Complexity of Public Interest in Ethical Analysis of Genomics

James Tansey
University of British Columbia *

Michael Burgess
University of British Columbia †

1 Introduction

In one of the more provocative moves in recent years, the Washington Department of Fish and Wildlife proposed that Atlantic Salmon swimming freely within the waters of the Pacific Northwest ought to be classified as pollutants, an idea that certainly raises eyebrows about the legal implications were this approach adopted (Firestone and Barber, 2003). To make sense of this initiative, it helps to know that the salmon in question are not migrants from the Atlantic Ocean but escapees from the salmon farms along the coastline that is shared by the US and Canada. Despite their apparent similarities, there are significant genetic differences between Atlantic Salmon (actually a form of trout) and their Pacific cousins. The Department of Fish and Wildlife’s interest is to provide a mechanism to protect native species against the potential colonisation of their habitat by escaped Atlantic salmon, but deliberate or not, it would also effectively place aquaculture in the same category as industrial plants that create point-source pollutants.

During the past twenty-five years, aquaculture has been a rapidly expanding industry in North America, and there has been considerable growth in the protected waters of British Columbia for finfish aquaculture, and more recently, shellfish. In British Columbia, aquaculture is seen as a way of revitalizing the economic foundations of coastal communities, although this is likely the view adopted by some at the local level. After all, public reaction to the growth of aquaculture in B.C. induced the provincial government to place a moratorium on site licences for finfish aquaculture which has only recently been lifted. Indeed, recent BC Legislature hearings into aquaculture have not resulted in any increased support for aquaculture. Nevertheless, the argument for community improvement reflects a real need to address a decline that has occurred for a

*Corresponding Author. E-mail: james.tansey@sauder.ubc.ca
†E-mail: mburgess@ethics.ubc.ca
number of reasons, including technological changes in all resource sectors that reduce the need for human labour and, in the case of fishing communities, the rather rapid decline in capture fish stocks. Some feel the phrase ‘endangered species’ applies equally well to fishing communities as to the fish they pursue.

In this paper we examine and summarise the findings of five consultations in 2005 with diverse groups using a simple focus group methodology. Our approach to these conversations was exploratory and open ended; the methodology is described below. We examine the proposition that both wild stocks and fisheries communities are accorded special status in broad public deliberations about the future of the aquaculture industry in Western Canada. Specifically we try to answer two questions:

1. What are the issues that the use of genomics and biotechnology in aquaculture are most likely to attract public scrutiny?
2. What are the appropriate ways to evaluate the level and nature of public concerns about genomics in aquaculture, and what potential governance strategies exist?

2 Talking to strangers

Focus groups are widely used and vary significantly along a number of dimensions. We chose to construct one-off focus groups involving 8–10 participants in a 2–3 hour discussion. The groups were professionally facilitated and some structure was provided using open-ended questions to the group. We were interested in the participants’ ‘top of head’ interpretations of salmon genomics and then their hopes and concerns were addressed separately. The questions were presented in turn to the group and in the first instance each participant was asked to reflect on their personal responses privately. They were then asked to share these reflections with the group. The role of the facilitator was to seek clarification from the participants and to encourage discussion among them.

The study design involved five focus groups, each composed of participants drawn from common backgrounds. The first segment was composed of two groups (Random1 and Random2) who were randomly recruited by a consulting firm using random digit dialling. The second segment recruited participants with a direct professional interest in the area of salmon genomics; they were recruited using targeted research into the relevant organisations and by soliciting recommendations from individuals known to the research team. The first of these three groups (NGO) was composed of individuals recruited from a mix of non-governmental organisations. The second group (Fund/Res) was composed of individuals who work for funding organisations and researchers directly involved in salmon genomics. The third group (Reg/Acad) was composed of academics and regulators with a direct professional connection to salmon genomics.

Participants in the focus groups were given very little information about the project. While there are good reasons for informing participants, in this particular case we wanted to see how they would define the technology, what
their background understanding of the field was, and what hopes and concerns they could identify without being inhibited by assessing whether they were realistic.

A wide range of studies have sought to address these questions from an academic perspective and a summary is available elsewhere (Power, 2003). In the following section we focus on the issues that emerged from the focus groups, all of which generated a fairly complex and sophisticated depiction of the issues (Bates et al., 2005; Kerr et al., 1998).

3 Concerns inherent to the technology

A key finding all of the groups is that participants often conflate two related but distinct areas of research. While the facilitators consistently asked about the role of genomics in aquaculture, the examples the participants discussed most commonly were transgenic. The distinction is important since the vast majority of genomic research in aquaculture is not focused on transgenic applications. Genomic research supports traditional breeding methods to produce higher quality fish and results in the enhancement of the genetic stock through non-transgenic methods. Other genomic research focuses on parasites that affect the viability of aquaculture. While an American company with a Canadian subsidiary, AquaBounty Technologies has submitted applications for transgenic, growth-enhanced salmon to the Canadian Food Inspection Agency and the U.S. Food and Drug Administration, at various times, and then withdrawing and re-submitting, the vast majority of the research in genomics and aquaculture does not focus on transgenic applications.

We did not explore the reasons for this conflation in any detail, but could speculate that it is the transgenic applications that have been the focus of the greatest media attention. These media accounts provide the examples individuals use to make sense of the technology. What is interesting is that there was also strong evidence of this conflation in two of the three expert groups. Only the Regulator/Academic group consistently maintained the distinction between the two technologies.

Within the Reg/Acad group, one participant argued that a whole class of genomic technologies could be tainted by association with negative perceptions of genetically modified organisms:

V2 if the public viewpoint is that genetically modified organisms are bad, and by association the salmon aquaculture industry uses genetically modified organisms, then it spreads to aquaculture products and in fact even into other salmon products.

In the extreme case, a controversy could spread to the entire seafood industry, including wild salmon. In this case the participant asserted that consumers do not really distinguish between different types of seafood, which is odd given that in B.C. ‘wild’ and ‘farmed’ salmon are routinely and widely distinguished in supermarkets and restaurants. In any event, the implication is that negative
perceptions of transgenic salmon could have much wider impacts. From a risk management perspective, the implication is that negative perceptions of a specific technology can contaminate an entire class of technologies since ultimately it is perception rather than brute facts that drives human behaviour.

More generally, a number of participants noted argued that large-scale crises in the food production system like BSE were undermining consumer confidence in processes of industrial production. This manifests in terms of declining trust in government scientists and regulators. A number of participants across the groups raised concerns about the welfare of salmon used in genomic research. As we suggested above, these concerns revealed the confusion between genomic and transgenic applications:

V3 So the ethics is there. I think scientists don’t have the right to do or generate any monsters or Frankenfish. We do not have the right, I think. (Reg/Acad group)

In this case the concern is expressed in terms of negative effects of failed experiments and the rights of humans to modify animal genes. NGO participants also focused on the rights of organisms to have their genetic integrity respected. The discussion of the rights of organisms was framed in relative terms; humans see themselves as being on the top of a hierarchy and as having the right to manipulate other organisms. NGO participants questioned the presumption of a right for humans to manipulate other organisms, claiming that if we cannot modify humans without consent, then there is no justification for modifying other organisms that cannot consent. Participants in other groups addressed the issue of animal welfare in aquaculture as it relates to genomics. They pointed out that established breeding programmes in aquaculture already create large numbers of unviable fish that are culled or die naturally. At a practical level, participants said that genomic research may not create additional welfare concerns beyond what is already accepted by consumers and by the industry.

In cases where genomic applications were interpreted as ‘cloning’, participants raised concerns about whether the natural instincts of fish to return to their spawning grounds might be affected. Other participants (Random group) suggested that while cloning or modification of higher order animals, such as sheep, might be unacceptable, modification of less sentient species like salmon might be acceptable. This suggests that some public concerns are expressed relative to a continuum where some right to freedom from genetic interference is correlated with sentience.

Many of the participants noted that salmon has a special status both in Canadian culture and in First Nations culture. Concern about modification of salmon species and about the industrial character of aquaculture may have deeper cultural underpinnings. It was felt that creating a ‘Frankenfish’ may diminish what are considered by some to be the ‘magical’ or mythical properties associated with salmon. Salmon are critical to the spiritual well being of BC coastal and tributary First Nations, so harm to the fish will harm the community.
as a whole (although it was recognized that some First Nations have established joint ventures with aquaculture companies).

4 Environmental impacts of aquaculture

Concern about salmon escapes have been widely documented by academics as well as by the media. These concerns were evident in the focus groups where it was felt that escapees could compete with wild stocks and could also interbreed and reduce the fitness of the wild populations. These concerns were expressed in the focus groups but were also balanced by a view that genomic research could relieve pressure on the environment. For instance, improvements in productivity could limit the footprint of salmon farms so that their impacts are more localized. Many felt that aquaculture has the potential to be a more efficient method of food production than commercial capture of wild stocks. Wild stocks and species could benefit from salmon genomics and aquaculture as a result of the reduced pressure on wild stocks that might result from getting farms out of the oceans.

Participants in the random groups argued that salmon left for sport fishing and recreation generated much more economic value. The broader benefits included reduced pressure on wild stocks and freeing up more wild fish for feeding bears. Participants in the Res/Fund group felt that fish farming may be more effective than fisheries closures for protecting wild stocks. One participant argued that because fish farming has reduced the cost of salmon it has relieved poaching pressure on wild salmon stocks that existed when a stolen fish could sell for up to $200.

5 Governing aquaculture

Many of the concerns raised about the future of aquaculture in general reflected concerns about the governance of the industry. This manifested in a number of different ways. One theme reflected concerns about ownership of the industry by foreign companies. It was felt that foreign companies would have limited interest in delivering local benefits or in maintaining high environmental standards. The implication is that Canadian owned aquaculture would be more acceptable. Specifically, participants felt that British and Norwegian companies dominate aquaculture in BC and use the province as a laboratory. The view was expressed that these companies were kicked out of Europe because of the effects of aquaculture and now they threaten sports fishing in BC. Others were concerned about the way innovation occurs in the industrial regime as a whole, regardless of who owns the company. It was felt that new species or varieties delivered with the support of industrially funded research are being converted into commercial applications too quickly; the concern is that we still don’t understand the underlying biological mechanisms and that the pressure to patent creates new risks. The research environment is much more competitive today.
so there is less collaboration and nobody is looking at the aggregate impacts. Research is done with the end in mind:

V5 Because they already have the end in mind. We want you to do research to get us here. The end is defined. And if you don’t do that we’re not funding you, because this is what we want the end product to be. You get us there.

The profit motive is creating a society that is ‘out of control’ and is driving the development of aquaculture.

In addition, one participant argued that modern aquaculture requires the enclosure of common property: the oceans and that other individuals and animals that make use of these spaces may lose out.

More generally, a number of participants were concerned about the kind of commercial arrangements that can follow from heavy industrial involvement in research. They cited Monsanto, a company that has no direct stake in aquaculture, but is nevertheless widely villified for all of the ills of corporate multinationals involved in agri-business. The issue seemed to be related to the case of Percy Schmeiser, a Saskatchewan farmer who was found guilty of patent infringement for knowingly growing protected crop varieties. More problematic to some participants was the idea, located vaguely in ‘farmers privilege, where sterile seeds are sold annually to farmers on a strict commercial license, to argue that operators would be worse off if transgenic fish were produced because restrictions perceived to be equally restrictive would prevail.

In contrast, a number of participants argued that significant improvements in and expansion of aquaculture could revitalize coastal communities that have declined as a result of the collapse of wild stocks. This kind of revitalization would result in more stable communities, reduced divorce rates, improved infrastructure and so forth. The participant used the example of the Norwegian government’s support for aquaculture as a way to underpin communities. There was a lengthy discussion in the Res/Fund group about the extent to which commercial fishing supports only transient workers both in the Alaskan and the BC fisheries. Stable communities create responsibility and ownership and help build community. Both genomics and the aquaculture industry were thought to provide better-paid and more stable jobs and these benefits could be extended to First Nations communities.

Finally, Participants identified a range of other related environmental concerns related to genomics.

- “visual” pollution or offensive odours from fish farms when they are introduced may reduce the value of properties or conflict with people who had moved into the area for aesthetic reasons
- GM material ‘getting out’ through predators who consume salmon
- impacts of fish farm owners shooting seals, sea lions and birds that feed on farmed salmon
• modified salmon may result in altered disease vectors.

• environmental impact of using fish meal from South America for salmon farms.

Potential environmental benefits from salmon genomics were also identified.

• using genomics to create low cost or non-animal proteins might make salmon farming more acceptable and take the pressure off wild stocks.

• applications of genomics to ensure that farmed salmon are sterile (this would address some concerns about escapement)

• possibility that the feedstock fishery that supports for salmon farming is being used sustainably and that if it wasn’t used for salmon, it would be used for something else.

These themes identify a range of interests and issues as well as stakeholders that are important to analysis or discussion of the interests and issues raised by the participants. What is striking about the range of hopes and concerns raised in the focus groups is that they extend far beyond the specific technological applications that were the formal subject of the consultations. While established scientific assessment processes focus on the characteristics of the organism in question and involves debates about whether a technology is ‘substantially equivalent’ in all respects except the novel trait to an conventional comparator, the evidence from these focus groups suggests that technologies are seen as heavily socially embedded (Rip and Kemp, 1998). They are considered more or less acceptable not because of the inherent characteristics of the technology (although this is clearly important) but also to the extent that they reinforce or transgress wider social norms. For instance, many participants would find aquaculture more acceptable were it Canadian-owned aquaculture that generated significant local employment, involved First Nations, intentionally limited environmental impacts and was managed as a co-operative. While this statement seems rather obvious, policy responses to most novel foods focus on the safety issues and generally neglect social welfare and distributional issues. A prime example is the UK government response to the outcry over the use of genetically modified seeds in agriculture. The government’s position emphasized safety issues, testing and field trials, while we would argue that the volatile nature of the issue was influenced by knowledge that the industrial proponent was an American company.

6 Evaluating public concerns

Focus groups represent one approach to evaluating the nature of public concerns about genomics in aquaculture. In this case we chose to use a simple focus group design with only a single iteration and with homogeneous composition. While a range of stakeholdergroups were engaged in these focus groups,
they can hardly be described as exhaustive or representative. Instead, our goal was exploratory and we sought to paint a picture, in broad strokes of a political landscape relevant to the topic. What the transcripts describe are rather mixed and competing views about the role of genomics in aquaculture. Moreover, what is very clear from across the transcripts is that it is impossible to separate hopes and concerns about the role of genomics from the wider debate about the acceptability of aquaculture in general. It is also impossible to ignore social norms relating to the treatment of animals and the fate of wild stock of salmon, which are thought to be culturally and symbolically important. The transcripts support the view that technologies are always socially embedded and are complex and variable carriers of meaning. By this we mean that it is impossible to evaluate genomics in narrow functional and material terms associated with imagined applications. While consultation exercises typically seek to delimit the scope of negotiations, for instance to issues of safety, we suggest that this narrowness can be self-defeating.

One of the key lessons from over three decades of professionalized risk management is that if the context of a consultation excessively limits the terms of reference then normative concerns will be expressed through proxies. While much of the debate about genetically modified organisms has focused on their safety the underlying position of many of the stakeholders reflects concerns about much wider issues including the rights of species, the moral hazards of ‘playing God’, the symbolic importance of species and landscapes and the distribution of costs and benefits from a proposed technology. Rather than engage in a debate about whether these views are right or wrong, the role of exercises of this sort should be to recognize and display these enduring views that are rarely subject to easy or rational review. Instead, normative positions are expressed consistently by established stakeholder groups. The subjective importance of these issues to stakeholder groups should be sufficient to warrant regarding the issues as legitimate topics of discussion to be understood and dealt with rather than dismissed, particularly in exploratory studies related to emerging technologies.

Evaluating the level of public concerns relative to other issues is more challenging, particularly with respect to emerging technologies. While exploratory focus groups and other similar methods can help chart the political landscape, it is very hard to chart the topography. These approaches do not help us determine which issues are likely to be of greatest concern to a specific group and it is probably impossible to determine which issues will be most significant across groups. To add to the complexity, the impact of novel technologies can rarely be predicted in advance and many controversies associated with them have been due to unintended consequences. This suggests that the implementation of any major technological regime from agricultural biotechnology to biometric testing should include ongoing evaluation of stakeholder concerns. Practically this would create real challenges for regulators and promoters of these technologies.

Finally, while we have already pointed out that the composition of the focus groups was not representative, they were designed to target some of the more obvious stakeholder groups who are likely to have an interest in the topic.
Missing from the list of groups are First Nations and this silence requires some explanation. We went to great lengths to engage First Nations in a focus group discussion and encountered a number of problems. First, we tried to engage a regional group that operates on behalf of First Nations involved in fisheries but discovered that very few of the staff were themselves First Nations. We were concerned about the problems of asking professional staff to speak on behalf of an unrepresented group. Second, we sought to establish direct contact with First Nations in British Columbia but they were not willing to engage in the exercise for at least two reasons. First, they felt that focus groups structure and organize conversations in ways that are inconsistent with the groups’ own norms about how dialogue should occur. Second, and more importantly perhaps, the senior band members were wary about engaging in a process that might be interpreted as providing an authoritative and final position on genomics and aquaculture. This reflects negative experience in the past where statements from First Nations individuals who engage in formal consultations are then interpreted as statements on behalf of that tribe or First Nations in general. All we can conclude from this example is that there are wider procedural problems in the relationship between First Nations and other governments in Canada. Until these procedures are legitimately institutionalized, it will prove difficult or impossible to consistently engage First Nations in consultations. Our experience suggests that many First Nations view themselves not as ‘levels of government’ but as ‘governments’ in their own right (regardless of the current constitutional position). They are often similarly resistant to the term ‘stakeholder’, which subordinates their claims issues they consider important to a higher body.

7 Bibliography


