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Environmental Education in New York State

A Case Study Comparison

By

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ABSTRACT

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Environmental education is vital to the sustainability of our society. It is often through programs and classes that citizens learn about processes that are harming the environment and how they can be remediated. This thesis explores two different, 501(c)3 organizations in New York State that aim at increasing public awareness regarding environmental pollution and degradation.

The first study presented in on Five Rivers Environmental Education Center. This nonprofit offers class to the general public as well as to local schools aimed at increasing awareness of environmental problems. It has miles of trails dedicated to helping people develop a love and respect for their local environments in the hope that they will do more to protect them.

The second case study is on Clearwater Sloop, Inc., which is a physical ship that sails down the Hudson River. It too offers classes as well as summer camps. The main goal of this organization is to raise public awareness of issues regarding the industrial pollution of the Hudson River, and well as educate on remedial methods and projects that can use more support. This thesis ends with a compare and contrast between the two organizations presented in this paper.

Five Rivers Environmental Education Center, Delmar New York

The Five Rivers Environmental Education Center is located just outside of Albany, New York. It is one of two environmental education centers operated by the New York State Department of Environmental Conservation (NYSDEC), with the other location being the Dr. Victor Reinstein Woods Preserve outside of Buffalo. The DEC has a statewide responsibility to manage natural resources and protect the environment; Five Rivers contributes to this effort by offering enjoyable educational programs, which help develop the public's understanding of complex environmental concerns (*DEC: Five Rivers*). Five Rivers is a living museum, with over 450 acres of fields, forests, and wetlands to explore, and is utilized by over 100,000 visitors annually. They firmly believe that environmental education is a life-long learning experience and therefore have programs for children, adults, and families. Their mission reflects this belief, and states, "Five Rivers fosters discovery, spiritual refreshment and physical fitness through wholesome outdoor recreation," (*Five Rivers Environmental Education Center* 22 Jan 2016). The center provides year-round education programs, and offers both guided and self-guided opportunities for visitors to see and experience wildlife. In recognition of its outstanding interpretive programming, the National Park Service has designated Five Rivers a National Environmental Study Area.

At the Visitor's Center, you can view exhibits on the natural history of the area, see several different species of birds through the indoor bird watching window, or observe bees in their hive. Outside, there are over ten miles of trails for hiking and

cross-country skiing and snowshoeing in the winter. The center's staff encourages interest, participation, and involvement from all who visit. The main focus of all programs at Five Rivers is on the environment, as well as on the natural history of the area. The center also provides school lessons in order to "promote awareness, knowledge and appreciation of New York State's environment year 'round," (*Five Rivers Environmental Education Center* 22 Jan 2016). The grounds are open daily from sunrise to sunset, and the Visitor's Center is open Monday thru Saturday.

Five Rivers Environmental Education Center

The Department of Environmental Conservation in New York operates two fully staffed Environmental Education Centers, which offer classes and programs on environmental awareness around the state. The center hosts a variety of programs aimed at getting the general public outside and into the local environment in a fun yet educational setting. Programs aimed at younger children provide the basis for scientific thinking and active, hands-on learning. The hope is that if children are exposed to this educational style at a young age, they will continue it throughout their lives. Five Rivers believes that if people spend time outside and interact with the plants and animals in the area, they will become connected to it and feel more of a personal responsibility in caring for it.

Five Rivers does not offer programs that teach about recycling, or conservation, or environmental protection. They are not an organization that focuses on how to fix the environment; rather, they concentrate on how to avoid its destruction in the first place. They are unique in that they teach people why they

should appreciate and care about their environment before it is too late. Five Rivers accomplishes this mission through programs both indoors and outdoors, trails for hiking, snowshoeing, and exploring, and a Visitor's Center with hands on exhibits, viewing areas, and staff that are eager to hear and answer any and all questions from the youngest visitors to the oldest and most educated ones.

Five Rivers Funding and Staffing

Five Rivers Environmental Education Center is operated by the NYSDEC. As a result, a large part of their funding comes from the state. On Monday, January 25, 2016, construction began on a new Visitor's Center next door to the current building. It will use geothermal heating and cooling, will have a green roof, solar panels, and be built using trees from surrounding forests. Rainwater will be collected from the roof, and be used for the toilets. This will be an incredibly sustainable and environmentally friendly building, and will cost around \$7 million dollars. All of the money needed for this new construction is from state funding.

Friends of Five Rivers is a not-for-profit corporation formed in 1972. It operates independently of NYS and has 652 members. Their mission is, "to support environmental education at the Five Rivers Environmental Education Center..."

(Friends of Five Rivers: Annual Report). In the 2014-2015 fiscal year that ended on June 30, 2015, the organization generated almost \$170,000 in revenue, with more than half of the money coming from memberships and donations (Figure 1). From this, 88% of the money went towards educational programs such as the Guided School Program. In conjunction with 228 local schools and groups from the area, last

year over 3,200 students participated in programs at Five Rivers that provided hands-on scientific experiences for students to engage in (*Friends of Five Rivers: Annual Report*). The programs take place outside, and change with the seasons. Members of Friends of Five Rivers can donate money or their time to the center on any level they wish.

Five Rivers has four permanent staff members that include Ray, the Center's director, as well as three environmental education members. Their main responsibilities are focused around running the many programs the Center offers to schools. These staff members are hired by the DEC and are placed at Five Rivers. Aside from these employees, there are several interns at Five Rivers. The Hudson Valley River Corps has 40 different interns that it places in state parks from Albany down through New York City. Five of these interns are placed in Five Rivers for ten months in partnership with Americorps; in addition, Friends of Five Rivers provides two naturalist interns to the Center. The interns provided through Friends of Five Rivers are there for four months, full time. All of the interns have housing provided to them on site by Five Rivers.

Friends of Five Rivers has three full time staff members, including an executive director, a Guided School Program coordinator, and a summer programs coordinator. There is also a board of directors, which staffs an additional 15 people. Before anything is decided upon in the organization, board meetings are held in which members can voice their opinions and vote upon how funds are raised or spent.

When a new program is added, or the theme of the programs are decided upon, Friends of Five Rivers, the interns, and the permanent staff all make the

decisions together. Since most of the funding comes from Friends of Five Rivers, and the interns are some of the teachers of the programs, it is only just that everyone has a say in what happens at the Center.

Five Rivers also pays close attention to the concerns of the local community. The Center is beloved by many, and some people will visit weekly. When news of the new Visitor's Center reached the general public, there was great concern over a beloved screech owl. According to Renee, an intern through Americorps, the owl has a nest in a tree ten feet from the parking lot where the new construction is occurring. When people heard about the new building plans, several of them showed up to voice their concerns about the safety of the owl and to ask what was being done to protect it. The construction crew was made aware of the owl, and the tree and surrounding ones are off limits. Renee said so far the owl has been curious and watches the construction, and that the noise does not bother her at all. She admitted that it had only been a few days, but reassured me that the Center was constantly monitoring the owl and her nest. This shows how much the public cares about Five Rivers, and how much the Center listens to the public. Much of their funding comes through general donations from Friends of Five Rivers, so the Center pays close attention to the opinions of their potential donors.

Environmental Education in New York State

Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of

environmental issues and have the ability and skills to make informed and responsible decisions. According to the Environmental Protection Agency (EPA), the components of environmental education are awareness and sensitivity to the environment, knowledge and understanding of challenges, attitudes of concern for the environment and motivation to improve conditions and create equality, skills to help identify and solve problems, and participation in activities outside (*What is Environmental Education?* 24 Jan 2016). It does not advocate a particular viewpoint or course of action, but teaches how to see all sides of serious issues by thinking critically, while enhancing their own problem-solving and decision-making skills.

In 1990, the National Environmental Education Act was passed. This states that the EPA must provide national leadership to increase environmental literacy; in order to accomplish this, the Office of Environmental Education was developed in order to implement these programs (*National Environmental Education Act* 24 Jan 2016). There are various committees nationwide whose main purpose is to help ensure everyone has access to educational programs. The National Environmental Education Advisory Council is comprised of representatives from organizations other than the federal government who provide EPA with advice on environmental education (*What is Environmental Education?* 24 Jan 2016).

The National Environmental Education Foundation (NEEF) was established in 1990, and is an independent non-profit organization complementary to the EPA; the organization helps extend its ability to foster environmental education for all ages and in all segments of the American public. Environmental challenges are one of the major problems the world is facing today; NEEF believes that these issues can only

be solved if all Americans understand how they play a role in addressing and mitigating these problems first-hand. They state, “It is our belief that most people want to do the right thing. Far too often they have not been included in environmental conversations or do not have access to relevant environmental knowledge,” (*NEEF* 24 Jan 2016). Therefore, NEEF’s goal is to reach the general public with messages that are relevant to their daily lives.

As more individuals become involved with this mission, their collective actions will have a great environmental impact and can help bring about a cultural shift in attitudes and behaviors towards the environment. It is this belief that has led NEEF to develop their commitment to offer “Knowledge to Live By” to 300 million Americans by 2022 (*NEEF* 24 Jan 2016). It is foundations such as NEEF that help spread environmental education to the masses, ensuring that everyone has access to programs. This communal effort is an attempt to make huge changes in America, in the hope that they eventually can spark worldwide shifts in attitudes and behaviors.

New York State has made it its mission to educate the general public on the environment that surrounds them, as well as to get as many people outside taking advantage of the diverse landscapes across the state. This is achieved through the help of several programs and organizations statewide that provide services for various skill levels and age groups. No matter what part of the state you live in, there is guaranteed to be at least one class or program located nearby in which environmental education is taught.

The New York State Outdoor Education Association (NYSOEA) is a membership organization that supports outdoor and environmental education services

in the state. It was developed in 1968, and its missions is to promote “lifelong learning in, for, and about the outdoors and seeks to inspire appreciation of the environment by all people,” (*New York State Outdoor Education Association* 29 Jan 2016). They aim to promote a lifelong sense of appreciation and sense of stewardship for the environment, and promote a public awareness of the value of environmental education. NYSOEA also focuses on assisting members in expanding their knowledge and skills in using the environment responsibly.

Apart from statewide programs, there are several smaller environmental education organizations located in all areas of New York. The Environmental Education Advisory Council (EEAC) is the only nonprofit whose sole purpose is to promote and support environmental education in New York City schools and other learning institutions. It was established in 1974, and serves as an advisory group to those who wish to design, develop, and implement environmental education programs. While it originally only focused on NYC, the council has now grown so much that its reach extends farther upstate, although its focus remains on the city (*EEAC* 22 Jan 2016). While there are several smaller environmental education centers in and around NYC, the EEAC has seen the greatest success and has had the largest impact on the surround area.

It is agencies and councils such as the EEAC that really spurred the movement towards increased and more accessible access to environmental education programs. Concerned citizens who could see what humans were doing to the environment decided to take a stand before it was too late. They believed that everyone should have access to the outdoors, and that there should be a certain attitude and respect

towards the environment in which we live and work in. The story of Five Rivers reflects this thinking, and is a great success story.

The land that Five Rivers Environmental Education Center is located on started as a Late Archaic Period Indian Encampment in 2500 BC. In 1791, the Patroon, which was a landowner with manorial rights, granted 230 acres to the Radley family. Eventually, another farm was established on the land, and, in 1933, New York State purchased both farms. During the Great Depression, the farmers could no longer afford to take care of their land and make ends meet. The NYS Conservation Department purchased them in order to develop the Delmar Experimental Game Farm. During this time, game birds and waterfowl populations were in serious decline; the facility was established in order to learn more about the propagation and management of these species.

Between 1933 and 1936, the site was used as a base camp for Civilian Conservation Corp S-72. They put up buildings, fences, and developed roads throughout the site for game farming. They also dammed the Vlomankill, created ponds, and hatched over 100,000 grouse and pheasant that were released around NYS. In 1941, the Department established a Wildlife Research Center on site to expand on-going pathology studies, as well as to field test innovative theories in wildlife management (*History of Five Rivers* 24 Jan 2016). Techniques developed on site included aging deer via dentition, perfecting the cannon-net and modeling wildlife populations via biometrics; these and others revolutionized the wildlife management profession nation-wide.

In 1948, the staff began to develop a small area housing caged animals that came to be known as the Delmar Zoo. It remained open until 1970, when the NYS Conservation Department underwent major reorganization. Concerned citizens that loved the zoo organized and successfully convinced the state to turn the area into an environmental education center. It was renamed Five Rivers after the five major rivers that compromise the watershed in which the center is located, and was opened in June 1972 (*History of Five Rivers* 24 Jan 2016). In 2006, an additional 43 acres was added to the existing Center's land.

The other major environmental education center in NYS is the Dr. Victor Reinstein Woods Preserve, located just outside of Buffalo. There are also three regional environmental education programs in NYS that offer professional development for teachers, in-class and after-school programs for students, and public programs at local fairs and festivals. They are located in DEC Region 1, Long Island, DEC Region 2, New York City, and DEC Regions 6, 7, and 8, the Western Adirondacks and Central NY (*Environmental Education Centers and Programs* 1 Feb 2016). Through its two environmental education centers and its other various programs, the DEC is able to reach people statewide, and spread its belief in the importance of education the general public on the environment and the natural history of the area that they live in.

Environmental education programs and centers can be found both on the national level, the state level, and the local level. It is an area that is growing and that more and more people are taking an interest in. Since climate change and global warming are such hot topic issues today, there seems to be an increase in participation

in these programs. More and more citizens are realizing how potentially devastating and destructive our damaging and careless behaviors can be. The more people can be made to care about the environment, the better they will treat it. This is the common hope among all environmental education programs and center, no matter where they are located.

Five Rivers and their Environmental Education Programs

As mention previously, Five Rivers provides a variety of programs and services that are easily accessible to individuals, families, and organized groups. The Center has public programs, guided walks, demonstrations on a variety of environmental and natural history topics, workshops on environmental topics and outdoor skills, guided lessons for school groups, self-guided visits, and teacher workshops (DEC: Five Rivers). The Center grounds are open daily, and the Visitor's Center is open all day Monday thru Saturday.

The Visitor's Center in its current state is incredibly interactive and hands-on. There are many displays labeled with signs that say "please touch", and picture books lying near each display that give a brief, kid friendly overview of what is being shown. There is a birding window in the Center where anyone can sit and watch the birds as they eat, bathe, and fly around; there are also speakers that project the chirps and squawks of the birds inside. Books lie across the table with pictures and descriptions of the birds that can be seen in the area. There are also flow charts that one can use to determine what species they are looking at using by answering a series of "yes or no" questions. The various ways in which the birds can be identified make

the display accessible to all visitors, and the staff is more than willing to help and answer any questions.

Five Rivers also has several programs that are focused on “Citizen Science”. These are centered on a specific animal such as a frogs, bat, or butterflies, and are geared towards the older general public. The programs change with the seasons and occur throughout the year. Some, such as “A Day in the Life of the Hudson River”, or “Bluebird Trail Monitoring”, where the public can build bluebird boxes for their property, are more educational and focused on natural history. Programs such as “Crowd Hydrology” where the Vlomankill stream height is measured, or “Winter raptor Survey” are public programs, but the information collected is used at Five Rivers to monitor the health of the environment and the surrounding area. These programs are free of charge to anyone who is interested.

One of the programs funded by the DEC is called Nature’s Schoolyard. It is for second grade classes at six inner city Albany elementary schools. There is one half-hour program each month, and the theme changes each time. This month, the theme is “Owls as Superheroes”, and next month, it is “The Food Web”. Programs are designed to be quick and concise, yet fun and entertaining at the same time. The school buses the students in, and the environmental education interns and a permanent staff member run the programs.

For older students and those outside of the Albany School District, there is the Guided School Program. Funded by donations made to Friends of Five Rivers, it has its own building located adjacent to the Visitor’s Center. While these programs are not state funded, they are specific to NYS and focus on many ideas and concepts

tested in the state exams for Mathematics, Science, and Technology, particularly the Living Environment components (Welcome to the Outdoor Classroom at Five Rivers). Similarly to every other program run at the Center, the themes change monthly. They include classes such as “Stream Life”, “Marvelous Maples”, and “Insects” (Figure 2). They are designed for specific age groups, and each class has a small instructor fee depending on how many students attend the class. Classes last two hours, and by the end, students share observations and draw conclusions. Friends of Five Rivers provides scholarships for schools that do not have room in the budget for transportation to and from the Center, as well as for those who cannot afford the instruction fee. The goal of Five Rivers is to make the classroom as open and inclusive as possible, and to get as many young, curious students outside exploring as they can.

Aside from the programs and the Visitor’s Center, Five Rivers also has plenty of trails available for use any time by the general public. Snowshoes are rented out during the winter, and people cross-country ski there frequently. In the warmer months, the trails are open for use by anyone who wishes to explore the area, and there are also guided tours that one can take if they wish to learn more about the history and the environment in which they are.

Success and Effectiveness of Five Rivers Environmental Education Programs

One of the most effective parts of the environmental education at Five Rivers is the range of programs offered. There are classes and presentations for all ages, and they are constantly changing what is being offered. The majority of programs offered

at the Center are free, and there are ways to offset the cost of those that have a fee associated with them if it is a problem for a school or group. Five Rivers is adamant that not only should everyone have access to the outdoors, but that they also should have the opportunity to learn about the environment that surrounds them.

One thing that is unique about the educational programs offered at Five Rivers is the focus of their teaching. Instead of trying to teach conservation, recycling, and sustainability, the Center is more focused on natural history, species identification, and harboring a love for the environment. They firmly believe that if people spend time outside and develop an appreciation for the land, they will treat it respectfully and there will be less destruction and degradation; this would in turn lead to a decline in the need for mitigation and remediation programs in the future. Part of the reason Five Rivers offers programs for kids as young as preschool is to help instill these values and appreciation in them from a young age, in the hope that it stays with them throughout their lives.

One way to measure the success of Five Rivers is through Friends of Five Rivers. This not-for-profit organization relies completely on donations from individuals who used the trails and facilities, know the people that work there, and attend the classes offered. The organization had 45 new members in the past year, which clearly shows that it is still growing. The two major grants they receive have both increased in value over the past year, meaning that they will be able to offer more extensive training to program staff, as well as develop new programs for kids. Last year, the Center held over 220 Guided School Program classes, serving approximately 4,000 students. They also had 180 students participate in a five-week

summer program sponsored by Friends of Five Rivers (*Friends of Five Rivers: Annual Report*). These numbers have all increased over the past years, showing that the Center is increasing in popularity, and that more people are taking advantage of all it has to offer.

In order to understand how much Five Rivers means to those who visit and work there, all one has to do is visit the Center. Once you step inside, a friendly staff member who is more than willing to answer your questions instantly greets you. Although the existing Visitor's Center is small, it is filled with exhibits and information. People of all ages stop by the Center throughout the day, but the youngest visitors steal the attention. They come running through the door, eager to go play with the tray of bones, look out the window at the birds, or stand next to the stuffed bear in awe. Their willingness to learn and the excitement they have when they walk into the Center is contagious, and it is easy to see why there is so much public support.

In order to keep the Center operating successfully, Five Rivers needs to continue offering a wide array of programs to kids of all ages, and to get as many schools to visit during the year as possible. They could also increase the number of programs offered to older visitors; however, they are working on a limited budget and are more focused on younger children who may not have as much exposure to the wonders of the outdoors. Friends of Five Rivers is continuing to increase in membership and donations which is a trend that needs to continue in order to continue the depth of educational programs offered at the Center. Since Five Rivers relies

heavily on donations from its not-for-profit, the growth of Friends of Five Rivers is directly correlated to the success of Five Rivers Environmental Education Center.

Hudson River Sloop Clearwater, Inc.

The Hudson River Sloop Clearwater was in 1969 to clean up the Hudson River. Over the years, Clearwater has been at the forefront of the environmental movement, working to pass landmark legislation such as the Clean Water Act and protecting citizens from toxic waste. Clearwater utilizes one of the greatest natural resources in the region to inspire, educate, and activate people; it is a grassroots model for the successful generation of change to protect our natural resources and environment. Started by American folk singer and social activist Pete Seeger, one of the most influential people of the twentieth century, the sloop *Clearwater* is recognized as America's Environmental Flagship and is among the first vessels in the United States to conduct science-based environmental education aboard a sailing ship. Its innovative programs and success have led to the creation of a template for environmental education programs around the world.

Today, Hudson River Sloop Clearwater Inc., and the *Clearwater* partner with Hudson Valley schools and community groups to spread environmental education and awareness while encouraging youth to develop an appreciation and concern for the Hudson River and the environment in which they live in. The organization uses multiple environmental education programs, youth empowerment programs, environmental action campaigns, Green Cities initiatives, and public outreach to sit as a symbol of successful grassroots action through hands-on learning, music, and celebration.

Hudson River Sloop Clearwater, Inc.

For over 45 years, Hudson River Sloop Clearwater has been at the forefront of the environmental movement surrounding the Hudson River. It has worked to pass landmark legislation, provide innovative educational programs and increase environmental advocacy. Its mission is, “to preserve and protect the Hudson River, its tributaries and related bodies of water. As an organization, Clearwater works to provide innovative environmental education programs, advocacy, and celebrations designed to expand people’s experience, awareness and stewardship of this magnificent natural resource,” (*Hudson River Sloop Clearwater: About*, 1 March 2016). The organization wishes to inspire, educate, and activate millions of people through its programs and outreach.

While the organization was officially founded in 1969, it had its beginnings in 1966. The raw sewage, toxic chemicals, and oil pollution that plagued the Hudson during this time began to raise concern and spurred the development of Clearwater. Musician and activist Pete Seeger had a vision to build a replica of a sloop that sailed the Hudson in the 18th and 19th centuries in order to bring more people to the river so that they could experience its natural beauty, form a connection with it, and be moved to clean and preserve it. The 106-foot replica named *Clearwater* was built in Beacon, New York in 1968. It was launched on May 17, 1969 from Harvey Gamage Shipyard in South Bristol, Maine, and added to the National Register of Historic Places on May 4, 2004 (*Hudson River Sloop Clearwater: History and Specifications*, 1 March 2016). Early vessels and their crews were the main communication link between riverfront towns and outlying areas where a large percentage of the nation’s population lived at

the time. *Clearwater* aimed to continue that tradition as a vital link between communities while sharing the message that there is incredible beauty and wealth in the region's waterways, and an everlasting need to preserve, protect, and celebrate them.

Hudson River Sloop Clearwater Funding and Staffing

The Hudson River Sloop Clearwater is a 501(c)3, tax exempt nonprofit and is member supported. The large majority of funding comes from individual donations from members and citizens; there are over 400 members who pay annual dues. In 2013, Clearwater launched a Corporate Membership program aimed at offering meaningful benefits to companies that share a love and desire to protect the Hudson River. Revenue earned from tickets sold to the general public to sail onboard the sloop also contribute to Clearwater's funding.

Hudson River Sloop Clearwater has earned Charity Navigator's 4-star rating for its ability to efficiently manage and grow its finances. In the 2014 fiscal year, Clearwater's total income was \$2,282,620 with the large majority coming from special events (\$1,064,269), followed by individual donations (\$531,693). A very small percentage of this was raised from corporations and foundation grants. For the same year, total expenditures were \$2,396,109 (Figure 3). This includes a charge for office rent that occurred prior to the 2014 year. However, it was still included in the yearly report. The largest source of spending was on special events (\$933,888), followed by educational program services (\$752,549) ("Clearwater Navigator", Winter 2015-2016; Figure 4). Financial information was not accessible for previous

years.

In January of 2014, Clearwater was given a 75% matching grant from NYS for \$497,303 to support a three-year plan for ship repairs and restoration. The grant was awarded by the NYS Office of Parks, Recreation, and Historic Preservation using funds from the Regional Economic Development Council initiative; the funding was designated to pay for skilled labor and materials needed specially for this project (“Clearwater Navigator”, Spring 2014). In order to be eligible for this grant, Clearwater had to raise half of the total amount of restoration costs, which totals around \$850,000. To date, they have raised \$671,685 from donations, enough to secure the grant.

Clearwater has several fundraising events throughout the year to raise both money and awareness for the Hudson River. The Great Hudson River Revival is an annual charity event that has been hosted for over three decades. The festival features singers, musicians, and performers, as well as a craft show, environmental education sites, and several other mini-events. It lasts for one weekend in June, and averages around 19,000 attendees and \$162,000 in donations (“Clearwater Navigator”, Spring 2014). All proceeds directly support Clearwater’s environmental education and advocacy to help preserve and protect the Hudson River, its tributaries, and surrounding communities. The festival is not being held this year in 2016 due to the restoration of the sloop; all resources and finances are dedicated towards this project. The Great Hudson River Revival is scheduled to return in 2017. In order to make up for this large source of income, Clearwater is planning on holding smaller charity events throughout the year.

Clearwater is made up of staff, board members, and volunteers. There are 17 full time staff members that include an executive director, three administrators, two sloop captains, two development officers, seven educational coordinators and educators, and two members in charge of specific programs. Members of the Clearwater board play key roles in fundraising, event planning, program development, financial management, public relations, and project management; they are also spokespersons for Clearwater. There is an executive committee of four members, two at-large members, and nine directors (*Hudson River Sloop Clearwater: Board of Directors*, 1 March 2016). Annual board meetings provide general Clearwater members with the opportunity to elect board candidates into office where positions are held on a term-by-term basis.

There are several staff members who work on board the sloop. *Clearwater* employs six professional crew: an onboard educator, a first mate, a second mate, an engineer, a bosun, and a cook on board with the captain at all times. Onboard educators live on *Clearwater* on alternating weeks, and lead two three-hour educational programs each day. While on the ship, they also train volunteers to teach stations and operate and maintain equipment (*Hudson River Sloop Clearwater: Captains and Crew*, 1 March 2016). All crewmembers are expected to have extensive knowledge of the ship including safety standards and emergency procedures; they are also expected to participate in on board programs.

Clearwater relies on volunteers to help run programs and spread their mission. Volunteers can work onboard the sloop helping run group activities or for a special event during the year. In 2014, Clearwater had over 1,300 general and event

volunteers (“Clearwater Navigator”, Winter 2015-2016). Volunteers do not have to be members of Clearwater, but they can be; if someone is a member, they do not have to volunteer. Volunteers often attend board meeting where board members are voted on an elected into position, so they often have a say in who is brought into office.

When a new program or financial undertaking is planned, it must be brought up to the board at a meeting. All matters are discussed at board meetings. The staff presents the proposal to the board members who vote on it and decide whether they will pass it or not. After all new proposals have been presented and voted on, the floor is opened to volunteers or the members in attendance who can voice concerns, ask questions, or make comments (*Hudson River Sloop Clearwater: About*, 1 March 2016). All staff, volunteers, and members present must vote on the new board slate before it can be approved.

Industrial Pollution of the Hudson River

From its start in the Adirondack Mountains 315 miles south to its entrance into the New York Harbor, the Hudson River is abundant with a diverse array of species and natural resources. The lower part of the river, from Albany to New York City, is known as an estuary- a long arm of the sea subject to tides and the upriver press of salty ocean water. The estuary is high in biodiversity; the plants and animals found there depend on its productive waters in order to live and reproduce (Department of Environmental Conservation, 7 March 2016). In the days following the Industrial Revolution, industry depended on water power and many factories were located along the Hudson River. The fast flowing river provided both power to operate machinery

and a convenient means of waste disposal. Toxic wastes entered into the precious ecosystem, destroying natural resources and habitats. Today, the Hudson runs cleaner than it has in decades thanks to the work of dedicated scientists, government officials, and those who love the river. However, past pollution still presents problems in the Hudson today.

There are several federal legislative actions related to environmental protection aimed at specifically preventing the pollution of American waters. A number of intermediate acts dealt with public health, water quality, and air pollution up until the formation of the EPA in 1970. After the EPA was established, subsequent legislation was administered, including the Resource and Conservation Recovery Act (RCRA, 1976) and the Toxic Substances Control Act (TSCA), just to name a few.

As cities grew along the Hudson, sewage discharges into the river increased. In 1965, NYS passed the Pure Waters Bond Act to fund sewage treatment, and the passage of the Clean Water Act (CWA) a few years later made cleanup of the Hudson a national priority. The CWA also limited industrial discharges into the river, and required that the best technology available be used to clean any water that was allowed back into the river. CWA was able to protect the Hudson and its tributaries, however due to a loophole, this is not true for several hundred miles of other streams and rivers in NYS (“Cleaner Water for the Hudson River Estuary”, DEC, 7 March 2016). Even though there were problems with the interpretation and enforcement of the CWA, it is recognized as one of the guiding forces behind the initial cleanup and restoration of the Hudson River.

Arguably the most infamous pollution in the Hudson River is polychlorinated

biphenyls disposed of in its waters between 1947-1977 by General Electric (GE). Polychlorinated biphenyls, more commonly known as PCBs, are a probable human carcinogen and have been linked to several other non-cancerous human diseases. They are stored in fat and are not water-soluble; once they get into the body, they are not easily or readily excreted. PCBs are ubiquitous pollutants. They are found at low but measurable levels in nearly all marine plants and animals, fish, mammals, birds, bird eggs, and humans, and levels increase up the food chain. PCBs belong to a broad family of man-made organic chemicals called hydrocarbons. They were domestically manufactured in the United States from 1929 until 1979, when their manufacture was banned. They are chemically stable, non-flammable, have high boiling points, and good electrical insulating properties, all characteristics that make them ideal for use in hundreds of industrial and commercial applications (*Polychlorinated Biphenyls (PCBs)*, EPA, 12 Feb 2016). Once they get into the environment either through use or disposal practices, they remain for years, negatively impacting anything living exposed to them.

GE used PCBs in its capacitor manufacturing plants in Fort Edward and Hudson Falls, New York, about 50 miles north of Albany. It is estimated that GE dumped around 1.3 million pounds of PCBs into the Hudson during its production and use of these substances until their federal ban in 1977. Once these PCBs entered into the river, they were either deposited or mixed with sediments along the river bottom as well as along the shoreline in the floodplain. In 1984, 200 miles of the Hudson River between the Hudson Falls plant and NYC were placed on EPA's National Priority List of the country's most contaminated hazardous waste sites,

designating it as a Superfund site in need of remediation (*Hudson River PCBs Superfund Site*, EPA, 7 March 2016). Ongoing evaluations of water quality, sediments, air quality, fish, and wildlife by the Federal Government and NYS showed that the Hudson was not cleaning itself and PCBs in the sediment posed a serious risk to both human health and the environment.

In February 2002, the EPA issued a Record of Decision for the Hudson PCB Superfund site that called for targeted environmental dredging of approximately 2.65 million cubic yards of PCB-contaminated sediment from a 40-mile section of the Upper Hudson from Fort Edward to Troy, New York. Dredge areas were identified using the results of a multi-year sediment sampling program conducted by GE that began in 2002; it generated over 60,000 samples from the bottom of the Upper Hudson River, and led to the conclusion that most of the contaminated sediments were in localized spots along this stretch of the river. (*Hudson River PCBs Superfund Site*, EPA, 7 March 2016).

The dredging of river bottom sediment began in 2009 and was completed in fall 2015. The dredging was divided into two phases, both of which were completed by GE with EPA oversight. Dredging removed over 300,000 pounds of PCBs from the upper Hudson and cost around \$1.6 billion dollars (*The Hudson River Dredging Project*, 7 March 2016). Now that dredging has finished, GE's environmental cleanup work on and along the Hudson will switch its focus to restoring under-water vegetation to areas that were disturbed during cleanup as well as monitoring environmental conditions in the river for the foreseeable future. They will also continue to evaluate the floodplains along the river to determine if mitigation is

needed there.

The main concern for human exposure to PCBs comes from fish that have accumulated large concentrations from the water and their diets. When humans consume these fish, they ingest and store all PCBs the fish had inside it. The DEC and the EPA work together to place regulations on the consumption on fish; these are dependent upon what section of the river they were caught in (Figure 5). From Hudson Falls in the north south to Troy, fish that are caught in this area are not allowed to be eaten; they must be caught and released. From Troy to Catskill, near the middle of the river, women of childbearing years and children under the ages of 15 are not allowed to eat fish caught here. For everyone else, there are certain species that can be eaten once a month; everything else is not edible. In the lower Hudson, from Catskill to NYC, women of childbearing years and children under the ages of 15 are not allowed to eat fish caught here. Others can eat certain species once a week or once a month; there are still species that are inedible in this area (*Hudson River Fish Advisories*, EPA, 7 March 2016). Waters and PCB levels in fish are continually monitored along the Hudson, and regulations are updated accordingly.

Musician, singer, songwriter, and activist Pete Seeger founded the Hudson River Sloop Clearwater. In 1966, Seeger announced plans to build a boat to help save the Hudson as a response to the severe oil pollution, toxic chemical, and sewage that plagued the river. The river was unsuitable for swimming and fish and other ecosystems were disappearing down its length. Seeger and many other concerned individuals believed a majestic replica of the sloops that sailed down the Hudson in the 18th and 19th centuries would attract people to the river where they could

experience its beauty and all it had to offer in the hopes that this would inspire them to preserve it (*Hudson River Sloop Clearwater: The Clearwater Story*, 1 March 2016). It was through this vision that *Clearwater* was born, and the grassroots organization took off.

In 1969, a 106-foot long replica vessel named *Clearwater* was launched. On her maiden voyage, she was launched in Bristol, Maine, and sailed to New York City before making it to her home on the Hudson. The sloop was the first wooden sailing ship with a mission to preserve and protect the environment, and the first onboard environmental classroom accessible to kids of all ages, races, and backgrounds (*Hudson River Sloop Clearwater: History and Specifications*, 1 March 2016). This year, *Clearwater* is undergoing extensive restorations in order to ensure that it can continue to be an icon representing the Hudson's beauty, wealth, and need for preservation.

While a main focus of *Clearwater* is on PCB removal from the Hudson, the organization is involved with several problems and events that negatively impact the river and its ecosystem. While *Clearwater* is one of the main grassroots organizations in the Hudson area that are focused on this, three other "sister" organizations- the Natural Resource Defense Council (NRDC), RiverKeeper, and Scenic Hudson- work with them towards accomplishing their goals. There are also several other, smaller environmental grassroots organizations in the area that work towards cleaning and preserving the Hudson, however, these four work together and have a large impact. Together, utilizing the strengths of each organization, environmental education, legislation, research, and activism can be achieved on a scale that reaches a national

level. Clearwater has gained national recognition for its activism dating back to the 1970s when their actions helped force cleanup of PCBs in the river. The organization has gained worldwide recognition for its leadership in helping to pass important environmental laws on both a state and federal level.

The Hudson River Sloop Clearwater and the Fight Against Pollution

Clearwater works to protect the Hudson and those living in its vicinity through several environmental actions. It aims to ensure that PCBs are removed, that the aging and leaking nuclear power plant at Indian Point is closed down before a disaster happens, and supports the development of renewable energy sources that do not pollute. According to its website, Clearwater's objective is to ensure "a Hudson River ecosystem free of harmful pollutants, with ample habitat to sustain the reproductive integrity, health, and well being of life at all trophic levels-including human" (*Hudson River Sloop Clearwater: Environmental Action*, 1 March 2016).

Today, Clearwater carries forward founder Pete Seeger's legacy by partnering with schools and community leaders to help spread the message and importance of environmental education. The organization is helping people realize that the Hudson River and its protection and restoration couples with creating a sustainable, green world and a green economy. Clearwater's unique approach to public outreach has made the sloop a national symbol of grassroots actions through hands-on learning, educating, and celebration. The sloop and its programs have helped create a template for environmental education programs around the world.

In order to help deal with and mitigate the industrial pollution of the Hudson,

Clearwater has several primary goals and concerns. First and foremost, the organization aims to educate the general public to the importance of preserving the Hudson River system and other similar ecosystems around the state and the world. According to Manna Jo Green, Clearwater's Environmental Action Director, "If I can share the message of the importance of environmental protection and restoration of the Hudson and pay it forward, then it is not just sitting on a shelf. It becomes living history," (Appendix C). Manna believes that the more people know about the problems with the river, the more likely it is that there will be able to be more cleanup.

Secondly, Clearwater wishes to inspire, educate, and activate a new generation of environmental leaders to bring about a sustainable future full of positive changes and protection of natural resources. In 2014, over 12,000 students sailed on *Clearwater* in the Sailing Classroom Program. The deck of the sloop is a platform for students to learn about the river's natural beauty and cultural significance, as well as introduce many of them to the Hudson with which they can forge connections with nature that will last a lifetime. Teachers can choose from several different themes for programs, and students will be exposed on hands on learning of both sailing and the Hudson. Each group sail lasts three hours, and costs \$1,250 per group (*Hudson River Sloop Clearwater: The Sailing Classroom*, 7 March 2016). There are a limited number of partial scholarships available to schools and youth groups in underserved communities to ensure everyone has the opportunity to experience the Hudson and develop a love and appreciation for the natural environment.

Clearwater also fosters stewardship and community involvement by

encouraging green infrastructure and bringing about green energy alternatives. Clearwater's Green Cities initiative assists those in the Hudson River in incorporating principles of sustainability in municipal and community planning. This is done to create a healthier and greener Hudson River Valley that makes environmental stewardship a priority. Another goal of Clearwater dealing with the surrounding community is to protect the well being of those along its banks and related areas in the cause of environmental justice. The organization partners with other grassroots leaders in the region to identify environmental inequalities to take action. In collaboration with others, Clearwater has implemented a Climate Justice Initiative in four Hudson Valley cities which are vulnerable to sea level rise and are at risk for environmental, economic, public health, and other impacts of climate change in communities of color and low socioeconomic status (*Hudson River Sloop Clearwater: Environmental Injustice*, 7 March 2016). The goal is to assure that everyone has fair and equal access to the Hudson and protection against potential harmful effects.

Clearwater also conducts actions that enhances and improves the environment of the Hudson River valley, and which fosters the historic and cultural heritage of this region. The Great Hudson River Revival, while its main purpose is as a critical fundraising event for Clearwater, also celebrates the traditions of the area. There are local musicians, crafters, and artists, all who have something unique to the area to offer. Clearwater believes it is vital that the general public understand the cultural significance of the area in the hope that they will develop a greater appreciation for everything that it has to offer. If a small fishing community is no longer able to live

next to the Hudson due to a lack of fish, it is not just the people and their livelihoods that we stand to lose. Those who reside in this region have important ethnic histories that should be preserved.

Anyone who wishes to sail down the Hudson can purchase a ticket. It is not only for school groups and children; in fact, it is the hope of Clearwater that everyone has the opportunity to experience the majesty of the Hudson at some point during their lifetime. Many of the programs are aimed at younger children since they are the next generation that can stop pollution and increase restoration, while the fundraising events are aimed at older populations since they have more ability to provide financial support. However, all events and programs are open to anyone who wishes to attend.

Clearwater's Success

Clearwater has gained worldwide recognition for its innovative education style and leadership in helping to pass landmark environmental laws. The organization played a large role in the passage of the Clean Water Act in 1972, and also was a key player in EPA's decision to force GE to remove PCBs that they had dumped into the Hudson from the river. While the organization has found success with a lot of its endeavors, there are still several in which they have not been able to accomplish what they set out to do.

Manna Jo Green had a lot to say about Clearwater's strengths and the problems it faces (Appendix C). According to her, Clearwater's strong point is grassroots organizing. In the last two years of GE's dredging, other organizations did

legal research while Clearwater set out to get 70 municipalities to sign a call for additional voluntary cleanup of the river by GE. While this was not passed and the cleanup ended after the bare-minimum was accomplished, getting that many people to agree to this was no easy task. Manna emphasized this, saying they had to talk to several of the municipalities multiple time, had to answer countless questions, and had to present scientific facts and data in a manner that was easy for someone with minimal environmental background to understand. In this sense, she believes their efforts were a success.

Manna also explained that the law is a large hindrance to a lot of the action Clearwater tries to pass. Companies and even some governmental organizations often put profit or other monetary value above the human and environmental health. This is a frustrating problem and one that is not easily solved. She said that “when the governor wants something, he gets it, and if he doesn’t want it to happen, it won’t”. When organizations were lobbying for GE to voluntarily cleanup more of the river, the governor was trying to get GE to move its headquarters to NY. Since he had personal and monetary interest in this, he was not as helpful as he could have been and did not push hard for this additional dredging.

Currently, Clearwater is trying to close Indian Point, a nuclear facility on the Hudson that is old and leaking. Manna voiced concern over a possible “Fukushima-like” disaster, since the plant has 20 million people located within a 50-mile radius. Only time will tell if Clearwater and the other organizations it is partnering with will be successful in this.

I think that Clearwater is a successful grassroots organization. While it may not be getting everything it is lobbying for, it is still making people more aware of issues and increasing the environmental education of those who live in and value the Hudson River region. The sloop is currently undergoing major renovations to keep it sailing for at least another 50 years, and tens of thousands attend events hosted by Clearwater each year. It is known as a model for successful grassroots organizations, and has helped many develop a love and desire to help save the Hudson. In the words of Manna, while they are not accomplishing everything they set out to do, they are making people talk. It is once people stop talking and caring that concern will arise. In this way, I think Clearwater is a successful organization, and is very effective in getting their message to a wide and diverse audience.

Compare and Contrast Between Five Rivers and Clearwater

The two environmental organizations I looked at this term were Five Rivers Environmental Education Center in Delmar, New York, and Hudson River Sloop Clearwater, Inc. The New York State Department of Environmental Conservation (NYSDEC) operates Five Rivers, while Clearwater is a 501(c) 3 nonprofit organization that relies heavily on donations from members to succeed. Five Rivers is focused on environmental education and runs countless programs to increase public awareness and knowledge related to the areas in which they live, work, and play. Clearwater is mainly focused on lobbying for mitigation for industrial pollution in the Hudson River, as well as avoiding potential problems in the future. While both organizations have an educational focus and programs that reflect this, Clearwater is a grassroots organization that works to pass environmental legislation and provide environmental advocacy while Five Rivers is concentrated on spreading knowledge on a more personal level.

Five Rivers is a physical center that anyone can visit. It has various interactive exhibits inside, and miles of outdoor trails for hiking, walking, and snowshoeing. Local schools often visit Five Rivers and partake in programs held on site. Clearwater does not have a visitor's center, but has a sloop that sails on the Hudson. Schools and other groups can attend programs on the ship that teach about the river and the problems it faces. While both organizations have a fee that those who wish to attend programs must pay, there is no charge to visit Five Rivers. If you wish to visit Clearwater's sloop, you must buy a ticket before you are allowed on board. Since

Clearwater does not receive funding from NYS, they have to charge a decent amount (~\$50/person) for people to sail on their ship in order to keep their organization afloat.

Clearwater's actions have helped make the sloop a national symbol of grassroots actions through hands-on learning and cultural celebration. The organization has created a template for environmental activism and education around the world, gaining worldwide recognition for its leadership in helping to pass landmark environmental laws. Five Rivers reaches a much smaller audience, but is still visited by tens of thousands of people annually that interested in learning more about their environment. Five Rivers is focused on environmental education for younger generations; the majority of all programs they offer are focused on elementary and middle school ages. They are trying to inspire kids to learn about and care for their environment, before they develop habits that can be destructive or detrimental to ecosystems. Clearwater, while they have programs for younger children, relies on the moral and financial support of older citizens. While they still feel that it is important to educate youth, their main focus is on the restoration and cleanup of the Hudson.

Five Rivers is funded by the NYSDEC, but also has a non-profit. Friends of Five Rivers operates independently from NYS and raises money to support environmental education at Five Rivers. There are several hundred members who donate annual to this foundation. Clearwater is a non-profit that does not receive state funding. They too rely on donations from hundreds of members and supporters in order to accomplish their mission of inspiring, activating, and educating millions of

people. While Clearwater is much more dependent upon individual donations, neither organization would be able to operate without individual monetary support from those who believe in what they stand for.

Both Five Rivers and Clearwater understand the importance of education. Five Rivers targets a younger audience and aims to prevent pollution and degradation, while Clearwater goes after an older group of people and works to mitigate existing problems in the Hudson. Five Rivers has a non-profit but receives state funding, where Clearwater is solely a non-profit. While they have their differences, both organizations play an important role in protecting and restoring our natural environment and seem to have bright futures.

Appendix A

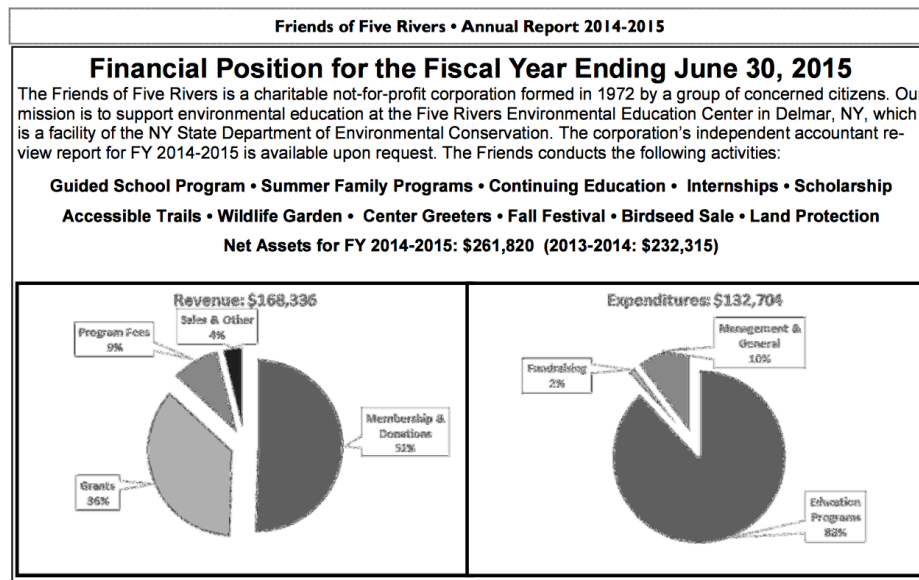


Figure 1. Friends of Five Rivers Finances for Fiscal Year Ending June 30, 2015. The graph on the left is revenue, and the one on the right shows expenditures. *Friends of Five Rivers: Annual Report. 2015.*

Grade Level	Program Title	Purpose of Program
Preschool	Explorers	Get kids outside
K-1	Animal Science	Identify animal tracks
2-3	Insects	Catch to determine if is insect
4	Stream	Catch critters to look at stream health
5+	Pond	Catch critters to look at pond health

Figure 2. A Chart Detailing the Guided School Program. The left column shows grade level, the middle states the program title, and the right states the main goal of the program. Source: Erica, Environmental Education Intern.

	TOTAL
Ordinary Income/Expense	
Income	
Individual Contributions	531,693
Foundation Grants	97,286
Corporate	45,225
Government	141,695
Education Program Fees	311,464
Special Events (Includes Festival)	1,064,269
Merchandise	74,409
Other Revenue	16,579
Total Income	2,282,620
Expense	
Development	275,362
Educational Program Services	752,549
Environmental Action Programs	190,906
Special Events (Includes Festival)	933,888
Management, General, Overhead, etc.	243,404
Total Expense	2,396,109
Net Income	-113,488 *
<p>* Note: Because the numbers are on a P&L accrual basis, the expense shown for Management, General, Overhead, etc. include \$138,723 for office rent, which was actually not spent in 2014, but is the amount taken as depreciation of prior years' expenditures. Without counting that as a 2014 expense, the year would show Net Income of \$25,235.</p>	

Figure 3. A chart breaking down income and expenses for Clearwater during the 2014 fiscal year. Net income was -113,488 but after adjusting for a previous expense, net income was actually \$25, 235. (From “Clearwater Navigator”, Winter 2015-2016).

2014 APPLICATION OF FUNDS



Figure 4. A pie chart representing where funds raised during the 2014 fiscal year was spent. The majority went to special events focused on fundraising, including the Great Hudson River Revival. The next largest recipient was educational program services. (From “Clearwater Navigator”, Winter 2015-16).

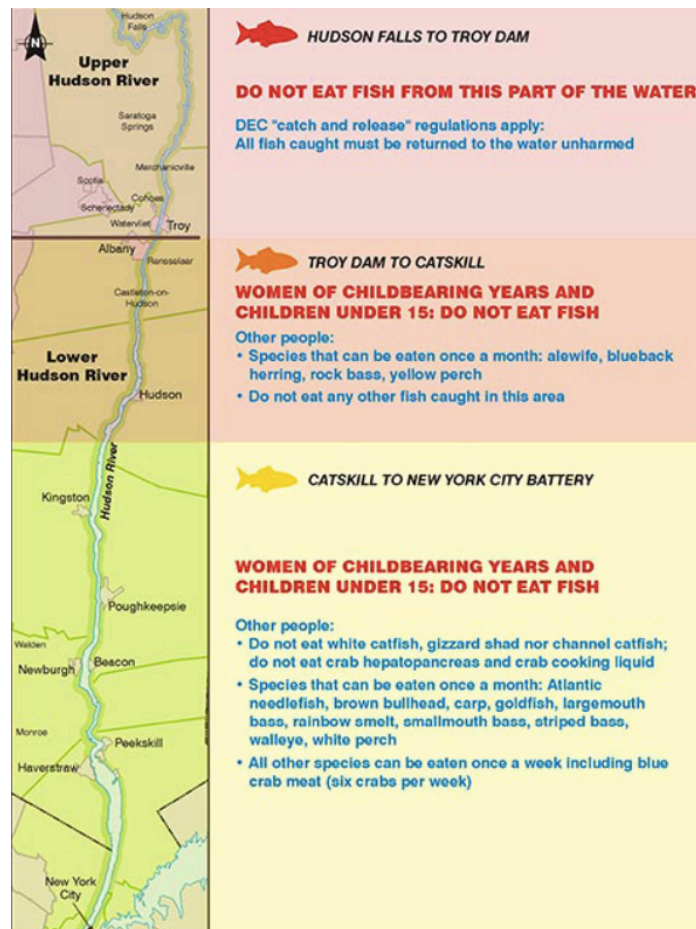
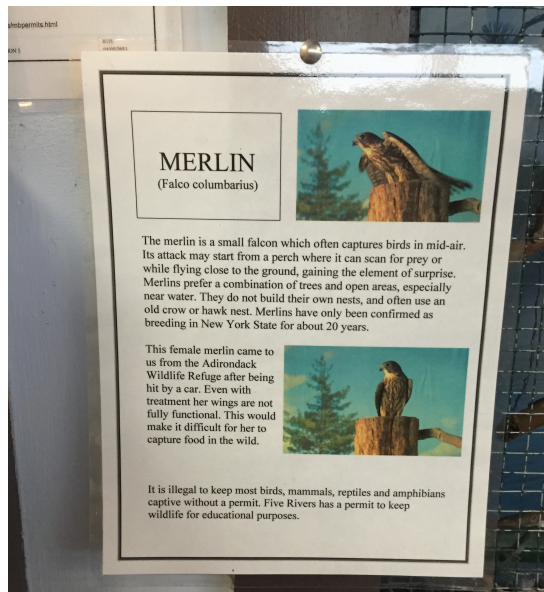


Figure 5. Restrictions on consumption of fish along the Hudson River. (Figure from EPA, 7 March 2016).

Appendix B

Photos taken by Laura Schad of Five Rivers Environmental Education Center in Delmar, NY.





Appendix C

Interview with Manna Jo Green, Clearwater's Environmental Action Director and point person on PCBs in the Hudson River conducted via phone on March 7, 2016.

Q: What do you feel is the main goal of Clearwater?

A: If I can share the message of the importance of environmental protection and restoration of the Hudson and pay it forward, then it is not just sitting on a shelf. It becomes living history. The more that people know about it, the more likely it is that we will be able to get more cleanup.

Q: What are Clearwater's strengths?

A: Clearwater addresses all issues that affect the Hudson River. There are dozens that we work on, but the two main ones have been PCBs and trying to close Indian Point before a nuclear disaster occurs. Our strong point is grassroots organizing. In last 2 years of remediation [for GE's dredging], other organizations did legal research while Clearwater helped organize teams to talk to 70 municipalities who signed call for GE to negotiate more voluntary cleanup, dozens of editorials calling for more robust cleanup. This was very effective, but it didn't happen. We organize and educate people, and rely on sister organizations that have legal staff to focus on litigation.

Q: In your opinion, what is the biggest problem that exists when it comes to the cleanup of the Hudson?

A: Unfortunately, the biggest problem that is in order to get a robust cleanup, the law is not on our side. With the cleanup of PCBs, 136 acres outside the delineation area still needed dredging. However, they were not marked as hot spots and therefore were not required to be touched. There is also a debate between agencies. With PCBs, Clearwater was unable to convince EPA that there was no need to do more than the basic dredge area. Therefore, dredging "finished" incompletely, which was very frustrating after working on it for 15 years.

Q: What would you say has been a success when it comes to PCB removal?

A: The river is much cleaner, but only around 60-70% of what we would have hoped for. The dredging gets a passing grade, but just barely. However, we are much better off than in EPA had not required GE to clean at all.

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