Bureaucratic Impediments to Collaboration: A Case Study of the Asian Carp and the Great Lakes Basin

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Abstract

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Silver carp and bighead carp, also known as Asian carp, were first imported to the United States in the early 1970s for use in aquaculture, research, and waste management; however, these species escaped to the Mississippi River basin in various flooding incidents by 1980s. Both species have now spread throughout much of the upper Mississippi River system. In the Illinois River, commercial fishing operations harvested over 5 million pounds of bighead and silver carp from the Illinois River in 2009. Depending on its life stage, Asian carp will eat between 5-20% of its body weight daily in plankton, and adult Asian carp can weigh more than 25 kg. Almost all native fish in the Great Lakes Basin depend on plankton for at least part of their life cycle, so an established population of Asian carp will have profound effects on the ecosystem. Moreover, the presence of silver carp in a waterway poses a serious risk to boaters, since these fish have excellent hearing and leap 8-10 feet into the air when startled and have caused bruises, concussions, and broken bones when the carp have collided with humans. Natural resource managers are concerned about the possible introduction of bighead and silver carp to the Great

Lakes Basin through the Chicago Area Waterways System. In response to the potential introduction of Asian carp species to the Great Lakes, the Obama Administration formalized the Asian Carp Regional Coordinating Committee (ACRCC) in 2010.

This thesis studies the relationship between the organizational structure of the ACRCC's member agencies and these agencies' efforts to work together. One hypothesis is that agencies key to ACRCC efforts exhibit fewer characteristics of a bureaucratic organization; an alternate hypothesis is that the agency's calculation of the costs of and benefits resulting from collaboration explain its decision to collaborate or not. Data was gathered through elite interviews with agency representatives who attend ACRCC meetings. Interview questions were designed to gather insights into several different aspects of the agencies involved and the ACRCC in general, including the structure of each participant's agency, the participant's agency's role in the ACRCC as well as the roles that other important agencies play in the ACRCC, and the effectiveness of the ACRCC as an organization, together with any factors that aid or detract from the ACRCC's goal. The questions were designed to be general, to allow each participant's perceptions of the ACRCC to guide our discussion. The open nature of the questions and the resulting responses led to the creation of the second hypothesis midway through the interviews.

Data supported both hypotheses: some correlation was found between the levels of collaboration and the levels of bureaucratic characteristics as predicted by the first hypothesis, especially in federal agencies. There was also support for the second hypothesis, particularly for state agencies. These costs and benefits included jurisdictional issues and access to resources (whether these aspects were considered costs or benefits depended on the circumstances organizations were faced with), as well as concerns about the costs associated with the continued

spread of Asian carp. However, given the limits of this study it is not possible to conclusively prove one hypothesis over the other. Interview responses also provided information about the level of collaboration for the ACRCC as a whole. The organization provides a forum for communication about the issue among its members, but the ACRCC does not yet appear to rise consistently to the level of true coordination. Due to the limitations of this study, it is not possible to make predictions about future collaborative efforts in the ACRCC. Further studies are necessary to gather more information before such predictions can be reliably made.

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Introduction

There is a large literature in Public Administration and Public Policy that explores both organizational structure and collaboration. In this introduction, I first explore the literature on collaboration, focusing particularly on interagency collaboration, and then I examine the literature on bureaucracies. After outlining the theory behind these concepts, I introduce my case study, the possible introduction of Asian carp species to the Great Lakes basin and a broad multi-agency, multijurisdictional effort to stop it. Finally, I propose several hypotheses regarding the responses of government agencies to the Asian carp issue in light of these agencies' organizational structures.

Interagency Collaboration

To avoid confusion, I will start by discussing the terms *cooperation*, *coordination*, and *collaboration*; although all three terms are used to describe joint efforts between two or more entities, the literature highlights important differences between these terms. The first term, *cooperation*, has been defined by Schermerhorn as "deliberate relations between otherwise autonomous organizations for the joint accomplishments of individual operating goals" (Schermerhorn 1975 in his synthesis of the literature on interorganizational cooperation). Coordination is a distinct, though related, concept. *Coordination* is defined by Rogers and Whetton as "the process whereby two or more organizations create and/or use existing decision rules that have been established to deal collectively with their shared task environment" (Rogers and Whetton, 1982). Alternatively, Kenchington and Crawford state that "[a] coordinated system involves independent, generally equivalent components working to a common purpose" (Kenchington and Crawford, 1993). From the definitions above, the differences between these

two concepts become more apparent: in cooperation, organizations attempt to achieve their own independent goals through interactions with each other. However, in coordination, organizations participate in joint efforts in order to better manage shared tasks, which may be different from an organization's individual goals and/or outcomes. Furthermore, Rogers and Whetton suggest that personnel involved in coordination activities tend to be at a higher level in their organization compared to personnel involved in cooperation activities because coordination activities affect organizations (Rogers and Whetton, 1982).

Collaboration is a more general term than either cooperation or coordination and has been discussed by a number of authors. For example, *collaboration* is defined by Bardach as "any joint activity by two or more agencies that is intended to increase public value by their working together rather than separately" (Bardach 1998). Huxham and Vangen define collaboration as "any situation in which people are working across organizational boundaries towards some positive end" (Huxham and Vangen 2005). These definitions encompass a wide range of agency interactions, including cooperation and coordination. For the purposes of this thesis, I focus on collaboration as a phenomenon because it is the most general of the three terms and thus most likely to capture any relevant interactions between agencies.

The concept of integration is closely related to the above terms; in the area of marine policy, Cicin-Sain and Knecht suggest using a continuum to describe varying degrees of integration, in which "to integrate…means to put parts together into a whole" (Cicin-Sain and Knecht 1998). Bardach's definition of collaboration is comprehensive enough to use in conjunction with this continuum, which can then be used to describe varying levels of collaboration (Kuska 2005). See Figure 1 for a reproduction of this framework.

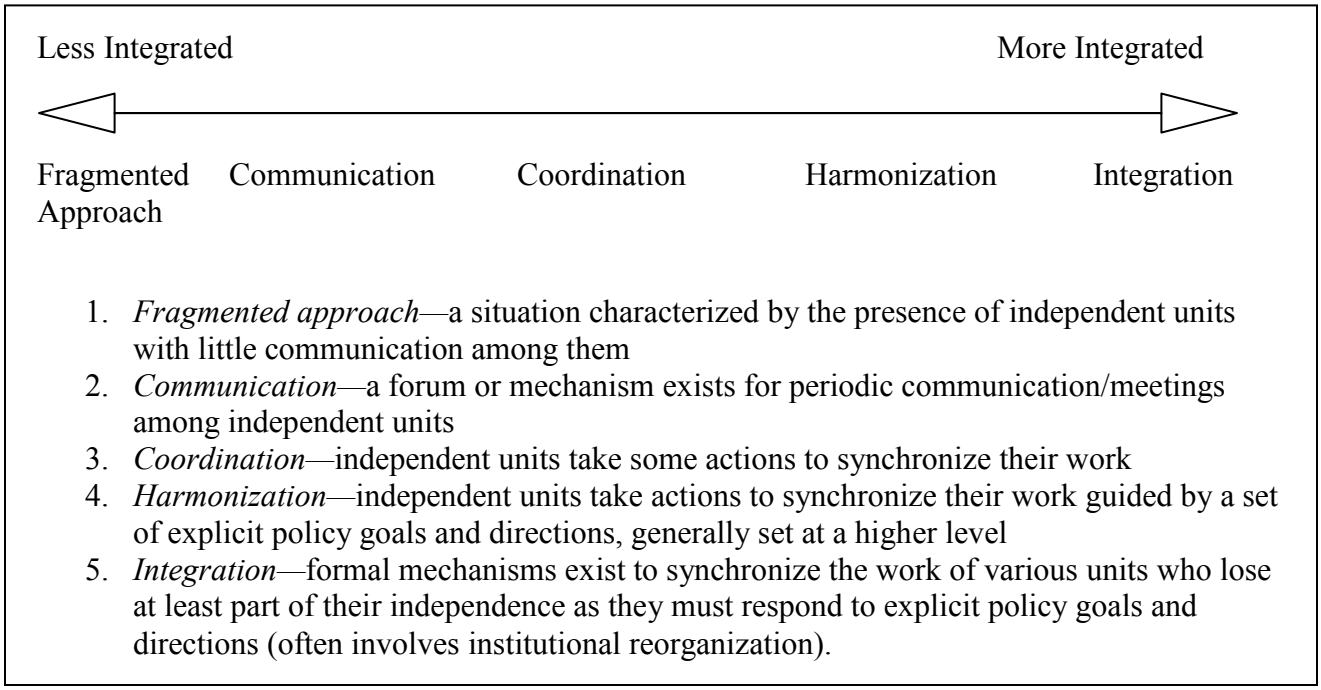

Figure 1: Continuum of Policy Integration (Source: Cisin-Sain and Knecht 1998)

Organizations collaborate to gain some sort of benefit, and the exact nature of this benefit is extensively discussed in the literature. Incentives for collaboration include financial advantage, professional values, political advantage, problem solving, reduction of uncertainty, and compliance with the law (Weiss 1987). Other motivating factors include leaders that want collaboration between agencies and actively pursue this collaboration with other important actors (Gans and Horton 1975), powerful external forces that demand collaboration, organizations that have shortages of resources or that are not performing effectively (Schermerhorn 1975), providing public services seamlessly, and even a moral imperative for agency collaboration on important issues that cannot be solved by any one agency acting alone (Huxham and Vangen 2005).

In his book *Getting Agencies to Work Together,* Bardach analyses interagency collaborations, particularly how these collaborations begin and develop. He states that despite numerous possibilities for beneficial (in that collaboration would produce cost savings and/or improve agency performance) joint efforts between agencies, many of these opportunities are not taken. Agencies choose not to pursue collaboration for several different reasons, including challenges inherent in collaborative efforts, limited resources (both in terms of funding and personnel), protection of organizational autonomy, and a lack of talented, motivated leaders and legitimacy (Bardach 1998). Thus, agencies may choose to collaborate with other organizations if the perceived benefits in cost savings and enhanced performance outweigh the costs in resources and autonomy necessary for such efforts; agencies may choose not to collaborate if these costs are seen to outweigh the possible benefits.

Marine policy (in keeping with United States federal policy practices, here I use marine policy to mean any policy affecting the United States exclusive economic zone (EEZ), the coastal areas, or the Great Lakes) is not cohesive in the United States (Pew Oceans Commission 2003). Due to the nature of the marine environment, the EEZ and the Great Lakes have a number of national, state, provincial, and local political boundaries imposed upon areas with species and environments that span across these boundaries. A number of federal, state, and local agencies often control various aspects of a particular problem (for example, an oil spill that stretches across state borders and comes from a foreign vessel), a particular habitat in need of protection, or a particular species (such as migratory species, e.g. salmon or tuna). Thus, marine issues are often subject to several (and possibly many) different agencies with jurisdiction over disparate pieces of the topic. In response to this multi-jurisdictional characteristic of marine issues, a number of authors have highlighted both the need for an integrated marine policy (Chua, 1993;

Kenchington and Crawford, 1993; Pew Oceans Commission, 2003), as well as the use of collaborative partnerships to address watershed issues (Rabe, 1996; Bidwell and Ryan, 2006).

Bureaucracy

Around the turn of the last century, agencies were structured to be bureaucratic; however, this does not imply that these agencies were structured badly. Instead, the characteristics of bureaucracies were a solution to the earlier practice of allowing political appointees to run agencies despite a lack of knowledge or skills necessary for such a task, which led to inefficiencies and corruption (Sabatier, et al. 2005). In contrast to the structures of earlier agencies, bureaucratic organizations are hierarchically structured and staffed by trained personnel. Personnel in a bureaucracy are qualified for the positions that they hold in the organization through their educational background, and these employees pursue careers in the organization (Weber 1946). Historically, the Forest Service was an example of such organization; employees were hired based on their education and skill set and were then trained by the organization to perform their jobs as higher levels of management preferred (Kaufman 1960). However, starting in the 1960s, new trends in forest management and environmental policy made it difficult for the Forest Service to operate under its traditional organizational structure. For example, a number of laws enacted in the 1960s and 1970s (such as the Multiple Use-Sustained Yield Act of 1960, the Surface Mining and Minerals Act of 1970, and the Endangered Species Act of 1973) expanded the jurisdiction of the agency while other laws changed procedures for implementing policies (such as the National Environmental Policy Act of 1969). These changes caused the Forest Service to "debureaucratize" or to reduce the bureaucratic characteristics present in the organization (Tipple and Wellman 1991). Bureaucracies are very effective in implementing policies that are specific responses to narrowly

defined problems. Once a bureaucracy is established for a particular purpose, the organization is resistant to change—for example, when the Forest Service was confronted with new challenges outside of its original mandate, the agency was not able to change course swiftly to respond to new conditions. (Tipple and Wellman 1991)

Downs further explored the theoretical basis for bureaucracies in 1965. He states that an organization is a bureau if it has the following characteristics: the size of the organization prevents senior officials from personally knowing a majority of employees; most people in the organization are employed full time; hiring and promotion practices are grounded in performance, training, and/or elections; and the majority of the organization's output is not traded in markets (which means that the organization cannot use profits as a measure of its success) (Downs 1965). According to the above parameters, all federal and state government agencies (as well as many local government agencies) are bureaucracies.

The theory that Downs suggests also produces several laws of bureaucracy, including Downs's Third Law that "Unrestrained conflict at any given level of a hierarchical structure shifts power upwards" (Downs 1965) and Downs's Fourth Law that "Any attempt to control one complex organization tends to generate another" (Downs 1965). In addition to the universal statements expressed in Downs's Laws, Downs also lays out several hypotheses that are true of many, but not all, bureaucracies. Some of these hypotheses are that bureaucracies tend to choose "policies which are simpler, more conservative, narrower in their effects, and less cognizant of uncertainty" (Downs 1965), especially when policy selection is urgent; bureaucracies are structured as hierarchies; given the high costs associated with changing a bureaucracy (especially due to its size), these organizations rationally choose to resist change most of the time; and bureaucracies are territorial over their policy areas and will defend that area against other

organizations, particularly when overlapping jurisdictions are an issue (Downs 1965). Overall, these statements suggest that bureaucracies will select targeted, straightforward policies to implement, and once the selected policies are in place, the organization will resist any attempt to change course or to cede management of the policy area.

Although the term "bureaucracy" has often been used as a negative term in the past, these organizations do have positive roles to play. Research into the performance of agencies suggests that bureaucracies can be efficient and effective (for example, Brewer and Seldon 2000; Stazyk and Goerdel 2010). However, traditional bureaucracies are unable to effectively address "wicked problems"—or issues without an agreed upon problem definition and no clear solution—thus requiring collaboration to deal with these complex issues (O'Toole 1997; McGuire 2006). Unfortunately, agencies that have more bureaucratic characteristics are less likely to collaborate (Thomas 2003).

As discussed previously, marine issues tend to be complex because they often span political boundaries and can involve a number of agencies at different levels of government. The next section discusses one such complex issue, the possible introduction of Asian carp species to the Great Lakes Basin.

Invasive Species and the Great Lakes Basin

Since 1800, at least 140 invasive species have become established in the Great Lakes Basin (National Research Council 2008). There have been a variety of introduction vectors, including artificial canals, transport via ballast water, and intentional release of species. The connection between the Great Lakes and the Mississippi River basins is now threatening to allow several new invasive species, collectively known as Asian carp, into Lake Michigan and beyond.

Four Asian carp species—the grass carp (*Ctenopharyngodon idella*), the bighead carp (*Hypophthalmichthys nobilis*), the silver carp (*Hypophthalmichthys molitrix*), and the black carp (***Mylopharyngodon piceus)—***were introduced into ponds and aquaculture pens in the southern United States between 1963 and 1999. Asian carp were imported for use in a variety of industries, including research, aquaculture, and waste management; depending on the species, these fish can be used to control the amount of plankton or parasitic snails in aquaculture ponds and to control the amount of nuisance aquatic vegetation in waterways. Because these species were considered to be an environmentally friendly alternative to chemical pesticides, they were imported by not only private businesses but also government agencies, including the USFWS, the USEPA, and the Arkansas Game and Fish Commission. The first known accidental release of grass carp was in 1966 near Stuttgart, Arkansas (Kelly 2011). Grass carp were also intentionally stocked in a number of open water systems (ponds that connect to rivers, streams, and lakes) stating in the 1970s by various government and private entities; grass carp are often used as a biological control for nuisance aquatic plants (USGS 2011). Grass carp currently have the greatest North American range of the four species. They have been reported in 45 states, and have established breeding populations in at least eight states, including populations in the Illinois River. There have been confirmed grass carp captures in Canadian waters in Lake Huron and Lake Ontario, indicating that the species has also been present in Lake Michigan and Lake Erie. Grass carp prefer to feed on aquatic plants, and can consume up to 45 kg of plant matter per day (USGS 2011), which can result in significant ecological impacts.

Black carp were first imported to the United States accidentally in a shipment of grass carp sent to an Arkansas fish farm (young grass carp are very similar in appearance to young black carp). This species was later imported intentionally as both a food fish and as a biological

control for an aquaculture parasite. Flooded hatchery ponds near the Lake of the Ozarks in 1994 resulted in the release of at least 30 black carp and several thousand bighead carp into the Osage River (tributary of the Missouri River) (USGS 2011). Black carp have the smallest North American range, with confirmed reports in Louisiana, Mississippi, Arkansas, Missouri, and Illinois (USGS 2011). The most recent capture on the Mississippi River was a black carp caught in Pool 25 (near Hamburg, IL) on July 1, 2010 (USGS 2011). The introduction of black carp is not seen as an immediate threat to the Great Lakes Basin; however, they do pose a threat to the areas of the Mississippi River where they currently inhabit. Black carp prefer to feed on freshwater mussel and clam species, and thus will likely have a detrimental effect on the native species in the watershed, many of which are currently listed as threatened or endangered under the Endangered Species Act (Nico, et al. 2005).

Silver carp were first imported to the United States by a commercial fish farmer in Arkansas in 1973; silver carp were found in open water systems by 1980, likely as the result of escapes from their original enclosures in various incidents (USGS 2011). Silver carp have now spread throughout much of the upper Mississippi River system; in the Illinois River, commercial fishing operations harvested over 5 million pounds of bighead and silver carp from the Illinois River in 2009.[1] Adult silver carp reach an average weight of 27 kg (USGS 2011) and are voracious feeders that eat plankton. Depending on its life stage, a silver carp will eat between 5-20% of its body weight daily. Studies have already detected a decline in the general health of gizzard shad (*Dorosoma cepedianum*) and bigmouth buffalo (*Ictiobus cyprinellus*) (native planktivore fish species) in the Illinois River; the data further suggest that this decline is likely

[1] Information gathered by the Commercial Fishing Program in the Illinois Department of Natural Resources and provided by Rob Maher on September 19, 2011. Illinois reports the catch of both bighead and silver carp together as "Asian carp".

due to established populations of bighead and silver carp in the same waterway (Irons, et al. 2007). Almost all native fish in the Great Lakes Basin depend on plankton for at least part of their life cycle, so an established population of silver carp will have profound effects on the ecosystem. Moreover, the presence of silver carp in a waterway poses a serious risk to boaters, since these fish have excellent hearing and leap 8-10 feet into the air when startled. Silver carp have knocked boaters out of watercraft and have caused bruises, concussions, and even broken jaws to the people that they have collided with.

Bighead carp were also imported by a commercial fish farmer in Arkansas in 1972, and by 1981 were reported in the Ohio and Mississippi Rivers. Similar to the silver carp, bighead carp likely escaped from aquaculture pens in flooding incidents and then spread to adjacent natural waterways. The species has now spread throughout much of the upper Mississippi River system (USGS 2011). Its eating habits are very similar to the silver carp, although adult bighead carp tend to be larger, with an average weight of 40 kg (USGS 2011). The presence of bighead carp in the Great Lakes, should they enter the system, will likely cause significant ecosystem shifts (Kolar, et al. 2005).

Computer models may be able to predict the future extent of Asian carp species' ranges. Herborg, et al. used ecological niche modeling to predict suitable environments for the grass, silver, bighead, and black carp in North America; these models were based on the Genetic Algorithm for Ruleset Prediction (GARP), which has been widely used and tested in the field of biogeography. A variety of climatic, topographic, and hydrologic variables that were hypothesized to describe the species niche were entered into the program, and the resulting model was used to test the species native range in Asia. Models that were found to accurately predict the species native range were then used to predict the expected range in North America.

These models predict that the environment throughout most of the continental United States and southern Canada is suitable for grass and silver carp. Moreover, the models predict that bighead and black carp will not spread as far north into Canada or as widely throughout the Rocky Mountain area, but they would spread across the eastern half of the United States and as far north as the Great Lakes and the St. Lawrence Seaway (Herborg, et al. 2007).

Pingfu Chen has also developed models using GARP that are designed to predict the maximum range that Asian carp species will be able to inhabit in North America. These models predict that the major tributaries in the Mississippi River basin will provide silver carp with sufficient habitat to become established and are likely to extend into southern Canada; however, bighead carp are not predicted to establish permanent populations north of Missouri (Chen, et al. 2007). The grass and black carp are projected to spread throughout most of the Mississippi River Basin and the Great Lakes (Chen 2008). Although the two sets of models do not perfectly correlate with each other, they both suggest that silver, grass, and black carp could ultimately establish permanent populations throughout the Mississippi River system and the Great Lakes Basin.

Natural resource managers are concerned about the possible introduction of bighead and silver carp to the Great Lakes Basin from the Mississippi River system in Chicago, where the two ecosystems are connected. The Great Lakes basin is connected to the Mississippi River system in the Chicago area by two canals: the Chicago Sanitary and Ship Canal (CSSC), which was constructed between 1892 and 1900, and the Calumet-Sag Canal (CSC), which was built between 1911 and 1922. Both canals were dug by what is now the Metropolitan Water Reclamation District. The CSSC runs between the South Branch of the Chicago River in Chicago and the lower Des Plaines River at Joliet, IL. The CSC runs between the CSSC and the

Little Calumet River. This system of canals reversed the flow of both the Chicago River and the Calumet River, so that both now flow away from Lake Michigan. In 1933, the Army Corps of Engineers began operating the lock at Lockport on the CSSC when the canal became part of the Illinois Waterway. This system of canals and natural waterways allows for navigation between the Lake Michigan and the Illinois River (a major tributary of the Mississippi River); with this system, ships can travel from the St. Lawrence Seaway to the Port of New Orleans on internal waterways (Great Lakes Navigation System Review, USACE). This pathway between the Mississippi River and Lake Michigan is the major connection point between the two systems, which has made Chicago the focal point for efforts to prevent Asian carp species from entering the Great Lakes.

These species are currently present in the Illinois River in large numbers, raising concerns that they will enter the Great Lakes through the Chicago Sanitary and Ship Canal. If these species enter Lake Michigan, they will negatively affect other fish species by consuming large amounts of the available plankton. Thus, the presence of silver and bighead carp will likely limit the commercial and recreational fisheries (valued at $7 billion per year) in the Great Lakes, the recreational boating industry (an estimated annual economic impact of $3,798,000,000 (Great Lakes Commission 2004)), and may pose additional risks to the Great Lakes ecosystem and to surrounding communities.

Attempted Legal and Political Solutions

Since 2010, there have been several lawsuits filed by Michigan and several other Great Lakes states against the state of Illinois, the Metropolitan Water Reclamation District, and the Army Corps of Engineers. One lawsuit sought to reopen a case, *Wisconsin v. Illinois*, which was

decided by the Supreme Court in 1922; the original issue was the amount of water that could be diverted by the CSSC from the Great Lakes. In addition to the petition to reopen the main case, two preliminary injunctions were filed asking the Court to force the Army Corps to close the O'Brien Lock and Dam and the Chicago Controlling Works on the CSSC. According to the plaintiffs this would be the most effective way to prevent Asian carp from entering Lake Michigan, but the defendants argued that closing the canal to ship traffic would impose large economic losses and would impede Chicago's ability to prevent flooding in the event of a storm on Lake Michigan. The Supreme Court rejected both preliminary injunctions and declined to reopen the original case (Nelson 2010). The case was then filed in District Court, which found for the defendants (the Metropolitan Water Reclamation District, the Army Corps of Engineers, and the State of Illinois) (Vicini 2012).

Another lawsuit asked the courts to compel the Army Corps to complete the Great Lakes Mississippi River Interbasin Study (GLMRIS) more quickly (Associated Press 2011). Congress initially authorized GLMRIS in the Water Resources Development Act of 2007; the legislation calls for the Army Corps to complete a comprehensive analysis of all options to prevent the spread of aquatic invasive species between the Mississippi River and Great Lakes basins (USACE 2011). The Army Corps expects to finish GLMRIS in 2015 (USACE 2012). To date, the courts have not granted any preliminary injunctions in this case, though there is still the possibility of future legal action (Hall 2011).

Congress has passed several pieces of legislation that have affected efforts to stop the Asian carp. In October 1996, Congress passed an amendment to the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990; part of this law, The National Invasive Species Act, authorized the Army Corps to build a demonstration electric dispersal barrier. This barrier

was designed to allow water and vessels to move freely through the waterway, but to prevent fish species from passing by sending an electric current through the water column. In addition to the demonstration barrier, there are two other electric dispersal barriers in the CSSC. These barriers are located about 25 miles from Lake Michigan. The Army Corps is responsible of the construction, operation, and maintenance of these barriers; the demonstration barrier has been operational since 2002, and the second barrier was brought up to full time operation in 2009.

Additionally, Congress passed the Asian Carp Prevention and Control Act in 2010, which added bighead carp to the list of injurious species under the Lacey Act. (The USFWS had decided not to list the bighead carp because of the species' use in aquaculture.) This listing prohibits interstate transportation of importation of live bighead carp without a permit. The US Fish and Wildlife Service is responsible for both listing species and enforcing the Lacey Act. The Fish and Wildlife Service began the listing process for black carp in 2000 and for silver and bighead carp in 2002 after receiving petitions to start the process; however, all three species' listings were in an internal review process for years (Fowler, et al. 2007). The silver and black carp were listed administratively under the Lacey Act in 2007 (DOI 2007).

The US Fish and Wildlife Service and the Aquatic Nuisance Species Task Force organized the Asian Carp Working Group to develop a comprehensive national strategy for Asian carp. This working group, which included representatives from the fishing and aquaculture industries, agency personnel, and scientists, released its plan in October 2007. The plan emphasizes the prevention of future releases of Asian carps, the development of alternatives for the use of Asian carp species in aquaculture, and the control of extant populations of these species, through harvesting operations and potential carpicides. The projected implementation

cost of this plan is $286 million over 20 years (Conover, et al. 2007). This plan is considered to be comprehensive and likely effective if implemented, but it is currently not funded (ID-6).

Asian Carp Regional Coordinating Committee

In 2009, the Illinois DNR asked the EPA to review its rapid response plan in the event that Asian carp are detected above the electric dispersal barriers (ID-12). This joint effort then grew as more agencies became involved in efforts to stop the spread of Asian carp. Eventually, the ad hoc effort also included the US Coast Guard, the US Army Corps of Engineers, and the City of Chicago (ID-9), and was modeled after interagency rapid response teams (ID-12).

The Obama administration appointed John Goss to be the Asian Carp Director for the Council on Environmental Quality on September 8, 2010 (White House 2010). As the Asian Carp Director, John Goss chairs the Asian Carp Regional Coordinating Committee (ACRCC), which consists of federal, regional, state, and local agencies. The ACRCC formalized the existing interagency effort among the federal agencies and the Illinois DNR; states throughout the Great Lakes were also asked to join in the effort. The mission of the ACRCC is to "create a sustainable Asian carp control program to prevent introduction and implement actions to protect and maintain the integrity and safety of the Great Lakes ecosystem from an Asian carp invasion via all viable pathways" (ACRCC 2011). Table 1 lists the agencies that form the ACRCC.

Table 1: Federal, State, and Local Members of the ACRCC

Agency	Authority	Jurisdiction	Role
City of Chicago	Municipal	Home rule authority within the city limits of Chicago	Supports other agencies, especially actions within Chicago
Great Lakes Fishery Commission	Bi-lateral treaty	Management of fisheries in the Great Lakes	Fisheries management and research
Illinois Department of Natural Resources	State	Natural resources in Illinois	Lead agency for monitoring, sampling, fish removal, and rapid response actions
Illinois Environmental Protection Agency	State	Protect environmental quality in Illinois	Protect aquatic life, recreation, and drinking water in rivers and lakes
Indiana Department of Natural Resources	State	Natural resources in Indiana	Lead agency for monitoring, sampling, fish removal, and rapid response actions
Metropolitan Water Reclamation District of Greater Chicago	Regional	Operation of the Chicago Area Waterways in the metropolitan Chicago area	Supports the work of other agencies and takes actions allowed by its authority
Michigan Department of Natural Resources	State	Management and protection of fishery resources and protection of aquatic habitat in Michigan waters	Lead agency for monitoring, sampling, fish removal, and rapid response actions
Michigan Office of the Great Lakes	State	Prevent aquatic invasive species in Michigan's waters in the Great Lakes	Policy development and program implementation the protect the Great Lakes
Minnesota Department of Natural Resources	State	Conserve and manage Minnesota's natural resources for recreational and commercial uses	Manage fish and wildlife resources
National Oceanic and Atmospheric Administration	Federal	Technical assistance and research programs that support coastal zone management	Funding research
New York Department of Environmental Conservation	State	Conserve and protect New York's natural resources and environment	Lead agency for the prevention and control of invasive species in state waters
Ohio Department of Natural Resources	State	Protection and management of Ohio's natural resources	Lead agency for fish monitoring and rapid response actions in state waters
Pennsylvania Department of Environmental Protection	State	Protection of Pennsylvania's lakes, rivers and streams	Issuing permits for piscicides and monitoring for Asian carp
Pennsylvania Fish and Boat Commission	State	Management of all aquatic organisms in Pennsylvania's waters	Lead responsibility for initiating the state AIS rapid response plan

(Source: Asian Carp Regional Coordinating Committee website, located at [http://www.asiancarp.us/aboutus.htm])

Table 1: Federal, State, and Local Members of the ACRCC (continued)

Agency	Authority	Jurisdiction	Role
US Army Corps of Engineers	Federal	Planning, construction, and operation of navigation projects	Operation of the Chicago Area Waterways System Lock and Dam systems and the Electric Dispersal Barrier
US Coast Guard	Federal	Navigable waterways	Manages waterways, regulates the marine industry, and supports the marine transportation system
US Department of Transportation/Maritime Administration	Federal	Promote and integrate the use of waterborne transportation and maintain the Merchant Marines	Supports the maritime transportation system
US Environmental Protection Agency	Federal	Coordination of federal Great Lakes policy and activities	Coordination and funding
US Fish and Wildlife Service	Federal	Management of all inland fish stocks and enforcement of the Lacey Act and the Endangered Species Act	Coordination with partners to prevent the spread of AIS and to mitigate the impacts of established AIS
US Geological Survey	Federal	Surveys and research of natural resources, including hydrology and biology of US	Provide technical expertise and information to better predict ranges and effects of AIS and to contain, reduce, or eradicate their populations
White House Council on Environmental Quality	Federal	Works to balance competing positions and encourages government-wide coordination on matters relating to the environment, natural resources, and energy	Monitor the development and execution of the Asian Carp Control Strategy Framework
Wisconsin Department of Natural Resources	State	Protection and management of Wisconsin's natural resources	Cooperate with efforts to separate the Mississippi and Great Lakes basins

(Source: Asian Carp Regional Coordinating Committee website, located at [http://www.asiancarp.us/aboutus.htm])

The ACRCC includes all of the agencies listed above, as they each have jurisdiction over some part of the issue. However, the mandates and missions of these agencies vary widely; these differences in organizations' jurisdictions and interests may hinder joint efforts to prevent the Asian carp from reaching the Great Lakes.

The ACRCC meets in person about four times per year at various locations throughout the Great Lakes basin. In addition to the general ACRCC meeting, the Federal Executive Committee meets during the same week and a public forum is held to present updates (ID-12). The ACRCC also communicates via biweekly conference calls; the Executive Committee has conference calls in the opposite weeks (ID-12). There are also a number of phone calls between members of the ACRCC on a regular basis; for example, the Communications and Outreach Workgroup has a regular call every three weeks (ID-6). See Figure 1 for the structure of the ACRCC and Table 2 for a list of previous ACRCC meeting dates and locations.

In order to prevent the spread of Asian carp into the Great Lakes basin, the ACRCC has been formed to allow its member agencies to work together more efficiently despite their different missions and jurisdictions. Many of these individual agencies have jurisdiction over a specific aspect of the issue. For example, the USACE is responsible for maintaining navigable waterways, which includes the CAWS and structures in those waters, such as the Electric Dispersal Barriers. The USCG is responsible for ensuring human safety on navigable waters and thus issues regulations in the area of the Electric Dispersal Barrier. The IL DNR has jurisdiction over the living resources within its state waters, in particular the Asian carp populations in the Illinois River and the CAWS. The USFWS has jurisdiction over invasive species in US waters, and the GLFC (in which the state of Illinois is a member) is responsible for managing the fisheries in the Great Lakes, including threats to those fisheries. The USEPA controls the release of chemicals in rivers and lakes, such as the application of rotenone (a piscicide that effectively kills all fish in the waterway but biodegrades after 24 hours) to manage Asian carp populations.

Table 2: ACRCC In-person Meeting Dates and Locations

Chicago, IL	April 2011
Port Clinton, OH	July 2011
Saginaw, MI	September 2011
Portage, IN	January 2012
Bloomington, MN	April 2012
Chicago, IL	July 2012

(Source: personal communication with Paul Angelone, US Fish and Wildlife Service)

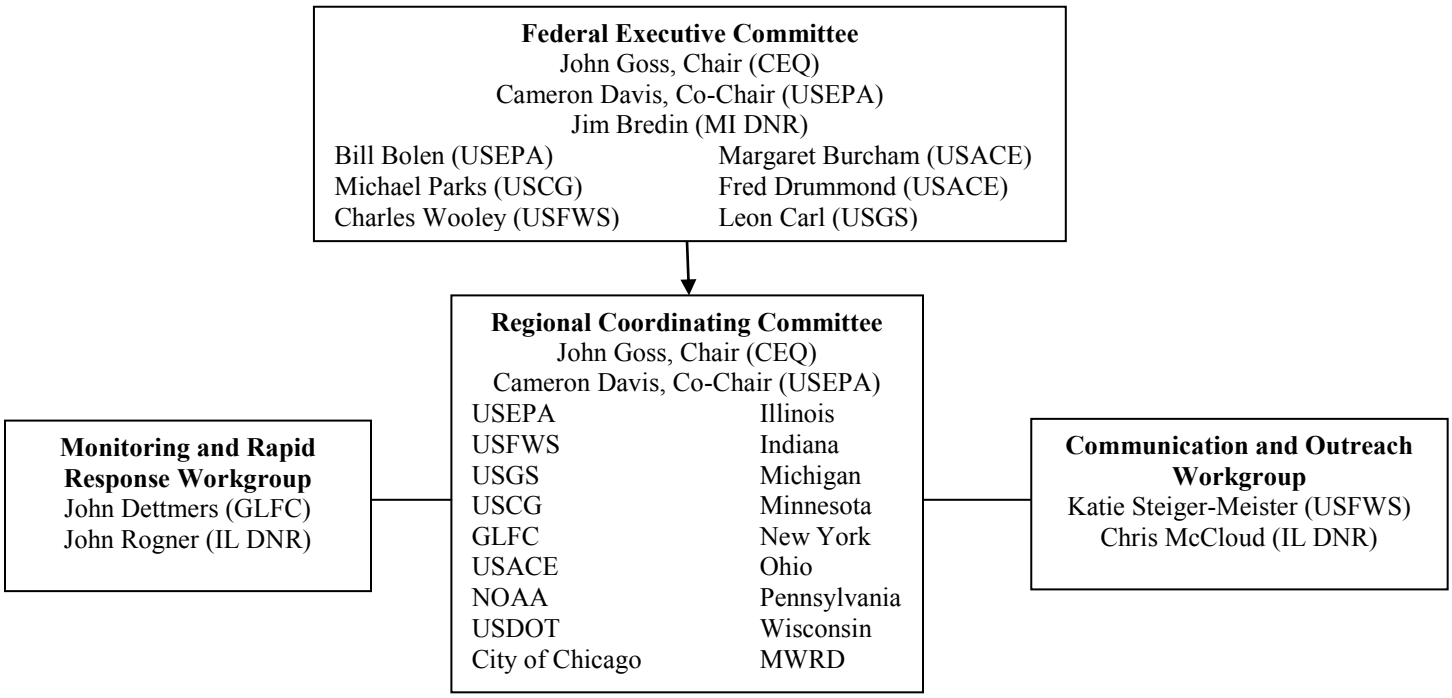

Figure 2: The ACRCC Organization (Source: FY2012 Asian Carp Control Strategy Framework, pg 41)

The ACRCC prepares the Asian Carp Control Strategy Framework (Framework), which outlines all of the ACRCC's projects, as well as providing details about the lead agency, other involved agencies, and funding sources. These projects include prevention methods (such as the Electric Dispersal Barrier), monitoring efforts (such as commercial fishing efforts in the Illinois River), and research into control technologies and impact mitigation. The funding sources

include base funding, or an agency's pre-existing budget, and funding from the Great Lakes Restoration Initiative (GLRI). The Framework distinguishes between base funding and GLRI funding because the GLRI funds are not intended to backstop any pre-existing funding (such as the funds that Congress has already appropriated to the Army Corps for the Electric Dispersal Barrier). The 2011 Framework lists 44 projects, with a total budget of slightly over $41 million for the year. Base funding provided $2.57 million and GLRI funding accounted for the remaining $38.45 million. The Framework for fiscal year 2012 lists 58 projects and a total budget of almost $51.7 million, with $32.3 million in base funding and $19.4 million from the GLRI. See Figures 2, 3, and 4 for a breakdown of funding by agencies as listed in the 2012 Framework.

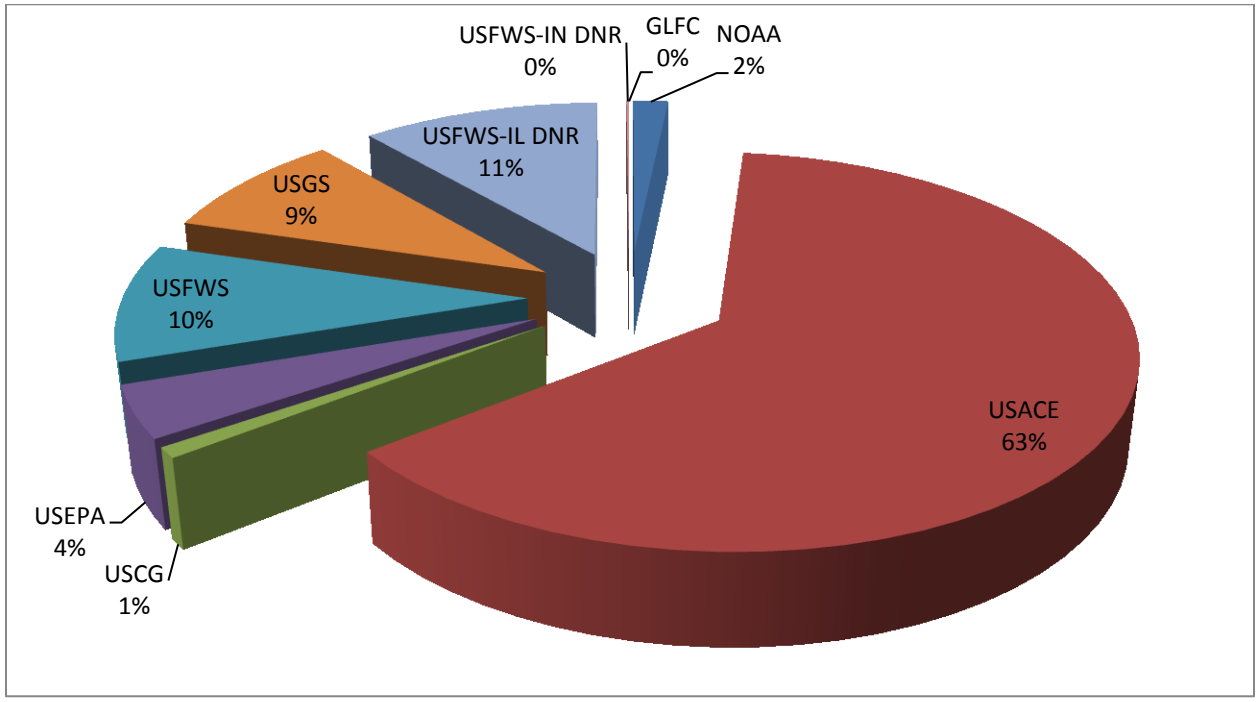

Figure 3: Total ACRCC Funding for FY 2012 (Total = $51,664,717) (Source: FY2012 Asian Carp Control Strategy Framework)

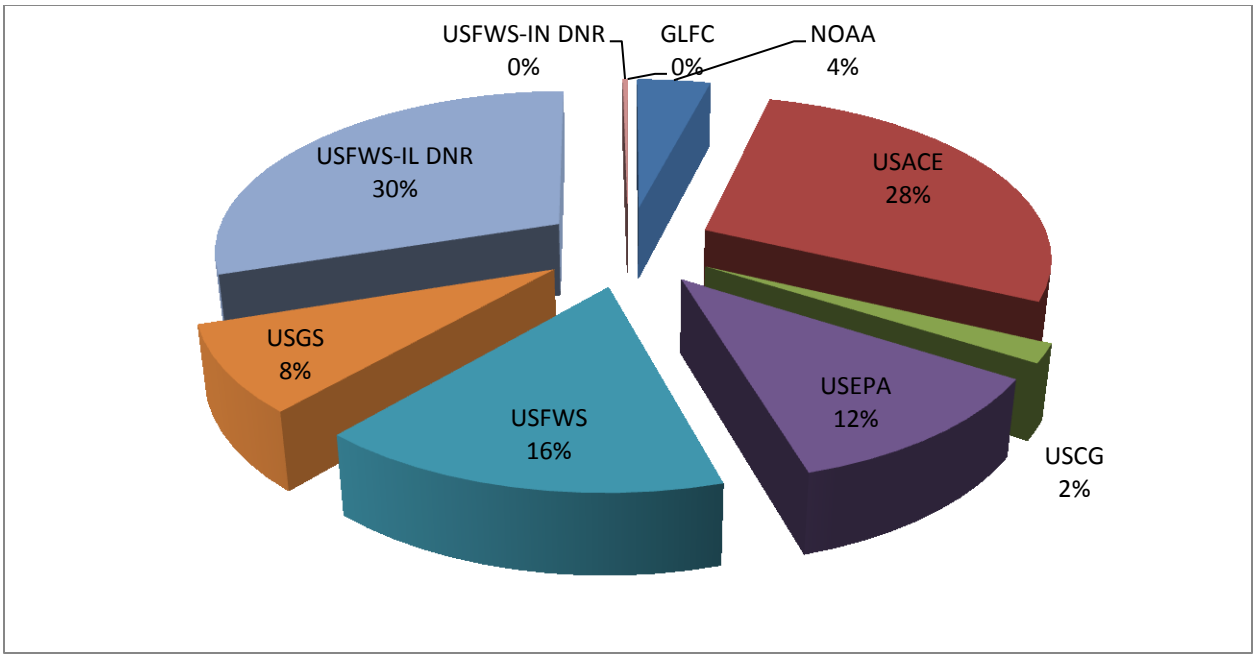

Figure 4: Total GLRI Funding for ACRCC Projects in FY 2012 (Total = $19,389,717)
(Source: FY2012 Asian Carp Control Strategy Framework)

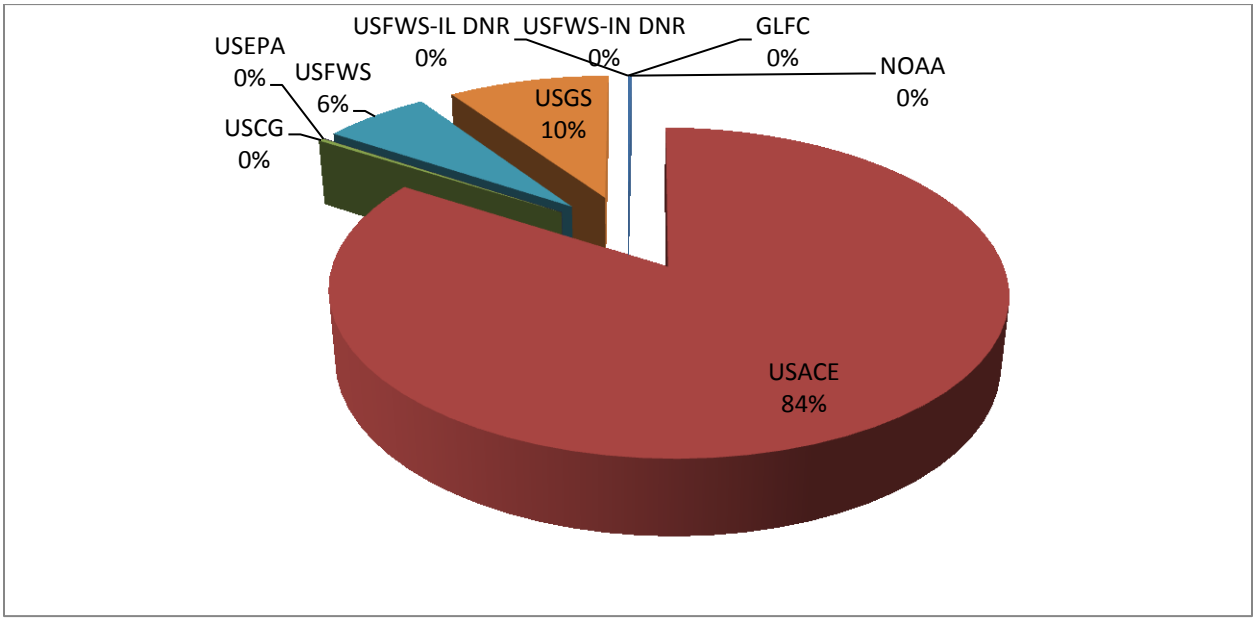

Figure 5: Total Base Funding for ACRCC Projects in FY 2012 (Total = $32,275,000)
(Source: FY2012 Asian Carp Control Strategy Framework)

Hypotheses

As discussed previously, the literature suggests that agencies that have more characteristics of a bureaucracy are less likely to collaborate with other agencies. My research was designed to test the following general hypothesis: **Agencies that are more effective at collaborating in ACRCC efforts exhibit fewer characteristics of a bureaucratic organization.** In particular, I focused on the characteristics that I thought would be most relevant to the agencies in question:

1. The authority to speak on behalf of the agency at ACRCC meetings (personnel of more bureaucratic organizations have stricter limits on what they can say on behalf of the organization)
2. Hierarchical chains of command (more bureaucratic organizations have a more rigid organizational structure; supervisors in a more bureaucratic organization take more interest in duties assigned to subordinates)

By "more effective at collaborating", I mean that the agency's actions will fall further towards the "integrated" end of the collaboration continuum described previously. I am using each of these characteristics to measure the relative level of bureaucratization in each agency. For example, an agency representative that needs clearance from a superior before speaking in a meeting indicates that that organization is more highly bureaucratized, as does the presence of a longer chain of command above an agency representative.

An alternate hypothesis that may better explain the data is that: **Differences in levels of collaboration between agencies can be explained by how agencies weigh the set of organizational benefits and costs caused by joint efforts with other agencies.** Again, "levels

of collaboration" refers to the collaboration continuum described above. This hypothesis suggests that agencies decide to participate in collaborative efforts because the benefits of such collaboration outweigh the associated costs, and not because of the bureaucratic characteristics of the organization, as suggested by Bardach and as discussed above (Bardach 1998).

Methods

In order to test my hypotheses, I wrote a series of questions designed to assess the level of bureaucratic characteristics listed above in the ACRCC member organizations and the perception of ACRCC joint efforts, including the effectiveness of these efforts and influential factors contributing to or detracting from the ACRCC. After creating these interview questions, I conducted a practice interview with a colleague who is employed by a federal agency to test if the questions are understandable and answerable.

I then conducted three pre-test interviews with agency personnel who are members of the Region 10 Regional Response Team and Northwest Area Committee. I choose the Regional Response Team because it is similar to the ACRCC in that it is an interagency task force with both federal and state agencies that responds to environmental concerns likely to extend across political borders. I interviewed someone from the United States Coast Guard, United States Environmental Protection Agency, and the Washington State Department of Ecology.

For the ACRCC interviews, I attempted to recruit at least one interview participant from each agency that is listed as a member of the ACRCC on its official website, www.asiancarp.us, to obtain as many viewpoints as possible into the organization. I sent emails to all agency contacts given on the ACRCC website. I also sent emails to other member agencies by finding addresses on their official websites. In addition, I asked interview participants if they could suggest other potential interview subjects. I only interviewed agency personnel that had participated in ACRCC meetings, which could include in-person meetings or phone calls. Of the 22 member agencies in the ACRCC, one agency declined to participate and ten agencies did not respond to repeated requests for an interview. Eleven agencies agreed to participate in my

research, and I conducted a total of twelve interviews. See Table 3 for a list of participating agencies.

Table 3: Interview Participants' Agencies

- Great Lakes Fisheries Commission
- Illinois Department of Natural Resources
- Michigan Department of Natural Resources
- Minnesota Department of Natural Resources
- National Oceanic and Atmospheric Administration
- New York Department of Environmental Conservation
- Pennsylvania Fish and Boat Commission
- United States Army Corps of Engineers
- United States Environmental Protection Agency
- United States Fish and Wildlife Service
- Wisconsin Department of Natural Resources

For each interview, I called the participant's phone through an online program, Skype. All calls were recorded with G-Recorder Professional. During each interview, I asked the same set of questions (but not necessarily in the same order, depending on the conversation in the interview). My interview questions were designed to gather insights into several different aspects of the agencies involved and the ACRCC in general. The first set of questions was designed to gather information about the structure of each participant's agency: where was each participant located in the management structure, the number of supervisors each participant reported to, etc. The second group of questions was designed to gather information about both the participant's agency's role in the ACRCC as well as the roles that other important agencies play in the ACRCC; these questions were designed to elicit responses about both the purpose of agency participation and the exact nature of said participation. The final set of questions was designed to gather information about the effectiveness of the ACRCC as an organization, including any factors that aid or detract from the ACRCC's goal. The questions were designed to be general, to

allow each participant's perceptions of the ACRCC to guide our discussion. The open nature of the questions and the resulting responses led to the creation of the second hypothesis midway through the interviews. See Appendix I for a list of interview questions.

I listened to each recording and took detailed notes on participant responses; I then used these notes to code the responses. For responses about the level of involvement (of supervisors or agencies), I coded responses on a scale of 0 to 3, as follows: 0=no involvement; 1=minimal involvement; 2=some involvement; 3=pretty involved. Responses about the level of interest in an organization were also coded on a scale of 1 to 3, with slight differences for federal and state agencies. For federal agencies, responses were coded as follows: 1=below the regional office; 2=regional director; 3=national level or the top of the chain of command. For state agencies, responses were coded as follows: 1=local interest only/below the district level; 2=district level; 3=state level/interest from the top of the agency and/or the governor's office.

I also recorded the number of times each agency was named as a key agency in ACRCC efforts. Reasons given for naming an agency as key to ACRCC efforts were also recorded. Interviewees were also asked about the effectiveness of the ACRCC, and I tracked the outputs mentioned, as well as any factors contributing to or detracting from the ACRCC's efforts.

Results

All interview participants have attended ACRCC meetings and/or phone calls. Most of the people interviewed have been involved with the ACRCC for two to three years, and all have been an active member for at least one year. Moreover, all participants have been working at their particular agency for at least two years, and many have been with the agency for considerably longer. Participants had several different professional backgrounds, such as fish biology, public administration, or public relations.

Bureaucratic characteristics

Several interview questions were designed to elicit information about the organizational structure of the participant's agency. Participants were asked about their job titles and who they reported to, and from this information, I used the agencies' organizational chart to calculate how many people were above the interviewee. So for example, the participant from the USEPA has a 2 for the length of the chain of command since this person is two levels below Lisa Jackson, the EPA Administrator, in the agency. When asked if they were able to speak on their agency's behalf, all respondents answered positively. "Limited" corresponds to interviewees who qualified their "yes" answer by explaining that they would need approval for certain decisions or actions. See Table 4 for a complete listing of bureaucratic characteristics by agency.

Table 4: Bureaucratic Characteristics by Agency

Agency	Length of Chain of Command	Number of supervisors	Authority to speak for agency
IL DNR	1	2	Yes
US EPA	2	3	Yes
PA FBC	2	1	Yes
GLFC	2	1	Yes
MI DNR	2	1	Limited
MN DNR	3	2	Yes
USFWS	3	1	Limited
NY DEC	4	1	Limited
WI DNR	5	1	Yes
USACE	6	1	Limited
NOAA	7	1	Limited

Indications of Collaboration

In order to measure agencies' willingness to collaborate, I asked several questions about interviewees own agencies' involvement with the ACRCC, as well as similar questions about other agencies that the participant had indicated was important to the ACRCC's efforts. I did not ask direct questions about interest in collaboration because I suspect that most respondents consider collaboration to be positive and could be compelled to overstate the actual interest. Instead, I asked about supervisor interest and agency interest in the issue to get a sense of the importance to the agency. I was also able to get additional information about some agencies from other participants. For the questions about a supervisor's or an agency's involvement, I have categorized the responses as either minimal involvement, some involvement, or very involved. To determine an agency's interest in working with the ACRCC, I used both responses from personnel at the agency as well as other participants' perceptions of the agency's interest; if the two perceptions did not match, I put parentheses around perceptions from those outside the agency. See Table 5 for a complete listing of this data.

Table 5: Indications of Collaboration by Agency

Agency	Supervisor Involvement	Agency Involvement	Interest in collaboration
USEPA	Very involved	Very involved	High
IL DNR	Very involved	Very involved	High
GLFC	Very involved	Very involved	High
USFWS	Very involved	Very involved	High
USACE	Very involved	Very involved	High (Low)
MI DNR	Some involvement	Very involved	Medium
MN DNR	Some involvement	Some involvement	Medium
PA FBC	Some involvement	Some involvement	Medium
NY DEC	Some involvement	Minimal involvement	Medium
WI DNR	Minimal involvement	Minimal involvement	Medium
NOAA	Minimal involvement	Minimal involvement	Low

The 2012 Framework describes the 58 projects associated with the ACRCC in detail, including information about the lead agency (or agencies) for each, as well as information about the funding for each (ACRCC 2011). The Framework lists 14 projects with more than one lead agency, and 28 other projects designate one lead agency, but include additional agencies as contributing to the project. See Table 6 for details about funding for these projects.

Only two of the projects with more than one lead agency use base funding, including the operation and improvement of the Electric Dispersal Barriers (Action Item 2.3.2 in the 2012 Framework). The USACE has been funded through Congressional appropriations since 2002 for the construction, maintenance, and operation of the electric barriers; for this project in 2012, the USGS did receive $75,000 of GLRI funding for its efforts. The other twelve joint projects rely solely on GLRI funds, and account for almost half of all GLRI funding for ACRCC projects.

Table 6: Funding Amounts by Source for Joint Projects in the 2012 Framework

Type of Projects	Number of Projects	GLRI funds	Base funding	Total funding
More than one lead agency	14	$9,732,417	$22,175,000	$31,907,417
One lead agency with additional agencies listed	28	$5,628,700	$6,288,000	$11,916,700
All projects	58	$19,389,717	$32,275,000	$51,664,717

(Source: FY2012 Asian Carp Control Strategy Framework)

Hypothesis Comparison

In addition to the bureaucratic characteristics discussed above, each participant was also asked about his or her agency's participation in the ACRCC. Questions about agency participation were designed to elicit information about why the agency is involved and how the agency participates in ACRCC efforts. I qualitatively analyzed the responses to determine the available evidence for each hypothesis; these results are presented in Table 7 below. The column labeled "Length of Chain of Command" is taken from Table 4 above. H1 refers to the first hypothesis, namely that organizations with more bureaucratic characteristics tend to collaborate less, and vice versa; information in the fourth column is a summary of Table 4 and 5 above and additional qualitative data from interview responses. The entry "no explicit mention of a connection" indicates that although the evidence shows a correlation between bureaucratic characteristics and collaboration, participants did not attribute the presence or absence of collaboration to a bureaucratic indicator (such as needing approval from a supervisor before joint efforts could begin). H2 refers to the second hypothesis, or that collaboration can be explained by the associated costs and benefits of joint actions; information in the fifth column is derived from the reasons for the agency's participation (or lack thereof) in the ACRCC given in interview responses.

Table 7: Evidence for Each Hypothesis

Agency	Level of Government	Length of Chain of Command	To What Extent Does H1 Apply?	To What Extent Does H2 Apply?
IL DNR	State	1	Fewer bureaucratic characteristics and more collaboration than other agencies, but no explicit mention of a connection	Has jurisdiction for fish management in Illinois and is thus lead agency, but needed access to more resources, which the ACRCC has provided
USEPA	Federal	2	Fewer bureaucratic characteristics and more collaboration than other agencies, but no explicit mention of a connection	Concerned that decisions are environmentally sound; commit millions of GLRI to ACRCC efforts and manages the distribution of GLRI funds
PA FBC	State	2	No evidence	Concerned about the threat posed by Asian carp
GLFC	International Treaty	2	Fewer bureaucratic characteristics and more collaboration than other agencies, but no explicit mention of a connection	Very invested in preventing new invasive species due to organization's history
MI DNR	State	2	No evidence	Concerned about the risk posed by Asian carp, and would be responsible for dealing with the problem
MN DNR	State	3	No evidence	Concerned about the spread of Asian carp in the Mississippi River, and hopes to get financial assistance from ACRCC in the future to deal with the problem
USFWS	Federal	3	No evidence	Jurisdiction over inland fish species

Table 7: Evidence for Each Hypothesis (continued)

Agency	Level of Government	Length of Chain of Command	To What Extent Does H1 Apply?	To What Extent Does H2 Apply?
NY DEC	State	4	No evidence	Concerned about the spread of Asian carp via pathway in NY; hope to draw federal attention to this pathway
WI DNR	State	5	No evidence	Difficult to devote so much effort to just one species, especially compared to federal agencies
USACE	Federal	6	More bureaucratic characteristics, differing accounts of level of willingness for collaboration, but no explicit mention of a connection	Electric barrier is one of the higher profile projects in the country, which the USACE built when directed to by Congress; heavily engaged in issue, but probably not by choice
NOAA	Federal	7	More bureaucratic characteristics and less collaboration, but no explicit mention of a connection	No jurisdiction in the issue; tried to stay out of the ACRCC

Important Agencies

All interviewees were asked to name the key agencies—or agencies perceived to be essential for the ACRCC's efforts—in the ACRCC, as well as follow-up questions about these key agencies. Federal agencies are seen as key agencies in the ACRCC meetings: ten responses mentioned the USACE, nine mentioned the USFWS, and eight mentioned the CEQ and the USGS respectively. Other agencies mentioned in responses included the USEPA (in 5 responses), the IL DNR (in 3 responses), and the USCG (in 3 responses). See Figure 5 for a complete listing of key agencies.

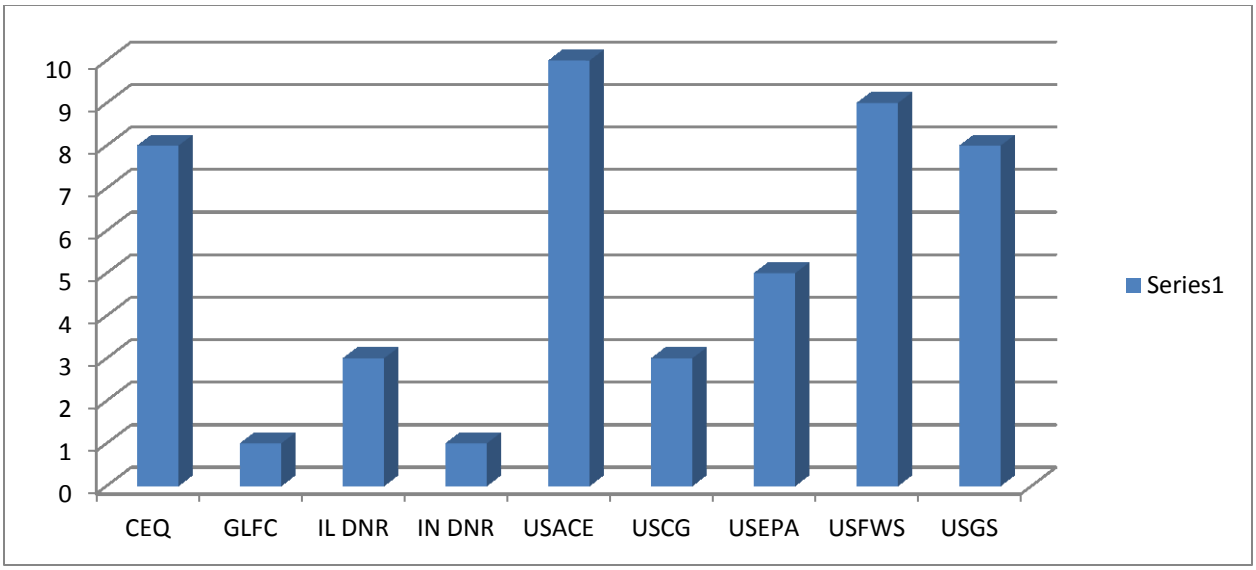

Figure 6: Frequency of Responses Listing Agencies as Key to the ACRCC

Outputs from ACRCC Efforts

In addition to information about the organizational structure of participating agencies, I was able to gather additional data from these interviews, such as outputs from the ACRCC's efforts and factors that contributed to or detracted from the ACRCC. Participants identified twelve outputs when asked what had come out of the ACRCC's efforts; participants were also asked follow-up questions about whether these outputs would have been possible without the ACRCC. I classified these outputs as easy, medium, or difficult, based on how challenging achieving these output was for the ACRCC according to participants' responses. The outputs classified as easy were things that participants mentioned would likely have happened without the ACRCC or some similar interagency group. However, this does not imply that the ACRCC has had no effect on these outputs; for example, without the ACRCC agencies would have likely exchanged information about the issue in some way. The existence of the ACRCC and its regular meetings facilitates this communication, which increases the value of this information exchange.

Outputs that are medium difficulty are things that might have happened without the ACRCC, but the existence of an interagency group significantly increased the likelihood that the output occurred according to interview responses. For example, the ACRCC has funded a number of projects with GLRI funds, which are distributed by a task force chaired by Lisa Jackson, head of the USEPA. GLRI funds were not initially intended specifically for the Asian carp issue. However, ACRCC received about 20% of available GLRI funds in 2011, due to the interest in the issue generated by both the existence of the ACRCC and the work that the organization does (ID-12). Although the absence of Asian carp in the Great Lakes was listed by three participants (one state, two federal) as an output of the ACRCC, it should be considered an outcome since the ACRCC cannot directly control it, and thus is not included with the outputs. These outputs are listed in Table 8.

Table 8: Outputs of the ACRCC

Output	Difficulty	Number of Responses	
		State	Federal
Increased collaboration/cooperation	Medium	4	5
Information exchange	Easy	4	3
Increased funding/GLRI funding	Medium	3	4
Asian Carp Framework	Medium	3	4
Increased Efficiency	Medium	2	3
State Participation in ACRCC	Medium	2	2
Increased research and/or knowledge generation	Easy	3	1
Increased public awareness	Easy	2	1
Increased leadership	Medium	0	2
Legitimacy	Medium	0	2
Rapid response efforts	Medium	0	1

Positive Factors

Participants identified nine factors that have positively contributed to the ACRCC's efforts. These factors can be grouped into internal and external factors. By internal, I mean factors that originate from the members of the ACRCC. External factors are outside forces that affect the organization. Seven of the nine factors are internal, which may indicate that the ACRCC as an organization is aiding its own efforts. However, this may also be due to response bias from the interview questions themselves and/or the participants' positions in their organizations and in the ACRCC. Many of these internal factors are associated with strengthening the relationships between agency representatives, including strong partnerships and/or positive interactions; frequent contact between representatives (including regular phone calls to complete ACRCC work); and a recognition that good people are involved with the organization. Another similar factor is the history of trust among the principal members of the ACRCC, although this relates to personnel with federal agencies. This factor is due to the fact that most of the federal agencies involved, and especially the key agencies, have district offices in the Midwest. Moreover, these agencies have been involved with a number of past cooperative actions, which has created a significant working history between these field offices.

Other internal factors also contribute to the ACRCC's efforts. A number of interviewees perceive the ACRCC to be a motivating force, which indicates that it is able to encourage its members to contribute to ACRCC work. State participation was also mentioned in four responses, in two different contexts: the first, which was discussed above, is the role that John Goss played in encouraging states to become participants (ID-5, ID-7). Other responses that mentioned state participation did so to illustrate the contributions to ACRCC work that states have made (ID-6, ID-9). One participant mentioned the longevity of the ACRCC as a benefit to

the organization and then went on to explain that the organization becomes stronger and more cohesive in pursuing its goals the longer it exists.

Only two of the beneficial factors that were mentioned are external. Four responses discussed the high visibility of the Asian carp issue in the Great Lakes region, in the context of aiding ACRCC efforts. With the high visibility of the issue, there is considerable pressure on the ACRCC and its member organizations to succeed, but there is also political will to provide the resources necessary to find a solution. The other external factor mentioned was the interest in the issue shown by the Obama Administration; both of the participants that mentioned this factor are at federal agencies. Many of the responses that discuss the role of CEQ do mention that CEQ's role in the ACRCC indicate interest in the issue at the highest levels, which indicates a willingness to solve the problem. I also included the availability of increased funding and GLRI funding for ACRCC from the previous table listing ACRCC outputs, as several participants mentioned that funding sources are important for the ACRCC's work. See Table 9 for a complete list of all beneficial factors.

Table 9: Factors that Help the ACRCC

Factor	Category	Number of Responses	
		State	Federal
Increased funding/GLRI funding	External	3	4
Strong partnerships/Positive interactions	Internal	2	3
Motivating force	Internal	1	4
State participation	Internal	2	2
Highly important issue	External	2	2
Frequent contact with other members	Internal	1	2
Good people/personalities	Internal	1	1
History of trust among principles	Internal	1	1
White House interest	External	0	2
Longevity of ACRCC	Internal	1	0

Negative Factors

Participants identified twelve factors that hinder the ACRCC's efforts. These factors have been classified as internal, external, and issue. Internal factors refer to aspects that result from the member agencies or representatives from those agencies that work with the ACRCC. Of the internal factors, two point to some amount of conflict within the ACRCC: disagreement over scientific results and clashing personalities. Two interview participants mentioned these factors, one at a federal agency and one at a state agency. However, neither response indicated that these sources of conflict were detrimental to overall ACRCC work; rather these factors caused some tension in ACRCC meetings, but did not seem to greatly affect the decisions made by the organization. Several other responses indicated that representatives worked through differences at meetings, but that seems unsurprising given the diversity of agencies and interests involved in the ACRCC.

External factors, or aspects arising from conditions outside of the ACRCC's control, account for four of the factors mentioned. Several of these factors involve political issues, such as a limit to the funds or resources that an agency has available and conflicting agency mandates. Several participants mentioned restrictions within their agency that affected the amount of time that agency could effectively devote to the problem. Moreover, several state representatives mentioned travel budget restrictions that prevented them from attending some or all of the in-person meetings (however, most also mentioned that the biweekly phone calls were able to fill in the gaps and allowed them to participate in ACRCC work). The presence of lawyers at ACRCC meetings was also mentioned by a few interviewees. There is pending litigation involving several of the ACRCC member organizations and there is also the threat of future lawsuits. As a result,

some member organizations have their attorneys in the room when the ACRCC meets (one person mentioned the Army Corps specifically).

The other category of factors involves aspects of the issue itself. Four responses mention the presence of Asian carp in other waterways in addition to the Chicago Area Waterways System; specifically, Asian carp are spreading throughout the upper Mississippi River system and east into the Ohio River and its tributaries. Several responses mentioned these other waterways to illustrate that the problem is much larger that the focus on the Chicago waterways might indicate. This also leads to limits on the available funding, since Congressional mandates on this issue are clear and the funding that has been allocated is only for efforts in the Chicago area.

Several other factors mentioned point to larger issues with invasive species policy, namely the absence of Canada in the ACRCC and the ACRCC as the wrong policy approach to invasive species. I will go into a longer discussion of these issues in the policy implications section. See Table 10 for a list of all factors that hinder the ACRCC.

Table 10: Factors that Hinder the ACRCC

Factor	Category	Number of Responses	
		State	Federal
Limits on resources and/or funding	External	2	3
Presence of Asian carp in other waterways	Issue	3	1
Conflicting agency mandates	External	0	3
Wrong approach to managing invasive species	External	2	1
Response could have been faster and/or bigger	Internal/External	1	2
Presence of lawyers and lawsuits	External	1	2
Disagreement over scientific results	Internal	1	1
Uncertain and complex issue	Issue	1	0
Sensitive issue	Issue	0	1
Canada is not included	Internal	1	0
ACRCC is not a decision-making body	Internal	1	0
Clashing personalities	Internal	0	1

Discussion

The interviews revealed differences in the levels of bureaucratic characteristics in the agencies, including variation in the length of chains of command and in the number of supervisors that participants report to. Agencies are listed in Table 4 according to the levels of these characteristics, with agencies listed at the top having fewer indications of bureaucratic characteristics. As expected, shorter chains of command and more supervisors (which indicates that the chain of command is more flexible) correlate with fewer limitations on the participant's ability to speak for the agency. Thus, the data suggest that the IL DNR and the USEPA are less bureaucratized than the USACE and NOAA.

Moreover, according to the data listed in Table 5, the USEPA and the IL DNR are both highly involved in joint efforts. These agencies were instrumental in early collaborations that eventually led to the ACRCC (ID-12). The USEPA influences how the GLRI funds are distributed to all of the initiatives that are part of the GLRI (the GLRI has five focus areas, one of which is invasive species) (ID-7, ID-11); the original intention for GLRI funding for invasive species was to go towards work on species currently in the Great Lakes (ID-12). However, the USEPA was able to direct that money towards ACRCC efforts instead (ID-12). The IL DNR initially approached the USEPA for help in dealing with the Asian carp issue (ID-12) and continues to be very involved in joint efforts, especially with the USFWS.

Despite the correlation between fewer bureaucratic characteristics and increased collaboration, there was no explicit mention of a connection (participants did not mention bureaucratic characteristics as a reason for a decision to collaborate or not) between these variables in the interview responses. Responses did provide evidence for the second hypothesis:

responses stated that the IL DNR has jurisdiction over Asian carp within state borders and receives needed resources for this effort from the ACRCC. Similarly, the USEPA wants to ensure that actions taken to combat the Asian carp invasion are environmentally sound and participation in the ACRCC allows the agency an opportunity to do so; the USEPA has contributed millions of dollars from the GLRI to ACRCC efforts. Thus, the data suggest that these agencies are interested in collaborating with other agencies in the ACRCC because benefits from these collaborative efforts outweigh the costs of participating.

The two agencies that have more bureaucratic characteristics differ in their levels of involvement with the ACRCC. The participant from NOAA reported that they actively tried to keep NOAA out of the ACRCC as the issue is outside of NOAA's jurisdiction until Asian carp are in the Great Lakes (ID-11). This is in sharp contrast to the GLFC, which was involved in the Asian carp issue early on and remains highly interested in joint efforts through the ACRCC, despite its jurisdiction only extending to Great Lakes fisheries (ID-7). Again, this difference correlates to differences in the bureaucratic characteristics of the two organizations. The GLFC is less bureaucratized than NOAA. (Interestingly, the job task of the NOAA participant is to better integrate the field offices of NOAA departments at a regional level. Historically, NOAA departments existed as separate agencies and were combined into one agency when NOAA was formed. NOAA is trying to create a more unified identity especially for the public, so that someone could go to a National Weather Service office and also get information about the National Marine Fisheries Service (ID-11).) Yet, despite the correlation between higher levels of bureaucratic characteristics and lower levels of collaboration, again there was not an explicit mention of a connection between the two variables. There is evidence for the second hypothesis: NOAA was reluctant to join the ACRCC because the issue is outside of NOAA's jurisdiction

and the organization was concerned about the costs of participation, such as devoting personnel to ACRCC projects, etc. In contrast, the GLFC is very interested in participating because it actively manages invasive species in the Great Lakes and wants to prevent the introduction of any potential invasive species. Thus, the GLFC considers the cost of participating in the ACRCC to be worth the benefit of preventing Asian carp from getting to Lake Michigan.

The USACE is more bureaucratized than most of the other agencies, but the USACE plays an important role in the ACRCC. The participant from the USACE reports that the agency is highly involved in the ACRCC, which is supported by the amount of funding that the USACE receives for its ACRCC projects, both in terms of base funding and to a lesser extent GLRI money. Personnel from other agencies perceive that although the USACE plays an important role in the ACRCC, the agency's participation is somewhat reluctant. Several respondents mentioned that the USACE has played an important role in the ACRCC, despite the Asian carp issue being outside of its traditional mission (ID-7, ID-10). For example, one participant stated that the USACE is "heavily engaged in the issue, but probably not by choice. The electric barrier is one of the higher profile projects in the country, but the Army Corps probably never thought they'd be in the fish business" (ID-7). The USACE built the initial electric dispersal barrier, which was designed to repel possible invasive species, in 2002 at the direction of Congress; the barrier ultimately led to the USACE's inclusion in the ACRCC. It is interesting to note that the USACE does not act without prior authorization and appropriation from Congress (WRDA 2007). Moreover, a USACE spokesperson questioned positive eDNA results (which indicated the presence of Asian carp DNA above the barrier and within several miles of Lake Michigan) at a public meeting in April 2012.[2] Several respondents mentioned conflicts about scientific/eDNA

[2] Audio broadcast of ACRCC Public Meeting in Bloomington, MN, on April 5, 2012.

results as a detriment to the ACRCC (ID-3, ID-10). Therefore, there is some evidence for both hypotheses; due to the limitations of this study, it is not possible to conclusively prove one over the other for the USACE.

The second hypothesis explains the results from most state agencies. MN DNR, WI DNR, PA FBC, and NY DEC have varying levels of bureaucratic characteristics, but all have medium interest in collaboration. Moreover, there was no explicit mention of a connection between levels of bureaucratic characteristics and the level of collaboration. Thus, other factors besides bureaucratization appear to be more influential. The MN DNR is very concerned about the spread of Asian carp up the Mississippi River and is frustrated at the lack of resources for efforts not in the Great Lakes. The participant from MN DNR indicated that they would continue to participate in phone calls, but would not be interested in other efforts. The participants from the NY DEC and the PA FBC both stated that they are concerned about the risks of Asian carp entering the Great Lakes, but they are relatively distant from Chicago. They want to stay informed about the issue, and so they participate in ACRCC phone calls. The NY DEC is also hoping to draw federal attention to a potential invasion pathway in New York. However, neither agency has the resources to contribute more to ACRCC efforts. The WI DNR stated that the focus on Asian carp makes the ACRCC less attractive to that agency, because it concentrates resources on two species, when 138 other invasive species also need to be addressed in the Great Lakes.

There was some agreement about outputs from the ACRCC, particularly the following: increased collaboration or cooperation (mentioned in 9 responses), information exchange (7 responses), increased funding and/or GLRI funding (7 responses), and the Framework (7 responses). Participants seemed to use collaboration and cooperation interchangeably; in the

interviews it seemed that both terms were used to mean joint actions between agencies. I was surprised that only four responses (and only two from state agency personnel) mentioned state participation in the ACRCC as an output, since John Goss specifically invited all Great Lakes states to the ACRCC shortly after he was appointed as the chair (ID-5). This may indicate that representatives from state agencies are not seeing sufficient benefits from participation the ACRCC. I was also surprised that only two responses cited increased leadership as an output. Of the eight participants who named the CEQ as a key agency, seven stated that John Goss was a reason why. This suggests that although participants see John Goss as an important figure as the chair of the ACRCC, the ACRCC is not necessarily taking more of a leadership role in the issue.

There was little agreement among participants on positive or negative factors; no single factor (apart from increased funding) was mentioned in a majority of responses. There are several possible explanations. First, the ACRCC has only existed as a formal organization for two years and may still be evolving, both in terms of structure and more individual aspects. Second, the forum used for meetings may affect people's perceptions. There are phone calls every other week for the main body of the ACRCC, as well as working groups that also have regular phone calls. So, there is a significant amount of potential contact among representatives, but with frequent calls it may be difficult for some members to attend every meeting. Furthermore, communication over the phone may change participants' perceptions and interpretations of statements compared to meeting conducted in person. The ACRCC does meet in person every three months, but several participants from state agencies mentioned that they were unable to attend these meetings due to travel budget restrictions (ID-1, ID-3, ID-5, ID-8).

Most of the interview participants seemed optimistic about the accomplishments of the ACRCC and the work it was doing (ID-2, ID-3, ID-6, ID-7, ID-9, ID-10, ID-12). The lack of

consensus on most of the outputs given, such as increased efficiency, increased research, and increased public awareness, is interesting and could suggest that the ACRCC can do more to show that it is making progress in its mission to keep the Great Lakes free from Asian carp species. It may be that the ACRCC lacks an agreed set of metrics that clearly communicates what progress is being made. However, due to the limitations of this study it is not possible to state definitely what this lack of consensus might indicate. Based on the interviews I conducted, I would place the level of collaboration in the ACRCC between communication and coordination on Cisin-Sain and Knecht's continuum framework (Cisin-Sain and Knecht 1998). The ACRCC certainly provides a forum for communication among its members, but from the evidence I found, it does not clearly reach the level of coordination. Of the 28 projects that the 2012 Framework lists as having collaborating agencies, there is limited information about the form that collaboration would take and may just involve communication. Moreover, agencies that are coordinating their activities may be doing so to get additional funding.

Conclusion

There is support for both hypotheses: there is some correlation between the levels of collaboration and the levels of bureaucratic characteristics as predicted by the first hypothesis, especially in federal agencies. However, no explicit connection between bureaucratic characteristics and collaboration was mentioned in any of the responses. There is also support for the second hypothesis—differences in collaboration between agencies can be explained by how agencies weigh the set of organizational costs and benefits caused by joint efforts—especially for state agencies. These costs and benefits included jurisdictional issues and access to resources (whether these aspects were considered costs or benefits depended on the circumstances organizations were faced with), as well as concerns about the costs associated with the continued spread of Asian carp. Thus, there is evidence for both hypotheses, but given the limits of this study it is not possible to conclusively prove one hypothesis over the other.

Interview responses also provided information about the level of collaboration for the ACRCC as a whole. The organization provides a forum for communication about the issue among its members, but the ACRCC does not yet appear to rise consistently to the level of coordination. The level of collaboration may increase as the ACRCC is still relatively new, and could evolve as the Asian carp issue progresses. Moreover, many of the participants expressed both optimism about the ACRCC and its work and concern about the Asian carp issue, which suggests that individuals are committed to the organization and its work on the Asian carp issue. However, it is also possible that collaborative efforts may decrease as the situation develops. Due to the limitations of this study, it is not possible to make predictions about future collaborative efforts in the ACRCC. Further studies are necessary to gather more information before such predictions can be reliably made.

It is likely that interagency collaboration will continue to be important in marine policy, especially given the nature of marine issues and the structure of current ocean governance in the United States. Additional research into the organizational structure of these collaborative efforts will aid in understanding how these agency groups work together, and may ultimately provide insight into creating more effective working groups in marine policy.

Policy Implications

One participant stated that "Asian carp demonstrate everything wrong with invasive species policy. They were imported without being screened, then they escaped twenty or thirty years ago, and we still haven't really responded. The fact that the ACRCC had to be formed is a sign that invasive policy is broken in this country. The good news is that with collaboration it's possible to do a lot" (ID-7). Historically, invasive species policy throughout much of the United States has been reactionary; species are presumed innocent until proven guilty (or injurious). However, this makes it much more likely that a harmful species will be introduced to a new area and then become established before that species is considered problematic. Once a species is established it is extremely difficult if not impossible to extirpate it, and managing invasive species is time-consuming and expensive.

Efforts in the CAWS focus primarily on two species of Asian carp: silver carp and bighead carp. The consequences of introducing either species have been described previously. However, the grass carp and the black carp are also likely to change the Great Lakes ecosystem if they were to establish populations. The grass carp already has established populations in 45 states and Puerto Rico. These fish primarily consume aquatic plants and although they would likely not be in direct competition with game fish for food, the grass carp could still cause significant changes to the waterway's habitat. The black carp is the least prevalent of the Asian carp species in North America; despite this, black carp could also spread throughout the Mississippi River Basin and threaten native mussel species. Some of the work funded by the ACRCC will also prevent the further spread of grass and black carp, but more could be done to prevent the future spread of these other Asian carp species.

Additionally, the connections between the Mississippi River and Great Lakes basins further complicate the issue. Since these two systems are currently connected, focusing only on the Great Lakes seems shortsighted. Moreover, there are other potential invasive species that can potentially move from one system to the other. One participant mentioned that only working on Asian carp ignores the larger invasive species problem in the Great Lakes (ID-1). The ACRCC would likely increase buy-in from states if the focus was broadened to include the Mississippi River system and other potential invasive species. Although many areas of the Mississippi River system already have established populations of Asian carp species, there are still sections of the that system that can be spared if appropriate defenses are maintained.

The interviews highlighted the importance of funding when dealing with a complex problem. Seven of the twelve participants discussed the essential role that funding plays in ACRCC efforts. With increased funding, it is possible to address the problem of invasive species in the Great Lakes more efficiently and effectively, which will undoubtedly save money in the future. Since agencies are generally constrained by what Congress authorizes and funds, Congressional action (or lack thereof) is also an important, though less visible, aspect of setting invasive species policy. Unfortunately, governmental efforts to date have focused almost exclusively on repairing the damage caused by invasive species after they have established populations with a relatively little consideration of the many pathways by which invasive species continue to be introduced to our waterways.

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Appendix I: Introductory Text and Questions Used in Interviews

Interview introductory text:

I am a Master's student at the University of Washington in the Evans School of Public Affairs and in the School of Marine and Environmental Affairs. For my thesis, I am studying the Asian Carp Regional Coordinating Committee by conducting interviews with agency personnel working with this Committee. During this interview, I will ask you questions about your experiences working with this Committee. I expect that this interview will take no more than one hour. With your permission, I will make an audio recording of this interview, but no one will be allowed to listen to the recording other than myself and my thesis committee, and I will keep your identifying information confidential in my thesis and all other related work. (I will attribute quotes to "unnamed governmental official")

Questions:

1. I'd like to start by asking questions about your role in [agency]:
    a. Can I confirm your job title? What does that entail?
    b. To whom do you report? Do report to anyone else? Is the entire portfolio of your duties under this person?
    c. Does your job description require specific education?
2. Now I'd like to ask you questions about your work with the Asian Carp Regional Coordinating Committee:
    a. When did you get involved?
    b. Why did you get involved?
    c. What is your role?
    d. How often does the ACRCC meet?

3. Now I'd like to ask you some questions about your organization's role:
    a. What is [agency's] overall involvement with the Asian carp issue?
    b. At RCC meetings, do you speak on behalf of the agency or do you have to get clearance first?
    c. How involved is your supervisor in your work on the Asian carp? Other (higher?) management levels?
    d. How far up the chain of command is your organization interested in the Asian carp issue?
4. Now I'd like to ask you questions about the role of other organizations in the Asian carp issue:
    a. There are lots of agencies involved; which are key agencies?
    b. Why are they a key agency?
    c. What is your perception of the [other agency's] overall involvement with the Asian carp issue?
    d. Based on what you've observed in RCC meetings, are [other agency]'s representatives speaking on behalf of their agency, or do they need to get clearance first?
    e. Again based on what you've observed, how involved are the [other agency]'s supervisors in the Asian carp issue?
    f. How far up the chain of command is [other agency] interested in the Asian carp issue?
5. Now I'd like to ask about the effectiveness of the Asian Carp Regional Coordinating Committee: What has come out of RCC's effort so far? Would these results have been

possible without the RCC?

6. Have there been any setbacks in joint efforts on the Asian carp issue?
7. In closing, do you have any final thoughts about RCC and its effectiveness in dealing with the Asian carp issue?
8. Is there anything else you'd like to add or wish that I had asked you about?