This document presents the highlights of the 2014 and 2015 NOAA Science Camps.

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Since its inception in 2003, NOAA Science Camp has evolved into a highly regarded, collaborative science program. It introduces middle-school youth, high school and undergraduate-level camp assistants and graduate-level educators to the multidisciplinary nature of research. Scientists and educators interact directly with camp participants to demonstrate how National Oceanic and Atmospheric Administration (NOAA) research addresses environmental issues on both local and national scales. NOAA, two programs from the University of Washington (UW): the Joint Institute for the Study of the Atmosphere and Ocean (JISAO), Washington Sea Grant (WSG), and camper fees provide financial support. Participation and partnership are keys to NOAA Science Camp's success. The camp involves several NOAA offices and two NOAA-funded programs at the UW, including scientists and education staff that develop activities and interact with the campers. NOAA Science Camp also works with partners to recruit campers from underserved communities.

NOAA SCIENCE CAMP 2014 – 15 BIENNIAL REPORT

Science Camp

KRISTEN CANN, CO-DIRECTOR, 2014–15

RINA HAUPTFELD, CO-DIRECTOR, 2014

ERIC STRICKLER, DIRECTOR, 2015

JACKIE WILSON, JUNIOR LEADERSHIP PROGRAM LEAD, 2014–2015

MAILE SULLIVAN, WASHINGTON SEA GRANT LIAISON, 2014–15

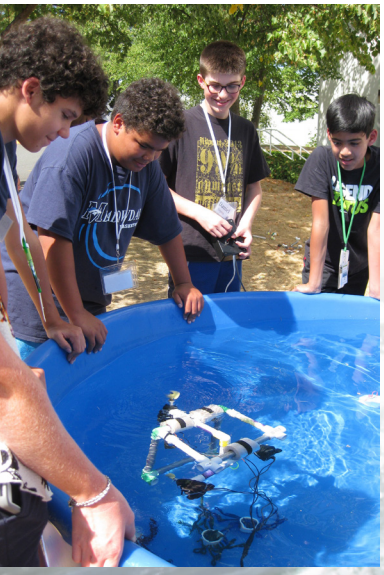
LISA HIRUKI-RARING, NOAA LIAISON, 2014–15

SKADI VON REIS CROOKS, COORDINATOR, 2014

ANNIE HILLIER, COORDINATOR, 2015

"It inspired me to pursue science and to work harder in school. I loved it, and I hope a lot more people do too. I really loved the Dive Center because I didn't know you could do science and scuba dive at the same time. I used to think it was just for fun to dive."

Junior Leader, NOAA Science Camp, 2014



LETTER FROM WSG DIRECTOR

Research shows that the window of time for engaging young people in the sciences is a small one. For over 12 years, NOAA Science Camp has filled that small window, capturing the imagination of middle and high school students every summer for two one-week sessions, and delivering experiences in cutting-edge science through activities led by real-life scientists. NOAA Science Camp engages more than 100 campers each summer, including those from underrepresented communities, and serves them a full plate of science, technology, engineering, and mathematics (STEM) education – and knowledge they can carry with them for a lifetime.

These past two years have been exciting ones, as we ramped back up from reduced operations to two fully-funded weeks of summer camp. During this time, the camp introduced a number of new innovations. In 2015, middle school camps offered STEM design challenges that included everything from building remotely operated vehicles (ROVs) to engineering wind speed monitors. Junior Leaders carried out a local habitat restoration project and went on field trips, visiting the Seattle Aquarium, meeting professional staff, and interviewing researchers about the Seattle seawall project.

NOAA Science Camp engaged additional partners in an effort to expand our reach to underrepresented communities. We worked with minority-serving organizations such as Solid Ground and Seattle Mathematics, Engineering, Science and Achievement (MESA) to increase camp access for underserved youth. In 2015, we were able to accommodate a family whose son has cerebral palsy and a passion for science.

Solving real-world science problems continues to be the hallmark of NOAA Science Camp. Both 2014 and 2015 offered the Junior Leaders a day on board the M/V P. S. to study water quality and build data-collecting buoys. Middle school campers attended a current events briefing on ocean acidification that featured NOAA scientists and shellfish industry experts.

Looking ahead to next year, we are planning more innovations, with new workshops that will offer hands-on science activities throughout the summer.

Looking back at 2014 and 2015, we are pleased to report years of expansion and regeneration. NOAA and its partners continue to be dedicated to this unique program that nurtures excitement about ocean literacy among our youth and invests in the next generation of marine science leaders.

The environment may be the biggest winner. WSG is proud to encourage new generations of marine scientists, policymakers, and educators who use the experience and knowledge they gain to sustainably manage and protect America's marine resources.

Penelope Dalton

Penny Dalton

Director, Washington Sea Grant

NOAA SCIENCE CAMP GOALS

- Increase interest in and understanding of the diversity and scope of NOAA science in a fun, hands-on, place-based learning environment.
- Engage campers in hands-on activities that give them the scientific knowledge and skills to address real-world environmental issues, and in the process, show how NOAA offices work together to achieve a common goal.
- Generate interest and excitement about the sciences and in pursuing STEM-related coursework, careers, and professional development in the future.
- Provide opportunities for underserved youth to become involved in experiential learning in STEM fields.
- Improve scientific and ocean literacy among campers, staff, and scientists.

CATALYZING SCIENCE INTERESTS

NOAA Science Camp engages both middle and high school students in hands-on scientific experiences. Research indicates that starting in early adolescence, youth develop a passion for subjects that later drive their academic and career paths. Interest in and pursuit of STEM occupations are often ignited at this early age. Yet the Pacific Northwest offers few relevant programs that reach youth during this critical period, even though the opportune window closes rapidly if students are not exposed to science during these years. Through its two activities – summer camp for middle schoolers and the high school leadership program – NOAA Science Camp fills an important niche and provides a model of learner-driven science education for the region. It creates the type of motivating, cumulative learning experience that is at the core of real-world science.

NOAA scientists collaborate with skilled informal science educators to develop the camp's curriculum, which meets both Washington state education standards and Ocean Literacy Essential Principles, as defined by a national consortium of scientists and educators.

MOVING YOUTH FORWARD IN THE SCIENCE PIPELINE

Since 2003, NOAA Science Camp activities have inspired middle schoolers' interest in and exposure to the broad range of NOAA's science pursuits. In 2011, NOAA Science Camp developed a Junior Leadership Program (JLP) for high school students in response to requests from parents, campers, and scientists asking for continuing STEM opportunities after Science Camp. The JLP provides a science pipeline for teens, building on concepts learned at the middle school camp and providing hands-on learning experiences in leadership, inquiry science, and marine science careers. The two-week program continued to evolve in 2014 and 2015, with greater emphasis on large-group facilitation, integration of local projects, and off-campus field trips.

NOAA SCIENCE CAMP BY THE NUMBERS

- Serves approximately 50 campers per session
- Provides a minimum of five scholarships per session
- Junior Leadership Program hosts up to 20 high school youth annually
- In 2014 and 2015, the registration fee for campers for a one-week session was set at $250, and the Junior Leadership Program fee was $400. This fee continues to be lower than most regional day camps offering comparable services and activities. These lower rates ensure that NOAA Science Camp is accessible to all

Sessions	2014	2015
Campers	103 (Includes 14 Junior Leaders)	133 (Includes 19 Junior Leaders)
Girls (total)	45	80
Boys (total)	58	53
Scholarships	9	26
Washington Cities Served	31	29
Washington Counties Served	31	29
Schools Served	60	68
States Served	6	3
Scientists participating in NOAA Science Camp	85	85

"This camp found a fun way to introduce me to multiple fields of marine science while allowing me to meet new people."

Junior Leader, NOAA Science Camp, 2015

During this time, Junior Leaders learned and practiced leadership skills, facilitating large-group games for the middle-school campers as well as learning about behavior management techniques. They spent a day on Lake Washington with Ocean Inquiry Project aboard the M/V P.S., learning about scientific techniques for measuring water parameters. The Junior Leaders newly acquired knowledge was then applied during the second week of camp, when they designed and implemented projects on water quality parameters in and along Lake Washington, incorporating data-collecting buoys that they built themselves. In 2014, the student projects were designed as a pilot citizen science program; in 2015, a salt-water habitat was included in the Junior Leaders' research. Both years, the project teams presented their results to parents, fellow campers, and scientists at the end of the two-week program.

Junior Leaders interacted directly with a wide variety of NOAA scientists during the program. An annual career speed-networking event gave participants experience in practicing interviewing skills and opportunities for learning more about the diversity of marine science career options. Both years, campers received on-campus tours of the tsunami research lab, the marine mammal research bone collection, and NOAA's Seafood Inspection Program Office. In 2014, Junior Leaders also assisted a local habitat restoration project on NOAA's Western Regional Center campus, learning about removal of invasive plant species and enhancing salmon habitat on the shores of Lake Washington. In 2015, campers visited the Seattle Aquarium, where they met with professional staff and visited the Seattle waterfront seawall replacement, learning first-hand from a UW researcher how the new seawall functions.

JLP has proven to be a valuable addition to the NOAA Science Camp program, providing a bridge for interested middle schoolers to continue learning about science careers and NOAA's current research throughout their high school years. Before the program started, middle school campers had to wait 2-3 years to become volunteers. Over the five years of the program, 40-71% of Junior Leaders each year have come from the middle school science camp (a total of 28 Junior Leaders). Six campers (three via the JLP) have gone on to become staff assistants at Science Camp. High schoolers who came to NOAA directly through the JLP, without attending middle school camp, also found career opportunities through their participation. One became a staff assistant, and others have explored NOAA internship and volunteer opportunities in high school.

ASSISTING UNDERSERVED YOUTH

One of NOAA Science Camp's goals is to provide opportunities for underserved youth to become involved in experiential learning in STEM fields. NOAA Science Camp partners with UW's JISAO and WSG to provide support for campers from underrepresented and underserved communities, allowing them opportunities to attend camp and increase their access to the ocean sciences. Historically, the program has provided both full and partial scholarships to any applicants who met free and reduced lunch qualifications or indicated financial hardship.

NOAA Science Camp expanded key partnerships with minority-serving programs, such as Rainier Scholars, an academic organization supporting students of color from middle school to university, and Solid Ground, a low-income housing community organization. These partners supported NOAA Science Camp by recruiting underserved youth interested in attending the camp.

For the first time in 2015, NOAA Science Camp worked with Seattle MESA, a group that engages diverse students in STEM activities that connect mathematics and science fundamentals to the real world. Through Seattle MESA, NOAA Science Camp established a partnership with Tukwila School District's Showalter Middle School. Supporting this new effort, JISAO provided full scholarships for 19 students and the Tukwila School District provided bus transportation to and from camp each day.

In 2015, NOAA Science Camp went the extra mile to make camp accessible for a young man with cerebral palsy. Unable to find other scientifically-rich and dynamic summer science programs in their area to accommodate his special needs, the camper and his family drove all the way from California to participate in camp. Camp staff and scientists worked together with him and his family to make activities accessible. His experience at camp was so successful that he declared he would definitely return to camp again as a Junior Leader in 2016.

MAKING CONNECTIONS TO CURRENT EVENTS

One of NOAA Science Camp's greatest strengths is its focus on issues that are current and relevant, drawing connections between the various scientific disciplines and breadth of research that it takes to address them. When middle school campers hypothesize, simulate NOAA research, make deductions, and draw conclusions about a hypothetical environmental disaster, they gain insights into the life of a scientist. In 2014, NOAA staff took this approach a step further to make the science in their camp activities even more relevant: campers attended a "Current Events Panel" on ocean acidification where panelists from NOAA and the shellfish industry came together to talk to campers and their families about this regionally and globally important cross-discipline issue. Lively discussions touched on how ocean acidification affects the ecosystem and economy, and how NOAA science is used to study the issue and its possible solutions.

As STEM pathways become more of a national focus, NOAA Science Camp is responding by offering campers relevant activities and highlighting potential career options through the lens of NOAA science. New in 2015, middle school campers were introduced to a variety of STEM design challenges. Campers were divided into stations that challenged them to creatively engineer neutrally buoyant plankton to be "raced" for a prize, build anemometers to measure wind speed, design protective casing for an egg strong enough to withstand being dropped from a bridge, and build remotely operated vehicles (ROVs) designed to perform underwater tasks. NOAA Science Camp partnered with the Atlantis, Inc. ROV Team (an internationally accomplished high school underwater robotics team) and UW's School of Oceanography to integrate ocean engineering into the campers' experience and provide opportunities for staying involved in the STEM pipeline.

"The educators made the activities fun, and my daughter really enjoyed interacting with the scientists. This camp is a perfect combination of kid fun and real science. She wants to return to camp next year and later apply for JLP. In short — best camp ever!"

Parent, NOAA Science Camp, 2014

"It's very fun, nothing like school. You will learn how to be a little scientist, well that's how I felt. I [also] learned how to write a better hypothesis."

Camper, NOAA Science Camp, 2015

ON THE HORIZON

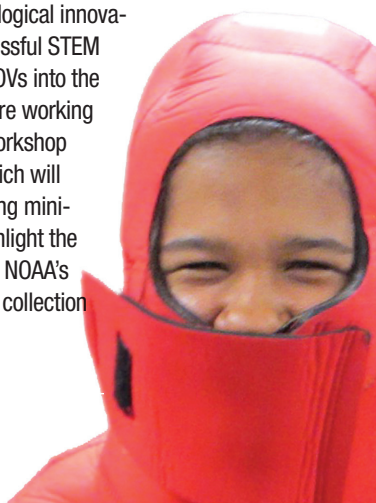
Nationally, NOAA Science Camp has become a model for other multidisciplinary, cooperative educational summer camps. This model demonstrates science through hands-on activities that address real-word issues. Led by NOAA scientists, campers connect with the work that NOAA produces and they experience how it touches their lives directly. The NOAA Science Camp model combines several scientific disciplines, working across departments to present campers with an investigative environmental mystery; for example, a fish kill on a Puget Sound beach. Using the skills they learn in camp activities, campers solve the mystery by determining the cause of the fish kill, its effects on other marine species, and its long-term effects on the environment.

The NOAA Science Camp model has inspired other camps to follow suit. For example, the NOAA Fisheries Science Camp in Hawaii, with a focus on underserved middle school students, has adopted a similar format. Now in its second year, they present campers with an environmental challenge to solve in fisheries and marine mammal research, using skills they've learned during camp activities.

Looking ahead, NOAA Science Camp is exploring different ways in which science camp activities can be adapted to other educational models, collaborating with other summer camps, and also investigating ways to reach an even broader audience through national partnerships.

NOAA Science Camp continues to expand its reach into underserved communities through collaborations with new partners. Most recently, staff collaborated with local community organizations to sponsor campers, including Rainier Scholars, Solid Ground, and Seattle MESA, and out-of-state organizations including the Central Bering Sea Fishermen's Association in Alaska. Through them, campers participated in NOAA Science Camp, with scholarships provided by UW's JISAO. Plans are underway to expand support to campers from underrepresented communities by seeking new partnerships with out-of-state organizations and Alaska Native organizations, such as Sealaska (the Native corporation for Tlingit, Haida, and Tsimshian communities) and the Aleut Community of St. Paul Island Tribal Government.

With the current national focus on increasing and sustaining engagement with STEM topics and ensuring that youth have access to quality STEM learning and career opportunities, NOAA Science Camp is developing new workshops on engineering and technological innovation at NOAA. Following the successful STEM design challenge incorporating ROVs into the 2015 middle school camp, staff are working on a pilot NOAA Science Camp workshop with Atlantis STEAM for 2016, which will focus on building and programming mini-ROVs. The workshop will also highlight the innovative engineering designs of NOAA's oceanographic and fisheries data collection instruments.



BUDGET

In 2013, NOAA Science Camp lost its established NOAA funding due to government budget cuts and sequestration, requiring the camp to reduce programming to one week of middle school camp and one Junior Leadership Program session, and reduce overall operation costs to $45,462. In 2014, local NOAA leaders raised funds from local and national NOAA offices, which in addition to the support provided by UW partners WSG and JISAO, enabled NOAA Science Camp to return to its full program of two middle school camp sessions and two weeks of the Junior Leadership Program, with an operations budget of $75,742. In 2015, local NOAA leaders worked further with NOAA national leadership to secure funds from three NOAA Headquarters offices (NOAA Fisheries, Office of Oceanic and Atmospheric Research, and NOAA's National Ocean Service) and the NOAA Deputy Under Secretary of Operations. This NOAA funding, along with funds from WSG and JISAO, provided NOAA Science Camp's budget of $80,985 in 2015.

EXPENSES	2014	2015
Staff Salaries and Benefits	$59,073	$57,973
Camp Operation Costs (supplies, food, transportation, scholarships, etc.)	$6,448	$12,083
SUBTOTAL EXPENSES	$65,521	$70,056
Overhead (14% in 2013, 15.6% in 2014)	$10,221	$10,929
TOTAL EXPENSES	$75,742	$80,985

REVENUE		
Camper Fees	$26,462	$27,371
JISAO	$1,400	$5,000
NOAA	$40,000*	$40,000**
WSG	$7,880	$8,614
TOTAL REVENUE	$75,742	$80,985

*In 2014, NOAA funding was provided by NOAA Fisheries (Alaska Fisheries Science Center $6K, Northwest Fisheries Science Center $5K, West Coast Regional Office $5K), NOAA Research (Pacific Marine Environmental Laboratory $8K), NOAA Diving Center ($3K), and NOAA Headquarters offices (NOAA Ocean Service $8K and the NOAA Finance office $5K).

FRIENDS OF NOAA SCIENCE CAMP

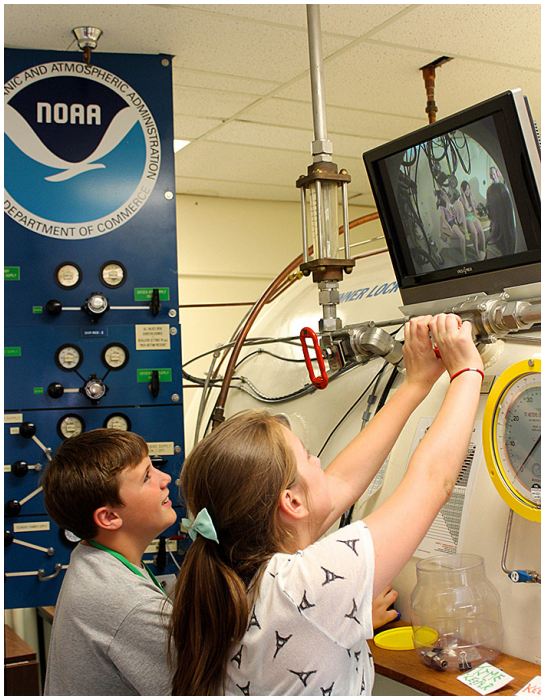
WSG and NOAA partner with numerous community groups to recruit and support underserved communities and underrepresented youth and to augment the NOAA Science Camp curriculum with field trips and activities.

Recruitment and support of underserved communities

Joint Institute for the Study of the Atmosphere and Ocean (JISAO) – education and diversity funding
Solid Ground – recruitment of scholarship recipients
Seattle Math Engineering Science Achievement (MESA) – recruitment of scholarship recipients
Tukwila School District – recruitment of scholarship recipients and transportation coordination
Rainier Scholars – recruitment of scholarship recipients

Curriculum and activity support

Ocean Inquiry Project
Sail Sand Point
Salish Sea Expeditions
Northwest Association of Networked Ocean Observing Systems (NANOOS)
UW School of Oceanography
Atlantis, Inc. ROV Team
Seattle Aquarium



"My camper liked the real life scenarios that were used in the camp. He enjoyed using current scientific information and methods for problem solving...he enjoyed the atmosphere of friendly competition between the groups. He is significantly more engaged and interested in ocean science since attending the camp."

Parent, NOAA Science Camp, 2014

CRITICAL PARTNERSHIPS

NOAA Science Camp relies on the engagement and support of countless individuals and partner groups to make the program possible. Outside of NOAA, the camp shares a unique partnership with UW for operational, financial, and programmatic support critical to its success. Two UW programs that are instrumental to NOAA Science Camp operations include:

Washington Sea Grant Based at the UW College of the Environment, Washington Sea Grant (WSG) is part of a national network of 33 Sea Grant programs, administered by NOAA and funded through federal and university partnerships. WSG supports marine research, outreach, and education and works with communities, managers, businesses, academic institutions, and the public to strengthen understanding and sustainable use of ocean and coastal resources. By partnering with educators and marine-related organizations, WSG brings valuable opportunities and resources to the K-12 community – expanding awareness of and engagement in the marine and coastal environment, improving ocean literacy, and fostering interest in marine-related careers.

WSG is a long-time partner of NOAA Science Camp. In 2005, WSG took on the important role of camp coordination and providing substantial funding support toward camp operations and scholarships each year. WSG coordinates recruitment and registration of campers, as well as the hiring of camp staff. WSG also works closely with NOAA to update and expand the NOAA Science Camp program and curriculum each year, administer camp programming, develop and implement evaluation tools, and produce annual reporting materials. WSG helps NOAA coordinate the camp's steering committee throughout the year to ensure continuity of the program.

Joint Institute for the Study of the Atmosphere and Ocean The Joint Institute for the Study of the Atmosphere and Ocean (JISAO) at UW is a NOAA Cooperative Institute that is at the forefront of research in atmospheric, oceanic, and fishery sciences. JISAO's education and outreach program aims to advance environmental literacy at all levels of society, and promotes mentorship of scientists in the next generation who reflect our diverse workforce. JISAO promotes interdisciplinary collaboration between UW and NOAA scientists and is a long-time partner of NOAA Science Camp. Since NOAA Science Camp's inception, JISAO scientists have been deeply involved, developing and presenting oceanography-related activities at camp. JISAO scientists have also assisted with program evaluation, assessing the educational efficacy of the program, and directing the growth of the program.

JISAO is committed to diversity and since 2006 has directly supported campers from underserved and underrepresented communities within the region by providing them with scholarships. In 2015, JISAO exceeded previous support and made it possible for 19 middle school students from Showalter Middle School in Tukwila, Washington, to attend camp.

SCIENCE ACTIVITY AND FUNDING PARTICIPANTS

Many NOAA offices contribute to the NOAA Science Camp effort, and the success of the camp is the result of cross-NOAA collaborations within and among NOAA science offices. NOAA line offices are involved in several levels of engagement: overall coordination, steering committee membership, science activity leads, and funding, which reflect support by NOAA both at the local office level and at the national level.

NOAA Fisheries
- Alaska Fisheries Science Center[1,2,3,4]
- Northwest Fisheries Science Center[2,3,4]
- West Coast Regional Office[3,4]
- Restoration Center[3]
- Seafood Inspection Program[3]
- NOAA Fisheries Headquarters[4]

Office of Oceanic and Atmospheric Research
- Pacific Marine Environmental Laboratory[3,4]
- OAR Headquarters[4]

National Ocean Service
- Office of Coast Survey, Pacific Hydrographic Branch[3]
- Office of Response and Restoration
  - Assessment and Restoration Division[3]
  - Emergency Response Division[2,3]
  - Marine Debris Program[3]
- NOS Headquarters[4]

National Weather Service
- Seattle Forecast Office[3]

Office of Marine and Aviation Operations
- NOAA Diving Center[3,4]

University of Washington
- Joint Institute for the Study of the Atmosphere and Ocean[3,4]
- Washington Sea Grant[1,2,3,4]

NOAA Finance Headquarters[4]

NOAA Deputy Under Secretary for Operations[4]

Numbers indicate level of engagement in NOAA Science Camp:
1 Overall coordination of NOAA Science Camp
2 Steering committee membership
3 Science activity lead
4 Funding

Logistical support for NOAA Science Camp could not happen without the support of NOAA Western Regional Center Facilities and Western Regional Security Office.

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