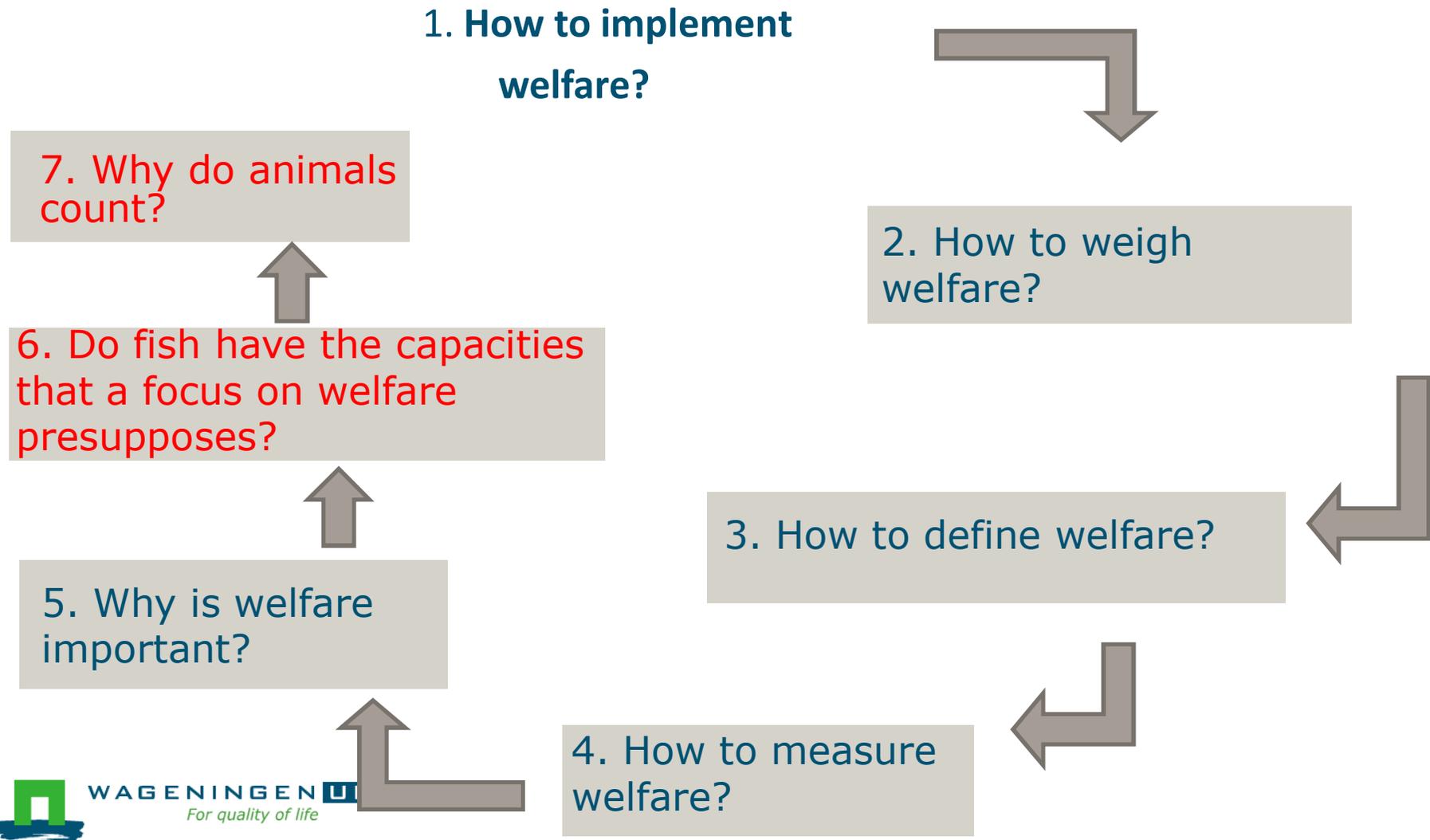
4. How do you measure welfare?



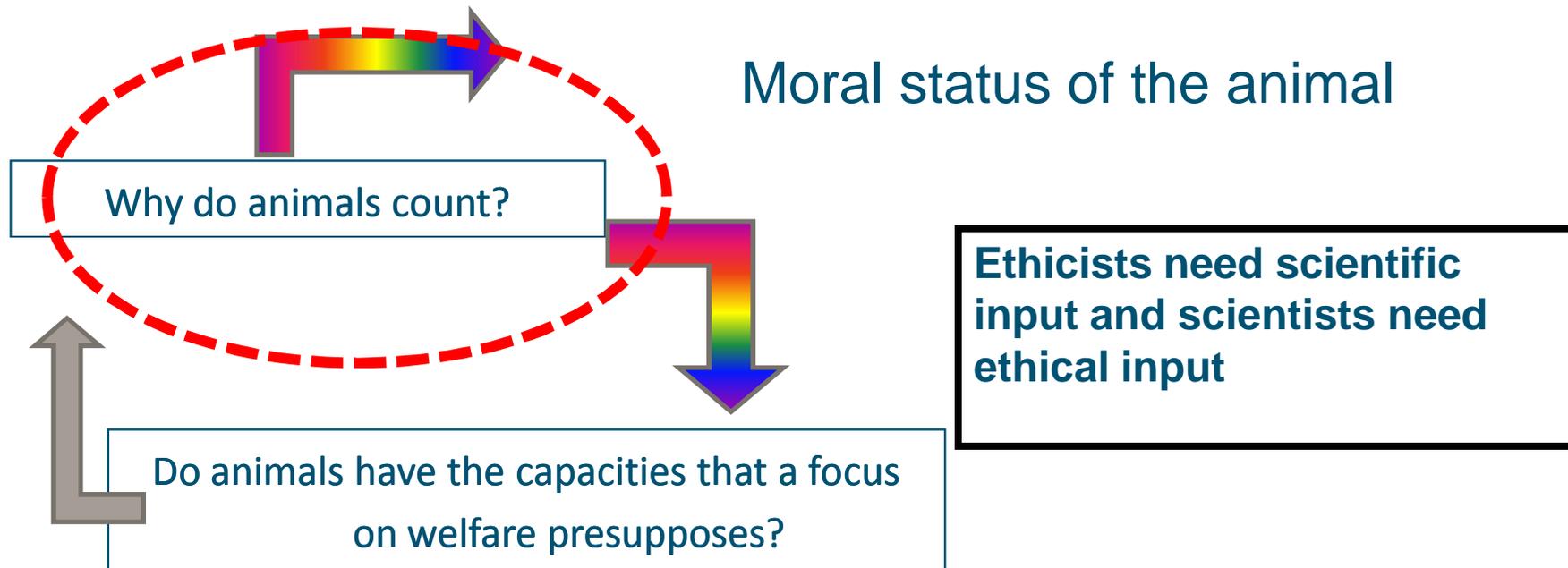
Why is welfare important?

- Speaking about welfare presupposes that welfare is relevant for our moral decisions
- Assumes that animals have an interest in the absence of pain and suffering and the presence of pleasure, or in natural behaviour
- Presuppose certain moral theories and excludes other ones

Fish welfare: a interaction



Welfare: an interaction



Three modes of thinking on 'moral status' of animals

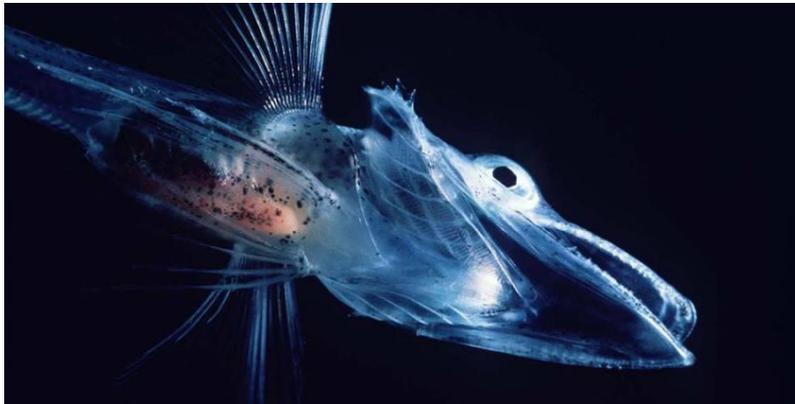
Sources of moral status		Ethical reasoning, ideal way of being
'Sentience' / 'Subject of a life'	Their ability to feel pain, suffer, feel pleasure (being in relevant ways like us)	Rational, altruistic
Empathy / Sympathy	Our ability to feel from their perspective, communicate	Relational, friendly
Awe	Difference from, rather than similarity to humans	Immersive, modest?

Empathy- line difficult

- Not cuddly
- No clear facial expression
- We cannot hear them
- Difficult to establish a relationship with a fish



Awe-line promising



Gobies: creation of a mental map

Fish with antifreeze in their blood

- Sex-change in fish
- Fish that swim thousands of kilometers to find their way home
- Fish that change the position of their mouth to climb rocks



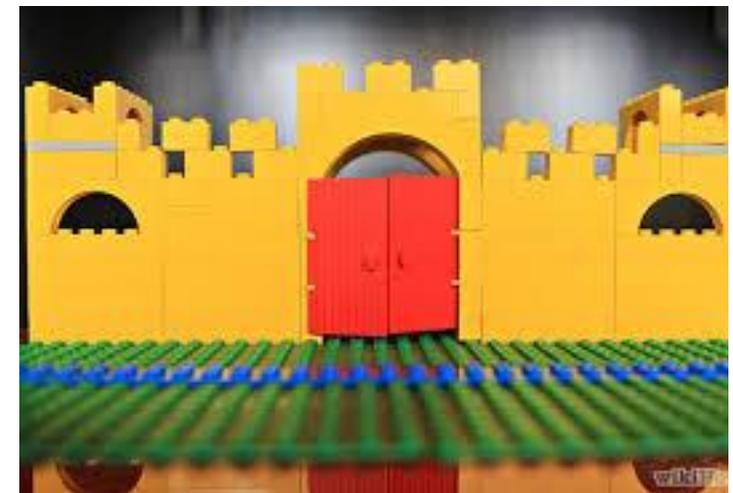
Moray eels and groupers: cooperative hunting across species

Sentience-line convincing to some



Victoria Braithwaite

- Fish do consciously experience pain
- Trout research with bee poison and vinegar
- Novel object test
- Combines behaviour with physiological data
- Pain has an evolutionary function
- Does assume that fish experience pain differently than people. What exactly does this mean?
- However, note that there are over 30.000 species of fish: can't generalise > More research needed



Summary

- When we are trying to determine how to implement fish welfare at the farm, we need to first answer a number of questions
- This requires an interaction between values and facts, between ethics and biology
- A focus on fish welfare assumes that animals count in our moral deliberations
- Raises the question: what is moral status based on?
 - sentience
 - empathy
 - awe

Thank you for
your attention

Questions?

