

FRAMING OF FISHERIES IN COLLAPSE: A CONTENT ANALYSIS OF TWO
NEWSPAPERS

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NEWSPAPERS

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FRAMING OF FISHERIES IN COLLAPSE:
A CONTENT ANALYSIS OF TWO NEWSPAPERS

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ABSTRACT

This quantitative content analysis draws from framing theory to examine newspaper coverage of fisheries in collapse. Two groups of newspaper articles formed the population for this census: coverage of the Georges Bank cod fishery by *The Boston Globe* from 1991 to 1996, and coverage of the Yukon River king (Chinook) salmon fishery in *The Anchorage Daily News* from 1997 to 2002. With a coding system rooted in Entman's (1993) four-part definition of framing, this study identified occurrences of an economy frame and an ecology frame within the population, as manifested by the explicit terminology used in the texts. Contrary to expectations based on precedents in the literature, the newspapers did not overwhelmingly rely upon economic terms to explain fisheries in collapse. When considered as a whole, the population contains a balance of economic and ecological frames, with the proportion of ecological stories increasing throughout the study period. Individual stories displaying a balance between economic and ecological frames were not common, suggesting that readers would receive a balanced appraisal of the topic only after attention to multiple stories over several years.

CHAPTER 1

INTRODUCTION

The Back Stories

Until the late twentieth century, fishers and the fishing industry commonly assumed that there would always be plenty of fish in the sea. But after several decades of industrialized fishing, in which fish-processing companies sought to meet an ever-rising global demand for wild seafood, many fish populations began to noticeably suffer. Two such fish populations will be discussed here: Georges Bank cod and Yukon River king salmon.

In the North Atlantic, cod has been an iconic fish for centuries. The first European settlers to New England reported that cod were so plentiful that they could easily be caught using weighted baskets lowered over the side of a small boat. Dozens of communities along the northeast coast of the United States and eastern Canada came to depend on the seemingly inexhaustible cod for their economic and cultural survival. Fishers from Massachusetts and Maine frequently dropped their nets and long lines on Georges Bank, an offshore area of shallow water east of Cape Cod. Cod catches increased to meet rising demand in the post-World War II years, and eventually the cod and other bottom-dwelling fish could not replace themselves quickly enough. A final sharp decline beginning in 1988 led to the closure of all cod fishing on Georges Bank by the New England Fishery Management Council in October 1994 (Cushman, 1994). In the six years from 1988 to 1994, the Georges Bank cod population dropped from an estimated 75,000 metric tons to 19,000

metric tons – about 13 percent of what ocean scientists consider to be a healthy population level (Crockett, 2011). The Georges Bank cod stock has hovered around 20,000 metric tons ever since (see Appendix 2), and commercial fishing effort has not returned to prior levels.

The demise of the commercial fishing sector in New England led to several economic shifts. Around the time that fishery managers closed most of Georges Bank to ground fishing in 1994, an initial package of \$30 million in federal aid was promised to fishing communities, with more coming from individual states (Iudicello, Weber, and Wieland, 1999). The number of commercial fishers dropped 80 percent from the mid 1950s to the mid 1990s, with the remaining fishers shifting their efforts to formerly discarded species like sharks and skates (Kurlansky, 2008). Some fishers were able, with the help of government loans, to refit their vessels to pursue more lucrative species such as lobster and crab—once the prey of the now-scarce cod. Out-of-work fishers also found new economic niches to fill in sectors such as tourism, in which many former fishing boats were transformed into whale watching vessels (Kurlansky, 1997). All around the north Atlantic region, those unable to find a new economic niche migrated away from fishing communities, largely into cities (Hamilton and Otterstad, 1998).

On the Yukon River in Alaska and western Canada, the decline of the king salmon run occurred a few years later than the fall of Georges Bank cod. King salmon (also known as Chinook salmon) returning to the Yukon are some of the most oil-rich and flavorful in the world. Until the late 1990s, almost all of the commercial harvest of Yukon River king salmon was exported to Japan, where they

were a highly prized delicacy, eaten raw as sushi. The king salmon was also the fish of choice in the subsistence fishery along the Yukon, where glistening, golden brown smoked salmon strips have comprised a major source of protein for Yukon River residents for generations. During the heyday of the Yukon king commercial fishery in the 1980s, between 146,000 and 198,000 king salmon were harvested in Alaska per year (Estensen et al, Appendix A3, 2010). But in 1998, the Yukon king salmon run unexpectedly dropped to around half of its average size, and the commercial harvest fell to below 40,000 fish. A brief upswing from 2003-2006 gave way to another decline, and the Yukon king run has remained poor since then (see Appendix 3). No commercial fishing for Yukon king salmon has been permitted since 2007, though subsistence fishing for local residents has remained in place most years.

Even so, the food security of many Yukon River residents diminished as a result of the reduced harvests of king salmon, coupled with the loss of cash income to pay for basic commodities such as heat, vehicle fuel, and food (Loring and Gerlach, 2010). In the absence of other employment opportunities in a remote region such as the Yukon River valley, the reduction in household income meant that many families could not afford the fuel and supplies required to pursue customary levels of subsistence food gathering, and a series of federal assistance packages brought money, human food and dog food to the villages beginning in the late 1990s (Buklis, 1999; Loring and Gerlach, 2010). Even when commercial fishing provides some additional income to families, the population of the lower Yukon River is one of the

poorest in the country, with a poverty rate nearly twice as high as the nationwide level (as of 2007), and a median household income of just \$30,000 (Kruse, 2012).

Fisheries Collapse in the Media

The news media have challenges and choices in documenting troubled fisheries such as Georges Bank cod and Yukon River king salmon. Fisheries collapse is a complicated and multifaceted issue, involving science, economics, sociology and politics. The fish cannot speak for themselves. People who would offer to speak for the fish are often difficult to understand. After *Boston Globe* reporter Beth Daley (2005) began an investigation of fisheries collapse in 2002, she found that:

“Without having a person, regulatory agency, or group at fault, it was difficult to find a conventional organizing mechanism for all of our reporting. The other challenge was, as one New England environmentalist likes to say, ‘fisheries regulation is like Alice in Wonderland—without the drugs.’ It took us months to even understand what was going on and to figure out ways to convey what we knew in reader-friendly formats” (pp. 32).

Reporters have approached the fisheries collapse issue from two primary angles: the human/economic angle, and the fish/ecology angle. The human/economic angle looks at the lives of fishers, their families and their communities as they are forced to adapt to declining fish harvests. The fish/ecology angle focuses on the ocean ecosystem, the processes that may have caused the fish stocks to decline and the consequences of depleted fish stocks for the marine ecosystem. These “angles” are known in the communications literature as frames.

Approaching the story through just one of these frames only tells part of the story. By choosing to explain the demise of a fishery only in terms of economic harm to humans (i.e., commercial fishers out of work), a journalist neglects to

mention ecological harm to the salmon's ecosystem, or to the viability of the salmon stock itself. A failure to include a balance of economic and ecological factors in a story about a fishery in collapse is a missed opportunity for the media to serve a crucial explanatory function: to bridge the gap between the audience and the vast and cryptic scientific data about the fishery and the ecosystem. All too often, in this researcher's opinion, the media have failed to perform this function with regard to the coverage of fisheries in collapse. As the collapse of the king salmon fishery dragged on into the 2000s, this researcher came to view the coverage provided by the dominant print media source in the state—*The Anchorage Daily News*—with suspicion. In particular, *The Anchorage Daily News* seemed to consistently favor a human angle to its fisheries stories, without too much concern for any ecological ramifications or explanations. Testing this unscientific perception in a structured manner was the impetus of this research.

The purpose of this research is to employ quantitative tools, in the form of a content analysis, to identify and analyze occurrences of frames in the newspaper coverage of the Georges Bank cod fishery collapse and the Yukon River king salmon collapse. The inclusion of the Georges Bank cod collapse should provide a broader context, so that fishery collapse coverage is not studied exclusively in a setting that is familiar to the author (an eleven-year resident of Galena, Alaska, along the Yukon River). The Georges Bank cod crash was much larger in terms of the people and businesses affected, in addition to the scale of the destruction of the cod stock at Georges Bank and the entire North Atlantic. It is the added intent of this research to provide a wide-angle view of fisheries coverage over multi-year periods, generating

practical feedback to other journalists in the form of empirical data that describe the characteristics of our efforts.

Definitions

Before progressing further, it is necessary to set out some definitions to key terms used in this analysis. A definition of framing will come later, in the first portion of the literature review.

Fisheries Collapse

A holistic definition of fisheries collapse that encapsulates the socio-economic ramifications of the phenomenon does not appear to exist. Instead, it is commonly used as a self-evident term that reflects a situation in which significantly fewer fish are being caught, fish-related jobs are being lost, and regulatory agencies impose increasingly stringent restrictions on the harvest of a troubled fish species. Nevertheless, the concept of fisheries collapse can be rationally approached from both ecological and economic perspectives. Eminent fisheries scientist Boris Worm from Dalhousie University in Nova Scotia, Canada has defined fisheries collapse as when the catch of a species is 10 percent or lower of the recorded maximum catch (Worm et al., 2006). More broadly, the science literature has defined fishery collapse as a “sustained period of very low catch values occurring after a period of high catch values”—emphasizing the economic dimension of lower fish populations (Mullon, Freon, and Cury, 2005). And perhaps most visibly, a fishery collapse is manifested on shore in fishing-dependent communities, where fishing restrictions or moratoria often lead to social and economic problems, such as unemployment, crime, and outmigration.

Economy Frame

The economy frame in media coverage of fisheries pertains to the monetary value and catch volume of commercially caught fish, employment in the fishing and fish-processing industry, and financial impact of fishing at the household, community and regional levels. In general, the economy frame attempts to portray the human dimension of fishing activity, and the role of money and capital in the management and harvesting of fish stocks. More details about how the economy and ecology frame will be strictly defined and operationalized are included in the methods section.

Ecology Frame

In contrast to the economy frame, reporting that employs an ecology frame focuses on the ecosystem that the troubled fish population inhabits. This frame pertains to assessments of the fish stock's overall population size, health, and relationship to other organisms. The term "ecology" is a particularly appropriate label for this frame because, as defined by the American Heritage College Dictionary, it has particular concern for "the study of the detrimental effects of modern civilization on the environment" (Costello, 1993).

Hypotheses

The origins of the following hypotheses are in the researcher's own perceptions of how Alaska newspapers—in particular *The Anchorage Daily News*—covered the collapse of Yukon River king salmon. The subsequent literature review section demonstrates that these perceptions of a predominance of economic viewpoints are shared and confirmed by other research about media coverage of

natural resources and the environment. More than any other passage in the literature, the following statement from Corbin's (2002) discourse analysis and ethnography about the collapse of the cod fishery in the maritime provinces of Canada makes a bold assertion about how the media have treated the issue of fisheries collapse. Corbin notes that:

"The bulk of media coverage occurred after the collapse of the cod stocks, when the issue was "news." Like most other environmental disasters, the slow demise of an ecology does not make headline news, and the result is limited public debate about resource and environmental issues." (p. 7)

Does Corbin's assessment hold true for the newspaper coverage of other troubled fisheries? Specifically, when covering the issue of fisheries collapse in their respective regions, have *The Boston Globe* and *The Anchorage Daily News* more often framed the issue in economic terms or ecological terms?

To answer this question, three distinct hypotheses are proposed.

H1a: There will be more strongly and very strongly economic stories than strongly and very strongly ecological stories or neutral stories in *The Boston Globe's* coverage of the Georges Bank cod fishery during the period from 1991-1996.

H1b: There will be more strongly and very strongly economic stories than strongly and very strongly ecological stories or neutral stories in *The Anchorage Daily News'* coverage of the Yukon River king salmon fishery during the period from 1997-2002.

The second hypothesis seeks to approach the concept of framing from a temporal standpoint, testing the common assumption and historic appraisal (for

example Corbin, 2002) that warnings from scientists and conservationists are usually heeded “too little, too late” to impede the decline of a collapsing fishery.

H2: The percentage of strongly and very strongly ecological stories will show an increasing trend throughout the study period.

The final hypothesis takes into account the likely situation in which one story contains both of the target frames, and posits that the ability to include both frames in a story is related to the amount of space allotted for that story in the newspaper.

H3: Long stories (defined here as consisting of more than 500 words) will be more likely than short (between 100 and 500 words) or brief (less than 100 words) stories to contain both target frames.

Finding the Answers

First, it is necessary to show how the aforementioned hypotheses are grounded in framing theory, and how they fill a void in the existing research about how the media have covered natural resource development. In particular, no existing research has attempted to connect framing theory and newspaper coverage of fisheries in the manner that is pursued here. Second, an appropriate methodology for investigating and answering the hypotheses will be outlined in the methods section, which features a technique for operationalizing the concept of framing that sidesteps many of the common methodological shortcomings of other framing research. Lastly, possibilities for further research on this topic will be discussed, along with consideration of this study’s results and limitations.

CHAPTER 2

REVIEW OF THE LITERATURE

Definitions and History of Framing Theory

Framing theory emerged in the late 20th century out of the social constructionism tradition, which asserts that reality is consciously created and interpreted by human actors and that “facts” are better understood as “interpretations” (McQuail, 2005). When framing theory began to take shape, it was part of a scholarly movement away from a “limited-effects” model of mass communications to a more moderate view, acknowledging the media’s power to shape messages and the audience’s ability to selectively receive and interpret them (Greenberg and Salwen, 1996).

Framing as a communication process can be likened to two visual metaphors that share the same terminology: a picture frame, and the frame of a building. Gamson et al. (1992) suggest that researchers utilizing framing theory tend to use it in the latter sense, as a structure that gives shape, as opposed to the picture frame concept, which emphasizes the creation of boundaries establishing what is germane and what is not. Both metaphors are helpful in understanding frames, by stressing that the process of framing involves the application of order to an otherwise scattered series of events or information, and also the inclusion of some information at the expense of others. In essence, framing is a communication process in which some elements of a perceived reality are selected and then conveyed in a manner that supports a particular perspective (Entman, 2007).

The first significant researcher to articulate frames in this way was Canadian sociologist Erving Goffman. He used the term “primary frameworks” (Goffman, 1974, p. 24) to describe the strategies that individuals employ in their attempts to organize incoming information and make sense of the world around them, similar to the concept of schemata in studies on cognition and psychology. In addition, Goffman acknowledged that much of the information that we receive, especially when an institution such as the media has mediated it, comes with its own frames attached.

After Goffman, a large body of research has further demonstrated how framing occurs at both ends of the communication process. Media producers might highlight a particular point of view or theme (i.e., frame) in their media texts, often to the exclusion of alternate points of view. The audiences of those texts in turn apply their own internal cognitive frames to interpret the information being received—a process heavily influenced by an individual’s prior knowledge and beliefs (Graber, 1988). Framing at the sending end of the communication process will be the focus of this analysis, instead of effects-oriented approaches to study framing done by audience members at the receiving end of the communication process.

After its formulation, researchers used framing theory to pursue a wide variety of research purposes and used an equally diverse range of research styles, inspiring Entman (1993) in an oft-cited study to call the body of framing research a “fractured paradigm,” plagued by “scattered conceptualizations” and a lack of consensus on definitions of key terms. Entman offered his own definitions to help

mend the paradigm and guide future research, including a four-part definition of framing as a means to define problems, diagnose causes, make moral judgments, and suggests remedies. Later in the 1990s, Scheufele (1999) still found the framing paradigm to be as scattered as Entman described a few years earlier. Scheufele used a meta analysis to further classify the wide-ranging literature on framing and suggest more key strands of framing research around which future researchers could rally. On the contrary, D'Angelo (2002) rejected the notion that framing research can or should be consolidated into a single paradigm, arguing instead that framing should be investigated within a wide-ranging "research program" that includes three different paradigms (cognitive, constructionist, and critical) and encourages cross pollination between different schools of thought in an effort to accumulate more knowledge about a multifaceted concept. The fragmentation of framing research was still apparent in a recent study by Borah (2011), who performed a content analysis on framing studies in major communications journals from 1997 to 2007. Borah found that far more studies were approaching framing from a sociological perspective (i.e., exploring media content for the existence of frames) as opposed to a cognitive perspective (i.e., experimental research on human subjects to probe for effects of framing). Framing studies were also more likely to investigate "unique" frames, specifically chosen for a particular issue or event in the news, instead of frames that could apply to coverage of a variety of topics.

Framing is often grouped with the theories of agenda setting and priming, though attempts to merge these three concepts into a single paradigm (e.g., McCombs et al., 1997) have not proven successful. Priming theory is rooted in

cognitive studies, and describes the power that a communicator has to connect a message with a preexisting schemata or mental impression held by an individual, usually to encourage a positive evaluation of the communicator (i.e., a politician) by that individual (McQuail, 2005). Agenda setting, at its basic level, seeks to illuminate “some form of positive association between the amount of mass media content devoted to an issue and the development of a place on the public agenda for that issue” (Scheufele, 2000, p. 304). In first-level agenda setting, this transfer of priorities from the media to the public occurs at the level of the *issue*. However, agenda setting’s founder Maxwell McCombs expanded his original theory to suggest the existence of a second level of agenda setting, which pertains to the *attributes* of a given issue and how they are highlighted or neglected by the media (McCombs and Bell, 1996). Just as the media convey an implicit agenda in terms of what issues are important, McCombs insisted that the treatment of issue attributes was another kind of agenda that the media could set and convey. It is here that McCombs wanted to assimilate the language of framing theory under the umbrella of agenda setting, and thus unify the two paradigms. But other researchers have found too many theoretical and operational disparities between agenda setting, priming and framing to endorse McCombs’ call for unity. For example, Scheufele (2000) finds the notion of consciously and deliberately setting the agenda too overbearing for an accurate description of the framing process, in which “subtle nuances in wording and syntax” and not-so-dubious journalistic habits and organizational constraints are often the prime factors that shape a media text.

Since this study does not intend to measure the effects of framing on human subjects using experimental methods, the corner of framing research that is most relevant concerns how media producers might employ framing in their production of texts. The common term in the literature for this type of framing is *media frame*, defined by Gamson and Modigliani (1987) as “a central organizing idea or story line that provides meaning to an unfolding strip of events” (p. 143), building upon the “strip of events” terminology used earlier by Goffman (1974). Gamson and Modigliani’s definition also derived elements from a few major book-length studies by investigators such as Gaye Tuchman and Todd Gitlin, who described the central role of the media frame as an essential tool used by journalists to condense a large amount of information into a relatively small package intended for mass consumption (Scheufele, 1999; Scheufele & Tewksbury, 2007). The concept of media frames acknowledges that media producers have a choice, story by story and line by line, in what information they present, and that is a critical assumption upon which this project’s hypotheses rests.

Limitations of Framing Theory

As mentioned previously, framing theory is vast and multifaceted, to the point of being scattered and unguided. Only the most ambitious of framing analyses attempt to study and measure frames at both the sending (media frames) and receiving end (cognitive frames or schemata of the audience) of the communication process. Measuring framing effects on human subjects in any way will be beyond the scope of this project. However, the justifications behind studying media frames (i.e., addressing the question of why we should want to know if a newspaper

featured economic frames more frequently than ecological frames in its coverage of a troubled fishery) inevitably wander into some speculations about framing effects. One could argue that quantifying the frames that certain readers were exposed to in their news consumption is a strong predictor of how the readers comprehend the issue at hand. Such an assumption was at the core of Graber's book-length study (1988), which found strong correlations between an individual's opinions about an issue and the way that issue was framed in the media diet that the individual consumed. Aside from mere speculation, a study that identifies and quantifies media frames could serve as a stepping off point for further research that, like Graber, aims to make empirical connections between media frames and framing effects.

Framing and Fisheries

There do not appear to be any prior studies that examine news coverage of fisheries in collapse through the lens of framing theory. In the framing literature, Jonsson (2011) comes closest to analyzing the relationship between frames and fisheries coverage. She determined that overfishing was the most frequently discussed environmental risk in a major Swedish newspaper's coverage of the Baltic Sea, but did not go into greater detail about what kinds of frames were employed, choosing instead to conduct a more in-depth framing analysis on a different environmental issue (changes in ocean chemistry).

However, a handful of studies have analyzed news coverage of fisheries from other theoretical perspectives using non-quantitative methods. Arguing for a priming effect on fisheries policy by the news media, Oliver (2005) suggests that

national print and television media in Britain have supported and successfully engendered more environmental protection and marine conservation. However, regional media tend to support the views of fishers in their area and in some cases have swayed policy in the favor of the fishing industry. Murata (2007) documented differences in fishery coverage at an international level. Her qualitative discourse analysis of articles about whaling in British and Japanese newspapers showed that, through word choices and source selection, British newspapers took a mostly anti-whaling stance, while Japanese reports were more data-based and technical in nature. Nevertheless, Japanese newspapers exhibited an underlying assumption that whaling is an acceptable activity. Various cultural and historical factors could explain the distinctions in the coverage of the whale fisheries, according to Murata. Because her study was cross-cultural in nature, Murata did not categorize each country's whaling stories according to frame type, which could have illustrated how various frames compare to each other in a particular setting over time, and thus served as a valuable precursor to this analysis.

Framing and Natural Resource Conflicts

While the communications literature might be largely devoid of studies on fisheries in the news, a substantial strand of research has used framing theory to answer questions about how the news media has portrayed natural resource conflicts. In general, these conflicts revolve around something that can be caught, harvested or extracted, and the arguments for and against those actions. Studies on the media's treatment of the logging industry have commonly shown a prevalence of the pro-development frame, including more attention and salience granted to

business and governmental interests compared with environmental activists or citizens' groups who seek to protect the trees (Liebler and Bendix, 1996; Ketchum, 2004). Similarly, Corbett (1992) confirmed her hypothesis that a "utilitarian" frame would be most common in local coverage of natural resource issues in rural Minnesota, while a "stewardship" frame would be most common in the more-distant urban newspapers' coverage of those same issues. However, Liebler and Bendix (1996) and Ketchum (2004) show that a pro-development frame can still come from a media outlet that is far removed geographically and economically from a particular resource conflict (such as logging old-growth forests in the Pacific Northwest), especially if the stakeholders making the pro-environmental argument are deemed to be irrational or extreme.

The framing of a natural resource issue can change as the resource becomes more or less abundant. Muter, Gore and Riley (2009) analyzed 30 years worth of newspaper coverage in the Great Lakes region about cormorants and used framing theory to depict a shift in the media's perception of the bird from a victim of human activities (namely pollution), to a threat or a nuisance to human activities such as fishing and agriculture after the cormorant population rebounded.

Economy or Ecology?

In the context of market capitalism, the economic development of a resource, bringing with it increased employment and wealth, has often been at odds with ecological preservation. The explosive growth of technology after World War II exacerbated this conflict, as humanity quickly obtained the power to make massive and sometimes irreversible changes to the air, land and water resources of the

planet (Archibugi, Nijkamp and Soeteman, 1989). In political discourse, the conflict between economic and ecological perspectives about a natural resource has frequently boiled down to a familiar dichotomy: jobs versus environment.

Vis-à-vis this conflict of perspectives, other framing studies have examined the tendencies of the news media to favor one type of frame over another in the coverage of natural resource uses and other environmental issues. Across a variety of times, places and issues, frame analyses have shown that the news media chooses economic frames far more often than ecological frames. In their content analysis of network television coverage of logging in the Pacific Northwest, Liebler and Bendix (1996) quantified the prevalence of a pro-development frame that highlighted the economic benefits (in terms of employment and revival of logging-dependent communities) of harvesting old growth forests. Castello (2010) correctly hypothesized that news about the petrochemical industry near Tarragona, Spain, would be framed largely in economic terms, with coverage of environmental issues related to the petrochemical industry happening less frequently and highly concentrated about dramatic events like spills and fires. Even when the coverage of an oil spill along the coast of Spain is directly and exclusively analyzed (Anderson and Marhadour, 2007), regional newspapers that serve the affected area still framed the incident more in terms of the local economy than its ecological impact. The same results hold true for the post-disaster coverage by a regional newspaper in British Columbia after a wildfire. Cox et al. (2008) identified more than four times as many occurrences of an economic/material frame (in 43% of stories) compared to an environmental concern frame (in 10% of stories) during a three-month period

after the wildfire destroyed the local sawmill and timber resource. Concerns about the loss of jobs related to the sawmill, the region's largest employer, were paramount in the newspaper's coverage, and human health risks related to the wildfire were almost totally ignored.

News coverage of biotechnology has followed a similar trend. When new biotechnology products (e.g., genetically modified corn) or procedures (e.g., stem cell research) are being introduced, media frames about ecological or biological impacts are more commonly featured. But over time, the science-related frames decline while frames related to governance, politics and economic development remain steady or increase in frequency (Navarro, 2011). In the U.S. media setting, Listerman (2010) found that an environmental impact frame never came close to achieving parity with a technical/economic discourse for relaying information about biotechnology in the news media.

The literature is not monolithic in its support for the supremacy of the economic frame over the ecology frame. Some studies have found a more balanced approach in the journalistic treatment of a certain environmental issue, and in some cases, the environment or ecology frame has received equal or greater attention compared to frames of economic benefits or harms. In a qualitative analysis of environmental conflict situations in Israel, Vraneski and Richter (2003) found that, while environmental disputes were almost always presented as a battle between competing groups, the pro-conservation argument was given equal treatment with the pro-development stance—something that the above-cited literature would not predict. However, the Israeli media setting may not be comparable to its American

counterpart in this regard, a conclusion that one could draw from Vraneski and Richter's assessment that Israeli reporters were frequently allowed to offer context and wider explanations regarding environmental policy and history in their reports. Even if it described environmental disputes with a more balanced perspective, the Israeli media rarely featured a "win-win" frame suggesting that economic and environmental interests could both be satisfied.

Culley et al. (2010) found evidence of balanced treatment of an environmental dispute in an American setting: the proposed expansion of nuclear power. Two newspapers in Georgia covered the proposed expansion of nuclear power in that state with primarily economic and environmental frames, and arguments for and against nuclear power within those frames were mostly balanced across the sample. The ecological risk stemming from nuclear accidents was one of the most frequently discussed subtopics.

An important distinction must be made about these studies. Vraneski and Richter (2003) and Culley et al. (2010) documented several examples of balance between economic and ecological interests in the framing of various issues, however none of these issues was directly tied to large-scale employment and multi-generational lifestyle patterns in the way that commercial fishing is. When covering the rises and falls of a resource industry that whole communities depend upon, economically and culturally, a review of the literature demonstrates that journalists tend to focus on the human dimension of a problem rather than delve into the more nebulous realm of ecological assessment and prediction (Sohn, 1984; Cox et al., 2008).

With particular reference to the ecology frame, researchers (Downs, 1972; Djerf-Pierre, 2012) have demonstrated that environmental reporting and themes have commonly followed an “issue-attention cycle” in the news, subject to wide ranging peaks and valleys in breadth and depth of coverage. However, the aforementioned literature on framing of news coverage about natural resource extraction consistently detected at least some level of an ecology frame, subordinate though it is to the more prevalent economy frame. So according to the relevant literature on this topic area, it is unlikely that either target frame would be absent from the population.

Fisheries in Collapse: Background from the Science Literature

A brief overview of the science literature can help identify many of the ecological attributes connected with fisheries collapse. After the collapses of the cod fisheries in the North Atlantic in the early 1990s, the topic of fisheries collapse received increasing attention in major peer-reviewed journals such as *Science* and *Nature*. The foci of scientific research and theorizing aimed at describing the causes of fisheries collapse and what, if anything, could be done to restore collapsed fish populations (Roughgarden and Smith, 1996; Myers, Hutchings, and Barrowman, 1997; Mullan, Freon, and Cury, 2005). A schism developed in the scientific community, with conservation-minded ecologists on one side, and use-oriented fisheries scientists on the other (Stokstad, 2009). A widely publicized article by Worm et al. (2006) exacerbated the schism by postulating, though not as its main conclusion, that all wild stocks of fish in the world could be extinct by the year 2048 if current exploitation rates were to continue. The fisheries science camp blasted

the article as alarmist and sharply criticized its reliance on highly variable and error-prone catch data in its methodology (Hilborn and Hilborn, 2012). The two camps have mostly mended fences in a broad effort to create a single, reliable data set on fisheries for all researchers to use (Stokstad, 2009; Worm et al., 2009). More ardent conservationists, such as Daniel Pauly, have resisted joining any unified fisheries research paradigm that does not embrace marine protected areas and long-term fishing bans as the basis for rebuilding fish stocks (Pauly et al., 2002; Pauly and Maclean, 2003).

While the human effects of a fishery collapse (unemployment and decreased revenues into households and communities) are well understood, science literature helps illuminate some of the underlying economic factors that served as contributors to the collapse. In open-access fisheries, there is strong economic pressure for fishers to capture as much of their target resource as possible, due to the uncertainty of the supply of that resource in the future (Iudicello, Weber, and Wieland, 1999). The incentive for catching the most fish in the shortest possible time has led to increased industrialization of harvesting and processing, and the adoption of modern technology such as sonar, global positioning satellite navigation, and aerial surveillance to ensure that fishers locate their prey. Government investment and subsidies have also allowed fishing fleets to grow to a size that a fish resource cannot support, a problem known as overcapitalization (Pauly and Maclean, 2003; Iudicello, Weber, and Wieland, 1990). The United Nations Food and Agriculture Organization estimated that in 1989, the world's fishing vessels collectively incurred a \$22 billion operating loss, most of which was

offset by government subsidies (Iudicello, Weber, and Wieland, 1990). Market forces have also provided incentives for overharvesting and diminishing diversity within a fish population. Large fecund females have a very high ecological value, due to their ability to lay exponentially more eggs than smaller females (Pauly et al., 2002). But larger fish also command a higher price at market. Fish from depleted stocks, often harvested illegally, also command high prices and incentivize fishers to further reduce the troubled stock.

The science literature also contains various policy recommendations that attempt to alter the economics of a troubled fishery. Communities affected by a fishery collapse have often appealed to state and federal governments for financial assistance, largely to make up for lost wages in the fishing industry. Government assistance has also come in the form of vessel buyback and decommissioning programs, which can have the added benefit of reducing the size of the fishing fleet and preventing the problem of too many fishers pursuing too few fish (Pauly et al., 2002). Grafton et al. (2006) assert that fishery conservation is best achieved by understanding fishers' motivations and crafting appropriate incentives to promote sustainable practices, largely by instituting transferrable harvest shares to individuals or groups and eliminating derby-style competitive harvests. Fishers could directly feel the pain of overharvesting if required to pay a dock tax, inversely proportional to the size of the fish stock (Roughgarden and Smith, 1996). Under such a system, delivering fish from a small fish stock would result in a larger dock tax than if the fish came from a healthier stock. Economic motivations also factor into suggestions for new types of fishing gear that target fish from a healthy stock

while letting fish from the collapsed stock escape. If they are effective and approved for use, these innovations allow fishers to continue fishing, and thus negate the need for public assistance.

The science literature is also replete, as one might guess, with explanations for the ecological causes of fishery collapse. Fisheries scientists and conservation ecologists agree that climate change can affect fish populations, in terms of the introduction of new predator species and parasites to an ecosystem, water temperature fluctuations, ocean acidification, and many other factors (Kurlansky, 1997; Mullon, Freon, and Cury, 2005). Climate change factors can serve as a knock-out punch to fish stocks that have already been depleted by fishing, spurring the ultimate crash of the stock (Pauly et al., 2002).

The fact that some types of fishing gear, namely bottom trawls, are destructive to the habitat of bottom-dwelling fish like cod is also not disputed (Chuenpagdee et al., 2003). Trawls destroy the reefs and rock formations that fish, especially juveniles, depend on for safety (Pauly and Maclean, 2003). In the Pacific Ocean, nets targeting lucrative stocks of pollock operate in the middle depths of the ocean, and while they do not result in as much habitat destruction as bottom trawls, they often catch a large amount of salmon as bycatch—an unintended harvest of a non-target species (Chuenpagdee et al., 2003).

Industrial-scale fishing can also result in the disruption of marine food webs, affecting multiple predator-prey relationships and allowing rapid outbursts of certain species like squid and jellyfish that used to be held in check by predators such as cod, swordfish and sharks (Pauly et al., 2002). The removal of a predator

species from an ecosystem may entice fishers to target smaller fish that used to be eaten by the predators, a practice known as “fishing down the food web” (Pauly et al., 1998). Removing both predators and prey from an ecosystem does not allow either to rebuild or sustain population levels, leaving the ecosystem weaker as a whole.

The designation of marine preserves at previously overfished areas is a common recommendation from ecologists (Pauly and Maclean, 2003), though fisheries scientists are less likely to prescribe marine preserves as a cure-all for collapsed fisheries (Worm et al., 2009). The equivalent of national parks on the land, marine preserves ban or severely restrict fishing effort to allow the ecosystem to recover. Some evidence suggests that marine ecosystems, if left to their own devices, can rebound to prior levels of abundance more quickly than terrestrial ecosystems. But scientists warn that if fish stocks drop below a theoretical “point of no return”—a quantity that has yet to be achieved—a consensus in the scientific community—the stock may never rebuild itself to previous levels of diversity and robustness (Kurlansky, 1997; Worm et al., 2009).

CHAPTER 3

METHODS

Because this project proposes three distinct hypotheses, one single method of analysis will not suffice to investigate the framing phenomenon as desired. A variety of quantitative tools will be employed, all rooted in the critical task of defining and identifying frames in a consistent and theoretically sound manner throughout the population of news stories.

Research Materials

The Boston Globe and *The Anchorage Daily News* are the regional newspapers of record for the areas encompassing the Georges Bank cod fishery and the Yukon River king salmon fishery, respectively. Both newspapers were corporately owned during the time periods in question here (*The Anchorage Daily News* was owned by McClatchy Newspapers, and *The Boston Globe* was owned by The New York Times Company), though both publications have since changed ownership. *The Boston Globe* serves a much larger population base and maintains a much higher circulation than *The Anchorage Daily News*. According to the Audit Bureau of Circulations, for the six months ending on March 31, 2012, the weekday circulation of *The Boston Globe* was about 225,000—more than five times greater than the circulation figure for *The Anchorage Daily News* for the same period. Nevertheless, *The Anchorage Daily News* is the largest newspaper in Alaska, and holds the reputation as Alaska's dominant source of news in print.

A researcher might also conduct an investigation similar to this one using stories from newspapers closer to the fishing grounds, which cover the fishing industry on a day-to-day basis as a beat. Much of the Georges Bank cod fleet is based in Gloucester, Massachusetts, a community of about 30,000 people, most of whom are involved in the fishing or fish-processing industries (wonderfully portrayed by Kurlansky, 2008). Gloucester has several local papers, including at least one dedicated to fishing issues. But as shown by Corbett (1992), newspapers in close proximity to a wildlife management conflict do not tend to cover the issue in an objective and unbiased fashion. Instead, small newspapers like those in Gloucester usually reflect the views of its audience, and rarely dare to frame the issue in a way that would anger readers or alienate the newspaper from its community (Sohn, 1984). Such pressures are less likely to influence the coverage of a fishery collapse by a regional newspaper, like *The Boston Globe* in the case of Georges Bank cod, due to geographical and cultural distance between the hotbed of the issue and the newspaper's base of operations. That distance often results in the regional newspaper "getting it wrong" in the eyes of the people close to the issue. Sometimes that means that the regional newspaper publishes factual errors, but it could also mean that the regional paper frames the situation differently than a resident of a fishing community. So rather than viewing regional newspapers as clueless or distant observers, one could view them as relatively dispassionate agents with more freedom to affix a variety of frames to this issue.

The author conducted a census on all articles from both newspapers that met certain pre-defined search criteria using online news databases. Articles from *The*

Boston Globe were retrieved from the Factiva archive using a keyword search for “Georges Bank” and “cod,” and articles from *The Anchorage Daily News* were gathered from the Newsbank archive using a keyword search for “Yukon River” and “salmon.” The final population size was set after inappropriate stories (e.g., recipes, passing references in obituaries and stories about other species of salmon, advertisements) were removed (see Appendix 1 for a complete list of the articles in the population). All textual portions of digitally archived articles, including headlines, captions and graphics, were considered eligible for analysis.

The six-year windows from which articles were drawn were chosen with the help of biological and economic assessment data about the status of each fishery. Because the present analysis is concerned with the framing of news about fisheries in collapse, the windows encapsulate periods of declining commercial catches and fish population estimates (see Appendices 2 and 3). The commercial catch of Georges Bank cod, for example, was around 38,000 metric tons in 1991, the first year of the study window. A steady downward trend then ensued, leading to the closure of most of Georges Bank for cod fishing in October 1994, and culminating in historically low catches of around 5,000 metric tons in the final two years of the study window, 1995 and 1996. For Yukon River king salmon, the first year of the study window, 1997, was a strong year, with commercial catches and total run size estimates above average for the 1990s. Then, the 1998 run was 40 percent smaller in terms of harvest data. The king salmon run rebounded a bit in 1999, but in 2000 the run size estimate and harvest level were the smallest ever recorded. No commercial fishing on Yukon River king salmon was allowed in 2001, and a modest

commercial harvest was allowed in 2002, despite the fact that the 2002 total run size was slightly smaller than 2001. In summary, during the selected time windows the fisheries showed an overall downward trend toward a fully collapsed fishery, as defined by Worm et al. (2006) as the point at which catches dip beneath 10 percent of the maximum documented harvest.

Operationalizing the Concepts

Consistent with the repeated observation that the body of framing research is scattered and multifaceted, researchers have operationalized framing in a wide variety of ways. All too often, authors discuss one or many definitions of framing in the introduction or literature review of a published article, but then do not clearly describe how a frame was identified or measured in the research being presented. In empirical terms, Matthes (2009) found that only 20 percent of framing articles published in major communications journals from 1990 through 2005 explicitly linked an operationalization with a theoretical definition of framing, and that “the translation of frame definitions to frame indicators was frequently left unspoken” (p. 355).

Approaching the concept of framing from a quantitative perspective usually leads researchers to focus on signifying elements in the text (the “frame indicators” that Matthes mentions in the previous quote). Specifically, keywords serve as signifying elements in a majority of quantitative content analyses (Konig, 2007). Studies have either listed and explained these keywords *before* analyzing the sample (e.g., the linguistic and manual holistic approach), or arrived at the keywords to indicate a frame after scrutinizing the sample (e.g., computer-assisted frame

mapping). While studies that employ pre-determined frames often suffer from reliability problems in the form of researcher fiat and self-fulfilling prophecies, frame mapping and other computerized forms of detecting frames often arrive at nonsensical or irrelevant conclusions, and hence a low level of validity. For example, Konig (2007) recounts a researcher's attempt to define the "environmental protection" frame using computer-assisted frame mapping, which concluded that the keywords of "environmental," "any" and "major" were the most important signifiers of the frame.

To avoid the problems of poor validity and reliability in content analyses, Matthes and Kohring (2008) developed a hybrid methodology that retained a human element while still allowing for the analytical power of computers. Instead of completely defining a frame in advance, and then scouring the sample stories for occurrences of it, Matthes and Kohring proposed that frames should be defined as the sum of frame elements, which are more specific and identifiable than entire frames. The frame elements that Matthes and Kohring adopted—problem definition, causal interpretation, moral evaluation and treatment recommendation—come directly from the theoretical foundations of framing cast by Entman (1993). The authors demonstrated their approach with a content analysis of newspaper stories about biotechnology, operationalizing each frame element into a number of pre-determined binary variables, the presence or absence of which the coder noted for each story. Cluster analysis then showed which variables were most commonly associated with each other, and those groupings were ultimately interpreted and defined as frames. The major benefits of this

approach are in its ability to extrapolate new and emerging frames from a large body of text, and in its deterrence of subjective analyses in which researchers only seek to find things for which they are looking.

Though it is admirable in its ability to improve reliability and validity in content analysis, the method championed by Matthes and Kohring (2008) is not entirely appropriate for this analysis. First and foremost, Matthes and Kohring set the unit of analysis at the article level, and did not allow for the possibility that one article may contain multiple frames—a critical assumption in this study. Second, the Matthes and Kohring method does not use predetermined frames. While there undoubtedly can be problems with researcher fiat and reliability when frames are defined before the research begins, this study stands on safe ground according to David et al (2011), who suggest that predetermined frames are permissible when there is enough supporting literature upon which to construct valid definitions. The literature review demonstrates that such precedents in the framing literature do indeed exist, as several prior studies have explored the relationship between economic and ecology frames and have arrived at consistent findings.

Even though it is not appropriate to incorporate the entirety of the Matthes and Kohring method, its fundamental structure, utilizing the frame elements derived from Entman (1993), is adopted here. The Matthes and Kohring method offers a detailed structure that makes frame detection less vague and subjective, while also not being as susceptible to reliability problems as holistic and linguistic content analysis methods. The following predetermined frame indicators served as signifiers in the coding process, with the presence of one frame indicator in the text

counting as one occurrence of that particular frame. There are an equal number of frame indicators (16) in each column.

Table 1: The Coding Grid

	BELONGS TO ECONOMY FRAME	BELONGS TO ECOLOGY FRAME
Problem definition	Decreased income for fishers	Decreased fish population
	Decreased catch volume	Changes in average size of fish
	Decreased catch value	Decreased recruitment of juveniles reaching adulthood
	Economic struggle of fishing communities	Disruption of marine food web (impacts on predator or prey species of the target fish)
Causal interpretation	Overcapacity (too many boats)	Habitat destruction by trawlers or other fishing activity or pollution
	Financial / governmental incentives for overharvest	Fishing occurred at levels above maximum biological limit
	Illegal fishing	Ecosystem change / climate change
	Bad or missing data about the fishery	Increased predation at sea
Moral evaluation of causal agents	Fishers neglected the risk of overharvesting	Fishers/regulators don't value the ocean ecosystem
	Fish buyers/processors are greedy	Fishers/regulators underestimate the impact of fishing on ecosystems
	Regulators are ineffective, corrupt, or closely tied to industry	Natural booms and busts in the fish population are unavoidable
	Outsiders/foreign fishermen are cheating	Cannot evaluate until more is known about ecological factors
Treatment recommendation	Government assistance / reduce financial effects of decline to fishers	Reduced catch limits and/or shorter harvest periods
	Shift fishing effort to other species to allow for continued fishing revenue	Protect entire food web, not just collapsed species
	Taxation and other financial incentives or disincentives to reduce overharvest	Gear restrictions or bans (e.g., banning bottom trawls)
	Develop other industries / diversify economy	Marine preserves / areas closed to fishing

The frame indicators are clustered into four groups of four, based upon Entman's (1993) four-part definition of framing. The components of Entman's definition are shown in the left column, adjacent to the frame indicators that were derived from them to serve the specific linguistic needs of this study.

Each story in the study population emerged from this portion of the coding process with two scores: one for the number of times that the economy frame was used, and one for the number of times that the ecology frame was used. Though authorship is not a variable directly examined here, the name of each story's reporter was recorded as well, in order to provide additional information that might help explain the results.

The validity of treating the existence of a single frame element as a manifestation of the entire frame is backed up theoretically by Entman (1993), who noted that "a frame in any particular text may not necessarily include all four functions" (p. 52).

The grouping of frame elements in the table is not meant to suggest that the news coverage of fisheries in collapse should be viewed as an antagonistic and partisan conflict, with an "economy" faction on one side and an "ecology" faction on the other, though those factions undoubtedly exist. Instead, the placement of a frame element into one category or another has more to do with the *terminology* used by journalists to describe and present some information about fisheries in collapse. For example, proponents of environmental protection and reduced fishing effort might use economic terminology and concepts (i.e., a dock tax on commercial fish landings that rises as the fish stock declines, as endorsed by Roughgarden and

Smith, 1996) in a list of policy prescriptions for restoring a collapsed fishery. But such usage, if it appeared in a newspaper article under scrutiny in this research, would be counted as an instance of the economy frame, due to the terms and concepts overtly stated. In other words, the implicit political connotations and affiliations of words, phrases and concepts will lie outside the scope of this analysis.

Quantitative content analysis: the tool for investigating the hypotheses

The method employed by this study is a quantitative content analysis. Quantitative content analysis is defined by Riffe, Lacy and Fico (2005) as “the systematic assignment of communication content to categories according to rules, and the analysis of relationships involving those categories using statistical methods” (p. 25). As explained by Graber (2004), a quantitative content analysis “involves establishing readily measureable, minimally judgmental criteria for defining the message elements to be detected and the indicators that signal the presence or absence of those elements” (p. 50).

The unit of analysis is “the meaningful proposition,” as used by Pan and Kosicki (1993, p. 65) and consisting of a noun and a verb. A small unit of analysis such as this is typical of a quantitative content analysis, as it allows for more precise data analysis (Graber, 2004). Honing in on the meaningful proposition also allows for multiple frame indicators to occur within the same sentence, as can logically be expected to occur.

As a quantitative, text-based study aimed at understanding more about media frames as they were presented to the public, this analysis focuses on signifiers in text, not on evaluating the production factors of a media frame (such as

journalistic norms and habits, time and space constraints, and prior knowledge of the journalist), which are more of the domain of qualitative research.

Pre-Test

To investigate the reliability of the coding scheme, two coders (including the researcher) conducted a pre-test using 29 stories from outside the study population. The pre-test sample was roughly 40 percent of the size of the main study population, and consisted of newspaper and wire service stories from a variety of publications about fisheries in the late 1990s and early 2000s.

The pre-test exposed some flaws in the original research design. The initial research plan intended to count the occurrences of each frame type in each story, and then use basic statistics to analyze those tallies in order to answer the hypotheses. Each pre-test story had two scores associated with it: total economy frame indicators counted, and total ecology frame indicators counted. However, a reliability test on the totals enumerated by each pre-test coder found significant disagreement (Krippendorff's alpha value of 0.777 for the economy frame totals, and a much weaker 0.274 for the ecology frame totals). Clearly, there were major differences in how each coder put items into the ecology frame column.

Though unreliable in its ability to count frame indicators, the coding system was good at identifying the general nature of a newspaper story – whether it was mostly written with an economy frame or an ecology frame. Both coders picked up on that, though to different degrees. When the story was more balanced in its use of frames, the coders picked up on that too, but usually did not agree on which frame type had the slight advantage over the other.

To avoid the reliability pitfall, the research design then morphed into more of a “tone study” that uses an ordinal ranking scheme to describe the overall nature of each story in relation to the two target frames under scrutiny. Instead of using the raw tallies of frame indicators for data analysis, the tallies were transformed into percentages, which then in turn were used to place stories into one of five ordinal categories (referred to later as “frame orientations”), as outlined in Table 2.

Table 2: System of Ordinal Categories (Frame Orientations)

Percentage of economy frames in the story	Ordinal category	Ordinal category name
0 – 19%	1	Very strongly ecological
20 – 39%	2	Strongly ecological
40 – 59%	3	Neutral
60 – 79%	4	Strongly economic
80 – 100%	5	Very strongly economic

Recasting the pretest data using the system shown above, and removing two outliers in the data, yielded an acceptable Krippendorff’s Alpha value of 0.804. In addition to passing the inter-coder reliability test, the change to an ordinal classification system also improves the validity of the research method by better capturing the experience of the reader, who does not precisely tally and compare one kind of statement with another in the process of reading and evaluating a newspaper article. Instead, the reader is more likely to complete the reading experience with a general sense of the tone and message of the story, as something

that predominantly conveyed a particular type of information or viewpoint, or instead was more balanced or neutral.

CHAPTER 4
RESULTS

The study population consisted of 73 newspaper stories: 39 from *The Anchorage Daily News* and 34 from *The Boston Globe*. Tables 3 and 4 depict the annual breakdowns for the stories in each subpopulation.

Table 3: *Boston Globe* Stories (N=34) by Year

	1991	1992	1993	1994	1995	1996
# of stories	2	1	2	13	12	4

Table 4 : *Anchorage Daily News* Stories (N=39) by Year

	1997	1998	1999	2000	2001	2002
# of stories	2	7	5	7	12	6

Frame Orientation

Hypothesis 1a predicted that *The Boston Globe's* coverage of the Georges Bank cod fishery from 1991 through 1996 would contain more strongly and very strongly economic stories than strongly and very strongly ecological stories or neutral stories. This hypothesis was supported by a small margin (see Tables 5 and 6).

Table 5: *Boston Globe* Story Classifications (N=34)

	Very strongly ecological (1)	Strongly ecological (2)	Neutral (3)	Strongly economic (4)	Very strongly economic (5)
1991	0	1	0	0	1
1992	0	0	1	0	0
1993	0	1	0	0	1
1994	0	4	5	3	1
1995	2	2	3	3	2
1996	0	1	1	1	1
Totals	2	9	10	7	6

Table 6: *Boston Globe* Story Classification Tallies and Percentages

Very strongly and strongly economic stories	13 (38%)
Neutral stories	10 (29%)
Very strongly and strongly ecological stories	11 (32%)

The average ordinal ranking for the *Boston Globe* subpopulation is 3.17 (SD=1.17), confirming that *Boston Globe* stories tended toward the economic end of the spectrum.

Hypothesis 1b predicted that *The Anchorage Daily News'* coverage of the Yukon River salmon fishery from 1997 through 2002 would contain more strongly and very strongly economic stories than strongly and very strongly ecological stories or neutral stories. This hypothesis was rejected a small margin (see Tables 7 and 8).

Table 7: Anchorage Daily News Story Classifications (N=39)

	Very strongly ecological (1)	Strongly ecological (2)	Neutral (3)	Strongly economic (4)	Very strongly economic (5)
1997	0	0	0	0	2
1998	1	2	1	0	3
1999	1	1	1	1	1
2000	2	0	2	1	2
2001	4	3	2	1	2
2002	3	1	0	0	2
Totals	11	7	6	3	12

Table 8: Anchorage Daily News Story Classification Tallies and Percentages

Very strongly and strongly economic stories	15 (38%)
Neutral stories	6 (15%)
Very strongly and strongly ecological stories	18 (46%)

The average ordinal ranking of the *Anchorage Daily News* subpopulation is 2.95 (SD=1.62), indicating the slight tilt toward an ecological frame orientation.

When combined, the subpopulations from *The Boston Globe* and *The Anchorage Daily News* show almost perfect balance in terms of their framing orientation. However, the number and percentage of predominantly ecological stories are slightly larger than the corresponding values for predominantly economic stories, and also greater than the number and percentage of neutral stories in the population as a whole (see Table 9).

Table 9: Whole Population Story Classification Tallies and Percentages (N=73)

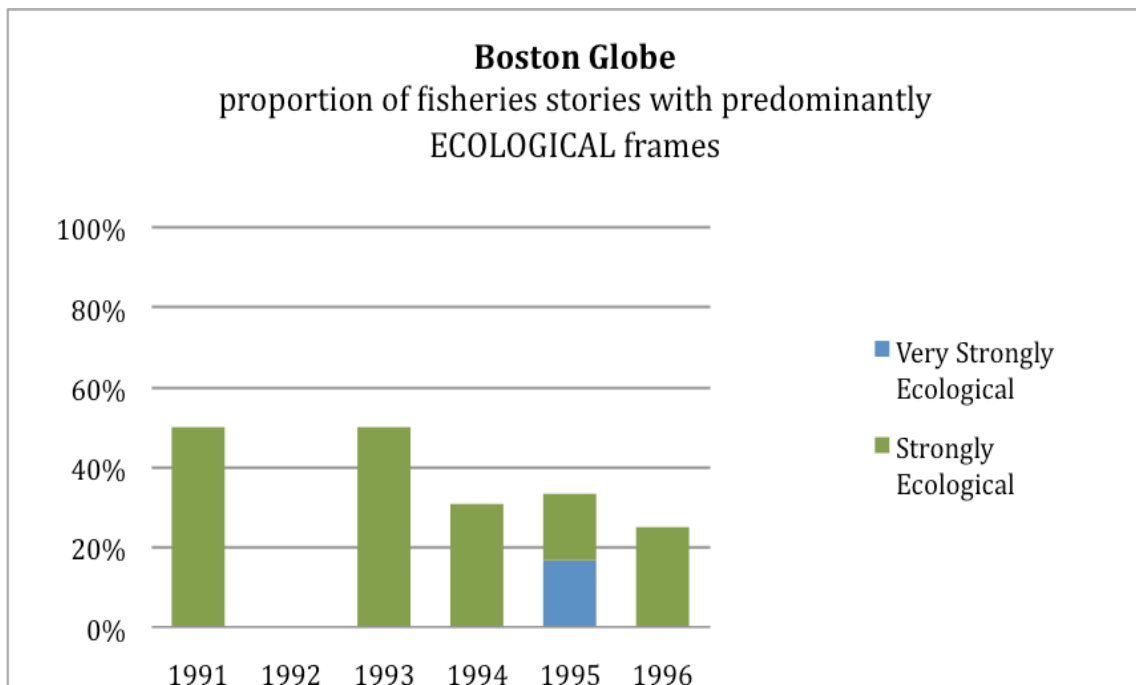
Very strongly and strongly economic stories	28 (39%)
Neutral stories	16 (22%)
Very strongly and strongly ecological stories	29 (42%)

The Trend of Predominantly Ecological Stories

Hypothesis 2 predicted that the percentage of strongly and very strongly ecological stories would exhibit an increasing trend as the study period progressed. To compensate for the fact that the number of fisheries stories published varied from year to year, the data are expressed in terms of proportions of stories that fell into each frame orientation category (very strongly economic, strongly economic, neutral, strongly ecological, and very strongly ecological) in each year.

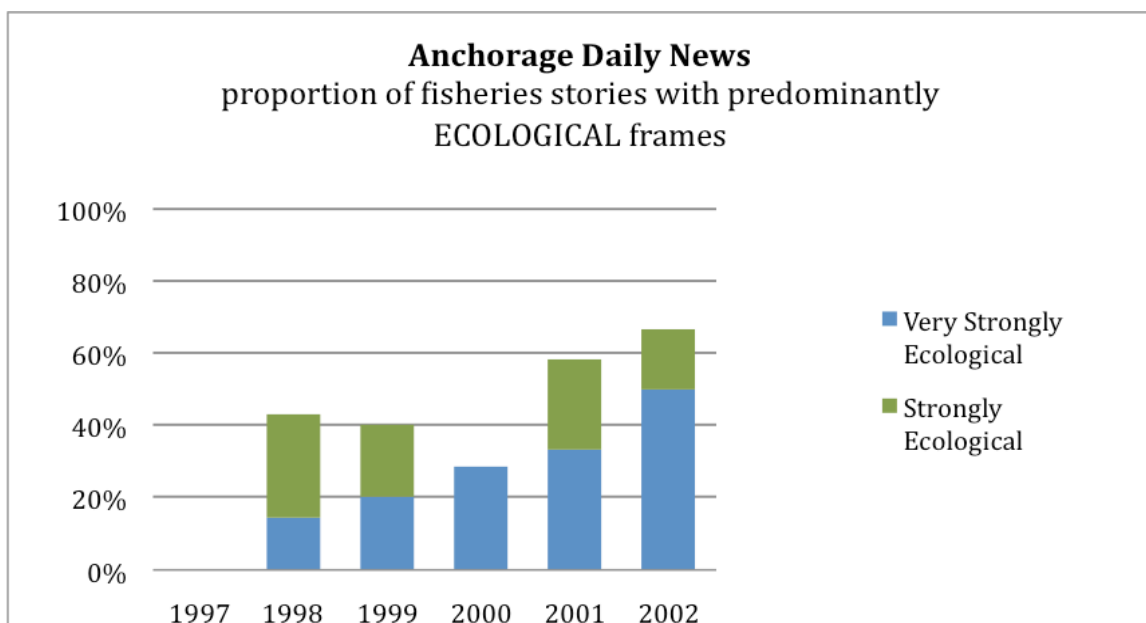
The two subpopulations both exhibited linear correlation relationships, but in opposite directions. The *Boston Globe* subpopulation, in opposition to the hypothesis, showed a downward trend in the proportion of predominantly ecological stories from the start of the study period to the end (see Figure 1).

Figure 1: *Boston Globe* Ecological Stories by Date



However, the data from the *Anchorage Daily News* subpopulation exhibited a strong increasing trend (see Figure 2). The absence of stories with predominantly ecological frames in the first year of the study period, 1997, is not alarming due to the presence of only two stories about the Yukon River king salmon fishery in that year.

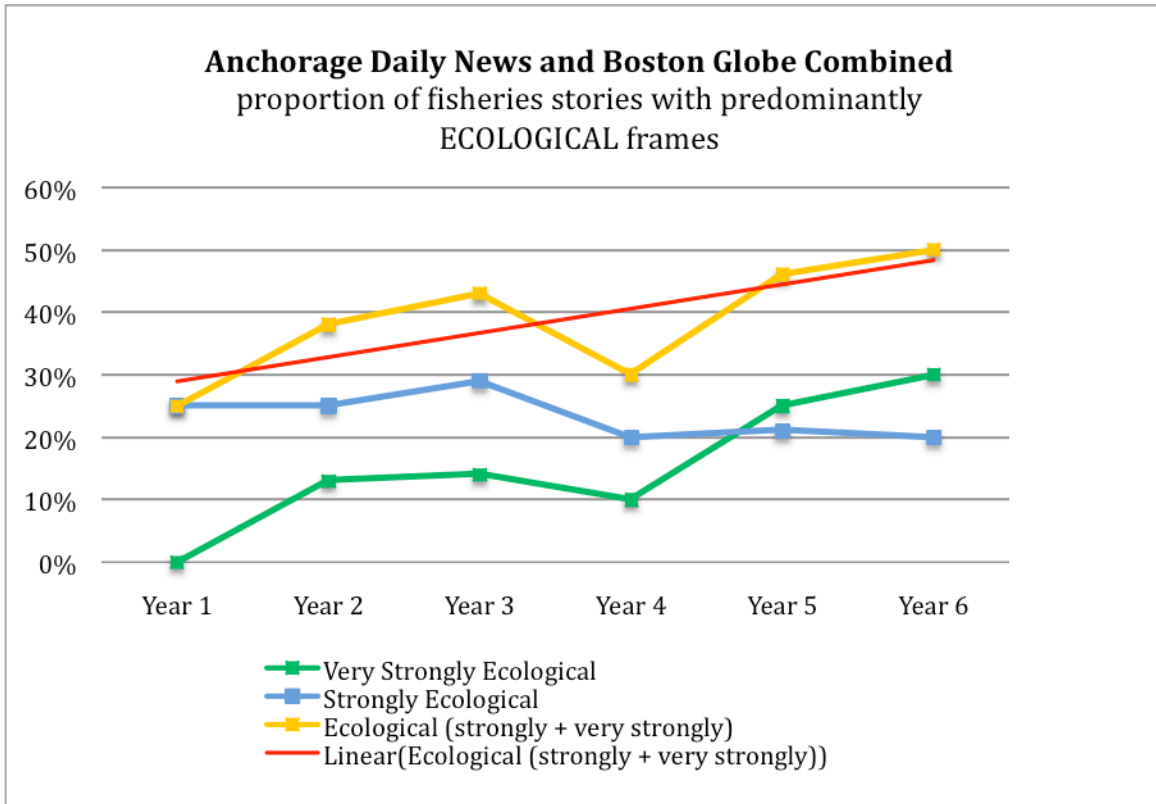
Figure 2: Anchorage Daily News Ecological Stories by Date



When the story subpopulations are combined, an increasing trend (demonstrated by the red trend line in Figure 3) is evident. A noticeable drop in the percentage of predominantly ecological stories in the fourth year of the study period, as well as the absence of any ecologically-dominant stories in particular years for each newspaper (1997 for *The Anchorage Daily News* and 1992 for *The Boston Globe*), should be noted, and will be explained in the following chapter. However, those influences were not strong enough to detract from an otherwise

increasing trend in the proportion of ecologically-framed stories as the study period progresses (see Figure 3).

Figure 3: Trends of Ecological Stories by Date for Whole Population



Story Length and Frame Variety

Hypothesis 3 predicted that long stories (defined as having more than 500 words) would be more likely to contain both types of frames than short stories (100-500 words) or brief stories (less than 100 words). A large majority of stories (89%) contained both frame types, and no stories in the population completed lacked either of the target frames. The average story length for all stories in the

population was 718 words, with an *Anchorage Daily News* story on average shorter (611 words) than a *Boston Globe* story (840 words).

Sixty percent of the stories in the population were in the multiple frames / long story condition, compared to 27% of stories in the multiple frames / short story condition, and smaller percentages in the rest of the conditions (see Table 12).

The hypothesis is supported.

Table 10: Frame Diversity vs. Story Length in *Boston Globe* Stories (N=34)

	Brief	Short	Long
Multiple frames	1 (3%)	3 (9%)	27 (79%)
One frame	1 (3%)	1 (3%)	1 (3%)

Table 11: Frame Diversity vs. Story Length in *Anchorage Daily News* Stories (N=39)

	Brief	Short	Long
Multiple frames	0 (0%)	17 (44%)	17 (44%)
One frame	1 (3%)	3 (8%)	1 (3%)

Table 12: Frame Diversity vs. Story Length in the Whole Population (N=73)

	Brief	Short	Long
Multiple frames	1 (1%)	20 (27%)	44 (60%)
One frame	2 (3%)	4 (5%)	2 (3%)

CHAPTER 5
DISCUSSION

Frame Orientation

Despite evidence from the vast majority of the aforementioned literature, the use of economic frames did not seriously overshadow the use of ecological frames in the coverage of fisheries in collapse by *The Boston Globe* and *The Anchorage Daily News*. One subpopulation (from *The Boston Globe*) did contain a majority of stories classified as either strongly economic or very strongly economic, however the difference was a mere two stories (6%) more than predominantly ecological stories, and just three stories (9%) more than neutral stories. In the subpopulation that contradicted the hypothesis, from *The Anchorage Daily News*, there were only three more (8%) predominantly ecological stories than predominantly economic stories.

The population, considered on the whole, therefore did not overwhelmingly frame the issue of fisheries in collapse in either economic or ecological terms, but instead achieved a high degree of balance. In this instance, Simon, Fico and Lacy (1989) provide an appropriate definition of balance, describing it as “the relative amount of coverage devoted to a particular side in a story” (p. 428). Calling the population “balanced” in its use of frames is not to suggest that reporters consistently produced stories with a neutral frame orientation, i.e., a “balanced” story. Such was the case in a comparable census content analysis by Culley et al. (2010), who found a majority of balanced stories in their population of newspaper stories about proposed nuclear power projects. Instead, the newspapers in this study achieve a level of balance only when their coverage is considered

cumulatively over a period of time, wherein a variety of stories were presented from all of the five frame orientation categories. And in this regard, the two subpopulations differed. A *Boston Globe* story was more likely to be near the middle of the frame orientation spectrum, with the fewest number of stories on each end of the spectrum (either very strongly ecological or very strongly economic). An *Anchorage Daily News* story, on the other hand, was more likely to be at the extremes of the frame orientation spectrum, with very strongly economic and very strongly ecological stories as the most common in the subpopulation. This contrast hints at possible differences in journalistic production factors, such as reporter workload and editorial directives, which are beyond the scope of this study.

Prior research suggests that even so-called “high prestige” newspapers have a poor track record at covering controversies in a balanced fashion (Simon, Fico and Lacy, 1989), and have a harder time covering a local controversy in a balanced way compared to a national controversy (Fico and Soffin, 1995). Insofar as the coverage of fisheries in collapse centers on the controversy of explaining and reacting to low populations of fish, a similar imbalance would be expected to appear in this study. But that was not the case.

A comparison of methodologies between this study and several key studies cited in the literature review sheds light on why the results presented here go against the dominant trend in the literature about the framing of natural resource conflicts. The units of analysis vary from study to study, and few, if any, researchers employed a unit of analysis as fine-grained as the “meaningful proposition” unit used in this study. Ketchum (2004) found a misbalance in favor of pro-development

voices after coding only the quotations in a sample of articles from a single newspaper. Corbett (1992) and Castello (2010) coded at the level of the whole story. Culley et al. (2010) did the same to assert that a slim majority of stories in their population were balanced in their treatment of pro- and anti-nuclear arguments. However, Culley et al. also noted in their conclusions that coding the same population of stories at a finer level could yield different results. In discourse analyses that documented a prevalence of economic perspectives in a population or sample, it is often unclear what the unit of analysis was used (e.g., Anderson and Marhadour, 2007; Cox et al., 2008). Most of these studies also drew their samples or populations from shorter periods, covering weeks or months rather than years. As this study has argued and proven (Hypothesis 2), the proportion of ecologically-framed stories takes awhile to develop and increase, relative to economically-framed stories. By setting their study periods rather narrowly, other researchers who have explored the dynamics of ecological and economic frames in the news may not have given the ecological side enough time to develop and manifest itself in the sample or population.

A partial explanation for the balance observed in the population concerns the nature of journalistic inquiry on the topic of fisheries in collapse, and the how the answers to certain basic questions about the fishery were coded in this study. The first basic question—how many fish are there?—would prompt an answer that counts as an ecology frame indicator. That question would likely be accompanied by an economically-themed question—how many fish are being caught and sold? Furthermore, feature-length stories would likely be expected to include some

treatment of the effects of climate change on the fishery (an ecology frame indicator), in addition to reflections about potential or apparent changes to the fishing lifestyle that is so closely linked to the image of maritime communities (usually counted as an economy frame indicator). Pertaining to prescribed or actual remedies for the fishery, descriptions of harvest limits (an ecology frame indicator) often accompanied details about government financial assistance for fishers (an economy frame indicator). Assuming that a reporter gave roughly equal treatment to these six subjects, the resulting story would likely be coded as neutral using this study's methods.

But based on the fact that only 22% of stories in the population fell into the neutral frame orientation category, it seems that the newspapers did not—for the most part—give equal treatment to these major content drivers within a particular story. Instead, reporters and editors tended to shift their foci over time, delving into economic issues in some stories and ecological issues in others. For example, reporter Scott Allen wrote three stories about the Georges Bank cod fishery for *The Boston Globe* in the final two months of 1996. The first was a short story that bluntly dispatched several dollar figures and economic metrics, such as the amount of federal money reserved for a boat buyback program, the estimated number of boats that would leave the fishing fleet, and a comparison of catch volume data from 1982 and 1996 to highlight the fishery's decline (Allen, 1996a). Accordingly, this story received a frame orientation classification of "very strongly economic." Next, Allen wrote a story with a balanced use of economic and ecological frames about the current status of the cod fishery and proposed regulatory changes that would

reduce fishing opportunities even more than they already were (1996b). Later that month, when the New England Fishery Management Council failed to endorse those new restrictions, Allen framed the meeting’s outcome and subsequent consideration of the future of the cod fishery in largely ecological terms, earning a frame orientation classification of “strongly ecological,” and narrowly missing a label of “very strongly ecological” (1996c). These three stories ran the gamut of frame orientation categories, demonstrating how a single reporter can document the news and issues relating to a fishery in a variety of ways.

A further analysis of the relationship between the reporter of a story and the story’s frame orientation expands upon this observation. In particular, the experience of the reporter does not seem to play a major role in determining the balance of a story. Reporters who produced two or more stories about a particular fishery generated neutral stories at almost the same rate as reporters who only produced one story on the fishery (see Table 13 below). The greater overall proportion of neutral stories in *The Boston Globe* compared to *The Anchorage Daily News* is reflected in these measurements.

Table 13: Reporter Experience and Neutral Stories

	Boston Globe	Anchorage Daily News
% of stories by multiple story reporters that are neutral	30	18
% of stories by single story reporters that are neutral	29	20

One noteworthy observation emerges from an analysis of the reporter bylines in the *Anchorage Daily News* subpopulation. The most common reporter classification in the subpopulation is “none”—that is, an article written anonymously with no reporter identified on the byline. Anonymous articles comprised 23 percent of the subpopulation (9 stories), and contained no neutral rankings. The stories in the anonymous group had the smallest average word count of any reporter group, and were strongly polarized in their frame orientations (standard deviation of the set is a relatively high 1.70), meaning that they tended to be strongly or very strongly tilted toward one frame type or the other. These anonymous stories were likely written by generalist reporters, working under tight deadlines, and relying upon one or a few sources to crank out a story about one aspect of a fishery. Under these circumstances, it would seem, a balanced story is unlikely to be produced.

A final consideration of how and when the newspapers achieved balanced in their fisheries coverage concerns the frame indicators in the coding grid (Table 1) that rarely, or never, appeared in the population. Chief among these overlooked dimensions of the situation were the ecology frame indicators that used the term “food web” (i.e., “disruption of marine food web (impacts on predator or prey species of the target fish)” in the “problem definition” group of frame indicators, and “protect entire food web, not just collapsed species” in the “treatment recommendation” group of frame indicators). In a similar vein, “fishing occurred at levels above maximum biological limit” was rarely invoked as a cause of the depressed fishery. The fact that indicators such as “decreased fish population” and

“reduced catch limits and harvest periods” appeared far more frequently in the population enables a perception that the cod or the king salmon is a species in isolation, and that its collapse does not have ripple effects elsewhere in its ecosystem. One species collapse often sparks another, as the fishing fleet shifts to smaller fish when the larger predator species are no longer available—causing problems for non-fish species like birds and marine mammals (Pauly et al., 1998; Pauly et al., 2002). Consideration of the role of the cod and the king salmon in their respective food webs contributes to a comprehensive ecological perspective in the news, underscoring that the collapse of a fish species can cause widespread damage to the natural world and not just the economy.

The Trend of Predominantly Ecological Stories

As predicted in Hypothesis 2, the percentage of predominantly ecological stories increased as time progressed in the study period, suggesting that it takes longer for editors and reporters to delve into the ecological dimensions of fisheries collapse, relative to the more apparent and vocal economic dynamics.

Though balanced on the whole, the coverage of fisheries in collapse was nonetheless sporadic, with most stories clustered around dramatic and controversial decisions. In *The Boston Globe's* coverage of the Georges Bank cod fishery, the volume of stories increased sharply in 1994, leading up to and immediately after the New England Fisheries Management Council banned almost all commercial fishing for cod and other groundfish. Unprecedented restrictions to the Yukon River commercial salmon fishery in 2000 led to a similar spike in stories in *The Anchorage Daily News*, continuing into 2001, when all commercial fishing on

the Yukon was closed. Both of those story surges occurred in the fourth year of the six-year study period, when a noticeable decline in the percentage of predominantly ecological stories was observed (see Figure 3). Subsequently, the fifth year of the study window saw both newspapers greatly increasing their percentage of stories with predominantly ecological frames. This suggests that reporters and editors initially chose to emphasize the economic aspects of the troubled fisheries, and only later followed up with more analysis on ecological issues.

The sporadic nature of the coverage and the delayed prominence of predominantly ecological stories may also help explain how a reader and critic, like this researcher, might have come to brand a newspaper in this study as biased or deficient in its coverage of a fishery in collapse. When reading about a fishery early in its collapse, or when directing more attention to fishery coverage due to dramatic events or major regulatory decisions, readers of the articles in this analysis were more likely to receive newspaper stories with predominantly economic frame orientations. This trend may influence a reader to maintain a perception of bias toward the newspaper, even as the proportion of ecologically-framed stories increases over time.

Story Length and Frame Variety

The data compiled to answer Hypothesis 3 demonstrate that a long story was very likely to contain both economic and ecological frames, though not necessarily presented in a balanced fashion. The logical assumption that the space afforded by a long story gives the reporter ample opportunities to employ multiple frames was proven correct. The small group of one-frame stories (8) was distributed among all

three length categories (brief, short, and long). Apparently reporters could go to any length to avoid incorporating multiple frames into a newspaper story about fisheries in collapse. When reporters only used one of the target frames, they did not strongly favor one type over the other: five of the one-frame stories featured only an ecology frame, and three of the one-frame stories featured an economy frame.

An analysis of how story length might relate to the frame orientation of the story yields one interesting observation. In four out of the five frame orientation categories, the number of stories in the category increases as story length increases, reflecting the greater abundance of long stories in the population as a whole (see Table 14). The exception is the very strongly ecological category, in which there were more short stories written than long stories. In addition, the data suggest that if a story in the population was long, it was least likely to come with a very strongly ecological frame orientation. It could be that reporters did not have enough ecologically-oriented source material from which to craft lengthy stories, or that a heavy emphasis on ecological issues was not deemed to be worthwhile or fair.

Table 14: Frame Orientations and Story Length of the Whole Population (N=73)

	Very strongly ecological	Strongly ecological	Neutral	Strongly economic	Very strongly economic	
Long story (>500 words)	4 (5%)	10 (14%)	12 (16%)	9 (12%)	11 (15%)	46
Short story (100-500 words)	7 (10%)	6 (8%)	3 (4%)	1 (1%)	7 (10%)	24
Brief story (<100 words)	2 (3%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)	3

CHAPTER 6

LIMITATIONS AND IDEAS FOR FURTHER RESEARCH

Research with a limited scope such as this will undoubtedly have limitations in the applicability of its results to the general understanding of how newspapers behave. Including more newspapers and more fishery collapse scenarios would lend more external validity to the present study's primary finding concerning the balanced use of frame orientations over time. Prior studies—as the literature review demonstrated—overwhelmingly found that the news media have employed an economic frame more frequently than an ecological frame in their coverage of natural resource development issues. Could the coverage of fisheries buck this trend?

Also, one cannot rationally assume that a news consumer would receive all of his or her information about a fishery collapse from a single source, especially in the internet age when multiple sources of information are readily accessible. Comparing and contrasting coverage from different media, including print, television, radio and internet, would paint a more complete and detailed portrait of the information that individuals have received about this issue. As noted earlier, prior research on natural resource and wildlife coverage in the news has shown that local and nonlocal media sources vary in their treatment of a given issue (Corbett, 1992; Sohn, 1984). To investigate those assertions in the context of the Yukon River king salmon and Georges Bank cod collapses, a variety of sources within each region could be analyzed and compared with nonlocal sources (e.g., frame orientations of

stories about the Yukon River king salmon fishery in the pro-business *Alaska Journal of Commerce* could be compared with the frame orientations of stories in the “local” newspaper in Bethel, Alaska, and the dominant statewide newspaper, *The Anchorage Daily News*).

Also, understanding the nature and extent of the newspaper coverage about fisheries collapse can serve as a stepping-off point for further research on media effects, which would seek to make connections between the content of media sources and observed effects in the audience. Research drawing from agenda-setting theory could seek to find a link between the content of media coverage in a fishery region and subsequent management actions or public comments submitted at fishery council meetings, where many of the harvest and conservation guidelines are determined.

When interpreting the results of this study and comparing them to similar studies, it is important to remember that the operationalization of framing employed in this research was concerned only with the terminology used to describe fisheries, and not with ideological or political connotations of individual statements. This study does not intend to portray media coverage of fisheries in collapse as a battle between factions, but rather as a complex situation in which reporters must choose between various types of information to present to the audience. Economic and ecological frames are not the only frames available to them. A procedural frame, concerned with the incremental movements of the political decision-making process, is also quite common, but not measured in this

analysis. Thus, the audience received more types of information from the articles in the population than were measured in this study.

The biggest challenge in this project's data analysis, and in turn the biggest caveat in interpreting its results, is the relatively small size of the study population. Initial database searches generated a total population size of 272 stories. But after eliminating nonconforming stories (those not explicitly and primarily about the fisheries under scrutiny), the population shrank to its final size of 73 stories. This made it impossible to achieve a desired level of detail in the data analysis for Hypothesis 2, which originally intended to produce more data points by breaking down the six-year study windows into four-month blocks. But the relative dearth of stories meant that too many of those four-month periods were unpopulated by stories. Each calendar year, therefore, became the unit of time in the data analysis.

Expanding the study windows from six years to ten or more years would increase the data pool, and also allow for a greater incorporation of Downs' issue-attention cycle (1972) into the analysis. Downs' theory has become seminal to subsequent work on the portrayal of environmental issues in the news media, but is not emphasized here due to the relatively short time periods under scrutiny. Of the five stages in Downs' issue-attention cycle, this project encompasses the first three: 1.) pre-problem stage; 2.) alarmed discovery; and 3.) realizing the cost of significant progress. The fourth stage—gradual decline of intense public interest—is not fully formed here, though the decline in the number of stories in each newspaper in the sixth and final year of the study window may indicate a burgeoning complacency about the topic of fisheries collapse. It is not clear when the post-problem stage (the

fifth stage) takes effect with regards to this issue, and perhaps it has not yet occurred. Downs describes the fifth stage as “a twilight realm of lesser attention or spasmodic recurrences of interest” (p. 40). Lengthening the study windows would allow a researcher to investigate if Downs’ claims about a prolonged state of limbo hold true for the fisheries collapse issue, or whether intervening factors, such as a fish population rebound, might break the issue-attention cycle.

A final set of limitations concerns the difficulty in coding newspaper content. Using a coding table with pre-set categories always involves some degree of subjective reasoning on the part of the coder. But at times, due to the vague and simplified diction used by reporters in an effort to explain a complicated topic to a general audience, it was impossible to accurately code a particular phrase without making risky assumptions about the reporter’s intended meaning. Words and phrases such as those went uncounted. For example, if a story stated that “conservation measures may be implemented soon to further protect the stock,” it is not clear if “conservation measures” refers to harvest limits (an ecology frame indicator) or some sort of financial disincentive to keep fishermen on shore (an economy frame indicator). Moving to an ordinal-level of measurement to analyze data and answer hypotheses rather than simply counting the number of frame indicators was a means to buffer against the errors (i.e., reliability problems) that come from human beings subjectively attempting to categorize a newspaper text.

CHAPTER 7

CONCLUSION

Fish are the last major source of protein for the human diet that is collected in large numbers from the wild. Public concern about the overharvest of wild fish stocks has increased in recent years. Major retailers such as Costco have vowed to stop selling fish from threatened stocks, such as Atlantic cod, bluefin tuna, swordfish and orange roughy (Profita, 2011). Groups like the Marine Stewardship Council, World Wildlife Fund and the Monterey Bay Aquarium have conducted public awareness campaigns, complete with pocket-sized fish buying guides, to help consumers choose seafood that comes from healthy, sustainable stocks. But these efforts have largely been ineffective at reducing commercial fishing pressure on the stocks they are trying to protect (Greenberg, 2010). Paul Greenberg, who wrote about both the Yukon River king salmon and Georges Bank cod collapses in his book *Four Fish*, remarks that he is asked for fish buying advice more than anything else in social situations. If his experience is common, it would seem that journalists have some clout in the fish market.

This research comes at a time when media critics, and quite a few reporters, are questioning the role the journalistic norm of balance should play in the coverage of environmental issues. On the topic of climate change in particular, reporters' dedication to the familiar template of "he said, she said" journalism has often given equal space to views that are marginalized or rejected by the scientific community (Boykoff, 2007). While there have been few fisheries collapse skeptics who deny

that certain fish stocks are dwindling, there are indeed a variety of often-contrasting viewpoints about the causes of the fishery decline problem, as well as possible solutions for it. As this study has explored, balanced coverage of this issue is a product of reporters' decisions about which of these viewpoints to mention in print, and to what degree.

The results highlight an important distinction between two types of balance that a news publication can achieve in its coverage of a certain issue. On the one hand, there is *intra-story balance*, describing an equal treatment of opposing or alternate viewpoints within a single story. On the other hand, *inter-story balance* emerges from a group of stories, considered together. The population compiled for this study achieved balance in the latter sense, while only satisfying the requirements of intra-story balance (i.e., publishing a story with a neutral frame orientation) 22% of the time. It is unreasonable to expect intra-story balance on the topic of fisheries in collapse each and every time that a regional newspaper such as *The Boston Globe* and *The Anchorage Daily News* addresses the topic, as that would preclude the existence of feature stories that delve into specific facets of the situation. For example, a story about recent research linking a species of parasite to increased fish mortality (e.g., *Ichthyophonus* in Yukon River king salmon) would necessarily be heavy on ecological terminology, and lack a counterbalancing proportion of economic statements. Cumulatively, after exposure to the myriad of features, briefs, and other types of stories about the fishery, a reader might receive a reliably balanced body of information (i.e., inter-story balance), in terms of economic and ecological frames applied to the fishery. But the acquisition of this

information does not come quickly. In the meantime, before the level of inter-story balance is reached, readers might be forming opinions about the newspaper they are reading based on a misbalanced sample of the population, leading to perceptions such as those which motivated this research. Given the power of audience frames to process, sort and receive only certain types of information (as Graber (1988) would put it, “stemming the information tide”), it is possible that these perceptions about a news source’s bias and credibility often become entrenched, even as the news source corrects the misbalance with more stories over time.

Nevertheless, the presence of any sort of balance in the coverage of fisheries in collapse inspires optimism about the performance of newspaper journalism. The “slow demise of an ecology” referenced by Corbin (2002) did indeed make the news, without being overshadowed by economic explanations of the situation. And there are more stories to tell. Despite tumultuous economic and technological changes in the newspaper industry, both *The Boston Globe* and *The Anchorage Daily News* continue to operate. And despite management actions designed to rebuild their stocks, the cod of Georges Bank and the king salmon of the Yukon River drainage remain in a state of collapse.

APPENDIX 1:
ARTICLES OF THE POPULATION

The Boston Globe (1991-1996) N=34

Date	Headline	Reporter(s)	Word Count
February 26, 1991	Fleet eyes new U.S.-Canada fishing rules	Jeff McLaughlin	795
October 26, 1991	Commercial fish losing ground on Georges Bank	Charles A. Radin	1096
January 26, 1992	Market sought for 'trash fish'	Jeff McLaughlin	1309
July 1, 1993	Council OK's plan to limit catches of groundfish off N.E.	Maria R. Van Schuyver	526
December 15, 1993	Wait to end for fishermen's wife	David Arnold	690
January 7, 1994	A diminishing harvest from the sea	David Nyhan	721
January 10, 1994	A rough ride coming: Government's new fishing rules are rocking Gloucester's fleet	Alexander Reed	795
January 12, 1994	Home of the bean and the cush: As cod supplies shrink, cooks turn to lesser-known fish	Sheryl Julian	1136
February 27, 1994	U.S. plans to shut fishing grounds: Overharvesting spurs action, fishermen irate	Colin Nickerson	1017
March 21, 1994	Federal aid at hand for fishermen: Commerce secretary to outline \$30 million relief package	Bob Hohler	1037
April 18, 1994	The promise of bounty goes bust for N.E.	Colin Nickerson	1949
April 19, 1994	A 'regulated inefficiency' may be the solution	Colin Nickerson	2656
August 10, 1994	Fishing study suggests shutting Georges Bank	Scott Allen	836
August 21, 1994	Georges Bank proposal worries fishermen: Federal	Shawn M. Terry	754

	officials consider closure to replenish supply of ground fish		
October 27, 1994	Vast fishery may be shut indefinitely	David Arnold	626
December 8, 1994	New England fishery areas shut down: U.S. ban includes Georges Bank	Scott Allen	988
December 9, 1994	Fishermen: Georges Bank closure to bring overcrowding elsewhere	David Arnold	448
December 19, 1994	Georges Bank: Comeback no sure thing	Scott Allen	1815
January 11, 1995	Regional panel expected to continue fishing ground closure	Scott Allen	526
March 4, 1995	U.S. to buy out some fishermen to reduce number of boats	Paul Langner	575
March 5, 1995	Hearing casts fishery as sinking ship: Little hope held out as catch sinks	Usha Lee McFarling	910
March 22, 1995	Clinton aide says Weld fisheries bid will get a hearing	Frank Phillips	590
March 25, 1995	Weld seeks disaster aid for fisheries: Eyes declaration by Clinton, eligibility for new funding	Scot Lehigh and Frank Phillips	708
March 26, 1995	Specialists blame overfishing: Some say Weld's 'natural disaster' argument ignores man-made causes	Tom Coakley	1044
April 26, 1995	Coast Guard seizes catch	AP	113
May 4, 1995	Fishermen on course for a wreck	David Arnold	957
August 10, 1995	U.S. makes grant to help fishermen	AP	99
September 20, 1995	Fishermen object to proposals on limits	Scott Allen	656
October 12, 1995	He's the last in a fishing line: Down to the water no more	Patricia Nealon	959
October 26, 1995	Tough measures on fishing backed	None	97
February 17, 1996	U.S. pays fishermen \$1.89m to quit work	Scott Allen	258

November 2, 1996	164 Northeast fishermen apply for boat buyout	Scott Allen	274
December 6, 1996	Study urges severe new limits on Georges Bank groundfishing	Scott Allen	879
December 12, 1996	Fishery council eases on limits: Averse to forcing further cuts in effort	Scott Allen	733

The Anchorage Daily News (1997-2002) N=39

Date	Headline	Reporter(s)	Word Count
July 23, 1997	Knowles likes what he hears at trip's end	Patty Sullivan	815
November 20, 1997	Sonar lawsuit argued – State asks court to quash claims	Helen Jung	442
August 2, 1998	Sea may not suit salmon – Experts debate ideas on cause of low runs	Tom Kizzia	1432
August 21, 1998	Common ground in Kaltag	Helen Jung	840
September 22, 1998	Knowles names panel to look at salmon woes	Don Hunter	410
July 9, 1998	Y-K salmon runs at 'disaster' mark	Tom Kizzia	1003
July 14, 1998	Team tallies disaster's toll – Poor fishing report due to Knowles	Helen Jung	510
July 23, 1998	Yukon salmon returns low	None	216
July 31, 1998	Knowles offers disaster aid funds – Lawmakers line up behind \$19 million for Western Alaska	Helen Jung	869
February 9, 1999	Fish council cuts salmon bycatch	Ben Spiess	692
February 21, 1999	Fishing disaster aid available	None	136
July 3, 1999	Western chum harvest restricted	Tom Kizzia	758
July 19, 1999	Western chum run falls short – Commercial season called off on Kuskokwim	Tom Kizzia	388
July 21, 1999	Kaltag tells officials of chum failure	Tom Kizzia	892

July 8, 2000	Yukon salmon fail to show – Knowles may seek disaster aid due to near-record lows	David Whitney	410
July 12, 2000	Drastic salmon limits set – King subsistence cut on empty Kuskokwim salmon	Elizabeth Manning	502
July 14, 2000	Runs might be disaster	None	191
July 15, 2000	Poor runs bring salmon fishing bans	None	137
July 30, 2000	Fight over fish – Industry hits Knowles’ plan	Wesley Loy	1054
August 4, 2000	Feds declare fishing disaster in Western Alaska	None	361
December 23, 2000	Fishery fight fueled – Biologist: Chum runs are healthy	Wesley Loy	645
January 30, 2001	Area M report suggests change – Disaster: But it doesn’t endorse specific solutions for reviving the chum runs	Wesley Loy	490
February 27, 2001	Feds to fund fish studies – Subsistence: Money will be used to seek better management of rural Alaska fisheries	Elizabeth Manning	386
April 4, 2001	U.S., Canada end deadlock over Yukon River salmon	None	160
May 6, 2001	Deadly salmon parasite found – Threat: Ichthyophonus kills Yukon fish, makes flesh unappealing, scientist finds	Craig Medred	1361
May 13, 2001	Feds’ fisheries acts may threaten heart of tourism in Bush	Craig Medred	967
June 21, 2001	Yukon River subsistence salmon fishers see more restrictions	None	158
July 29, 2001	Salmon netting banned on lower Yukon River	None	130
August 14, 2001	Feds lift Yukon chum restrictions – Priority: Run still not judged strong enough for commercial fishing	Elizabeth Manning	480
August 25, 2001	Fisheries hit disaster status –	Martha Bellisle	825

	Farmed fish, Japan recession lower prices for Alaska's commercial catch		
September 2, 2001	Another disaster – Dismal salmon runs coupled with low prices stun Western Alaska villages	Elizabeth Manning	2846
September 2, 2001	State and federal managers don't always agree when it comes to subsistence	Elizabeth Manning	475
November 24, 2001	Officials thought ad looked a little fishy – Subsistence: Claim that salmon came from Yukon River is apparently false	Elizabeth Manning	275
June 5, 2002	Fishing changes under federal oversight – Western Alaska: Subsistence fishermen adapt to 'windows'	Tom Kizzia	944
June 20, 2002	State OKs Yukon king harvest – Commercial: Biologist says 20,000 fish can be taken	AP	256
June 23, 2002	Weak runs cut down Yukon bag limits	None	61
July 2, 2002	Western salmon fill rivers – Comeback: Locals hit water as fish stage best return in years	Joel Gay	293
August 24, 2002	Alaska fishermen get state aid – Knowles: Western Alaska fisheries declared economic disaster area for fifth time in six years	Joel Gay	776
September 1, 2002	Yukon, Koyukuk river dipnet fisheries OK'd	AP	261

APPENDIX 2:

GEORGES BANK COD HARVEST DATA

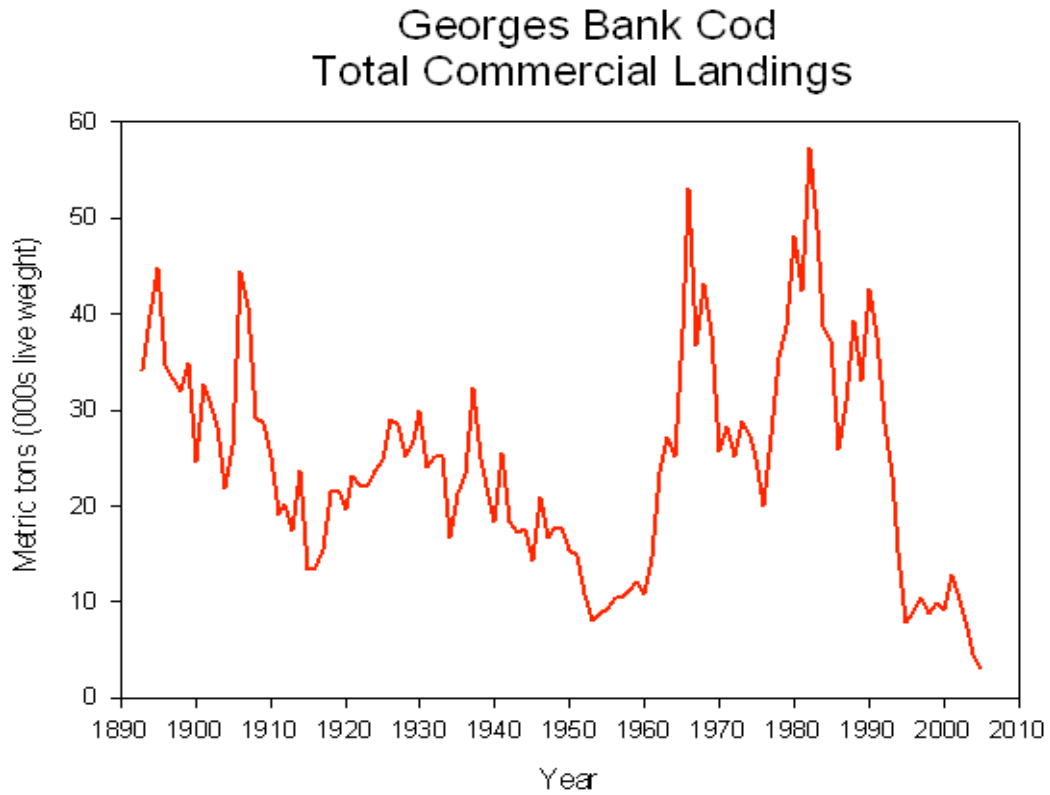
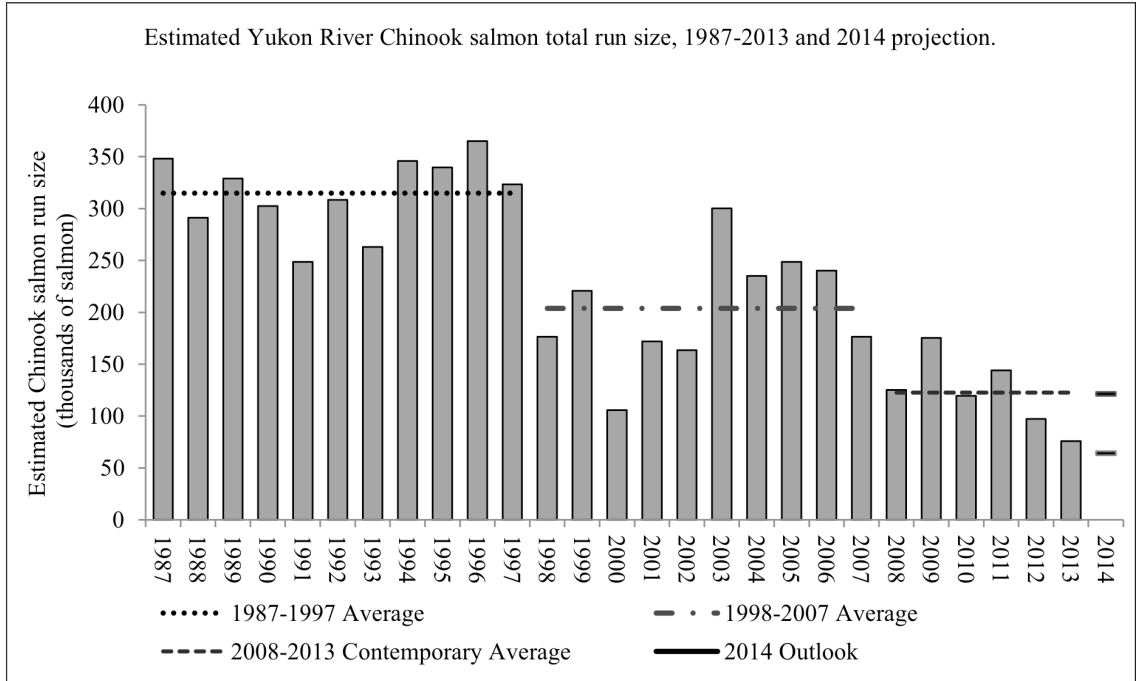


Figure 1.11 Total commercial landings of Georges Bank cod (NAFO Div. 5Z and Subarea 6), 1893-2005.

(from Mayo and O'Brien, 2006)

APPENDIX 3:

ANNUAL ESTIMATIONS OF YUKON RIVER KING (CHINOOK)
SALMON TOTAL RUN SIZE



Alaska Department of Fish and Game. 2014 Yukon River Salmon Fisheries Outlook.

APPENDIX 4:
CODING GUIDE

Explanations for how to complete each section of the coding sheet.

1. Write the headline of the article
2. Write the publication date of the article
3. Write the number of words in the article. This should be listed in the heading of each article, under the headline. You should not have to count the words manually.
4. Write the name of the publication
5. Write the name or names of the authors of the article. If no name is provided, then note “no name provided”. Some articles might be attributed to “news staff” or “Globe staff” or something similar to that. If so, write that in this space.

How to score a story using the coding table

The purpose of this study is to detect and quantify framing as it exists in a population of newspaper stories about fishing. Framing is a communication tactic in which certain information is selected and given prominence in a story, acknowledging that media producers have a choice, story by story and line by line, in what information they present and what they ignore or minimize. More specifically, this study looks for examples of an economy frame and examples of an ecology frame within each story. In general, the economy frame attempts to portray

the human dimension of fishing activity, and role of money and capital in the management and harvesting of fish stocks. The ecology frame, on the other hand, focuses on the ecosystem and a fish stock's overall population size, health, and relationship to other organisms.

Identifying frames in a consistent manner across the population is critical to insuring that this study arrives at valid and reliable results. But this is not a simple task, because frames are not self-evident, and recognizing them requires at least a bit of subjective judgment.

To guide the process of frame identification, this study uses an approach put forth by Matthes and Kohring (2008), which asserts that frames can be defined and understood as the sum of frame elements. The coding chart contains 16 frame elements for each frame type featured in this study (economy and ecology). The coder's job is to recognize these frame elements in each news story, wherever they might occur.

These frame elements do not have to, and likely never will, appear verbatim in order to count in the coding process. Instead, the coder must recognize what kind of information or message is being conveyed in each unit of analysis. The unit of analysis will be "the meaningful proposition," consisting of at least a noun and a verb and other descriptive words that convey a single coherent piece of information. Sometimes there might only be one meaningful proposition in a single sentence, and in other cases a sentence might contain two or more propositions.

For example, the following sentence contains only one meaningful proposition:

Yukon River commercial fishermen hauled in 25 percent fewer king salmon this year compared to last year.

This sentence, however, has two meaningful propositions:

Yukon River commercial fishermen hauled in 25 percent fewer king salmon this year compared to last year, and many complain that they will not be able to pay off loans related to their fishing activity.

The comma separates the two distinct propositions in the latter example.

In terms of scoring on the coding sheet, the first example sentence would receive one tally in the economy frame column, because it refers to “decreased catch volume”. The second example would receive two tallies in the economy frame column, because it describes “decreased catch volume” in the first proposition, and “economic struggle of fishing communities” in the second proposition.

It is important to remember that this study is measuring the terms and concepts that appear in print, and not the political or philosophical opinions of the people who wrote or said certain words. The placement of a frame element into one category or another has more to do with the terminology used by journalists to describe and present some information about fisheries in collapse. For example, proponents of environmental protection and reduced fishing effort might use economic terminology and concepts (i.e., a tax on commercial fishing catches) in a list of policy prescriptions for restoring a collapsed fishery. But such usage, if it appeared in a newspaper article under scrutiny in this research, would be counted as an instance of the economy frame, due to the terms and concepts overtly stated.

The implicit political connotations and affiliations of words, phrases and concepts are not to be measured here.

In addition to the main body of each article, please analyze the headline, captions, and any subheadings that are included in the digital copy of the story that you are scoring.

When you are finished scoring each article, please count the total number of tallies in each column (economy and ecology) and enter that information on the front side of the coding sheet.

APPENDIX 5:

CODING SHEET

1. Headline of article _____
2. Date of article _____ 3. Number of words _____
4. Newspaper _____
5. Reporter name on the byline _____

FLIP OVER FOR THE TALLY SHEET, WHERE YOU WILL SCORE THE STORY.

AFTER SCORING THE ARTICLE ACCORDING TO THE RULES OF THE TALLY SHEET, PLEASE INDICATE:

- Number of economy frame indicators (left column) detected: _____
- Number of ecology frame indicators (right column) detected: _____
- Total number of frames detected: _____
- Percentage of economy frame: _____
- Percentage of ecology frame: _____

-Were both types of frame indicators (economy and ecology) present in the article?

Yes _____ No _____

-Was only one type of frame indicator present in the article?

Yes _____ No _____

-Were no frame indicators present in this article?

Yes _____ No _____

Place a tally next to each frame indicator for each time that you detect it in the story.

	BELONGS TO ECONOMY FRAME	BELONGS TO ECOLOGY FRAME
Problem definition	Decreased income for fishers	Decreased fish population
	Decreased catch volume	Changes in average size of fish
	Decreased catch value	Decreased recruitment of juveniles reaching adulthood
	Economic struggle of fishing communities	Disruption of marine food web (impacts on predator or prey species of the target fish)
Causal interpretation	Overcapacity (too many boats)	Habitat destruction by trawlers or other fishing activity or pollution
	Financial / governmental incentives for overharvest	Fishing occurred at levels above maximum biological limit
	Illegal fishing	Ecosystem change / climate change
	Bad or missing data about the fishery	Increased predation at sea
Moral evaluation of causal agents	Fishers neglected the risk of overharvesting	Fishers/regulators don't value the ocean ecosystem
	Fish buyers/processors are greedy	Fishers/regulators underestimate the impact of fishing on ecosystems
	Regulators are ineffective, corrupt, or closely tied to industry	Natural booms and busts in the fish population are unavoidable
	Outsiders/foreign fishermen are cheating	Cannot evaluate until more is known about ecological factors
Treatment recommendation	Government assistance / reduce financial effects of decline to fishers	Reduced catch limits and/or shorter harvest periods
	Shift fishing effort to other species to allow for continued fishing revenue	Protect entire food web, not just collapsed species
	Taxation and other financial incentives or disincentives to reduce overharvest	Gear restrictions or bans (e.g., banning bottom trawls)
	Develop other industries / diversify economy	Marine preserves / areas closed to fishing

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