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The Introduction of Coho and Chinook Salmon into Lake Michigan to  
Solve the Ballooning Alewife Population Problem

Throughout the early 1960's the invasive, non-native alewife fish wreaked havoc on Lake Michigan's eco-system. They created a vitamin deficiency in the water that killed baby lake trout, the once mighty fish of Lake Michigan. They began to wash up by the truckload on Chicago beaches, odor and all, due to the lack of prey. In the mid-1960's the Great Lakes states created a joint federal program to fight the alewife problem. They opted to introduce Coho and Chinook salmon, native to the Pacific Ocean, into the lake in 1967. These fish species thrived on alewives. To this day, Lake Michigan is still being stocked with the salmon to keep the alewife population under control.

The innovative introduction of Coho and Chinook salmon paid off in more ways than one. Nothing like the alewife invasion had been dealt with before. The concept of introducing a non-native species to combat another non-native species was an inventive solution. In addition to controlling the alewife population, the salmon adapted successfully and were able to naturally spawn.<sup>1</sup> This spurred the growth of the salmon population of Lake Michigan. The size and tremendous number of Cohoes and Chinooks created a new opportunity for the fisherman of Lake Michigan.

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<sup>1</sup> Year of the Chinook arrives early here, Tom McNally, Chicago Tribune, May 22,1977

Alewives were first spotted in Lake Michigan in 1949, arriving via the Atlantic Ocean and St. Lawrence Seaway.<sup>2</sup> They became a nuisance and a threat in the early 1960's. Alewives preyed on lake trout that laid their eggs in the perfect places for alewives to eat them and were also not able to protect themselves from alewife attacks. When there were not enough lake trout to keep the number of alewives under control, their population exploded.<sup>3</sup>

In 1967 the Environmental Protection Agency predicted that approximately twenty billion alewives washed up on the beaches of Lake Michigan, heavily in the southern basin including Chicago. Alewives, who are prone to die offs and have been doing so since the early 1700's in the Atlantic Ocean, plagued Chicago beaches with mountains of carcasses.<sup>4</sup> Beaches had to be closed because of the massive piles of fish while the Chicago Park District hauled away the alewives, pile by pile.

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<sup>2</sup> <http://www.suntimes.com/chicago/chicagopedia/638484,CST-NWS-pedia07.article>, Chicagopedia, Chicago Sun Times, November 7, 2007,

<sup>3</sup> <http://greatlakesecho.org/2009/09/02/alewives-should-great-lakes-managers-kill-%E2%80%98em-or-keep-%E2%80%98em/>, Jeff Gillies, Great Lakes Echo, September 2, 2009

<sup>4</sup> <http://nepis.epa.gov/Exe/ZyNET.exe/2000UXW0.txt?ZyActionD=ZyDocument&Client=EPA&Index=Prior%20to%201976&Docs=&Query=Alewives%20in%20beaches%20chicago&Time=&EndTime=&SearchMethod=3&TocRestrict=n&Toc=&TocEntry=&QField=pubnumber^%22905R67107%22&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=pubnumber&IntQFieldOp=1&ExtQFieldOp=1&XmlQuery=&File=D%3A\ZYFILES\INDEX%20DATA\70THRU75\TXT\00000002\2000UXW0.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h|-&MaximumDocuments=10&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p|f&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=16>, Environmental Protection Agency, July 25, 1967

In addition to being a huge nuisance, the alewives were creating stress on Lake Michigan's eco-system. They caused a vitamin deficiency in the water that killed baby lake trout. The lake trout were the alewives' primary predator and contained their population growth.<sup>5</sup>

In 1967, while the alewives made up 90% of Lake Michigan's fish population by weight, both the Great Lakes states and the federal government began to develop a program targeting the ballooning alewife population.<sup>6</sup> The program, which was being funded by Illinois, Indiana, Michigan, and Wisconsin and matched by the federal government, decided to try an innovative combination of stocking Lake Michigan with Coho and Chinook salmon and dragging a net that had the capacity to haul up to five tons of alewives an hour. The latter also expanded commercial alewife fishing. Salmon fry (newly hatched fish) were introduced into tributaries of Lake Michigan, where the salmon would typically spawn, and then migrated back into Lake Michigan.

The base director for exploratory fishing and gear research at the Interior Department's Bureau of Commercial Fisheries thought that, "The combination of these two approaches looks most hopeful for controlling the alewife nuisance in Lake Michigan."

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<sup>5</sup> <http://greatlakesecho.org/2009/09/02/alewives-should-great-lakes-managers-kill-%E2%80%98em-or-keep-%E2%80%98em/>, Jeff Gillies, Great Lakes Echo, September 2, 2009

<sup>6</sup> Great Lakes States Unite In Alewife Plan,

The Chicago Tribune deemed the fishing season of 1967 the "'67 Miracle" due to the size and abundance of the newly introduced salmon. The salmon, unlike lake trout, are exciting for fisherman to catch because they fight and jump. In the '67 season, salmon weighing up to 22 pounds were caught.

In the summer of 1968, Chicago was one of seven highly populated areas around Lake Michigan to receive additional aid to fight the alewives. The City of Chicago planned to trawl eighty miles of Lake Michigan's shore. However, the city was slow to come up with the money, prompting an executive from the Federal Water Pollution Control Administration to say, "This (lack of funds) is in contrast to the heroic statements we heard from Illinois at the recent water pollution conference. It becomes a slightly hollow sound when we talk about money."

Out of all of the Great Lakes, the salmon in Lake Michigan were the most productive. The cool water temperature, which is better to spawn in and the large number of clean feeder streams and rivers to spawn in helped contribute to the success of the integration. The Coho and Chinook salmon also thrived because there were so many alewives for them to eat and also because they did not have any predators. They were the biggest fish in Lake Michigan.

In 1977, when salmon had been continually and successfully stocked for the past decade and salmon fishing was becoming extremely popular, a fishery biologist in Lansing, Michigan said, "There has never been anything like this. A few years ago the fisherman just couldn't catch the Chinooks. Then last year, they had a good season. But this year, right now, the Chinook fishing is three times better than at anytime last season." He went on to say, "We think now we are getting natural reproduction from spawning Chinooks. A few years back fisherman weren't really catching Chinooks, possibly because there were not that many. But with steady planting, along with natural, wild reproduction, we now have tons of Chinook." The salmon were thriving on the abundant alewives and were able to naturally reproduce and sustain their population. They were able to adapt enough to freshwater that they could begin to reproduce by themselves.

Meanwhile, the alewife population was under control and healthy. Other than not being as copious and threatening to the lake, the alewives were still in good shape but their numbers were being kept under control by the salmon. Jack Scott, the head of Michigan's fishery division said, "The game fish aren't endangering them. But we must remember, if we lose the alewives, we'll lose everything else."

By 1978, Lake Michigan was being stocked with eight million salmon annually. Alewives were viewed as a vital asset to the lake. An estimated

one to three billion alewives inhabited Lake Michigan. Steve Spigarelli, an ecologist at the Argonne National Laboratory said, "In the mid-1960's, everyone was concerned with dead alewives on the beaches. At that time, we didn't have the salmon in the lake. They provide 75% of the diet of the salmon." This demonstrates how the alewives, who were once a threat to Lake Michigan, became a necessary part of the food chain. Without the alewives, there would be no salmon population or the income that came with them.

Today in the state of Illinois, approximately 70-80% of all fish caught are salmon and the salmon fishing industry generates four to eight billion dollars in revenue annually. The majority of fishing licenses commissioned every year are for salmon. The salmon that were brought in as a precautionary measure against the invasive alewives created a booming industry. The alewives went from being a pest to being a necessary, vital part of the food chain. They are no longer just another invasive fish; they are the cornerstone of an industry.

This example of the integration of other species of fish to scavenge on invasive fish may be used today to combat the destructive Asian Carp. The Carp are a non-native species that are attempting to infiltrate Lake Michigan and disrupt commercial fishing, much like the alewives were preying on the lake trout. The Carp's enormous proportions will make it more of a challenge to find a possible fish that could forage for them.

Furthermore, unlike the alewives, the Carp can eat three times their body weight in a single day; nothing is bigger than they are. Even though the Asian Carp problem is on a somewhat bigger scale, hopefully a resolution as innovative as the salmon is found.

## Thesis

Invasive alewives threatened the stability of Lake Michigan's ecosystem during the early 1960's. When a predictable, massive die off of alewives occurred, causing twenty billion carcasses to flood Chicago beaches, the Great Lake states and the federal government created a program to solve the problem. In 1967, Coho and Chinook salmon, native to the Pacific Ocean, were introduced into Lake Michigan. The salmon thrived on the abundant supply of alewives. The innovative solution solved an environmental predicament and created an economic opportunity.

## Outline

### I. Invasive Alewives

- a. Kill off other marine life
- b. Wash up on beach
- c. CPD haul truckloads away- need solution

### II. Dealing with the Problems

- a. Joint program formed among Great Lakes states to find solution
- b. INNOVATION: Coho Salmon introduced
- c. Thrive on Alewives

### III. Full impact

- a. Alewives become necessary part of eco system, population under control
- b. Fisherman have an open season
- c. Once a nuisance, now vital
- d. Use this lesson today with the destructive Asian Carp

## Works Cited

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them? | Great Lakes Echo." *Great Lakes Echo - Environmental news across the basin*. Web. 21 Jan. 2010.

<http://greatlakesecho.org/2009/09/02/alewives-should-great-lakes-managers-kill-%E2%80%98em-or-keep-%E2%80%98em/>. This article

gave really great insight into the alewife situation today, thirty years later.

Gillies, Jeff. "Alewives: The trouble they cause and the salmon that love them | Great Lakes Echo." *Great Lakes Echo - Environmental news across the basin*. Web. 21 Jan. 2010.

<http://greatlakesecho.org/2009/09/03/alewives-the-trouble-they-cause-and-the-salmon-that-love-them/>. This article had a really useful description of the relationship between the alewives and the salmon currently and how they interact with lake trout.

Gillies, Jeff. "Great Lakes fish in the balance; biologists have little control | Great Lakes Echo." *Great Lakes Echo - Environmental news across the basin*. Web. 21 Jan. 2010.

<http://greatlakesecho.org/2009/09/04/great-lakes-fish-in-the-balance-biologists-have-little-control/>. This article, the last in the series, gave a really great explanation of what to do now in the situation with the alewives and salmon with the lake trout aspect thrown in.

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This was a great resource that explained where the alewife

population stands today.

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McNally, Tom. "Lake Coho Salmon Create Stir." *Chicago Tribune* 1 Oct. 1967. *Chicago Tribune Historical Archive*. Web. 21 Jan. 2010. This article gave great descriptions of how the Coho salmon affected the alewife and fisherman population.

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McNally, Tom. "Salmon Homecoming." *Chicago Tribune* 16 Sept. 1971. *Chicago Tribune Historical Archive*. Web. 21 Jan. 2010. The article describes how the Coho salmon migrate to spawn and die each year. This helped me get a grip on the nature of the Coho.

McNally, Tom. "Year of the Chinook Arrives Early Here." *Chicago Tribune* 22 May 1977. *Chicago Tribune Historical Archive*. Web. 21 Jan. 2010. The article explained how the Coho adapted to Lake Michigan and how they were spurring a fishing fever.

"Plan to Clear Alewives Hits Snag." *Chicago Tribune* 5 June 1968. *Chicago Tribune Historical Archive*. Web. 21 Jan. 2010. The short piece details the obstacles of the federal alewife relief program and was very helpful when trying to comprehend the capacity of the plan.