International Agreement Effectiveness: A Case Study Using The 1985 Pacific Salmon Treaty

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Introduction

This paper will evaluate the effectiveness of the Treaty Between The Government Of Canada And The Government Of The United States Of America Concerning Pacific Salmon. Comparing the treaty against a backdrop of theoretical expectations for international agreements, I find that many of the theory-predicted outcomes hold true. The agreement expects both Canada and the United States to come together to set annual quotas on the amount of salmon to be caught by each party with the goal of mitigating the overfishing and staving off eventual depletion of the salmon stocks of both countries. It lacks many of the attributes that theory points to as significant contributors to treaty effectiveness. Analyzing data on salmon harvest before and after the treaty, I find that the agreement was ineffective and, while we saw changes in the behaviors of both countries, those changes came about as a result of external factors.

Theory

Before we move into the specifics of the Pacific Salmon Treaty, it is important that we establish a theoretical framework around negotiations of international agreements within which to conduct our analysis. What follows is an summation of relevant theory that serves to explain the behavior of states in international agreements.

The most difficult environmental treaties and international agreements exist to solve a dilemma in which two or more states have conflicting interests that lead to behaviors that negatively affect all states involved. The problems that are easiest to solve are those in which countries' interests are closely aligned or identical. As interests become increasingly heterogeneous, the likelihood of cooperation decreases significantly (Miles *et al*. 2002, 15). This situation is explained by Garrett Hardin as a phenomenon he refers to as the Tragedy of the

Commons. Hardin (1968) says that in a Tragedy of the Commons, two or more actors have unrestricted access to some public good. Ellis defines a public good saying that the use of the resource by one actor prohibits its use by another actor, but any unused portions of the resource are available to other actors (Ellis 2004, 30). A self-interested actor has an incentive to consume as much of the resource as possible because additional units of consumption come at little to no cost to the individual. However, this behavior results in what Hardin refers to as the tragedy: every actor behaving in a self-interested manner consumes unsustainable amounts of the resource and the resource is depleted (Hardin 1968, 39). This lack of incentives to encourage more sustainable behaviors is the primary motivator for the negotiation and implementation of environmental international agreements. In the absence of an incentive adjusting international agreement, or in the presence of an ineffective one, these negative incentives contribute to environmental degradation as resources are overused and depleted.

Theory: Negotiation of International Agreements

Treaty negotiation is a complicated process. Bringing nations with varied interests together to mutually agree to solve some issue presents a number of obstacles, the first of which is engaging countries in the discussion. When negotiating an international treaty, it is important to create equitable obligations as countries must expect some benefit from an agreement if we expect them to participate (Brown-Weiss and Jacobsen 1998, 552). As we will discuss shortly, treaties lacking equitable obligations tend to experience ineffectiveness upon implementation. Additionally, treaty requirements should act in coordination with relevant economic incentives to encourage compliance (Brown-Weiss and Jacobsen 1998, 552). It is common in international environmental politics to have a treaty whose obligations are at odds with economic stimuli as

sustainability and development are so frequently at odds (World Commission on Environment and Development 1987, 184). By working with natural economic forces, or creating them through the agreement, you boost the likelihood of success as motivations for compliance are increased.

Edward Miles puts forth some other factors inhibiting the treaty negotiation process. He points to the decision making process both in the development of the treaty and in the treaty itself as a limitation on the possible bargaining range available to negotiators. Miles uses the concept of the *Pareto Frontier* (a point at which no one can be made better off without making another worse off) to explain the best arrangements available through negotiation (Miles *et al*. 2002, 9). While it makes intuitive sense that no country would settle for a bargain that makes them worse off than no bargain at all, the *Pareto Frontier* reduces the opportunity for agreements to entirely solve an environmental issue, and its use in international negotiations implies the ability of agreements to address an issue will be limited to parties' cost/benefit analyses.

A final factor in treaty negotiation is time. Christian Downie believes that prolonged periods of negotiation impact the aspects of the resulting treaty—"there are strategic opportunities in the course of protracted negotiation for actors to steer negotiations toward their preferred outcomes" (Downie 2012, 296). In addition to countries having more time to push their own agendas, extended negotiations provide for context shifts to be included in the creation of the treaty. Changes in the global political and economic situations affect countries' negotiating positions and in turn can change aspects of the resulting treaty (Downie 2012, 306). As a result, we can expect treaties that are negotiated over a shorter time span to be more effective than their longer negotiated counterparts because members will have less time to manipulate the guidelines of the treaty to their own ends.

Theory: Attributes of Effective International Agreements

Edith Brown-Weiss and Harold Jacobsen believe that there are three categories of strategies that, when included in an international agreement, can encourage members to comply with the terms. The first category is what they call "sunshine methods," that bring light to member behavior and increase domestic pressure from interest groups and non-governmental organizations to comply. The second category given is positive incentives that reward members for abiding by treaty requirements. The third is coercive actions that directly punish countries that fail to comply with treaty requirements (Brown-Weiss and Jacobsen 1998, 542). The presence of these factors in an international environmental agreement is useful in obtaining the cooperation of members because they correct incentives to continue destructive behaviors.

Time since implementation has an impact on the effectiveness of treaties. Miles says "we would expect the effectiveness of a regime to increase when it has had the time to mature…we would expect the typical pattern [of effectiveness] to be *curvilinear*—increasing as the regime matures, but diminishing as it ages into obsolescence" (Miles *et al*. 2002, 13). We expect the lifespan of a good treaty to look something like the following: low effectiveness when the issue is salient, but countries have not had the opportunity or motivation to adjust behaviors yet; high effectiveness when the issue is still salient and the full force of the agreement has been brought into effect; and low effectiveness again when the issue fades from public importance or treaty requirements become outdated or irrelevant.

The size of the membership to the treaty also has an impact on its expected success. Treaties with fewer members allow for much easier monitoring, and leave fewer opportunities for cheating and free-riding, than agreements that include larger bodies of membership (Brown-Weiss and Jacobsen 1998, 521). For treaties addressing particularly difficult issues, working with

a small number of countries that are able to hold each other accountable can augment effectiveness.

Theory: Situational Factors Contributing to International Agreement Effectiveness

Ronald Mitchell believes countries' post-treaty behaviors are dictated by normative forces that encourage continuation of pre-treaty behaviors. He says "Governments…need stronger arguments to reject a norm that they have previously supported and urged others to support" (Mitchell 2007, 908). This sentiment is echoed by Brown-Weiss and Jacobsen's point that "traditional behavior is related to a country's culture. Culture provides a context and springboard for what a country does" (Brown-Weiss and Jacobsen 1998, 530). It is clear that the norms present in a country affect that country's compliance with a particular international agreement, but it is difficult to predict if its effect is positive or negative: culture can either encourage or discourage compliance among treaty members depending on their positions before the treaty was negotiated.

Miles also puts forth an explanation as to why treaties are effective. He says that while the majority of environmental agreements fail to achieve their goals, many do affect the behavior of their members in the direction intended (Miles *et al*. 2002, 456). Miles points to the "processes of regime formation and implementation" as having a major impact on country behavior following treaty enactment, stating "governments as well as societies quite often make unilateral adjustments in response to new ideas and information" (Miles *et al*. 2002, 457). Even if international agreements exceed the capacity of member countries to solve the issues at hand, their process of development encourages steps in the right direction.

Theory: Attributes of Ineffective International Agreements

Environmental treaties that fail to address conflicting incentives often also fail to correct the environmental harms taking place. Using the phrase "problems of incongruity" to refer to these conflicting incentives, Miles states that one reason countries find themselves in problematic situations is because "the cost-benefit calculus of an individual actor is systematically biased in favor of either the costs or the benefits of a particular course of action" (Miles *et al*. 2002, 17). Absent intervention, countries have incentives to continue their poor behaviors and treaties that fail to account for this are unlikely to enjoy success. Miles thinks that we can expect noncompliant behavior in response to treaties that address "problems of incongruity," stating that postagreement implications include persistence of "incentives to unilaterally defect" when there are no treaty mechanisms for transparency, monitoring, or enforcement of treaty requirements (Miles *et al*. 2002, 21).

Many countries also act in accordance with some abstract notion of fairness. Actors are less likely to continue or begin implementation of international agreements whose obligations are not equitable (Brown-Weiss and Jacobsen 1998, 523). While the range of inequity countries are willing to accept will vary depending on the negotiating position of the nation in question, we can reasonable assume that unfair treaties are less likely to achieve their goals.

Theory: Situational Factors Contributing to International Agreement Ineffectiveness

States tend to be rational actors. They consider the actions available to them, and choose the ones with the lowest costs relative to benefits. Countries acting in accordance with their cost/benefit incentives opens up a possibility for them to refuse to comply with agreements that have high costs, as many environmental agreements do (Mitchell 2007, 908-09).

Another factor in the effectiveness of treaties is the nature of the problem itself. Problems that are more intellectually complicated and don't have a solution readily available, or problems whose solution is beyond the capacity of parties to the treaty are more likely to be doomed to failure (Miles *et al*. 2002, 3). This makes intuitive sense; the easier a problem is to solve, the more likely it is that problem-solving strategies will be effective.

Theory: Summary

In sum, we see that agreements exist to address situations in which countries have heterogeneous incentives, such as in the Tragedy of the Commons. When addressing these incentives, it is important that negotiations take steps to ensure equitable requirements and work with economic forces rather than against them in order to maximize potential success. Negotiations are also limited by a *Pareto Frontier*: beyond the *Pareto Frontier*, countries have no incentive to continue negotiating because at least one of them would be better off in the current situation. The time period over which negotiations take place is also a relevant factor in how treaties are formed, with greater effectiveness expected from treaties negotiated in a shorter time frame.

We have also developed a short list of attributes of international agreements that tend to contribute to success and attributes that tend to inhibit it. A treaty from which we can expect perfect effectiveness would contain: one or more of Brown-Weiss and Jacobsen's compliance encouraging strategies, requirements that are quickly implementable and solve the problem while the issue remains salient, and few parties to the agreement. Furthermore, treaties that are in some way interconnected with a network of relevant and easy to solve issues are expected to see a high degree of success. Conversely, a treaty that will experience poor compliance and goal

achievement will fail to account for heterogeneous incentives of member countries from the outset or have unfair or inequitable obligations.

Additionally, we have established a set of contextual circumstances which we expect to contribute to and detract from treaty effectiveness. One situational element with a positive effect on treaty effectiveness is the process of treaty development and negotiation. Domestic and global norms can have ambiguous effects on countries' behaviors in response to a treaty. On the other hand, strong economic incentives to defect from the agreement, or issues that are divisive or difficult to solve from the beginning will restrain treaty effectiveness.

Methods

This paper will examine the outcomes of the Pacific Salmon Treaty between the United States and Canada to analyze the real-world applications of the theory given above. Once an agreement has been negotiated, countries are still faced with the formidable task of implementing the treaty and ensuring fellow actors' compliance. But how do we know when a treaty has been effective? As Miles says "measuring the effectiveness of a particular regime…leaves a much larger role for subjective judgment" (Miles *et al*. 2002, 49).

To solve this issue, Miles provides us a measure treaty effectiveness that works by examining the agreement at three distinct steps. First, we look to the treaty itself, and the rules imposed by it. Second, we explore the actions countries take in response to the treaty. Third, we analyze the environmental reaction to the treaty (Miles *et al*. 2002, 6). These three steps provide us with a guide to considering whether or not a treaty was effective on the whole. While there are arenas in which to analyze the extent to which an international environmental agreement helped solve an environmental issue, the analysis in this paper is limited in scope to the impact the

agreement had on the behavior of member states, and so we will focus on Miles' second step of considering reactions to the agreement. With this in mind, we must compare actual country behavior in response to the treaty with the hypothetical actions we would expect them to take with no treaty in place (Miles *et al*. 2002, 52).

To measure the influence of the Pacific Salmon Treaty, this paper will use data on salmon catch in the years leading up to, and following, its signing. While the treaty's limits on salmon catch by its members varies year to year, we can expect to see a general decline in salmon catch by its members after the treaty as the annual quotas established are created with sustainability in mind. Using Miles' hypothetical comparison measure of effectiveness, we can compare the United States' and Canada's real catch of salmon in the years following the treaty to a counterfactual estimate of levels of salmon harvest in the absence of the treaty. Significant differences between the counterfactual and real behaviors imply at least some treaty effectiveness.

Case Study: Background

The Treaty Between The Government Of Canada And The Government Of The United States Of America Concerning Pacific Salmon was born as a result of "salmon wars" between the two countries in the 1970's and 80's (Huppert 1995, 4). The fundamental problem arises from the migration patterns of pacific salmon. Many of the rivers through which pacific salmon migrate travel through the borders of each country and empty into the Pacific Ocean. While occasional salmon harvests on transboundary rivers was an issue, the main controversy came about when salmon would finish their journey to the Pacific Ocean; once in the ocean, there is no way to identify the salmon by country, and as a result salmon from both countries were being

intercepted by the other (Huppert 1995, 5). Consequentially, both countries felt they were being cheated out of their rightful salmon harvests and began implementing measures to right that wrong including transit fees and increased fleet sizes designed to maximize domestic harvest while limiting possible interceptions by the other country (Huppert 1995, 4).

Eventually, the two countries agreed to negotiate a solution to the issue. Talks began in the early 1980's and culminated in the 1985 Pacific Salmon Treaty (Huppert 1995, 8). Notably, during this period, "a sudden shift in ocean conditions contributed to a marked increase in [Canadian salmon]…This shift surely strengthened Canada's hand in the negotiations" (Miller 2002, 6). The resulting agreement intended to prevent overfishing and provide each country an equitable portion of the catch (Huppert 1995, 8). It establishes a Commission in which both countries have equal representation. The Commission, using data from panels localized to individual rivers and previous years' available and caught salmon, establishes annual harvest quotas for each country. These quotas are non-binding, and the treaty does not have any monitoring or enforcement mechanisms to ensure compliance (Pacific Salmon Commission 1985). The over fishing and "cheating" of both countries prior to the agreement motivated the formation of the treaty, but they also provide us with a method of analysis for treaty effectiveness: both countries overfished without the treaty, so we would expect an effective treaty to be one that sees overfishing slowed or stopped after its implementation.

Case Study: Post-Treaty Behaviors

Between 1975 and 1985, we saw a notable rise in salmon catch by both the United States and Canada as demonstrated in Figures 1 and 2. Both nearly tripled their salmon harvesting over

that decade. After the treaty, we would expect a reduction in salmon catch. If the treaty is effective, the annual harvest will still vary depending on the quota set by the committee and the available salmon, but we can expect that each year's catch will fall within a range that allows the salmon populations to recover. This effect might be distorted a bit according to Miles' curvilinear expectations of effectiveness (Miles *et al*. 2002, 13). It may take a few years, but after the treaty requirements have been fully implemented, compliance should be in full force. We should not see any of the drastic jumps after the treaty that we saw before. In actuality, the catch did level off a least a little bit. Although it seems Canada performed much better than the United States, both countries caught below the predicted harvest levels represented by the counterfactual lines in Figure 3. On average, the United States has remained around the same level as its 1985 catch while Canada has reduced catch to below 1975 levels.

Additionally, looking at Figure 4, we see that countries that are members to the agreement ballooned from less than a quarter of worldwide catch in 1975 to more than a third in 1985. In 2005, twenty years after the application of the treaty, the member countries' portion of the worldwide catch has shrunk back down, though not quite to the levels we saw them at in 1975. Because the proportions reflected in a given year are not controlled for available salmon, it is important to note that rather than compare the raw numbers of each country in a given year, we should compare the catches of one country to the global total. That will give us a better estimate of how many salmon were caught versus how many were available, though it does not control for country specific factors like fleet size. Figure 4 shows that Canada has done a much better job of limiting its salmon harvest since 1985 than the United States, though both countries have seen reductions. Canada's harvest decline could seem like the natural result of overfishing in isolation: as salmon are harvested today, there are fewer salmon to harvest tomorrow.

Figure 1 (Data provided by Mitchell)

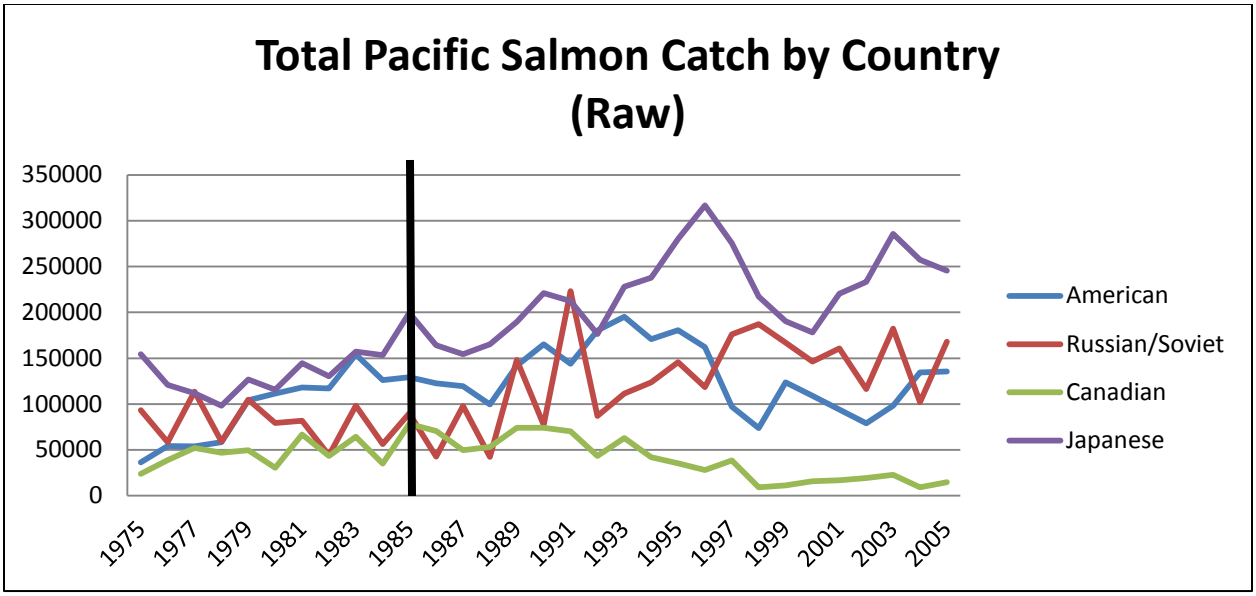


Figure 2 (Data provided by Mitchell)

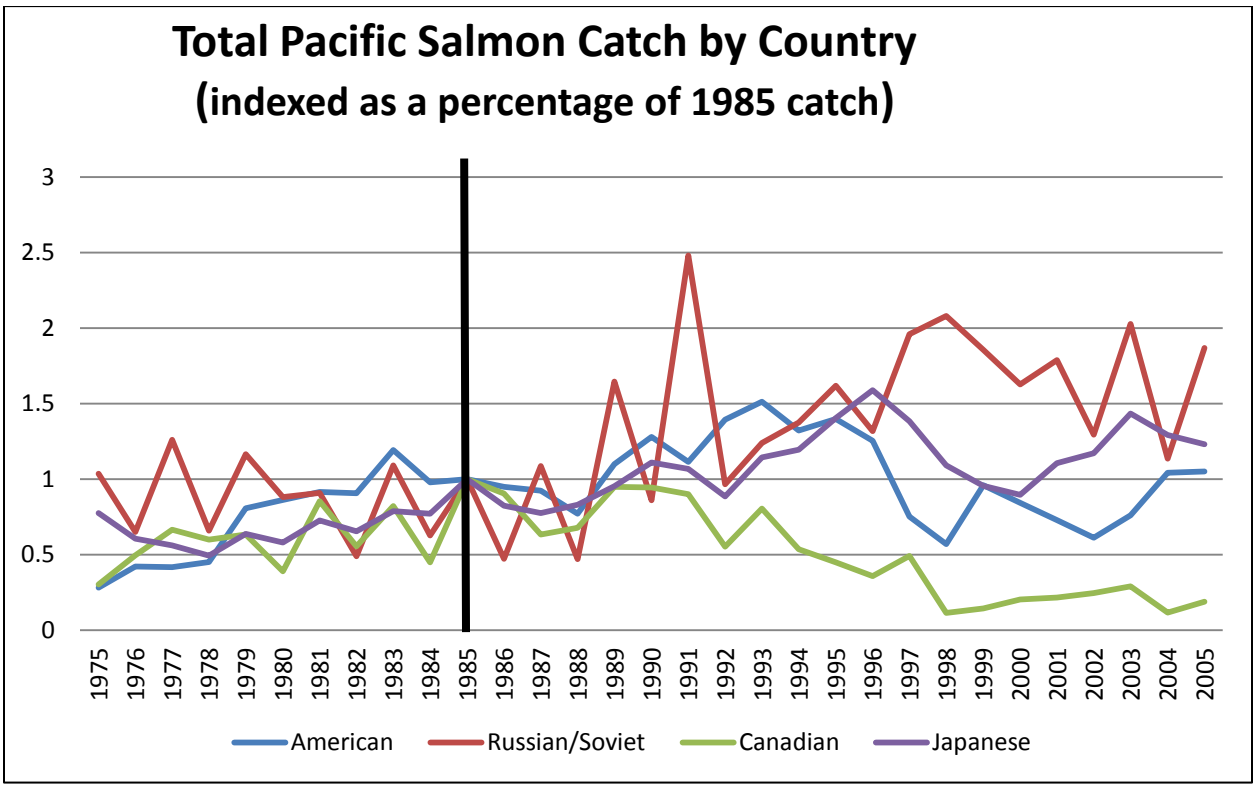


Figure 3 (Data provided by Mitchell)

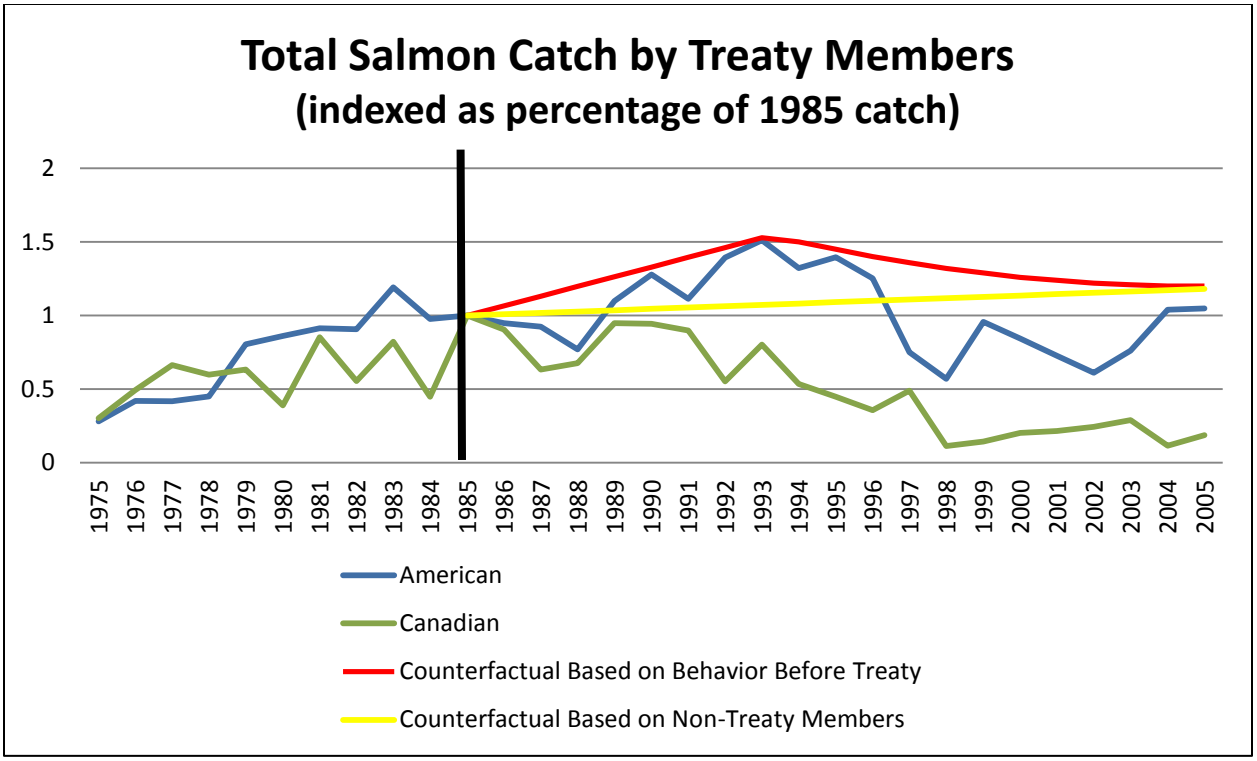
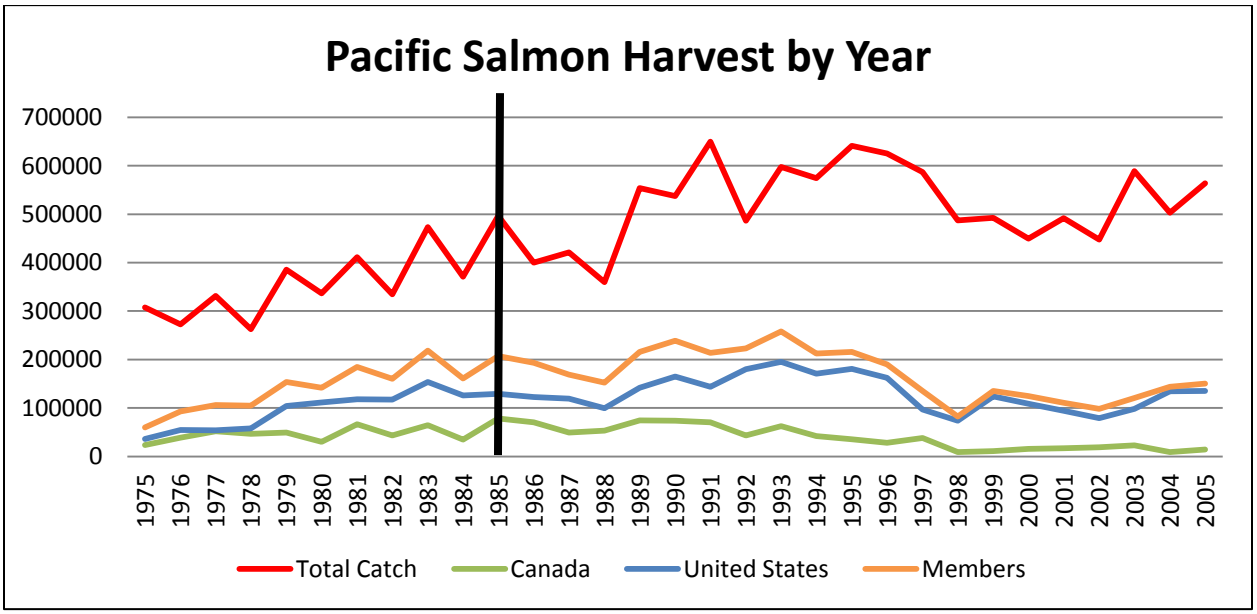


Figure 4 (Data provided by Mitchell)

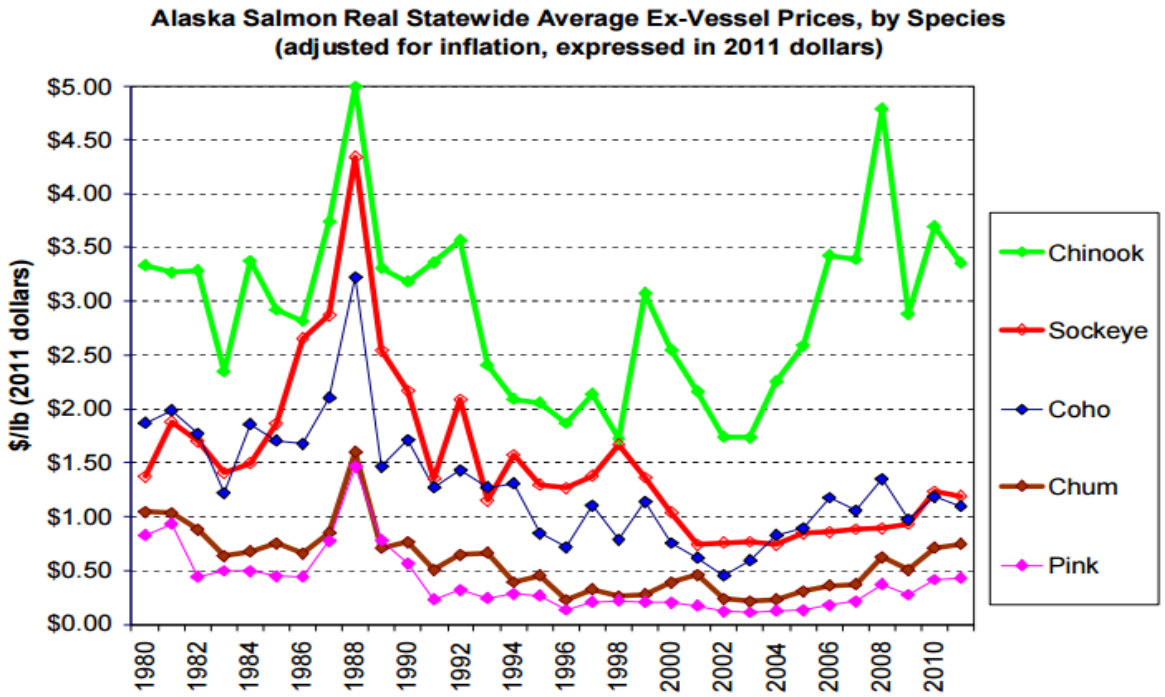


However, when Canada's catch is held up against the American catch or the global total, it seems as though fish were available to be caught, but Canada refrained. This suggests at least some treaty effectiveness. The bottom line seems to be that Canada has seen a significant decrease in salmon harvest since treaty implementation, while the United States has experienced little to no change. Below, we consider why this may be the case.

Case Study: Explanation of Behaviors

Before we attribute the behavior change to the effectiveness of the treaty, we should look for other factors explaining reduced salmon harvest the post-treaty period. Comparing the results in Figure 2 to the data provided by Gunnar Knapp in Figure 5, we see a negative correlation between prices and salmon catch. Even though the law of supply predicts that higher prices generate higher catches by fishermen trying to take advantage of those higher prices (Fair *et al*. 2014, 37), we see that some of the highest salmon prices accompany some of the lowest harvest years. One possible explanation is that the high prices came about as a result of the scarcity of salmon: the fishermen did not increase catch in high price years because there were not any more salmon to catch. This position is supported by statistics provided by Peter Vitousek: "As of 1995, 22% of recognized marine fisheries were overexploited or already depleted, and 44% more were at their limit of exploitation' (Vitousek 1997, 495). Under this assumption, it looks like the treaty did not have any effect since the United States simply continued fishing until it was no longer possible rather than abiding by sustainable quotas. Even though a cursory glance indicates treaty effectiveness because both countries stopped increasing their catches, it seems the more likely explanation is that the US has hovered around the maximum catch possible, which happened to be around its 1985 level.

Figure 5 (Graph by Gunnar Knapp)



As Argue and Shepard point out, the United States' engagement with the issue of over fishing of Pacific salmon was largely economically driven (Argue and Shepard 2005, 96). This is demonstrated by the arguments put forth by the United States during treaty negotiations. For example, Argue and Shepard claim that the United States was initially in favor of an "equitable balance" system that would compensate each state for interceptions of their salmon in the other. When reports came back that the pre-treaty arrangement was in the favor of the United States, American negotiators began changing the boundaries of the agreement, most notably claiming that the "Fraser [River] was an *international* rather than a *Canadian* river," (Argue and Shepard 2005, 97) in order to negate Fraser River interceptions made by the United States. This demonstrates the United States' commitment to increasing its own salmon catch, unfettered by interceptions in Canadian territories. This is corroborated by Daniel Huppert's claim that "[the

top two reasons for the United States to sign the treaty were] (1) to maintain a stable level of US fishing of Fraser River sockeye and pink salmon, (2) to conserve salmon of the transboundary rivers for *Alaskan* fisheries…" (emphasis added) (Huppert 1995, 9). The United States was committed to making sure their salmon made it to Alaska so they could reap the benefits of the salmon rather than splitting them with Canada.

Canada, on the other hand, has managed to reduce its own catch and fish at what are apparently sustainable levels. Again, Mitchell provides an explanation, stating that "the desire to be viewed by domestic and international audiences as a good environmental citizen may lead some governments to give little if any thought to violating an agreement" (Mitchell 2007, 903). It's possible that Canada's calls for sustainable fishing practices throughout the negotiation process committed Canada to a position that was later too difficult to renege on (Argue and Shepard 2005, 65). After all, as noted above Canada was in a much better bargaining position during treaty negotiations, making it much easier to focus on values of sustainability. However, a more likely explanation is that Canada simply ran out of fish to catch. Miller states that, despite outlier years, Canada's salmon stocks were steadily declining leading up to the treaty and "by the late 1990s it had become apparent that many of British Columbia's southern and interior Coho stocks were severely depleted" (Miller 2002, 8). The declining availability of salmon was exacerbated in the mid 1990s by the explosion in Alaska salmon (outlined below): U.S. vessels greatly increased fishing in the ocean around Alaska which resulted in increased incidental catch of Canadian salmon reaching the end of their migration (Miller 2002, 10). The data in Figures 1 and 2 shows that after the agreement was reached Canada immediately reduced its salmon harvest and continued reducing through the 1990's and 2000's. Canada's lack of access to salmon seems to have forced its compliance.

Why would the two countries sign a voluntary treaty that they would not comply with? Ronald Mitchell provides a potential answer, stating "commitments may go unfulfilled because…actors calculate costs and benefits and find the former to exceed the latter" (Mitchell 2007, 908-09). The cynic would say that the each country likely signed the treaty to preserve salmon as an economic resource for itself, and then violated the terms of the agreement when it stood to make greater economic gains from continued over fishing than political losses from cheating. It seems that changing economic incentives discouraged cooperation in later stages of the agreement. Miller validates this explaining that environmental changes have had a significant effect on the distribution of salmon. As a result of El Niño weather shifts, the number of Alaskan salmon jumped ten-fold, resulting in record harvest levels in 1993, 1994, and 1995, and "the 1985 Pacific Salmon Treaty…[was not] well designed to accommodate such changes. As incentives to cooperate shifted, disputes ensued" (Miller 2002, 1, 8). This is a textbook example of Garrett Hardin's Tragedy of the Commons. In the context of this treaty, each country has unrestricted access to the salmon that cross into their territory. They have an incentive to "outfish" the other country in order to maximize their own benefit. In the end, the salmon are over fished and driven to near extinction. In short, non-compliance with the treaty was exactly what was predicted because of the economic interests in continued over fishing.

Additionally, the treaty's basis in fairness and equity may have proved its undoing. Lack of monitoring or enforcement mechanisms in the treaty encouraged both parties to respond to perceived cheating with cheating of their own, or abandonment of the agreement entirely. This is particularly evident in the wake of the mid 1990s surge in Alaskan salmon. As the U.S. increased their catch to take advantage of the more abundant salmon, their interception of Canadian salmon increased as well. This led to Canada feeling cheated and, unable to increase their own fishing,

calling for renegotiation of the agreement (resulting in the 1999 amendments to the treaty) (Miller 2002, 10). It seems both countries were expecting to move beyond Miles' *Pareto Frontier* outcome and make themselves better off at the expense of the other, with Canada paying the price.

The 1999 amendments to the treaty are important for several reasons. First, and most obvious, they provide additional evidence that the original agreement was ineffective. The agreement failed to account for changes in the amount of fish harvestable per boat, something that "increased dramatically" between 1985 and 1995 (Schwindt *et al*. 2000, 27). But it seems the treaty would have been ineffective even without spikes in harvesting ability. Miller says "it appears [the members] achieved a solution only after there was a significant shift in bargaining objectives coupled with a new-found willingness to try more flexible tools to achieve equity objectives" (Miller 2002, 10). To solve the over fishing issue, the two countries had to renegotiate the agreement to include other elements of treaty effectiveness.

Among the factors added by the 1999 amendments was one prescribed by Brown-Weiss and Jacobsen treaty success: equitable obligations. Prior to the amendments, there were those that felt Canada was being treated unfairly. For example, Grafton and Lane say "we believe changes in management could significantly improve the economic viability and the sustainability of [Canadian] fisheries," going on to claim that the treaty should move to equitable salmon distribution according to "rights-based management" (Grafton and Lane 1998, 134). Some of the 1999 requirements included a tit-for-tat fishery operation system which requested both countries' fisheries close for seven days if projected total catch for the year fell below 1.1 million, though notably requiring United States fisheries to close first (Pacific Salmon Commission 1999, Attachment B). Another obligation outlined in 1999 was the United States' annual contribution

of a total of 140 million USD to two funds geared towards the "restoration and enhancement" of salmon populations in both countries (Pacific Salmon Commission 1999, Attachment C).

The treaty does not provide any reason for the United States being the sole contributor to the funds, but it is possible that this particular expectation stems from the United States receiving significantly more economic benefit from Pacific salmon at the time of the amendments. As Schwindt (2000) points out, at the time of the amendments Canada was generating a negative balance between purely economic costs and benefits of sustainable salmon stock management, likely motivating the expectation for the United States to step up to the table, so to speak (Schwindt *et al.* 2000, 42). The funding clause is backed up in the 2002 communications between Canadian Minister of Fisheries and Oceans Robert Thibault, and United States Secretary of State Colin Powell. In one letter, Robert Thibault says that a lack of United States contribution in a particular year will lead to the suspension of the treaty obligations for both countries (Thibault 2002, 2), demonstrating Canada's commitment to preventing the United States from continued overuse without contribution to a solution.

It seems clear that the 1999 amendments to the treaty existed to protect Canadian interests in the agreement while correcting several of the equity issues present in the original negotiations. With the drastic changes in salmon available to both countries, Canada became what Sprinz and Vaahtoranta refer to as an environmental "pusher": a country whose low abatement costs and high ecological vulnerability encourage them to push for stringent requirements in environmental agreements (Sprinz and Vaahtoranta 1994, 81). As Canada was rapidly losing its ability to fish anyway, its opportunity cost of reducing its catch was far lower than when Canadian salmon were abundant. As a result the 1999 amendments to the agreement

created increasingly environmentally responsible requirements in addition to setting more equitable obligations which theory predicts will lead to greater future effectiveness.

Findings

As a case study, the Pacific Salmon Treaty seems to be about as effective as theory would predict. It has many of the elements covered above (including being a Tragedy of the Commons, and shifting bargaining positions during negotiations), but all in all it lacks too many of the aspects of successful treaties, while embracing too many of the ineffective ones, to be expected to be successful.

While the Pacific Salmon Treaty was, on the whole, largely ineffective, it did include some elements of successful treaties. The treaty had few parties, which as Brown-Weiss and Jacobsen contend, would make monitoring easier if the treaty had required any. The agreement presents a relatively easy problem for solving by several high-capacity states, though the states did not follow through. Additionally, the treaty attempts to leverage global norms to encourage cooperation. Miles points out that "at least in the Western world, public demand for and governmental supply of environmental protection have increased significantly over the past three to four decades" (Miles *et al*. 2002, 439). Thus the treaty was in a position to put pressure on its members to comply if it had successfully wielded the global call for sustainability.

The inclusion of some of the positive treaty attributes creates a compelling argument for the importance of the ones ignored. Many of the aspects of successful treaties listed above were lacking from this treaty (for example, the equitable obligations added in 1999). The treaty requires consensus for each decision made by its Commission. On the one hand, this results in all parties' satisfaction with the actions that are taken, on the other, it leads to vague guidelines as

more stringent expectations are bound to spark disagreement (Yanagida 1987, 585). The consensus requirement is doubly problematic because of the bargaining time required: "[the Commission] must make its decisions in a timely fashion if fishermen are to pursue their livelihood. The potential for stalemate could be an absolute barrier to the purpose of the whole body" (Yanagida 1987, 586). The nature of the issue in conjunction with the consensus requirement creates a possibility of the Commission "stalling out," when agreement cannot be reached but entire economic industries depend on the quotas published by the Commission.

Additionally, the treaty failed to factor in differing incentives of its members. It assumed that each country valued conservation of salmon equally and completely ignored the economics of the situation. The agreement also failed to establish the equitable obligations necessary for effective treaties. While basing salmon quotas on the amount available in that particular river is a sound strategy for conservation, it does not account for how the quota will unequally impact the country within which that particular river runs. As we saw, this failure to create quotas that addressed varying river conditions led to the breakdown of the treaty.

The agreement fell short in a number of other ways: it was negotiated over a long period of time (allowing countries to steer requirements in favorable directions), it lacked all three of Brown-Weiss and Jacobsen's compliance enhancing strategies, its requirements took too long to be implemented are were too rigid to adapt to changes in levels of available salmon, and it failed to correct for harmful economic incentives. The treaty's ineffectiveness despite employing some positive attributes like having few members and a favorable political climate reinforces the importance of the missing factors in creating an effective treaty.

Conclusion

Theory around international agreements provides us with a formula through which to predict the effectiveness of treaties. This formula includes factors that can promote or sabotage agreement effectiveness. When I apply this formula to the Pacific Salmon treaty, I find it accurately anticipates effectiveness. The Pacific Salmon treaty lacked many of the compliance encouraging factors given by the formula and ended up being largely ineffective. While we did see changes in behaviors of both the United States and Canada, the data points to both countries' behaviors having been influenced by factors other than the treaty. This particular case study supports the theoretical formula for determining treaty effectiveness.

Sources

Argue, A.W. and Shepard, M. P. *The 1985 Pacific Salmon Treaty: Sharing Conservation Burdens and Benefits*. UBC Press, 2005. Print.

Brown-Weiss, Edith, and Harold Karan Jacobson. Engaging Countries: Strengthening Compliance with International Environmental Accords. Cambridge, MA: MIT, 1998. Print.

Downie, C. 2012. Toward an understanding of state behavior in prolonged international negotiations. International Negotiation 17: 295-320.

Ellis, Christopher J. Public Economics. Unpublished, last edit Spring 2004. PDF.

Fair, Ray C., Karl A. Case, and Sharon Oster. "Demand, Supply, and Market Equilibrium."Introduction to Microeconomic Analysis. Boston, MA: Pearson Learning Solutions, 2014. 23-54. Print.

Grafton, R. Quentin, and Daniel E. Lane. "Canadian Fisheries Policy: Challenges and Choices." Canadian Public Policy—Analyse De Politiques 24.2 (1998): 133-47. JSTOR. Web. 31 May 2016.

Hardin, Garrett. Edited by Ken Conca. "The Tragedy of the Commons." Green Planet Blues. 5th ed. Boulder: Westview, 2015. 38-45. Print.

Huppert, Daniel D. 1995. Why the Pacific Salmon Treaty Failed to End the Salmon Wars. SMA 95-1. 27pp

Knapp, Gunnar. 2011. "Trends in Alaska Salmon Harvests, Ex-Vessel Prices, and Ex-Vessel Value, 1980-2011 (PowerPoint Presentation)." Anchorage, AK: University of Alaska Department of Economics.

Miles, Edward L., Steinar Andresen, Elaine M. Carlin, Maaria Curlier, Jon Birger Skjaerseth, Arild Underdal, and Jorgen Wettestad. Environmental Regime Effectiveness: Confronting Theory with Evidence. Cambridge, MA: MIT, 2002. Print.

Miller, Kathleen A. North American Pacific Salmon: A Case of Fragile Cooperation. Issue brief. Boulder: Environmental and Societal Impacts Group—National Center for Atmospheric Research, 2002. Accessed 20 May 2016.

Mitchell, Ronald B. "Compliance Theory: Compliance, Effectiveness, and Behavior Chance in International Environmental Law" In Oxford Handbook of International Environmental Law. Editors: Jutta Brunee, Daniel Bodansky, and Ellen Hey. Oxford University Press, 2007, 893-921.

Mitchell, Ronald B. "salmon.xlsx (Excel Spreadsheet)." Eugene, OR: University of Oregon Department of Political Science.

Pacific Salmon Commission Treaty Text. Document dated: 28 January 1985. Document Accessed: 19 April 2016.

Pacific Salmon Commission. 1985. Attachments to the 1999 Agreement between the Parties. Vancouver, Canada: Pacific Salmon Commission Treaty Text. Document dated: 30 June 1999. Document Accessed: 30 May 2016

Pacific Salmon Commission. 1985. Treaty Between The Government Of Canada And The Government Of The United States Of America Concerning Pacific Salmon. Vancouver, Canada.

Schwindt, Richard, Aidan Vining, and Steven Globerman. "Net Loss: A Cost-Benefit Analysis of the Canadian Pacific Salmon Fishery." Journal of Policy Analysis and Management19.1 (2000): 23-45. JSTOR. Web. 31 May 2016.

Sprinz, Detlef, and Tapani Vaahtoranta. "The Interest-Based Explanation of International Environmental Policy." International Organization 48.1 (1994): 77-105. JSTOR. Web. 30 May 2016.

Thibault, Robert. "Note from Canadian Minister of Fisheries and Oceans (Hon. Robert G. Thibault) to U.S. Secretary of State (Hon. Colin L. Powell)." Letter to Colin L. Powell. 4 Dec. 2002. MS. N.p.

Vitousek, P. M., *et al*. 1997. Human domination of earth's ecosystems. Science 277(5325): 494-499.

World Commission on Environment and Development. Edited by Ken Conca. "Towards Sustainable Development." *Our Common Future*. Green Planet Blues. 5th ed. Boulder: Westview, 2015. 184-194. Print.

Yanagida, Joy A. "The Pacific Salmon Treaty." The American Journal of International Law81.3 (1987): 577-92. JSTOR. Web. 20 May 2016.