
Delaware River Experience

Unique Educational Programs on the Delaware River



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MISSION

To inspire people of all ages to conserve and respect the resources of the Delaware River and its tributaries through unique, hands-on educational experiences.

VISION STATEMENT

The Delaware River Experience will foster knowledge, awareness and an appreciation of the natural resources of the Delaware River and its tributaries through ecological experiences. Participants will be able to experience the ambience of the river on a state-of-the-art Coast Guard certified pontoon boat. School groups and other educational program participants will be able to collect water samples and specimens of aquatic river life and return to a land based laboratory/classroom to learn more about the ecology of the river. Keller's Landing is the home base for the Delaware River Experience and is nestled on 1.5 tranquil riverside acres. The property is well suited for groups interested in learning about the river and is equipped with a laboratory/classroom, large meeting space, scenic picnic grove and events area, restrooms, dock and ample parking.



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■ The need for Environmental Education

We live in a technologically driven society, one in which people have become increasingly alienated from the natural world. An alarming number of individuals have little or no concept of where their food and water actually originate, and even less understanding of how the dynamic systems of the planet work. But what has not changed is that human life, in fact all life, is directly dependent upon a healthy environment for survival. Today's citizens, both young and old, need to be made aware how their everyday lives are inseparably connected to the natural world and the resources it provides. We need to understand how human actions can detrimentally impact these natural systems, and recognize each individual's responsibility in helping to solve our environmental problems.



Students especially, as our world's future leaders, need to become informed and wise stewards of the earth. They need to develop the environmental knowledge that will empower them throughout their lives to make sound decisions about the use of the earth's resources and the health of our environment. It is through awareness, concern and knowledge that we will come to develop a stewardship ethic toward the conservation of our world's natural resources and the prevention and correction of continued environmental degradation.

■ The need to meet Pennsylvania and New Jersey education standards in environment

Within the past few years, both Pennsylvania and New Jersey have adopted updated versions of their Academic Standards for Education. These standards establish the essential elements of what students should know at the end of various grade levels. In both of these sets of Standards, study of the environment figures prominently.

Pennsylvania's Academic Standards for Environment and Ecology identifies nine target areas that enable students to "examine the world with respect to the economic, cultural, political and social structure as well as natural processes and systems". New



Jersey's Environmental Studies Standard, one of ten Core Curriculum Content Standards for Science, is designed to help students "develop an understanding for the environment as a system of interdependent components affected by human activity and natural phenomena". Both the New Jersey and Pennsylvania Standards for Environment are grounded in the complexity of our world and human impact on its sustainability. It is this integration across natural and human systems which is so important in the study of the environment.



■ The need for watershed studies

The Delaware River Watershed covers 12,757 square miles and parts of four states—New York, New Jersey, Pennsylvania, and Delaware. It is the third largest watershed in Pennsylvania. There are no dams over the course of its 300 mile length which stretches from the Catskill Mountains in New York to the Atlantic Ocean, making it the last major free-flowing river in the eastern United States. The river valley is home to more than 6 million people and provides drinking water for over twenty million people.

At both the federal and state levels, Watershed Education has been given a high priority. Pennsylvania has recognized this as one of the most important areas of focus for environmental education programs, and has funneled large amounts of state grant money into this area over the past 5 years. Still, few programs exist for the Delaware River Watershed. A program primarily centered on the Delaware River, and the relationships between its ecology, historical heritage and human impacts within the watershed and water basin would provide invaluable educational opportunities for hundreds of children and adults.

■ The need for a quality river resource study facility

The Delaware River is an important and valuable natural and recreational resource of the region. Over the past decade, recreational usage along the river has grown tremendously, attracting both residents and weekend visitors for boating, swimming, fishing, biking, and sightseeing. In spite of the river's growth in popularity and numerous recreational sites that capitalize on its scenic beauty, there are only a very few facilities that provide the opportunity to learn about its unique ecology. The New Jersey State Aquarium, located in Camden, is one such facility, but is a lengthy drive for the majority of schools along the river and is located on the estuary rather than the main stem. Group interaction there is largely with specimens displayed in tanks and does not provide the "hands-on" opportunity to collect the animals in their natural habitat.

There is no replacement for experiential education, and studies have shown repeatedly that people learn best when they are actively involved with their environment. An educational facility located right along the banks of the Delaware

River, will fill this void. Emphasis in this program is on an interactive approach to learning. Program participants will have the opportunity to explore the river from a boat, something that no other local river program offers, while learning about the natural and historical heritage of the Delaware River. Engaged in "hands-on" exploration, young and old alike will gain a respect and understanding of the river dynamics in particular and of the environment in general. What better way to connect with nature and one's environment than through a learning experience on one of the area's most significant natural features—the Delaware River.





SUPPORT FOR THE DELAWARE RIVER EXPERIENCE PROGRAM

Schools, nature centers, and the Bucks County Intermediate Unit have expressed excitement and interest in the Delaware River Experience. The quotes below are excerpts from letters of support for this innovative program.

"As an educator for 24 years in the Council Rock School District, I would like to place on the record my belief that this project will provide a valuable learning resource to school communities in Bucks County.

We are constantly searching for educational trips for our students that enrich and expand the curriculum. The Delaware River Experience program at Keller's Landing offers to schools an opportunity to explore unique learning in the areas of environmental education and ecology. It comes at an opportune time as the State of Pennsylvania has imposed new education standards dealing with environmental education. I know of no other project in our area that would allow the students both the variety of ecosystems and the accessibility to both land and water based resources. These are real life laboratories waiting for exploration. It is exciting to see this project unfold."

Mark J. Klein, Principal
Holland Elementary School
Council Rock School District

"As you know, I am the Delaware Basin Coordinator for the nationally recognized PA Parks Watershed Education Program. As such, I am continually seeking to reach a wider audience and to broaden opportunities for our participating schools. Your classroom area will be a perfect area to offer the teacher training workshop for local schools. Because the pontoon boat is a unique setting that is capable of housing lessons unavailable on land, it will draw school groups from the entire basin."

Bonnie Tobin
Environmental Education Specialist
Delaware Canal State Park

"I am writing in support of the proposal by Captain Dee Keller to establish a site on the Delaware River in Upper Black Eddy to be used as a living science laboratory for students.

The Delaware is a wonderful resource for our students, but it is not well utilized because there is no facility in the area that allows students access to the river and also to nearby indoor lab facilities so that samples can be more closely studied and analyzed.

Developing a knowledge and appreciation of the natural history and ecology of our area has always been a goal of the Palisades School District and with the recent adoption of the new state Science Standards by the legislature a detailed knowledge of these issues is now required of each of our students."—letter one

"I found the property to be one that can easily be converted into an ideal laboratory classroom on the edge of a tremendous natural resource, the Delaware River.

The Delaware River is the most interesting natural resource in the region, but it has been sadly neglected by our district and the other surrounding districts in Pennsylvania and New Jersey simply because there has been no safe and convenient access to the river. Captain Keller's plans for the property and the study boat, which he will dock there, will change all that.

Our district and many other districts will want to utilize this facility for the obvious reasons of the richness of wildlife both in and around the river and because it will be a unique opportunity to learn how care for the environment can benefit everyone in terms of improved recreation and economic development. Also the new science standards recently adopted by the State of Pennsylvania require that all students be proficient in all aspects of wetlands ecology, conservation of natural resources, identification of plants and animals, chemical and physical parameters, and pollution control and reduction."—letter two

Ken Hasz
Elementary Science Department Head
Palisades School District

"It was a pleasure to visit Keller's Landing and meet with you to discuss the private environmental education project you wish to pursue at this beautiful site on the Delaware River. The tract with its improvements seems prime for this endeavor, with access to one of the better pools on the river for educational pursuits. It is easy to foresee the desirability and utility of the location to educate the public. Please keep us informed of your progress as both Sherry and I will support this effort and do what we can to help."

Isidore "Bill" Mineo
Stewardship and Trail Manager
Delaware & Lehigh National Heritage Corridor



Henry Hudson, one of America's first European explorers, termed the Delaware "one of the finest, best and pleasantest rivers in the world." Today, over 300 years later many people would still agree. The river's scenic beauty, resources and recreational opportunities attract millions of visitors to its shores each year. Little do people realize, however, that among the pools, riffles and eddies lies a fascinating ecology and diversity of wildlife waiting to be explored.

The Delaware River Watershed covers 12,757 square miles, or about one third of Pennsylvania. It takes in parts of 4 states, 42 counties and 838 municipalities,

and provides nearly 10% of the U.S. population with drinking water. Its lower reaches are important as a shipping channel from Philadelphia and Trenton, and much industry and commerce has developed along its shores. Yet, the Delaware is still one of the most beautiful, unaltered rivers in the country.

The main stem of the Delaware River has never been dammed, and flows over 300 miles from the Catskill Mountains in New York to the Atlantic Ocean. The river flows through rolling hills and broad valleys, and woodlands cover many of the river islands. Where the river has cut deeply into the rock, palisades and cliffs have emerged, providing habitat for a variety of unusual plant species and wildlife, including Osprey and the endangered Bald Eagle. The river also serves as an important migratory route for birds. Raptors, waterfowl, and passerine birds rely on the river's north-south orientation to guide them on their bi-annual journeys.

The Upper Black Eddy section of river is characterized by long deep pools and riffles composed mostly of stone and gravel. This material washed down from the ancient Appalachian Mountains and was rounded by glacial action. The wide flood plains here contain large deposits of sand and gravel from the last Great Ice Age, when the river was much larger. Triassic red shale cliffs border each side of the river and serve as reminders of geologic action from a more turbulent time. Rare plants cling to these shale outcroppings. On rock shelves of the north-facing cliffs in Pennsylvania grow Arctic-Alpine plants such as Rosey Sedum, while Prickly Pear Cacti dot the cliff shelves on the south-facing New Jersey side, just north of Milford. In June, this cacti can be seen from the river with a profusion of their yellow flowers.

The waters of the Delaware support an interesting diversity of fish. Each year American Shad, Striped Bass and Herring return from the ocean to the upper reaches of the river to spawn. In contrast American Eels migrate down the river and out through the Atlantic Ocean for hundreds of miles to spawn in the Sargasso Sea. Small Mouth Bass, present in the river year round, attract fisherman from throughout the region and country. It is the American Shad, however, that is a major part of the river's ecology and has played the most important role in the river's early commercialization, development and tourism.



The American Shad, an anadromous species, is born in fresh water, but spends most of its life in salt water. Each year the adults return to the rivers where they were born to spawn, and then return to the ocean. The eggs mature rapidly, drifting with the current and hatching in about four to twelve days. Juvenile shad spend their first summer in freshwater feeding on zooplankton and insect larvae. Autumn's cooler water temperatures signal the young fish to migrate downstream to the ocean.

During the late 1800's, commercial Shad fishing was a major industry on the river, with the catch for the bay and river recorded at around 15 million pounds. By the 1920's, increased water pollution reduced the catch to barely a quarter of a million pounds. In the 1950's no shad were caught due to major pollution barricades in the river at Philadelphia. The Clean Water Act of the 1970's, which set strict regulations for the cleanup of polluted waters, dramatically improved conditions in the river, particularly dissolved oxygen levels so important to fish. Since that important cleanup work, the number of shad and other fish species found in the river have steadily increased. Estimates from sonar measuring devices indicate that over a million shad now pass New Hope each spring on the way upriver to spawn. There are now a number of commercial fisheries on the river again, and several riverside towns now hold festivals each Spring to celebrate the shad's return.

Improved water quality in the river is responsible for a dramatic increase in the plankton and fish populations which in turn have benefited other wildlife, as well. Bald Eagles, Osprey, Kingfishers, Great Blue Herons, Double-crested Cormorants, and other fish eating birds, are seen in greater numbers, and several species have expanded their nesting range due to the availability of food. River Otters and Beavers are also sighted regularly along the river.

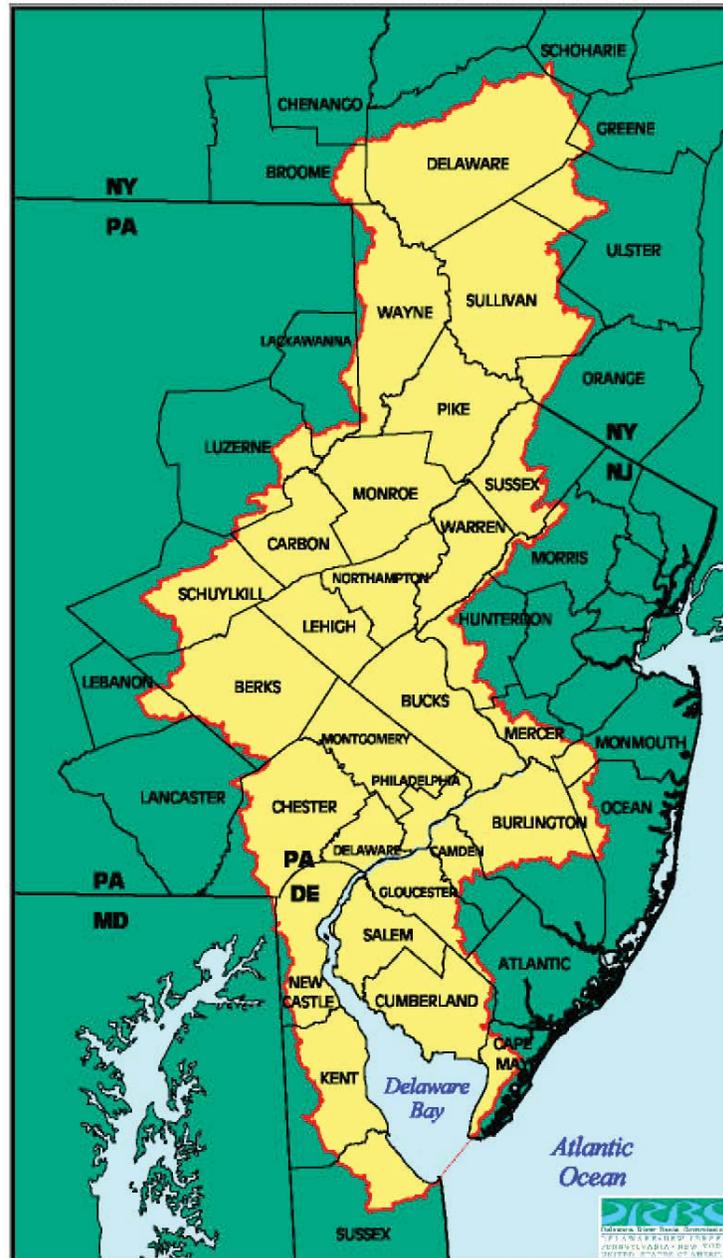
Learning about the American Shad's life cycle, commercial harvest, and near demise due to pollution helps to give people a greater understanding and appreciation for the interrelationships between all living things. It is a goal of the Delaware River Experience program, to educate people about these interrelationships and the unique ecology of the Delaware River, through hands-on explorations with river animals such as the American Shad.

American Shad –*Alosa sapidissima*





Counties within the Delaware River Basin



20 0 20 40 Miles





The intent of this program is education—for all ages. It is being targeted primarily to regional schools, universities, and educators, as well as other educational groups, community groups, and the general public. Each of these audiences will come to the Delaware River Experience (DRE) program with individual needs and different expectations, whether it be fulfillment of state environmental education requirements, completion of a Scout badge, or enjoying a weekend outing with the family. All, however, will leave with a better understanding for the web of life and a greater appreciation for the Delaware River and its inhabitants.



■ Schools, Universities, Teacher Training

Public and private schools and universities will be able to take full advantage of the facilities and DRE program offerings for a multitude of learning opportunities at all levels. The flexible scope of the program will be designed to compliment the school curricula, and to enhance classroom learning with real life experiences. A main thrust of the DRE program will be to help Pennsylvania and New Jersey teachers in public schools comply with mandatory state standards in Environment and Ecology, through comprehensive field offerings that address specific standards.

The large availability of environmental education curricula allows for an outstanding selection of activities from general ecology to Delaware River specific lessons. The DRE instructional staff will work with teachers to customize lessons to meet the individual needs of the class, and to teach specific concepts. All lessons will be designed with a variety of thought provoking and fun "hands on" activities, to be conducted both on and off the water. The DRE curriculum will also promote interaction and engage the interest and imagination of all attendees. Pre-and post-trip activity suggestions will help teachers provide their students with a more comprehensive learning experience.

There are a half dozen colleges and universities within about an hour's drive of Keller's Landing. This site has the potential to serve as a satellite fresh water/river study field station for these institutions. Access to the river via a study boat and use of the fully equipped laboratory can provide students and professors with an outstanding opportunity to further enhance their academic studies.

The Keller's Landing site also holds enormous potential for educator training workshops on numerous topics connected to water and the river. Public school teachers are required by law to periodically earn additional credits in order to maintain their public school certification. The Intermediate Unit oversees the course offerings and awarding of credits. Teacher training programs will be offered in conjunction with the IU. Private school teachers, camp instructors and other educators would also be interested in such training programs. In addition, other area environmental organizations can utilize the site to conduct educational workshops. The Delaware Canal State Park has already expressed interest in doing so.

A Typical School Visit Upon arrival at the Keller's Landing site, the group will receive a brief orientation and introduction to the lesson, before boarding the river study boat for the main part of the program. A trip out onto the river in a boat such as this usually provides a totally new perspective on what most have taken for granted. Students will become engaged in activities that help them better understand the dynamic force of the river and the myriad of creatures that live there. The instructor will also conduct other activities that relate to the theme of the lesson. Collected specimens can be temporarily held in live holding tanks for further analysis or examined in the lab later. Upon returning to shore, students can use the laboratory equipment to more closely study their findings with their teacher. A wrap-up and summary of the lesson concepts will be conducted at the end of each program, and the teacher provided with post-trip activity suggestions.

■ Other Educational Group Offerings

The beautiful setting and learning opportunities at the Keller's Landing site provide an enormous potential to reach a widely assorted audience with well designed educational enrichment programs. These programs and groups include but are not limited to: home school groups, continuing education, weekend workshops, summer ecology camps, Boy/Girl Scout and 4-H programs, community service groups, conservation organizations, weekend visitors and the general public.

With the classroom/science lab area, picnic and events area, and educational riverboat tours, there is no other place in the area that can offer as comprehensive a package to educational groups. The DRE program will provide these educational services in a wholesome and interesting environment making the experiences conducive to learning and retaining information.





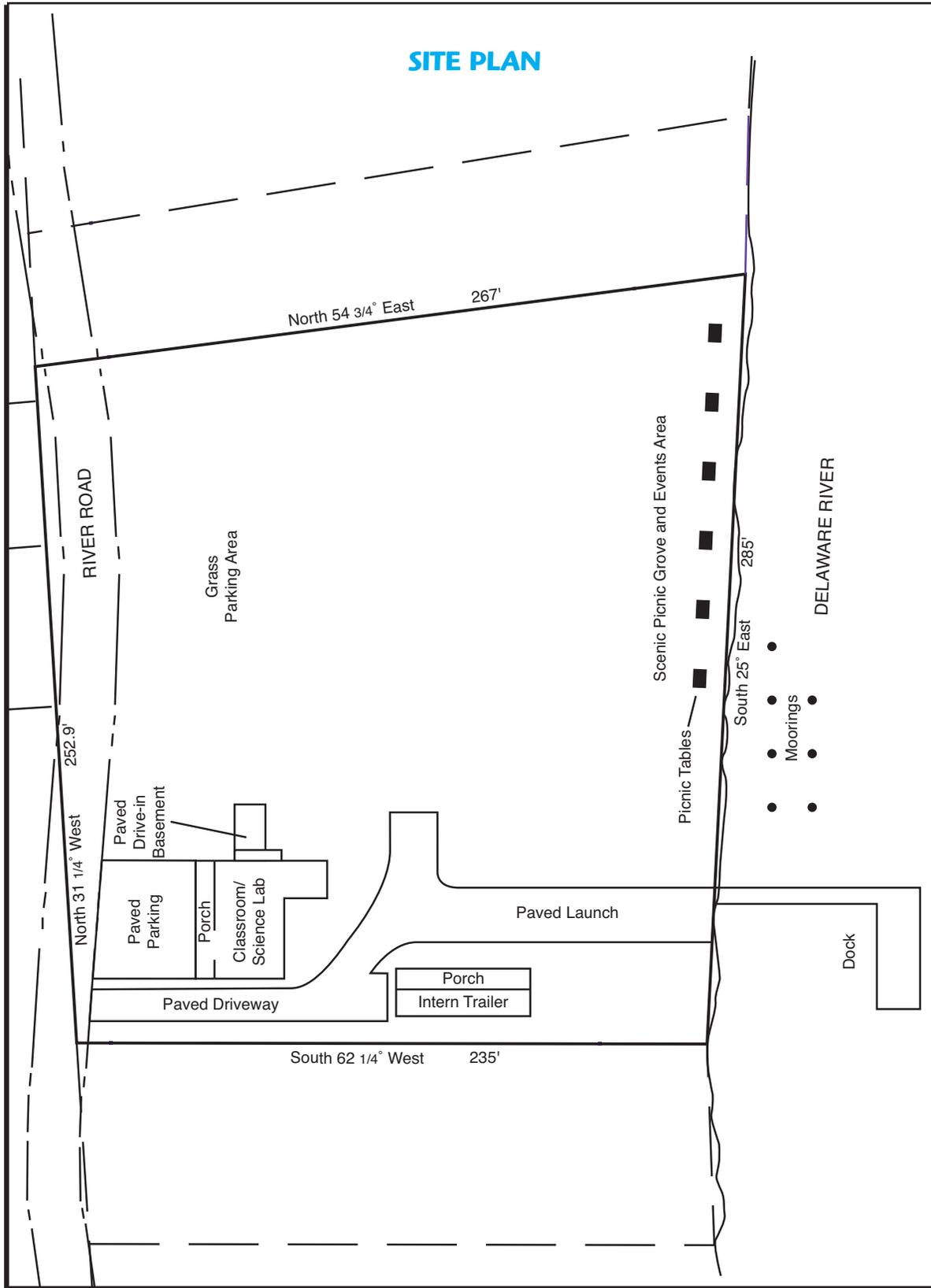
■ Facilities

Keller's Landing, the site for the DRE program, is located on 1.5 tranquil acres nestled on the scenic banks of the Delaware River. The facilities here will provide the framework for outstanding and unparalleled educational opportunities, and will be equipped to work equally as well for a college level field station or an elementary school trip.

The services and amenities at Keller's Landing will be handicap accessible and include:

1. 1000 sq. ft. state-of-the-art multi-purpose classroom/meeting room to include:
 - high speed internet access via T-1 line connections with a 9-port hub
 - video conferencing capabilities with a large screen monitor and camera
 - LCD projector with screen
 - conference phone system
2. 200 sq. ft. fully equipped laboratory/science activities room to include:
 - microscopes—compound and binocular
 - scientific experiment equipment
 - built in observation tanks
 - water sampling kits and measuring equipment
 - collecting nets, seines, pans
 - field guides, scientific keys and other reference manuals/materials
 - other related education program equipment
3. 52 ft. x 16 ft. custom-built Coast Guard-certified pontoon boat with:
 - capacity of up to 76 passengers
 - large sliding glass windows
 - collecting nets/seines and other sampling equipment
 - live holding tanks for holding aquatic specimens
 - heating and air conditioning, sound system, PA system, electrical outlets
 - 50 gallon fresh water tank
 - two restrooms
4. Scenic riverside picnic grove and events area to include tables and grills, recreational equipment, and space for a 40 ft x 60 ft tent
5. Boat dock and boat launch area
6. Two public restrooms
7. Ample parking

SITE PLAN



Delaware River Experience

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