

# Geoengineering Our Climate?

Ethics, Politics and  
Governance

## Case Study

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## Village Science Meets Global Discourse: The Haida Salmon Restoration Corporation's Ocean Iron Fertilization Experiment

Holly Jean Buck

Cornell University

[hjb84@cornell.edu](mailto:hjb84@cornell.edu)

**earthscan**  
from Routledge



 **Institute for Science,  
Innovation and Society**  
University of Oxford



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## Introduction

Haida Gwaii is a temperate rainforest archipelago in the North Pacific, six hours by ferry from Prince Rupert, British Columbia. It is home to about 5,000 people. Half are citizens of the Haida Nation, which is made up of two communities with their own governing councils. Skidegate band sits in the south, and a hundred kilometers north is the band of Old Massett. Quiet and remote, Haida Gwaii made occasional news over the past three decades due to its activism for indigenous care of forest resources. Yet, on October 15, 2012, Haida Gwaii became the center of a different kind of media maelstrom when British newspaper *The Guardian* released the story, "World's Biggest Geoengineering Experiment 'Violates' UN Rules."

In the summer of 2012, the Haida Salmon Restoration Corporation (HSRC), a private partnership ocean stewardship company, released 120 tons of iron sulfate and iron oxide into an ocean eddy centered 400 kilometers west of Haida Gwaii, and monitored the resultant plankton bloom with a fleet of high-tech ocean gliders and drifters. Their research question: "Does adding a trace amount of iron to an HNLC<sup>1</sup> ocean eddy located in a known salmon migration route cause phytoplankton to grow, and if so, what are the resulting environmental benefits or costs?"<sup>2</sup> Initially, the project was linked with a self-

styled eco-entrepreneur, Russ George,<sup>3</sup> who had a history of contentious carbon credit start-ups.

HSRC's project has been variously pointed to as a demonstration of why geoengineering needs governance protocols, a justification for a ban on geoengineering research, and, less frequently, a tale about a community on the front lines of ecological change trying to proactively restore ocean ecosystems with meager resources. The purpose of this article is not to judge the legality or science of the project, but to explain how and why the story developed and unfolded as it did, and examine what can be learned. The three themes this study will explore are the tension between citizen / village-scale science and institutional science, the media response to the event, and the slippery definition of geoengineering.

## Salmon, Carbon Sequestration and Media: An Accounting of Events

To begin, we will look at the motivations and genesis of the project, which was designed to respond to the problem of salmon decline, and to possibly become funded by carbon credits. Overall salmon decline has scientists puzzled, and salmon runs fluctuate wildly.<sup>4</sup> The Haida of Old Mas-

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<sup>1</sup> High Nutrient / Low Chlorophyll

<sup>2</sup> Written interview, September 2013

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<sup>3</sup> Old Massett had a ten-year working relationship with Russ George from tree planting work. With previous ocean fertilization startup experience, he was a scientist and advisor on the HSRC project until they parted ways in May 2013.

<sup>4</sup> For example, the Fraser River had a phenomenal run of 34 million in 2010, compared to 1.7 million in 2009 and around 6 million in 2011. See Parson and Whitney, 2012.

sett have run a salmon hatchery on the Yakoun river for forty years, and know that salmon are spawning and leaving Haida Gwaii—they just aren't coming back in corresponding numbers. This led the HSRC to wonder: What if the problem is at sea?

Global phytoplankton biomass has been declining over the past century at a rate of about 1% of the global median per year, according to a 2010 paper in *Nature* which sparked intense debate.<sup>5</sup> Winds deliver the Pacific micronutrients from East Asia, but HSRC's thinking is that land use change and climate change can mean less dust on the wind, implying that the bottom of the food chain is undernourished. Some scientists have hypothesized that iron-rich ash scattered by a 2008 Aleutian volcano eruption factored into the massive 2010 salmon run,<sup>6</sup> though definitively proving correlations between ash, plankton, and salmon is difficult at best. But this idea about insufficient dust and insufficient plankton is significant in that it implies that HSRC's project mimics a natural process, and that the natural process has been disrupted by humans already, perhaps making remediation a human responsibility.

Part of the contention around the project was that HSRC was hoping to sell carbon credits to make it economically sustainable. Right now, no formal carbon market is administering, selling, or validating

credits from ocean fertilization.<sup>7</sup> Yet whether carbon markets could, or should, play this role is central in ocean fertilization debates. Phytoplankton is responsible for half of the organic matter production on earth,<sup>8</sup> and the equivalent of about 1/4 of annual anthropogenic CO<sub>2</sub> emissions is absorbed and stored by the ocean.<sup>9</sup> If a plankton bloom can sequester some excess carbon, feed some salmon, and be funded by the carbon market, that seems like a triple win.

To understand how HSRC could consider carbon credits as a funding source despite the many uncertainties associated with ocean fertilization<sup>10</sup>, consider that Old Massett has long been interested in restoration and payment for *forest* ecosystem services. Like many environmentalists and green entrepreneurs, Old Massett economic development officer John Disney also believes that "humans must put a value on the environment to ensure its survival"<sup>11</sup>, and that this value must become a fundamental component of the way our economy works. Payment for *ocean* ecosystem services also could make the project self-sustaining—good science requires long-term monitoring. However, HSRC was able to take the salmon project

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<sup>5</sup> Boyce et al, 2010

<sup>6</sup> Parson and Whitney, 2012

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<sup>7</sup> Buesseler et al, 2008

<sup>8</sup> Boyce et al, 2010

<sup>9</sup> Rau, 2013

<sup>10</sup> Plankton has to drop to the deep ocean to be definitively sequestered, and monitoring and studying this is expensive. See Smetacek 2012; CBD Secretariat, 2012; Cao and Caldeira, 2010.

Carbon sequestration also depends upon the availability of light, silicate, and other factors like scale; it also might be outweighed by side effects of unknown magnitudes. See Strong et al, 2009: 256; Denman, 2008.

<sup>11</sup> Written interview, 26 August 2013.

forward with village funds: Old Massett voted to spend \$2.5 million for salmon restoration, with about 200 of 700 citizens participating and the majority in favor.<sup>12</sup>

### **Press: The World is “Alerted”**

How, then, did this project come to be defined as geoengineering? While press coverage portrayed HSRC’s project as geoengineering, HSRC did not consider it as such.

"We always thought of this as a village project whereby benefits, environmental, financial and social, would accrue to the village and citizens of Haida Gwaii," says director and operations officer Jason McNamee. As a village project, it had to obtain buy-in from the village. Critics claim that villagers were "duped" or didn't understand the project. In any case, the research was not a secret: many locals were appraised, Environment Canada staff knew about the idea since 2011,<sup>13</sup> and the HSRC published project information on their website. John Disney explains the project’s development: “In the seven years of preparation for the project with all the legislative chores, the financial planning, the computer modeling, the legal investigations, the endless discussions with the team and with my council, I never once heard the term ‘geoengineering’. Nor did I ever hear terms such as ‘controlling’ the climate or ‘managing’ the salmon stocks.”<sup>14</sup>

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<sup>12</sup> McKnight, 2013

<sup>13</sup> McKnight, 2013

<sup>14</sup> Written interview, 26 August 2013. On geoengineering, Disney comments that he rarely

Perhaps the project became geoengineering on October 15, 2012, when the *Guardian* presented it as such. In October 2012, the ETC Group— a technology watchdog group with nine members and a million-dollar budget— "contacted international press outlets to alert them" about the project.<sup>15</sup> Criticism erupted. The "revelation" of the HSRC project occurred during the UN's Convention on Biological Diversity in Hyderabad, India (CBD COP 11), in which the ETC Group was pushing for an enforceable test ban on geoengineering rather than the current non-binding moratorium.<sup>16</sup> Political analyst Josh Horton commented that the ETC group and sympathetic reporters "have orchestrated a mini-scandal timed to coincide with deliberations."<sup>17</sup> This would have been a familiar strategy, as ETC had cast another ocean fertilization experiment, LO-HAFEX, as a violation of the moratorium in 2009.<sup>18</sup>

Meanwhile, Haida Gwaii residents were coping first with the international press, and then an offshore earthquake. ETC claimed, "As Haida villagers headed for the hills amid tsunami warnings, they were still experiencing the aftershocks of the media storm of the previous fort-

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hears of any geoengineering scheme that would "fix the mounting list of problems emanating from our industrialization of the planet. Most of them scare me."

<sup>15</sup> ETC, 2012

<sup>16</sup> A 2010 CBD moratorium invites parties to consider a ban on geoengineering activities beyond small-scale research until there is regulation.

<sup>17</sup> Horton, 2012a

<sup>18</sup> Strong et al, 2009; Horton, 2012b— describing the outcome of COP 11 "essentially the status quo ante."

night."<sup>19</sup> Controversy arose within Haida Gwaii as well: the project was Old Massett's, but the negative press did not differentiate between the two Haida bands, placing new strains on the Skidegate / Old Massett relationship. The project was also not in conversation with the existing collaborative multi-year marine use planning efforts led by the Council of the Haida Nation,<sup>20</sup> and the latter issued a press release stating its noninvolvement.<sup>21</sup> At least one resident claimed that the research was about selling carbon credits and not about salmon,<sup>22</sup> and others called for an apology.

In the international sphere, some geoengineering researchers slammed the project—David Keith called it "hype masquerading as science"<sup>23</sup>— and parties to the London Convention/London Protocol<sup>24</sup> released a statement of condemnation in early November 2012. Joe Spears, legal counsel for the salmon corporation and village of Old Massett, called the condemnation "a clash between big science and big [non-government organizations], and village science and indigenous peoples".<sup>25</sup> A legal case is ongoing. Meanwhile, in autumn 2013, pink salmon made a strong return to BC waters<sup>26</sup>, an event that HSRC plans to

analyze further as it continues its work. Perhaps the project will cease to be seen as "geoengineering" in the future, as HSRC's data continues to be shared. In this case, "geoengineering" is what happened when actors collided.

## **Ocean Fertilization and Geoengineering: Further Exploration**

The complex context of the Haida Salmon Restoration project suggests that we might need to think a little differently about climate engineering governance. In this analysis section, we will raise three questions.

Firstly: who has the right or responsibility to act when faced with ecological decline? Disney comments, "It seemed appropriate for Old Massett to take the first steps to reclaim their stewardship role by working in an area that, before contact, would have been their responsibility." Colonialism is part of this context: the Haida population decreased after contact in the 1800s by 90-97%.<sup>27</sup> Haida Gwaii's abundant resources have historically been exploited for some external interest's gains. Economic hardship is also present: Old Massett's high unemployment (~ 70%) is mitigated somewhat by residents' abilities to fish and gather food, which makes functioning ecosystems and access to local foods like salmon even more important. In this context, payment for ecosystem services takes on a different rationale than

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<sup>19</sup> ETC, 2012

<sup>20</sup> Jones et al, 2010

<sup>21</sup> CHN, 2012

<sup>22</sup> Lavoie, 2012

<sup>23</sup> Hume, 2012

<sup>24</sup> A 1972 / 1996 protocol to regulate marine pollution and dumping of waste at sea.

<sup>25</sup> Lavoie, 2012. In March 2013, Environment Canada raided HSRCs offices and took data and materials; a lawsuit about this is pending.

<sup>26</sup> Hume, 2013. McNamee also states that while the HSRC team can't conclusively express a causal link

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with the surprising returns, they "hope that through DNA and stable isotope chemistry analyses we will be able to better define the relationship" (interview).

<sup>27</sup> Martineau, 1999

the get-rich-quick exuberance of financialized carbon; it seems like a responsible way to generate income. Another consideration in terms of responsibility to act is that Old Massett never signed a treaty ceding rights and title to their traditional territory, and could be considered the legitimate authority in its traditional lands. HSRC applied for and was granted three research permits from Old Massett's governing body, the Old Massett Village Council. While indigenous peoples have certain rights and responsibilities regarding their environment, Whyte argues that geoengineering governance models are generally silent about indigenous peoples or conceive of community members "only as citizens of nation states or as groups that have special rights under the constitution of the nation state that dominates them". He recommends that early SRM research governance models "articulate Indigenous peoples as sovereign peoples in relation to NGOs, private companies, scientific advisory committees, supranational organizations, as well as federal or state agencies of nation states."<sup>28</sup> While specific to solar geoengineering, the advice is certainly applicable in this case.

Secondly: who decides what is legitimate science? Does the legitimacy come from the actors, the experimental design, or the funders? The case brings up questions of how established institutions keep control of "science" in the twenty-first century, where both information and equipment are readily available to the non-institutionalized. Perhaps new institu-

tions, like the Haida Ocean Center of Excellence imagined by McNamee and Old Massett, where people could study environmental change in the North Pacific with open-source software and equipment, can be a forum for engagement. This topic is quite relevant for geoengineering governance, which often assumes an agreement between parties who are all already in the room, acting within professional scientist norms (and managing liability issues).

Finally: how do we disentangle "geoengineering governance" from environmental governance— or environmental care— more broadly? Disney's broader vision includes illustrating how "a group of determined, smart and diverse-minded people can set up totally sustainable systems to satisfy their own energy, food, transportation, health, education, spiritual and cultural needs"; on-island wind power, local food systems, community exercise and redefining economics are all part of his vision.<sup>29</sup> It is not possible to separate out "geoengineering" activities from these socio-ecological concerns; nor is it possible to cleave it from natural resource use and access, which are at the heart of this project.<sup>30</sup>

In conclusion, this case has pointed to the mounting set of problems with the umbrella term "geoengineering." As a linking

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<sup>28</sup> Whyte, 2012

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<sup>29</sup> Written interview, 26 August 2013.

<sup>30</sup> Galaz (2012), observing that geoengineering governance has thus far exclusively emphasized creating international level mechanisms, recommends approaches that integrate earth stewardship and geoengineering.

term, "geoengineering" served to connect the salmon restoration project not just with solar radiation management, but with imaginaries of global control, fossil fuel industry corruption, conservative think tanks, and a whole web of signifiers that are unconnected with this specific project save the semantic link. In this case, it was useful for activists to link the project to solar radiation management and other contentious strategies. Yet it is absurd to link these techniques— with their

varying scales, mechanisms, and motivations— and at the same time keep them separate from "usual" planetary-scale modifications, such as runoff from industrial agriculture or deep-sea trawling. The umbrella term is useful in that it invites comparison of different possible approaches to address climate change. Still, the evolution of the umbrella term "geoengineering" into something more coherent and analytically stable is probably due.

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