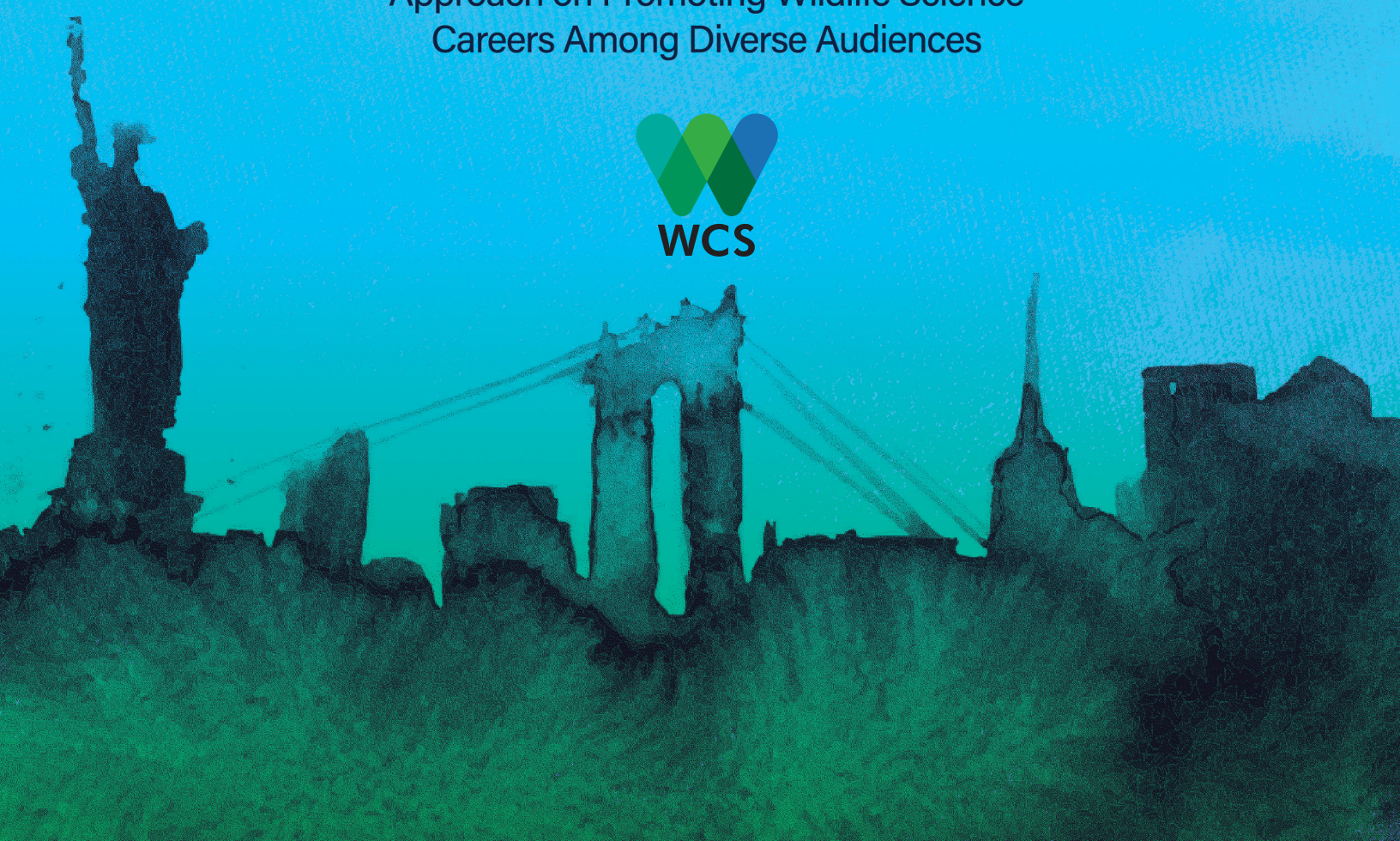


BRIDGING THE GAP

The Effects of a School-to-Career
Approach on Promoting Wildlife Science
Careers Among Diverse Audiences






“

I've always wanted
to work with animals.
I just didn't know
where to start.

—11th grader, Bronx Zoo

”

A hand is visible on the left side of the image, holding a small, white, textured object. The background is a vibrant green with a subtle pattern of small white dots. The text is centered in a dark green box.

**The Wildlife Conservation
Society's *Bridging the Gap*
program links New York City
high school students from
underrepresented minority
groups with wildlife and
conservation professionals
to increase diversity within
the zoo and aquarium field.**



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Executive Summary

To address the lack of diversity that exists within the fields of wildlife and conservation science, the Wildlife Conservation Society (WCS) developed *Bridging the Gap*, a three-year youth development initiative for New York City high school students. Over the course of three cohorts, *Bridging the Gap* served 150 students from communities underrepresented in the sciences. The project aimed to help participants see the relevance of science study to their own lives and support them in pursuing a career in wildlife conservation or another science. Participants engaged in activities including zoo and aquarium internships, college readiness seminars, mentoring, and career planning workshops. The project was made possible by a grant from the National Science Foundation's Innovative Technology Experiences for Students and Teachers program and Good Shepherd Services.

In tandem with the youth development program, WCS and external partner Hezel Associates carried out an evaluation research study to investigate how a school-to-career program model could be used to help minority students achieve the affective, cognitive, and behavioral outcomes necessary to pursue zoo and other science careers. The research used a mixed-methods approach, soliciting both quantitative and qualitative data from participants.

This report provides an overview of *Bridging the Gap's* key components, programmatic results, and research findings. Highlights from the program and research include:

Nearly 150 high school students took part in at least 60 hours of workshops and mentoring sessions through the *Bridging the Gap* program. Total participant contact hours were approximately 9,000 hours over three years.

***Bridging the Gap* fostered students' interest in STEM careers.** Sixty-nine of 84 students (82%) who participated in an online survey at the end of the program said that they planned on pursuing a STEM career.

Data suggest that *Bridging the Gap* influenced participating students' decisions to continue their education and helped them feel more confident and prepared to do so. As of Spring 2015, 88% of the *Bridging the Gap* students that were eligible to attend university were either enrolled or preparing to enroll.

Data suggest that the program improved participants' knowledge about zoo-related topics and wildlife science careers over the course of the project.

over
9,000
internship hours



Queens Zoo *Bridging the Gap* students conduct water sampling at Meadow Lake in Flushing Meadows Corona Park.

This report also shares lessons learned through *Bridging the Gap* and how these lessons might be valuable to zoo, aquarium, and other informal science educators working to increase STEM participation in communities traditionally underrepresented in the sciences. Specifically, this report suggests that:

STEM programs targeting youth may have greater success by focusing on students that already show some sort of STEM interest.

Learning by doing or through hands-on experience may be one of the most effective strategies for diversifying the zoo and aquarium workforce.

The community mentoring model featured in *Bridging the Gap* is a sustainable model that supports students, while also taking into account staffing constraints.

Developing and maintaining a connection with staff from area high schools where *Bridging the Gap* students attended was a key ingredient in the program's success.

Parental involvement played an essential role in increasing student engagement and success.

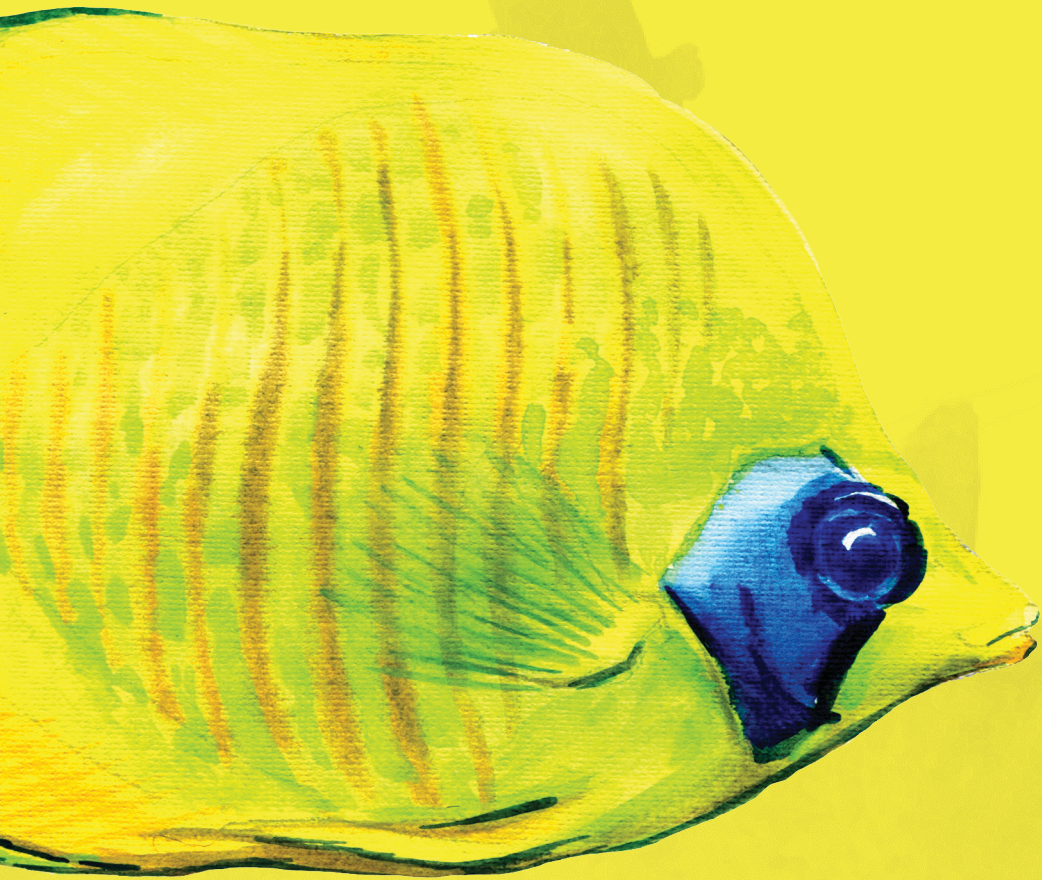
Participation by staff from other departments at WCS was critical to exposing the teens to the many different career options available at zoos and aquariums.

82%
**plan to pursue a
STEM career**

88%
**are enrolled
in university**



New York Aquarium students construct a model exhibit as a final project to demonstrate elements of exhibit design.



Introduction

Although minorities are the fastest growing segment of the U.S. population, they are sorely underrepresented in the sciences and in zoos and aquariums, in particular. African Americans, Hispanics, American Indians, and Alaska Natives accounted for just 10% of U.S. workers in science and engineering in 2010, despite making up 26% of the general U.S. adult population (National Science Board, 2014). Zoos and aquariums want to be more inclusive and have for years recognized the very small number of minority science professionals in their field, as evidenced by the numerous articles, papers, and conference presentations that have addressed the issue. In its 2004 Diversity Trends Report, for example, the Association of Zoos and Aquariums issued a directive to all member institutions addressing the lack of diversity in zoo and aquarium science staffs across the country.

Targeting New York City teens, *Bridging the Gap* strove to reach underrepresented minorities that may lack the support necessary to pursue a career in wildlife science. During the three years of the *Bridging the Gap* program, more than 95 percent of participants self-identified as part of a minority group. More than 60 percent of participants lived in a home where a language other than English was spoken all or most of the time. By providing direct career support to these teens and exposing them to the range of wildlife science career options at zoos and aquariums, we sought to increase the number of minority science professionals at WCS and in the larger zoo and aquarium community. Further, WCS's five parks are located in some of the most diverse areas of New York City (e.g., Bronx and Brooklyn). *Bridging the Gap* was therefore designed to address the needs of our local communities.

For most young people who are nearing the end of their high school education, finding a career that fits their interests and goals is a major area of concern (Aud, Fox, & KewalRamani, 2010). Studies have shown that

school-to-career programs (i.e., programs that begin in high school and follow students into college or trade school) increase graduation rates and boost the probability of college enrollment (Neumark, 2004; Neumark, 2007). We hypothesized that in order to meet our long-term goal of diversifying the zoo and aquarium workforce, we needed to target young people *before* they entered the workforce and *before* they entered college. Therefore, *Bridging the Gap* recruited high school students between the ages of 15 and 18 who identified as an underrepresented minority. Participants were selected from public and private high schools within the five boroughs of New York City (Brooklyn, Bronx, Manhattan, Queens, and Staten Island) via a process that included an application, essay, and in-person interview with WCS staff.

Once selected, students were assigned to take part in the program at one of WCS's five parks in New York City: New York Aquarium, Bronx Zoo, Central Park Zoo, Prospect Park Zoo, or Queens Zoo. Students attended full-day sessions on weekends for nine weeks, participated in two after-school sessions with



Bridging the Gap students worked with the Central Park Zoo Animal Department to understand how to care for the domestic animals. This included cleaning the exhibits and brushing the goats.

PEAR GROUP
EST 1979
CONNECTION

Central Park Zoo Guide
Central Park Zoo Guide

Spring 2018
CENTRAL
PARK ZOO

WCS professionals, participated in monthly mentoring sessions, and completed a 40-80 hour internship. All of the program activities focused on elements of STEM careers in zoos and aquariums, and were immersive, hands-on, and inquiry-based. Students received a stipend of \$1,075 upon completion of the program.

During the three years of the program, WCS also collaborated with social service agency Good Shepherd Services. Founded in 1857, Good Shepherd Services works to prevent youth disengagement by providing individual, family, and school-based services to high-need communities in Brooklyn and the Bronx. Good Shepherd Services provided guidance on a monthly basis in order to strengthen aspects of *Bridging the Gap* that were outside WCS's scope of practice (i.e., social work, mental health, and family counseling).

15-18

year olds were the targeted age group

60%

live in a home where the primary spoken language isn't English

95%

self identified as part of a minority group



Students attending the *Teens in Conservation* conference at the Bronx Zoo get an up close look at a prehensile-tailed porcupine.



Key Components of
Bridging the Gap

WCS designed *Bridging the Gap* based on the Positive Youth Development Framework (PYD). PYD focuses on supporting the developmental potential of young people, rather than focusing on “deficits” (Damon, 2004). Therefore, in order to encourage high school students’ interest in and eventual pursuit of STEM degrees and careers, we aimed to provide them with as much support from as many sources as possible. We knew that we would not be successful if we attempted to do this alone. We designed *Bridging the Gap* to include support from not only WCS, but also parents, schools, and a local social service agency. In the *Bridging the Gap* model, all of these parties worked together to support the development of the student.

Building on this framework, we designed and implemented six key programmatic components to meet our goals for *Bridging the Gap*: the School-to-Career Institute; College Bootcamp; internships; mentoring; parent workshops; and the Teens in Conservation Conference.

School-to-Career Institute

The School-to-Career Institute was designed to introduce participants to science careers in zoos and aquariums, explain the education and experience necessary to pursue these careers, discuss the job outlook for these professions, and provide an introduction to key concepts in wildlife science and conservation. During the School-to-Career Institute, participants attended nine full-day sessions at their assigned WCS site. Through hands-on activities, lectures, media, field trips, and behind-the-scenes experiences, Institute sessions exposed students to a host of topics and issues related to wildlife science, conservation, exhibit design, and urban ecology. Throughout the Institute sessions, students interacted with professionals in the conservation field, listened to professionals describe their career and life journeys, and had the chance to ask questions in a relaxing environment.

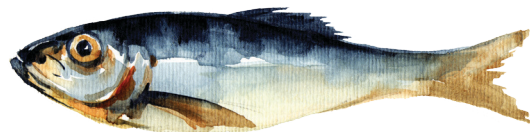
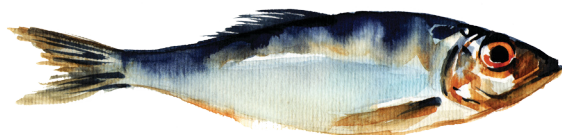
College Bootcamp

Our experience working with teens in other programs suggested that many teens have few trusted sources of information about the college admissions process. This was especially true for *Bridging the Gap* teens, many of whom were the first in their families to be college-bound. For example, roughly three-quarters of parents of *Bridging the Gap* students did not attend or finish college, and roughly one-fifth did not graduate from high school. Therefore, filtering what is necessary to know about the college application process became the foundation upon which the College Bootcamp program was built. Over the course of two days, the *Bridging the Gap* students learned about admissions topics such as essay writing, entrance exams, and financial aid, as well as aspects of college life. Topics covered during each day were as follows:

Day 1

The college admissions process

- Participate in a roundtable discussion about their plans after high school
- How to fill out a FAFSA and receive financial aid
- Write a first draft of a college admissions essay
- Learn to be a personal advocate
- Review the SAT and ACT, and decide which is right for you
- Practice filling out The Common Application



Day 2

College and campus life

- Learn about different types of college classes (lecture, discussion, seminar, independent study)
- Create a college schedule using a view book from the State University of New York
- Discuss and plan for time-management in college
- Review articles and student accounts of their experiences on campus and commuting to school
- Role-play common roommate dilemmas and brainstorm potential solutions

Internships

Engaging students through hands-on experiences was central to *Bridging the Gap*. WCS worked to set up internships for *Bridging the Gap* students across the organization, including placements with animal, public affairs, education and information technology departments, among others. In some cases, student internship performance led to future employment and internship opportunities at WCS. Student internships were as varied as they were interesting, including:

Animal Keeping/Veterinary Technician

Students worked side-by-side with animal department staff to plan and prepare food selections, and build enrichment toys for animals.

Marine Science

Students tested water samples from the New York Aquarium's tanks and shadowed marine scientists during their day-to-day duties.

Social Activism

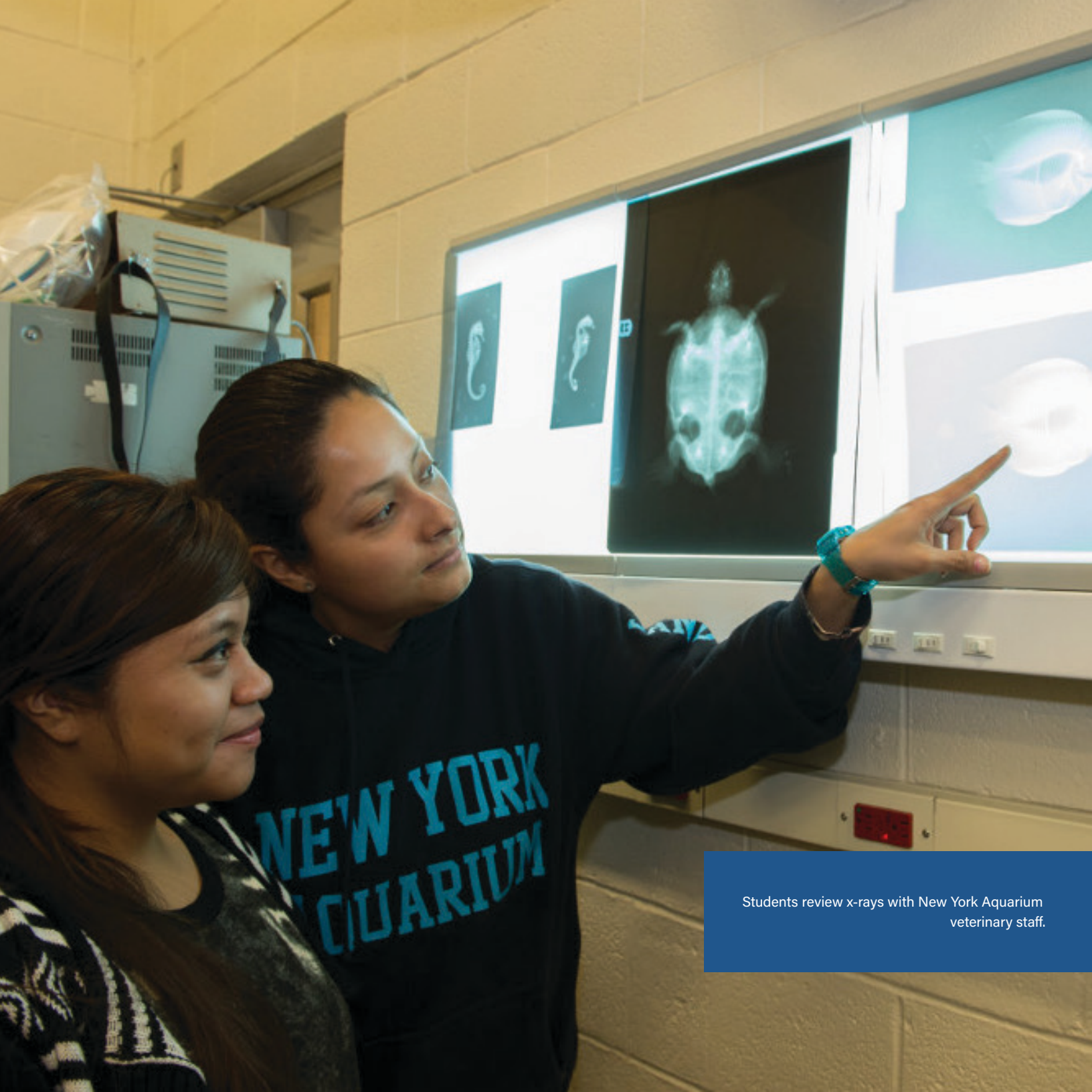
Students researched conservation issues and created mini-campaigns, including logos, slogans, websites, and public service announcements.

Education

Working side-by-side with WCS education staff, students assisted with youth camp and learned how educators teach the public about wildlife conservation.

Information Technology (IT)

Students received hand-on training from WCS IT professionals on computer software and hardware, and assisted with setting up IT for events and meetings.



Students review x-rays with New York Aquarium veterinary staff.

Internship Spotlight

**Natasha Isaacs (10th Grade) and
Victoria Vidal (11th Grade)**

What is your internship? We are working for the animal department in the Queens Zoo.

What responsibilities do you have? Mostly, we assist the zookeepers in cleaning and maintaining the animal exhibits on the farm side of the zoo. There is a lot of cleaning involved! We also help prepare the food for the animals and help move materials like shavings to their exhibits.

How is this important for WCS or conservation as a whole? This week has been really busy since it's a holiday, and having us here means that there will be more eyes and help for the animals. It also allows the zookeepers to get things done that they may not be able to do each day, and it's great that we can help with that.

What is your favorite thing about working here? Our coworkers. They are just really awesome, and it feels like we are a part of the team. They respect us, and we are learning so much from them.

What is the most memorable thing that has happened to you while working here? Working here has opened our eyes about what's really involved in maintaining a zoo and the animals in it. At the end of the day, it feels good knowing that all the animals are safe and that we made a difference.

What are your career aspirations or goals? We're not really sure, but probably something with animals or maybe marine biology. We're hoping that going to college and getting more experiences like this will help narrow it down.



Interns Natasha Isaacs (10th Grade) and Victoria Vidal (11th Grade) worked for the animal department in the Queens Zoo.

Internship Spotlight

Bianca Cangé (11th Grade)

What is your internship? I am working with the Seascape Program at the New York Aquarium.

What responsibilities do you have? Mainly trying to get more people involved in conserving and saving the wildlife in the Hudson Valley Canyon. I have also been reading the Seascape's project reports and proposals, and researching how to get more funding from the government to perform certain research and conservation actions.

How is this important for WCS or conservation as a whole? Since WCS is a nonprofit organization, it is important to get people involved and interested. This will help WCS get grants and donations for all the conservation work they want to do.

What is your favorite thing about working here? I really like finding creative ways to get people involved, such as thinking of different concepts for posters and finding possible spokespeople.

What is the funniest, most rewarding, or most memorable thing that has happened to you while working here?

One of the days during the internship, we got Russian food for lunch and it was really different and weird to eat. Some of it was good though. I tried an olive for the first time.



Bianca Cangé (11th Grade) works at the Seascape Program at the New York Aquarium

Mentoring

During the first year of the program, *Bridging the Gap* used a traditional one-to-one mentoring model (which involves connecting a student with an advisor who offers ongoing coaching, guidance, and career advice) to provide students with the opportunity to build relationships with professionals in the zoo and aquarium field. Staff members interested in becoming a mentor participated in a training class to learn about mentoring best practices. Students were then paired with professionals who had similar career goals, interests, and hobbies. Once linked, students and mentors were encouraged to communicate through email, phone calls, and text message, and to schedule mentor meet ups.

While *Bridging the Gap's* year one evaluation indicated student satisfaction with the mentoring component, the mentors pointed out a number of challenges with the overall structure. For example, some mentors felt as if the mentoring relationship was one-sided, with the mentor frequently initiating conversation and then waiting for a response from the mentee. Other

mentors said that there were not enough shared interests between the mentor and mentee, and as a result, interactions with mentees felt forced and uncomfortable. Additionally, since the program did not require regular in-person interactions, some mentors felt out of touch with their mentees.

With this in mind, in years two and three WCS adopted a community-centered mentoring model that eliminated the need for a one-on-one mentor/mentee assignment. Within this model, professionals and students interacted with each other in a group setting during monthly in-person sessions. Through the use of hands-on activities and discussion topics that were designed to strengthen the bond between students and professionals, mentors and students were able to build relationships with all participants instead of a select few. Group activities during the eight mentoring sessions included creating vision boards (collages with images that represent long-term and short-term goals), discussing future career plans, and practicing interview skills. Four to seven mentors and ten to twenty mentees participated in each session.

Parent workshops

Through informative workshops and phone and email contact, parents and guardians of *Bridging the Gap* students were regularly engaged with the program. One full-day parent workshop was held each year, with more than 90 parents attending over the three years of the program. During the parent workshop, attendees interacted with program staff, joined a *Bridging the Gap* activity with the site instructor and students, and discussed college-related questions (e.g., where to attend school, financial aid, scholarships). The workshops were designed to not only share important information to which the parents may not otherwise have had access, but also to promote parental buy-in and engagement with the overall *Bridging the Gap* program. This multi-party support for the *Bridging the Gap* student participants (as described earlier) was seen as critical to our success. Additionally, throughout the program, parents were able to access social, educational, family, and mental health services when requested through our partner organization, Good Shepherd Services.

Teens in Conservation conference

To celebrate the work of *Bridging the Gap* students, WCS hosted the first-ever Teens in Conservation Conference in March 2015 at the Bronx Zoo. Dr. Dorceta Taylor from the University of Michigan spoke to more than 100 attendees about addressing the lack of diversity in the environmental field. Majora Carter, an urban revitalization strategist and Bronx native, spoke about entrepreneurship and environmental justice in an urban setting. *Bridging the Gap* students also spoke to the conference audience about their experiences in the program. During lunch, the keynote speakers and WCS staff from six departments conversed with students in small groups about career aspirations. Afternoon breakout sessions allowed participants to investigate urban ecology at the nearby Bronx River, make enrichment for zoo animals, and tour the Wildlife Health Center. This culminating event allowed students from all three cohorts and all five WCS parks to reunite and share their passion for STEM and conservation science.

Student Profile

Veronica Wright

When and where did you participate in Bridging the Gap? I participated in *Bridging the Gap* at Central Park Zoo in 2013 and 2014.

Why did you get involved with Bridging the Gap? My ninth-grade science teacher was sponsoring internships, and *Bridging the Gap* was one of them. He said, "Anyone who is interested in animals, zoology or marine biology, this would be a good internship for you." Since I really want to work with animals in the future, I thought why not do this internship? So I tried out for it, did my interview, and I got in.

What was your favorite part of Bridging the Gap? Doing the internship. I was working with the animal department, and I was working with animals, so that was really fun.

What is one thing you learned in Bridging the Gap that has had the biggest impact on you? In *Bridging the Gap*, we thought a lot about ways in which we could improve the environment and protect animals. That was really helpful.

What do you plan to study in college? I'm still not sure, but I know I want to work with animals in the future.

In what ways did Bridging the Gap lead you to where you are at now? *Bridging the Gap* helped me as a person and helped me love science even more. After *Bridging the Gap*, I got the opportunity to be in AP Environmental Science. What I learned in *Bridging the Gap* helped me in AP Environmental Science.

Did your plans for college or career change because of Bridging the Gap? Yes. Before I wanted to go to an art school. I wanted to major in art. But then interacting with zookeepers and the many people who work at the zoo, I thought it would be really cool to work in a zoo environment. Working at the Wildlife Conservation Society has changed my whole concept from art to science.

What advice would you give to another teen interested in a science career or a zoo/aquarium career? Don't be shy. Everybody at the zoo is very friendly and will be willing to help you no matter what. It's a really fun place to work. I'm actually still working at the animal department. I've done two other internships at the zoo, and if it weren't for *Bridging the Gap*, I wouldn't be where I'm at right now.



Veronica Wright, was a Central Park Zoo *Bridging the Gap* student; she participated in two other WCS teen programs after completing *Bridging the Gap*.

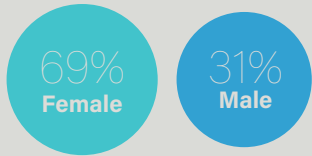
PROJECT TRUE
Teens Researching Urban Ecology



**By the
Numbers**

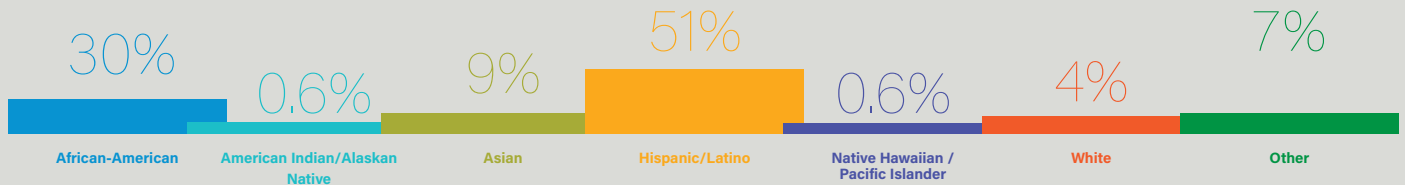
A program like *Bridging the Gap* requires a significant amount of resources. Hundreds of hours from dozens of staff members were dedicated to recruiting diverse cohorts of students, developing robust training sessions, and implementing the various aspects of the program. Countless conversations with parents, school advisors, teachers, and social workers took place behind the scenes to ensure that the students were supported throughout this program and beyond. But this dedication to ensuring that the *Bridging the Gap* students received the support they needed paid off.

Gender



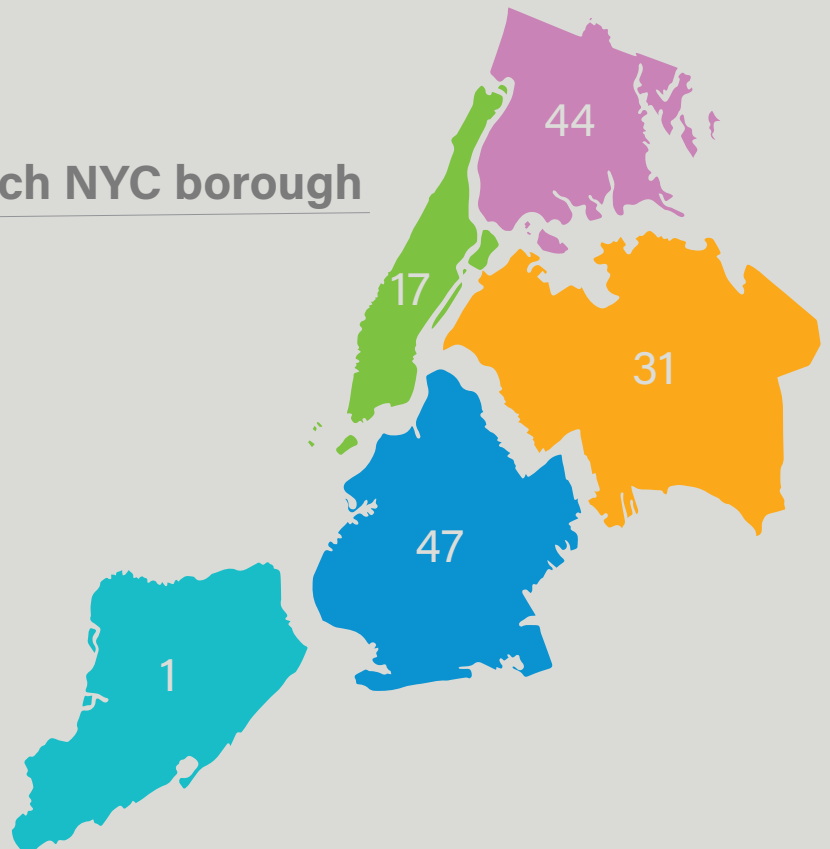
Student's Self-reported Race

Note: Respondents were able to choose more than one answer.



Number of students from each NYC borough

Bronx	44
Brooklyn	47
Manhattan	17
Queens	31
Staten Island	1



Nearly 150 high school students took part in at least 90 hours of workshops and mentoring sessions.

Total participant contact hours

9,000

Number of parents or guardians who attended the parent workshops

94

Average # of hours each student spent at an internship

60

Number of mentors

62

Number of conference attendees

100

of colleges or universities students were accepted into

28

NYC high schools represented

100

College enrollment/acceptance rate

88%

Students interviewed who reported learning the most from their internship

52%

Student Profile

Amanda Barahona

When and where did you participate in Bridging the Gap? I participated in the first cohort of *Bridging the Gap* at the Queens Zoo.

Why did you get involved with Bridging the Gap? I attended John Bowne High School, in which I was fortunate enough to be part of the animal science program. The Queens Zoo has a partnership with the high school in which applications for *Bridging the Gap* were offered. My animal science teacher at the time recommended me, and so I went through the process and was able to land a spot in the first cohort.

What was your favorite part of Bridging the Gap? Being able to have a wonderful mentor such as the vet tech was great. The connection and bond formed with my mentor runs until today. Being able to see the facilities and personally learn about the workers' jobs was also one of the most interesting parts of the program. I was able to appreciate and learn about a lot of animal science-related opportunities I had no idea about.


What is one thing you learned in Bridging the Gap that has had the biggest impact on you? The one thing I learned in *Bridging the Gap* that I was able to take with me and that has had a great impact on me would have to be the dedication and determination that is behind every single person involved in the care of the wildlife and all the animals in the zoo. The smallest things I didn't imagine would be impactful turned out to be so. I also learned about jobs and responsibilities that I had no idea existed.

What are you studying in college? I'm currently attending Mercy College as a pre-vet major.

In what ways did Bridging the Gap lead you to where you are at now? *Bridging the Gap* was one of my first opportunities to encounter animal science knowledge and experience at a broader level. Therefore I feel like *Bridging the Gap* has led me to where I am now by giving me skills and experience to expand upon my animal science passion.

Did your plans for college or career change because of Bridging the Gap? *Bridging the Gap* didn't change any of my plans for college, but it definitely strengthened the decisions I had made as to what career I desired to pursue.

What advice would you give to another teen interested in a science career or a zoo/aquarium career? To any other teen interested in a science career or a zoo/aquarium career I would say to take the chance and get your feet wet in the field as much as you can. If you have the wonderful opportunity of a great program like *Bridging the Gap*, take it and run with it.

A close-up portrait of a young woman with dark, curly hair, smiling warmly at the camera. She is wearing a dark green top. The background is dark and out of focus.

Amanda Barahona was a Queens Zoo BTG student and is now a Pre-Vet major at Mercy College.



Research and Evaluation Overview

In its 2004 Diversity Trends Report, the Association of Zoos and Aquariums (AZA) issued a directive to all member institutions addressing the lack of diversity in zoo and aquarium science staffs. Unfortunately, in the years since, not much has changed. Few zoo and aquariums programs have been specifically designed to provide minority students with career guidance in wildlife science fields. Additionally, the success of those that have existed has not been adequately measured. Our research and evaluation efforts were designed to address this need by investigating the effectiveness of a school-to-career program in increasing the interest of minority high school students in STEM study and careers.

The research study was designed to answer the following question: In what ways and to what extent can a successful school-to-career program model be adapted to help minority students achieve the affective, cognitive, and behavioral outcomes necessary to effectively pursue zoo science careers?

The research and evaluation of the *Bridging the Gap* program used a mixed-methods approach, soliciting both qualitative and quantitative data from participants. Data were entered by evaluators into SPSS (v.21) for analysis. The following instruments and data collection methods were used by external evaluators from Hezel Associates to gather data from students and their parents in each cohort.

Student Attitudes and Interests

Questionnaire: Designed to allow student participants to report their knowledge, attitudes, and behaviors relating to zoo and aquarium careers and education, both before and after the School-to-Career Institute.

Parent Questionnaire: Aimed to capture attitudes and knowledge of parents of student participants concerning their children's science education and careers.

Activity Quality Questionnaires (School-to-Career Institute; Parent Workshop Career Building Institute; Internship; and Ongoing Assistance): Created to compile students' opinions on the quality of the program's sessions.

Long-Term Questionnaire: Designed to reveal impact on students after completing the formal *Bridging the Gap* program activities, in terms of education choices and career interests.

The following instruments and data collection methods were used by internal researchers at WCS to gather data from students and program mentors at the end of the project.

Online survey and open-ended

questionnaire: Responses to Likert scale questions were tallied and averaged. The open-ended section was scanned for emergent codes, and then all responses were coded accordingly.

Card sorting with accompanying interview

for students: The cards selected by the students were tallied according to their selections. Significant segments of the interviews were transcribed. The interviews were coded using Dedoose according to the cards selected.

An open-ended questionnaire for program

mentors: Responses to the open-ended survey for the mentors were scanned for emergent codes, and then all responses were coded accordingly.



Research and Evaluation Findings

1

Finding #1: *Bridging the Gap* fostered students' interest in STEM careers.

69 of 84 students (82%) who participated in an online survey said that they planned on pursuing a STEM career.

20 of 29 students (69%) who participated in a card sorting activity stated their intention to go into a STEM field. Twelve students stated their intention to work with zoos, aquariums, or animals.

There was no noticeable conversion of any student's intentions from non-STEM fields. The data suggest that *Bridging the Gap* was most effective in fostering pre-existing interest in STEM.

2

Finding #2: *Bridging the Gap* stimulated students' exploration of careers in general and provided opportunities for them to consider their professional ambitions and pathways more deeply.

As of Spring 2015, 88% of the *Bridging the Gap* students that were eligible to attend university were either enrolled or preparing to attend university. Comparatively, in New York City just 45% of high school students graduate on time and enroll immediately in college.

Data suggest that *Bridging the Gap* influenced students' decisions to continue their education and helped them feel more confident and prepared to do so. Students were accepted into universities and colleges including Arizona State University, SUNY Plattsburgh, Pennsylvania State University, Rutgers University, and LaGuardia Community College.

Students' attitudes regarding their prospective college education and zoo careers changed little, but were high before the program began. This is likely due to the fact that students drawn to participate in a program like *Bridging the Gap* tend to be highly motivated, even though they may have had few if any similar opportunities previously.

3

Finding #3: Bridging the Gap improved participants' knowledge about zoo-related topics and wildlife science careers over the course of the project.

The greatest positive changes were generally found in items related to knowledge of zoo operations and careers. In particular, large increases were seen in understanding what zoo professionals do in their daily work and activities related to specific areas of zoo work, how zoos have changed over time, and how zoos manage captive populations of animals.

“I will never forget my time in this program, and I’m really excited about what my future holds.”

—12th grader, Queens Zoo



Lessons Learned

What follows are six lessons learned in developing and implementing a school-to-career STEM program for students from diverse backgrounds. These lessons learned emerged from the research and evaluation as key elements that increased student engagement and retention, and ultimately supported students on their pathways to college. Together, these recommendations can strengthen new and existing programs in order to help diversify the zoo and aquarium field.

Supporting STEM Interest

Our findings suggest that STEM programs for teenagers may have the greatest success by focusing on students that already show some sort of STEM interest. Our evaluation research data found no examples of shifting a student's career interest from a non-STEM field to a STEM field. However, those who were previously interested in STEM became more confident of their choice. Focusing efforts of STEM programs on these teens may also be beneficial to staff, who sometimes find it frustrating trying to engage teens who are not interested in STEM careers.

Learning by Doing

Learning by doing or through hands-on experience was when the most significant learning took place in *Bridging the Gap*. More than half of *Bridging the Gap* students, for example, said they learned the most through their internship at a WCS site. This real world experience helped the students to visualize what a STEM career at a zoo or aquarium would be like and helped them to better understand the pathways that could get them

there. These hands-on experiences may be one of the most effective strategies for diversifying the zoo and aquarium workforce. In some instances, *Bridging the Gap* students have been hired to work on a part-time basis with the departments that they interned with, thus providing another pathway to STEM career attainment.

Community Mentoring Model

While students in all three program years found the mentoring sessions to be valuable, our experience suggests that the community mentoring model is a *sustainable* model that supports students, while also taking into account staffing constraints. WCS staff were more satisfied with their experience in the community mentoring model vs. the one-on-one mentoring model employed during the first year of the program. The community model allowed them to rely on other mentors with diverse experiences, when necessary, in order to meet the varied needs of the students. The community mentoring model also allowed for a more natural flow of conversation between mentors and the students.

The School Connection

Developing and maintaining a connection with staff from area high schools where *Bridging the Gap* students attended was a key ingredient in the program's success. Relationships with guidance counselors, teachers, and parent coordinators boosted recruitment efforts and aided in case management of the individual students.

Parental Involvement

Parental involvement played an essential role in increasing student engagement and success. We operated with the philosophy that early parental engagement and relationship-building encouraged parents to be more supportive of the student's involvement in the program. This helped to reduce attrition rates and ultimately strengthened parental support for student interest in zoo and aquarium (and other STEM) careers.

Internal Partnerships

Developing relationships and partnerships with other WCS departments early on was key to our success. *Bridging the Gap* involved more than 65 WCS staff members from a range of departments. Their participation was critical to exposing the teens to the many different career options available at zoos and aquariums. These relationships have since continued to grow through partnerships on other career-based programs for teens.



Conclusion

At the beginning of *Bridging the Gap*, we set out to create a STEM careers pathway program for teens from the local communities surrounding our zoos and aquarium in New York City. We also aimed to identify effective strategies for increasing diversity within the zoo and aquarium STEM workforce. Like most informal science education programs for children and youth, we won't see the longer-term impacts of our efforts for several more years, when our student participants begin to graduate from college and enter the workforce. We aim to continue to track our participants' career paths, but we also recognize the inherent challenges in maintaining contact with program participants (especially younger audiences) over long periods of time.

However, the initial findings from *Bridging the Gap* are incredibly encouraging. Nearly 150 teens from underrepresented minority groups received intensive training, mentoring, and support to help them pursue STEM careers, and zoo and aquarium careers in particular. The vast majority of these teens have gone on to university, and 82% of *Bridging the Gap* teens who participated in an online survey

said that they planned on pursuing a STEM career. Our experience has led WCS to devote further resources to similar intensive STEM learning experiences for teens.

Further evidence of *Bridging the Gap's* success comes from external accolades as well. In September 2014, *Bridging the Gap* received the Association of Zoos and Aquariums' Angela Peterson Excellence in Diversity Award. The award recognizes achievements made in audience and workforce diversity.

The zoo and aquarium STEM career field still has a long way to go in achieving a diverse workforce. The *Bridging the Gap* program is one proven model for helping to address this important challenge. With a concerted effort to provide immersive experiences for young people from diverse backgrounds, combined with access to STEM career mentors, the zoo and aquarium field can meet our goals--one inspired young person at a time.



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