ChangeScale

an ENVIRONMENTAL EDUCATION COLLABORATION

2014-2016 Vision Statement

Introducing ChangeScale

Environmental education prepares every generation with the environmental know-how and inspiration to help create healthier communities, today and in the future. Given the complex environmental and social challenges we face, environmental education needs to be an essential core of every person's lifelong education—from understanding the role of science to learning how to be effective citizens in a democracy.

ChangeScale—a partnership effort in the greater San Francisco Bay Area, founded in 2011 as the Environmental Education Collaborative—seeks to embed environmental education as a foundation for learning. Through an open dialogue with practitioners, researchers, and funders who share a common interest, we worked together to identify strategies to increase the impact of environmental education.

ChangeScale is at an exciting and expansive stage of development. After soliciting feedback and guidance from hundreds of practitioners, thought leaders, community members, and stakeholders, we developed a three-year strategic plan to advance the field of environmental education. To inform the plan, we conducted research to better understand challenges and opportunities facing the field of environmental education, and used the collective impact framework to guide our process.

Our strategic plan provides a roadmap for environmental education's future in the greater San Francisco and Monterey Bay areas. At its core, the plan shows meaningful ways that diverse and varied organizations can work together to ensure that environmental education is a cornerstone of lifelong learning. Working together, we can foster meaningful connections to the natural world, build individual and collective leadership, and create a more environmentally literate and engaged citizenry.

As we move from planning to action, we invite you to join us.

We are extremely grateful to the S. D. Bechtel, Jr. Foundation and the Pisces Foundation for their generous support of our planning process.

Kirk Anne Taylor
Director, ChangeScale

Jason Morris
Chair, ChangeScale

Executive Vice President,
NatureBridge

Dr. Nicole Ardoin
Research Council Chair, ChangeScale

Assistant Professor,
Stanford University

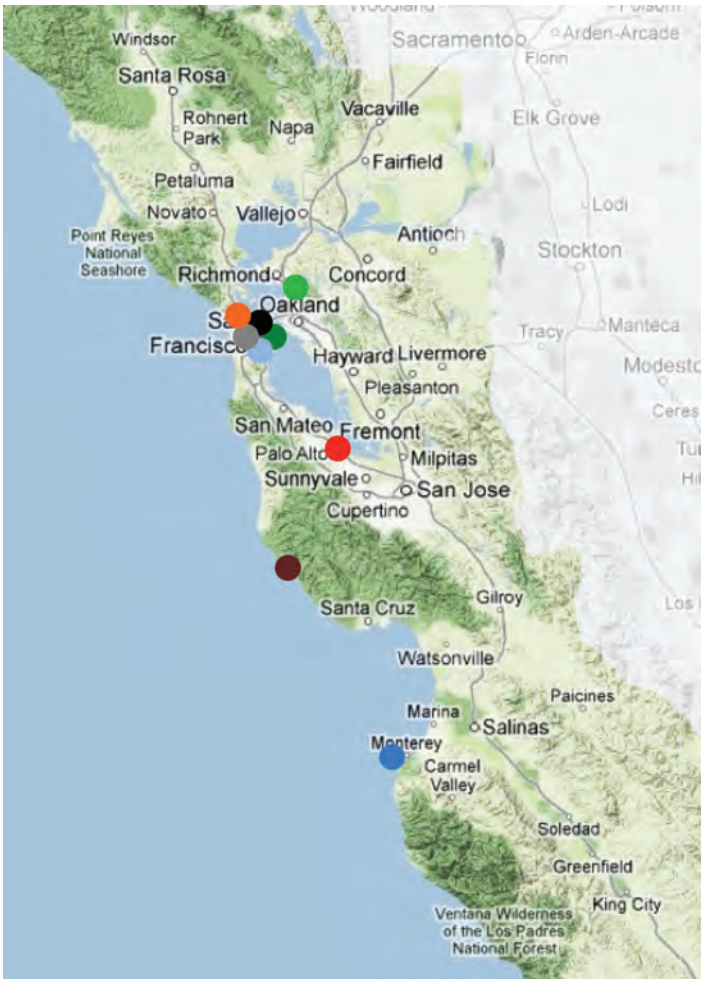
Graduate School of Education
Woods Institute for the Environment

ChangeScale

"Environmental education aims to create an environmentally literate citizenry, poised and motivated to take action on pressing environmental issues. It is about empowerment, skills development, and providing opportunities for action. At its best, environmental education represents hope and change."

"EE: A Strategy for the Future", Environmental Grantmakers Association

- THE LAWRENCE HALL OF SCIENCE, UNIVERSITY OF CALIFORNIA, BERKELEY
- GOLDEN GATE NATIONAL PARKS CONSERVANCY
- exploratorium®
- CALIFORNIA ACADEMY OF SCIENCES
- NatureBridge
- Tuolumne River Trust
- Stanford WOODS INSTITUTE for the ENVIRONMENT
- pieranch
- Monterey Bay Aquarium



This strategic plan is intended to be a living document that will be updated and improved upon as we learn and grow through implementation and iteration.

Introduction

The San Francisco Bay Area is home to a wealth and diversity of environmental education organizations and supporters. Yet we find ourselves at a point in time that requires a new approach to education—one that is collaborative and adaptive to our changing societal and environmental needs. ChangeScale was founded to develop and advance this new approach—building cohesiveness, effectiveness, and prominence in the field of environmental education throughout the 12-county greater San Francisco and Monterey Bay areas. Comprised of practitioners and academic institutions, ChangeScale's vision is to ensure that every generation is inspired with the environmental know-how[1] to create healthy communities and a healthy planet. Working collaboratively, we will achieve greater collective impact on environmental education outcomes than any organization could achieve independently.

Over the past two years, ChangeScale has worked inclusively to develop a shared agenda to integrate environmental education into formal and informal educational settings throughout the greater San Francisco Bay Area. The resulting strategic plan details ChangeScale's strategies over a three-year period, from 2014 through 2016. The goals and strategies included are designed to improve the quality and relevancy of environmental education, increase the scale of collaborative program delivery, and engage a broad range of stakeholders in meaningful ways.

Environmental Education

Environmental education is vital to healthy, vibrant communities.[2] The growing scale and complexity of the environmental issues we face, from climate change to pollution to loss of biological diversity, demands an environmentally literate public that is inspired to act as stewards of the planet and apply practical environmental know-how to support an improved quality of life. The breadth of experiences available through environmental education is not only a powerful tool for creating environmental literacy,[3] but also for preparing every generation with the skills and will to work toward a sustainable future.[4]

What Is Environmental Education?

Simply defined, environmental education consists of programs in, about, and for the environment.[5] Its goals are to increase environmental awareness, build skills to address environmental concerns, and promote positive environmental behaviors.[6] Environmental education is a lifelong process that engages a range of audiences, including young people and adults, as well as families and educators. It occurs in formal settings, such as schools, and informal settings, such as museums, aquariums, community centers, nature centers, farms, and parks.[7] In whatever setting it occurs, environmental education encourages individuals to build personal connections with the natural world.

High-quality environmental education is based on solid educational pedagogy and sound science. High-quality environmental education programs are designed to be fair, accurate, and inclusive of diverse perspectives.[8] At its core, environmental education is interdisciplinary, weaving together the study of the natural sciences, the social sciences, mathematics, literature, and art with the analytical skills required to address complex issues affecting our world. Environmental education is hands-on, engaging participants in learning in real-world and relevant contexts, encouraging the development of critical-thinking and civic-participation skills. Environmental education is human-centered, framed by the context of human interactions with the natural world, encouraging participants to ask questions, communicate, and explore their role in the environment.[9]

With an eye toward behavioral change, successful environmental education strategies are tailored to the appropriate audience and context.[10] Some programs may focus on local community issues, while others emphasize global environmental issues. Other programs are built around specific issues such as climate change, ocean acidification, food system sustainability, or ecological restoration. Some programs are not issue driven at all, but rather encourage exploration of nature or help people understand natural systems. Programs are also tailored to be age appropriate. Developmental psychology suggests that a general progression into engaging in conservation activities is important.[11] For example, in early childhood, environmental education programs should focus on free play in the out-of-doors and nature appreciation, while in middle childhood engaging in conservation projects is appropriate and can be empowering.[12]

Environmental Education

For adults, it is important for environmental education programs to highlight the relevance of environmental issues to daily life and build on prior experiences of a particular situation, issue, or activity.[13]

Environmental Education Outcomes

Environmental education can achieve a variety of outcomes in areas such as health and well-being, commitment to conservation and sustainability, and civic engagement.

Spending time in the outdoors impacts psychological and emotional well-being, creating opportunities for increases in creativity, attention span, and cognitive restoration.[14] Many researchers and writers have called attention to the growing disconnect children and, indeed, people of all ages have with nature.[15] Some have suggested that this disconnection from nature is associated with the changes in lifestyle that people in the United States have experienced over the past decades and may impact rates of crime,[16] decreased immunity,[17] and reduced productivity.[18] Environmental education can help remediate many of these effects through place-based programs and outdoor opportunities.

Interactions with nature may also help encourage development of an environmental identity,[19] which may in turn increase engagement with stewardship behaviors.[20] Early experiences with nature can affect the kinds of environmental behaviors that people demonstrate later in life.[21] Studies indicate that there is a complex but important relationship between learning about nature and taking up responsible environmental behaviors. This relationship suggests a need for ChangeScale to approach its goals strategically, with a broad definition of environmental education, rather than one focused solely on learning content.

Environmental education also encourages civic engagement. One goal is to promote thoughtful, informed environmental decision making that benefits society.[22] Environmental education explores issues within a complex ecological, social, and economic framework, thereby helping participants develop citizen-participation and problem-solving skills.[23]

ChangeScale's Role in Environmental Education

ChangeScale's core team is comprised of a variety of organizations, each with a unique mission, expertise, network, and suite of programs. Given the multimodal nature of environmental education, where certain approaches appeal or speak to specific cultural and political groups,[24] the diverse composition of ChangeScale is a strength. The job of environmental education is to, over time, move participants along the continuum of environmental literacy.[25] By working together, ChangeScale and its many stakeholders will promote and develop programs and services of educational opportunities to help people build environmental know-how over a lifetime. As a result, individuals across the Bay Area will have opportunities to connect to the natural world and address environmental concerns that are relevant to their lives today, and, at the same time, build a foundation for a healthy and sustainable future.

Challenges and Opportunities

Despite what we know about its importance, efforts to ensure that all young people experience environmental education have thus far met with limited success.[26] One contributing factor is that changes to standardized school curriculum are notoriously difficult,[27] especially in this era of testing[28] and reduced resources. Producing change in highly institutionalized settings, such as those surrounding education, may best be approached through a series of efforts aimed at "tinkering" with the system, rather than trying to radically change it all at once.[29] Success at altering experiences available to young people often comes from outside the public school system where changes to curriculum, opportunity, and resources are more easily adaptable.[30] Another challenge facing the field of environmental education is lack of financial resources. Environmental education programs receive funding from a variety of sources—donations come from foundations and individuals, corporations, and the government. However, support for environmental education represents a very small portion of overall philanthropic giving toward environment and education.[31]

In 2011, NatureBridge, the S. D. Bechtel, Jr. Foundation, and environmental education researchers at Stanford University convened thought leaders from across the country—including environmental education practitioners, academics, public officials, and funders—to gain a deeper understanding of both the opportunities available and the challenges facing the field of environmental education. The findings were echoed by more than 130 participants at five collaborative listening sessions in 2013.

These conversations helped ChangeScale members focus on strategic areas for leveraging strengths of the field in the following domains:

- Enhancing the **quality** of environmental education by increasingly weaving research-based best practices into program models;
- Expanding **relevance** so that environmental education is available to—and influenced by—socioeconomically and culturally diverse communities;
- Increasing **engagement** and participation by a wider range of sectors and stakeholders (e.g., for-profit, public, and philanthropic) in the design and delivery of the environmental education system; and
- Fostering **collaboration**, which will facilitate unity in message, vision, and standards as well as growth in the scope and scale of environmental education programs.

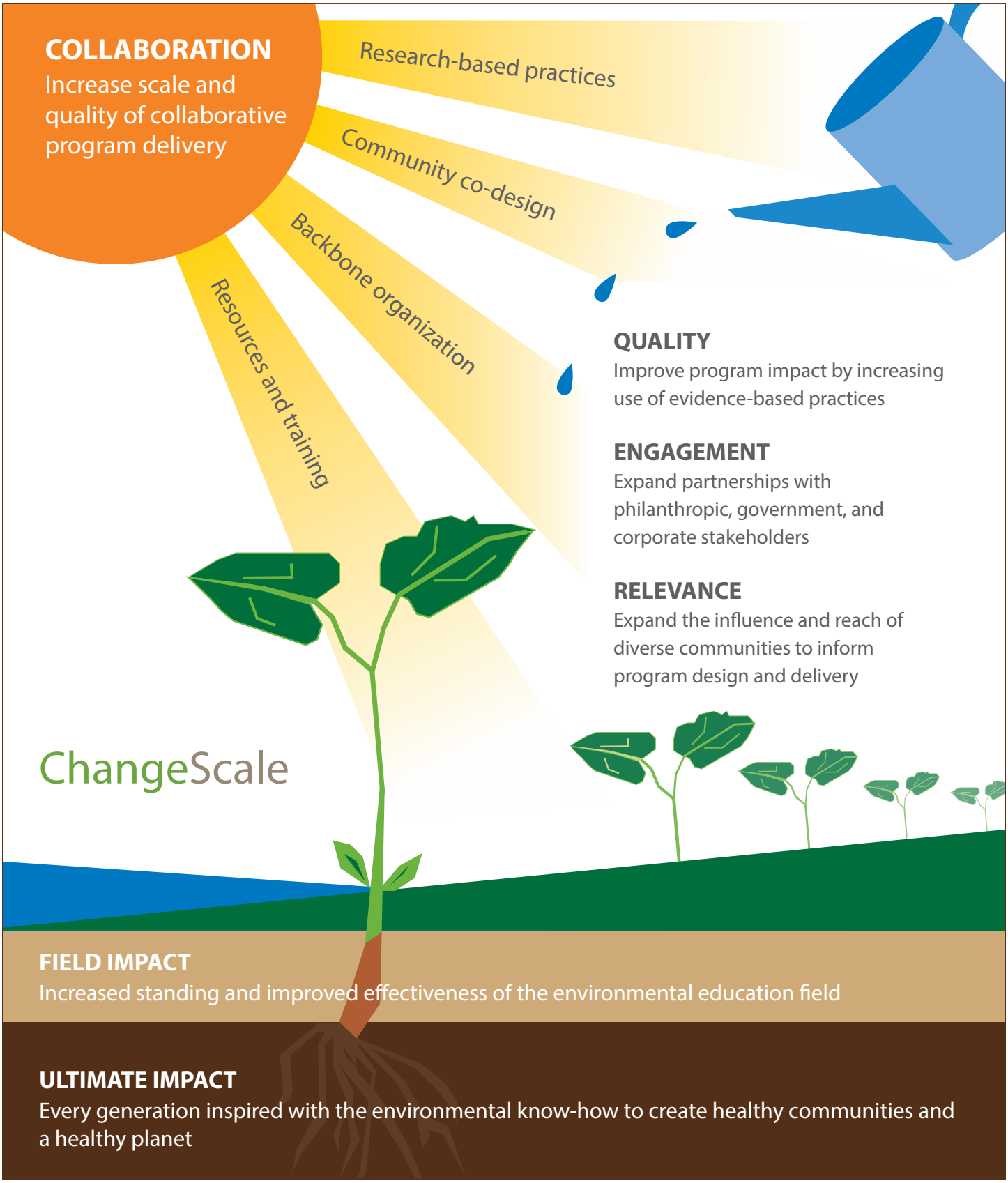
Theory of Change

Based on the lessons communicated in the strategy sessions and on insights and expertise of our members and peers, we have developed the following "Theory of Change," illustrating what must occur in order to strengthen and build the field of environmental education in the greater San Francisco Bay Area.

The Theory of Change depicts four major impact areas where ChangeScale aspires to make a difference: **quality, relevance, engagement,** and **collaboration**. **Collaboration** ensures that the many participating organizations act in a reinforcing manner, providing support both at the level of mission and vision, as well as programmatically. In a field such as environmental education, collaboration is particularly critical because of the sometimes controversial nature of the topics addressed in the field.[32] **Quality** demonstrates ChangeScale's commitment to working from a strong research base.[33] Building effective programs that demonstrate adaptive capacity, learning from past mistakes, and shifting in light of changing conditions are critical for leveraging resources to produce change. **Relevance** and **engagement**, together, represent cornerstones of this effort by acknowledging that environmental education often can be relegated to niche populations, making environmental education efforts relevant only to particular communities.[34] Relevance and engagement respond to the culture, needs, and values of communities across race, gender, and class with a universal benefit.[35] To ensure that ChangeScale's efforts are as broadly relevant as possible, engagement must be a critical facet of creating relevance.

Through collaboration and by focusing on engagement, relevance, and quality, ChangeScale seeks to increase the standing and effectiveness of the environmental education field in the greater San Francisco Bay Area, inspiring every generation with environmental know-how to create healthy communities and a healthy planet.

Theory of Change



ChangeScale's Approach to Collaboration

The collective impact method of collaboration is central to ChangeScale's strategic approach. After considering various models of collaboration, such as strategic alliances and social sector networks, ChangeScale members found collective impact initiatives as described by John Kania and Mark Kramer (2011) to be a useful framework.[36] The model of collective impact was compelling to our group because of its focus on building a collective agenda around large-scale social impacts and acknowledgement that large social and community concerns, such as the environment and education, cannot be addressed by a lone organization.[37] Additionally, collective impact initiatives have been effective at addressing complex social problems in which there is no single solution and no one entity with the ability to bring about the change needed.[38]

ChangeScale's initial membership consists of nine organizations that have strong stature in the fields of environment and education. Each organization committed to providing two representatives to participate in the collaborative group, including a program leader and an executive leader. Two foundations serve as thought partners in designing our collaboration, developing our strategic plan, and funding our initial planning process.

Backbone infrastructure is provided by NatureBridge, who is the fiduciary sponsor and responsible for ChangeScale's achievement of its mission.[39] NatureBridge also oversees the ChangeScale director, a full-time staff person who supports the development and implementation of the strategic plan, aligned activities, and ongoing communication for the collaborative. A steering committee of representatives from three organizations and the ChangeScale director provides strategic leadership and guidance.

As ChangeScale moves into the next phase and begins implementation of the strategic plan, the structure and those directly involved in the partnership will continue to evolve. A key component of the next phase is to develop a research agenda, including a shared measurement system to track progress toward the goals, disseminate lessons learned, and adjust our strategies as needed.

Guiding Principles

- We presume good faith, value multiple perspectives, and strive for humility, transparency, and honest communication.
- We are inclusive in our decision making and program design practices because we believe that healthy, sustainable communities and high-quality educational systems can only be achieved through collaboration.[40]
- We believe that all people should have equitable access to environmental education. As there are currently inequities in access to environmental education and in environmental-related careers, we focus our efforts in areas where the need is greatest.
- Having direct nature experiences inspires positive environmental behaviors,[41] increases creativity,[42] enhances cognitive abilities,[43] and promotes physical and psychological well-being.[44]
- Integrating research into program design and measuring our effectiveness and collective impact are essential for advancing the field of environmental education.[45]
- High-quality environmental education is fair, accurate, and inclusive of diverse perspectives[46] and economics.
- Environmental education is an essential tool for building STEM knowledge[47] and driving the implementation of the Next Generation Science Standards.
- Environmental education programs help all people learn to use their knowledge and skills to address environment-related, real-life opportunities and issues.[48]

ChangeScale Goals

In the next three years, ChangeScale will take action in a variety of areas to help improve the quality and relevancy of environmental education, increase the scale of collaborative program delivery, and engage a broad range of stakeholders.

Toward this end, we will work toward achieving the following goals:

1. Build and sustain a continuum of connected and scaffolded learning opportunities—or pathways—to strengthen environmental know-how
2. Integrate research into pathway design and delivery
3. Increase the capacity and ability of environmental educators and their organizations to collaborate
4. Develop and build the next generation of leaders with environmental know-how
5. Use evidence to demonstrate and articulate the impact of environmental education and actively share lessons learned with others
6. Build and maintain strong support structures for ongoing collaboration

Build and sustain a continuum of connected and scaffolded learning opportunities—or pathways—to strengthen environmental know-how

CONNECT LEARNING OPPORTUNITIES

Developing environmental stewards is a multi-faceted long-term endeavor. No one organization is positioned to meet the varied needs of youth at all levels on the environmental literacy continuum.

In the next three years, ChangeScale will focus its efforts on creating environmental education pathways as a proof-of-concept project. A pathway (sometimes called an education pipeline or continuum) is a set of educational experiences that connect knowledge and skills. ChangeScale's pathways may be focused in a variety of ways. A pathway may be implemented, for example, in an individual community or school district, or more broadly across a large geographic area. A pathway may also be organized thematically on a set or subset of environmental topics (e.g., watersheds or ocean acidification), or it could be an individual learning plan for a participant or group of participants. Pathways may take place in schools or out-of-school settings, or both.[49]

Link to Theory of Change: This goal links to all four impact areas in the ChangeScale Theory of Change by increasing the scale and quality of **collaborative** programming. It requires that several institutions work together, share participant data and contact information, and co-design programs to construct the pathway and track participants over time. Opportunities to co-design programs with a broad group of stakeholders including environmental education participants, teachers and school administrators, houses of worship, civic organizations, youth development groups, researchers, funders, and practitioners generate broad **ownership** and diverse community **relevancy**. **Quality** will be addressed by weaving evidence-based practices into program design and delivery, and through sharing lessons learned as the pathway progresses.

KEY STRATEGIES:

- Develop environmental education proof-of-concept pathways by linking together existing programs and creating new programs where gaps exist
- Ensure equitable distribution of programs
- Create an infrastructure to support the implementation and evaluation of the pathway
- Broaden the environmental education effort to include a wide range of organizations in the development and delivery of the pathway

Environmental Education Pathway

SUPPORT MECHANISMS
Measurement Systems
to track users' experiences, outcomes, and promote collective learning and improvement

SUPPORT MECHANISMS
Professional Development
for content, relevance, and program implementation

20 YEARS +

Is committed to environmental health

Understands range of solutions to improve planet health

Takes action to protect the environment

15 YEARS

Has positive attitude toward the environment

Understands human impact on the planet

Has meaningful stewardship experiences

10 YEARS

Cares about nature

Understands basic ecological concepts

Frequently experiences outdoors

5 YEARS

Enjoys spending time outside

Has basic knowledge of nature

PATHWAY DESIGN FEATURES

Programs are linked together, within and across age groups

Community and program providers co-design experiences

Pathways are informed by evidence-based best practices

Recognizes mastery of skills and accumulation of experiences

Programs are rooted in the lives of participants

Integrate research into pathway design and delivery

INTEGRATE RESEARCH

Current research and best practices must become more accessible to practitioners, yet funding for research and the real-world application of research is a barrier for the field.

ChangeScale will be a vehicle for sharing and distilling relevant research and evidence-based practices, and applying lessons learned to pathway program design and pedagogy.

Link to Theory of Change: This goal is directly tied to the **quality** impact area of the Theory of Change. It also links to the **collaboration** impact area as it involves several institutions working together to successfully reach this goal. **Relevancy** will be addressed through working with a broad base of constituents to inform our research and evaluation processes. This goal is intended to examine, document, and articulate the value and necessity of environmental education. In doing so, this goal also addresses the **engagement** impact area.[50]

KEY STRATEGIES:

- Use research findings and insights to inform the design and delivery of environmental education pathways
- Implement a formative and developmental research design process
- Measure learning outcomes for youth and ensure that lessons learned are incorporated into pathway design

Increase the capacity and ability of environmental educators and their organizations to collaborate

INCREASE CAPACITY TO COLLABORATE

The value of collective impact has been well documented, but collaboration requires time and resources—resources that many environmental education organizations will only commit with a clear plan and a vision for leveraged opportunities.

ChangeScale will deliver professional development opportunities for practitioners that are designed to support the effectiveness of environmental education collaboration. These professional development opportunities may take several forms, including smaller gatherings, webinars, and larger conferences or workshops.

Link to Theory of Change: This goal will directly address **collaboration**, **quality**, and **relevancy**, as the professional development opportunities will focus on those areas, using the pathway design and implementation as a model for demonstrating real-life application of new skills and tools. **Engagement** will be addressed through partnering with a myriad of stakeholder groups to co-design and implement professional development opportunities, and to tie into existing efforts led by these constituency groups and others whenever possible.

KEY STRATEGIES:

- Provide fun convening opportunities to explore specific environmental education topics
- Provide training on collective impact and collaborative models
- Provide content and pedagogical training for pathways based on pathway design and implementation

Develop and build the next generation of leaders with environmental know-how

FOSTER THE NEXT GENERATION OF LEADERS

The traditional environmental sector does not reflect the demographics of the country and is not demonstrating a strong aptitude for developing leaders who reflect those demographics.

Leadership development is a critical strategy for advancing the field of environmental education and ensuring a healthy environmental future for all. Through a collaborative process, ChangeScale will build a network of organizations that offer leadership opportunities at various levels. These organizations will connect emerging environmental leaders with new and relevant opportunities to further their leadership growth and pursue their passions. Individuals will have a variety of opportunities to choose from and a multitude of peers and role models with whom to share this pursuit. ChangeScale will help build a diverse and vibrant environmental education workforce for the Bay Area and beyond.

Link to Theory of Change: This goal is directly linked to the **relevance** impact area, but will also lead to increased **collaboration** and improved program **quality**. **Engagement** will be addressed by building relationships with funders, policy makers, community groups, and a variety of stakeholders that will provide leadership and career development expertise and be a source for internship and leadership development opportunities.

KEY STRATEGIES:

- Create a model for linked leadership opportunities that is connected to our pathways and attracts a diverse and vibrant environmental education workforce
- Include diverse perspectives in the design and development of leadership opportunities

Use evidence to demonstrate and articulate the impact of environmental education, and actively share lessons learned with others

DEMONSTRATE IMPACT

High-quality environmental education is a powerful solution to some of the most complex issues of our time, but without the ability to demonstrate its impact, we will not succeed in securing the support and backing it needs.

ChangeScale will focus on using evidence to build support for environmental education by acting as a laboratory for primary research on environmental education. Additionally, we will use the pathway model to build evidence of impact, producing reports to share lessons learned with key stakeholders. Achieving this goal will depend on building mutually beneficial relationships with stakeholders, working together to pursue common goals, and setting clear objectives and measurement outcomes.

Link to Theory of Change: This goal is directly linked to the **engagement** impact area as we build inclusivity and participation. The goal will also lead to increased **collaboration** as stakeholders build consensus around goals and measurements. Improved program **quality** and **relevance** will also result as we incorporate best practices to achieve greater impact.

KEY STRATEGIES:

- Work with stakeholders to advance shared educational, environmental, policy, community, and youth engagement goals
- Actively share lessons learned with colleagues in and out the field of environmental education

Build and maintain strong support structures for ongoing collaboration

BUILD A STRONG COLLABORATIVE

"Successful collective impact initiatives typically have five conditions that together produce true alignment and lead to powerful results: a common agenda, shared measurement systems, mutually reinforcing activities, continuous communication, and backbone support."

"Collective Impact", *Stanford Social Innovation Review*

This goal describes the internal work ChangeScale will do to build and maintain operational structures needed to achieve all of our other goals and aspirations. Accomplishment will rely on engaging new partners, developing a strong leadership structure, sustaining appropriate backbone support, and putting in place measurement tools to assess progress toward goals.

Link to Theory of Change: This goal will support all four of our impact areas individually. It will also enable ChangeScale to provide connectivity between **collaboration**, **engagement**, **quality**, and **relevancc**. It is this connectivity between impact areas that is the strength of the collaboration and the value add for the work.

KEY STRATEGIES:

- Define and implement a flexible governance structure that evolves as ChangeScale grows
- Measure and document our collective impact and feed those insights back into program design and the collaborative as a whole
- Actively seek out venues to share what we are learning

Outcomes

What will look different

YOUNG PEOPLE

Outcome 1: By participating in environmental education pathways, youth have a deeper set of experiences leading to increased environmental literacy, greater conservation and leadership skills, and a greater commitment to take positive environmental action.

Outcome 2: Young people in our targeted geographies have increased access to environmental education pathways.

ENVIRONMENTAL EDUCATION PRACTITIONERS

Outcome 1: Environmental educators participating in environmental education pathways have strengthened content and pedagogical skills and increased ability to integrate research findings into program design and delivery.

Outcome 2: Environmental education practitioners participating in environmental education pathways have increased capacity to work together with diverse populations.

Outcome 3: Environmental education practitioners have increased knowledge and skills for working collaboratively across institutions to plan and deliver environmental education programs.

PROGRAMMATIC

Outcome 1: Environmental education pathways are evidence based, produce greater learning outcomes, and inspire positive environmental behaviors.

Outcome 2: Environmental education programs are relevant to the audiences they serve.

EXTERNAL STAKEHOLDERS

Outcome 1: Sustained partnerships with key stakeholders increase support for environmental education in the Bay Area.

RESEARCH AND EVALUATION

Outcome 1: Ongoing research and evaluation improve the quality and relevancy of environmental education pathways and ChangeScale as a whole.

Outcome 2: We better understand the impact of pathways using a variety of metrics, including learning outcomes, attitudes, and conservation behaviors.

Measuring Our Progress

Research and evaluation are essential elements of the strategic plan and will focus on assessing two primary areas:

1) progress toward our goals and strategies; and

2) strength and growth of our work together as a partnership.

To assess progress toward these goals, ChangeScale will put in place a shared measurement system and collect data related to the impacts of the environmental education pathways, gauge learning outcomes for participants, and assess progress toward our goals. Ongoing evaluation will help document lessons learned by working together, provide feedback for continuous improvement of our partnership, and encourage joint problem solving. ChangeScale will employ a variety of techniques, such as contribution analysis, and process and developmental evaluation.[51] ChangeScale will also create a research council consisting of researchers, environmental education practitioners, and community advisors. The research council will guide the design and implementation of the research and evaluation strategies.

Please visit our website at **eecollaborative.org** to learn more about our strategic plan and to access resources related to our work. Contact us at **collaborative@naturebridge.org.**

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STEPHEN BECHTEL FUND

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ChangeScale Members

Nicole Ardoin,
Stanford University

Elizabeth Babcock,
California Academy of Sciences

Kevin Beals,
Lawrence Hall of Science

Rita Bell,
Monterey Bay Aquarium

Mary Ann Brooks,
formerly of Pie Ranch

Anne Burnett,
formerly of NatureBridge

Karen Gardner,
formerly of Tuolumne River Trust

Meg Gonzalez,
Tuolumne River Trust

Jered Lawson,
Pie Ranch

Mary Miller,
Exploratorium

Jason Morris,
NatureBridge

Doug Overman,
Golden Gate National Parks Conservancy

Christy Rocca,
Golden Gate National Parks Conservancy

Megan Schufreider,
California Academy of Sciences

Linda Shore,
Exploratorium

Craig Strang,
Lawrence Hall of Science

Cynthia Vernon,
Monterey Bay Aquarium

Eric Wesselman,
Tuolumne River Trust

Deborah Wojcik,
Stanford University

Acknowledgements

ChangeScale Staff

Kirk Anne Taylor, Director

Funders

David Beckman,
Pisces Foundation

Angie Chen,
formerly of the S. D. Bechtel, Jr. Foundation

Lauren B. Dachs,
S. D. Bechtel, Jr. Foundation

Randi Fisher,
Pisces Foundation

Alex Hooker,
S. D. Bechtel, Jr. Foundation

Barbara Kibbe,
S. D. Bechtel, Jr. Foundation

Jennifer Kurz,
Pisces Foundation

Carol M. Tang,
S. D. Bechtel, Jr. Foundation

Advisors

Paul Chapman, Inverness Associates

Rhiannon Crain, Independent Researcher

Kristin Grimm, Spitfire Strategies

Alex Hildebrand,
LFA Group: Learning for Action

Mark Jacobs, Meridian Institute

Rue Mapp, OutdoorAfro

Carol Olson, Basecamp Strategies

David Placek, Lexicon Branding

Susan Smartt, NatureBridge

Mele Wheaton, Stanford University

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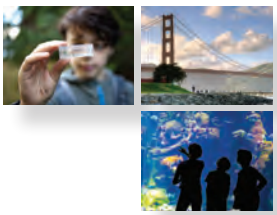
Felicia Gotthelf, NatureBridge

Hannah Melnicoe, LFA Group: Learning for Action

Caitlin Palmer, formerly NatureBridge

Tisha Strabley, Designer

Sheryl Trittin, Copyeditor



COVER IMAGES CREDITS

Endnotes

[1] We use environmental know-how synonymously with environmental literacy. As defined in "Developing a Framework for Assessing Environmental Literacy: Executive Summary" (2011) by the North American Association for Environmental Education, an environmentally literate person is "someone who, both individually and together with others, makes informed decisions concerning the environment; is willing to act on these decisions to improve the well-being of other individuals, societies, and the global environment; and participates in civic life." Environmental literacy includes cognitive (knowledge and skills), affective, and behavioral components that individuals develop over time. For more on the definition of environmental literacy see the Framework at www.naaee.net/sites/default/files/framework/EnvLiteracyExeSummary.pdf

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[4] Armitage, D., Marschke, M., & Plummer, R. (2008). Adaptive co-management and the paradox of learning. *Global Environmental Change, 18*(1), 86–98.

[5] Lucas, A. M. (1972). *Environment and environmental education: Conceptual issues curriculum implication*. (Unpublished doctoral dissertation). The Ohio State University, Columbus.

[6] These three goals are rooted in the 1978 Tbilisi Declaration and the 1975 Belgrade Charter, which were both created by consensus of environmental educators from around the world at UNESCO conferences. For more on the Tbilisi Declaration and the goals and objectives of environmental education, see www.gdrc.org/uem/ee/tbilisi.html.

[7] For an overview of settings, audiences, and strategies for informal science learning see the National Research Council's *Learning in Informal Environments: People, Places, and Pursuits* (2009). Available at www.nap.edu/catalog.php?record_id=12190.

[8] The North American Association for Environmental Education's *Guidelines for Excellence in Environmental Education* outlines a set of standards for high-quality environmental education materials and practices. The guidelines were developed with input from environmental educators, curriculum designers, and researchers and reviewed by thousands of professionals. The guidelines are available at eelinked.naaee.net/n/guidelines.

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Endnotes

[36]In strategic alliances, organizations collaborate to achieve mutually beneficial objectives (see the *Ivey Business Journal* for a discussion of the "five factors of a strategic alliance" at iveybusinessjournal.com/topics/strategy/the-five-factors-of-a-strategic-alliance#.UmVMNpSiecw) whereas social service networks (as defined by Kania and Kramer) focus on relationship building, information sharing, and short-term activities, rather than building a structured and sustained initiative. For more on collective impact, read "Collective Impact," *Stanford Social Innovation Review* (Winter 2011), pp. 36–41 by John Kania and Mark Kramer, available at ssir.org.

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[38]One model for collective impact is the STRIVE Partnership in Cincinnati, Ohio. STRIVE focuses on improving student achievement along the cradle-to-career continuum. Despite budget cuts and the recession, STRIVE partners have shown positive trends in several areas that they track, including high-school graduation rates, fourth-grade reading and math scores, and the number of preschool children that meet kindergarten readiness standards (see Kania & Kramer, 2011; strivetogether.org). For a discussion of other collaborations that have a demonstrated track record with collective impact (e.g., Memphis Fast Forward, Opportunity Chicago, and Calgary Homeless Foundation), see Hanleybrown, H., Kania, J., & Kramer, M. (2012). Channeling change: Making collective impact work. *Stanford Social Innovation Review.* Available online at ssir.org.

[39]Kania et al. (2011) argue that successful collective impact initiatives require a dedicated organization and staff to serve as a "backbone" to the overall effort. There are a variety of organization types that act as backbone organizations, ranging from the development of new nonprofit organizations to supporting the effort across several organizations. NatureBridge, an existing nonprofit organization, serves as the backbone for our collaboration. See Kania & Kramer (2011), p 7, for more on backbone organizational types.

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[49]For example, the "Kids Discover the Trail" program in Ithaca, New York, has organized seven informal education venues around the town to provide incremental and collaborative thematic field trips for the local school district. Every youth participating in the program visits a different site each year during kindergarten through eighth grade. This program has been running since 2005. Evaluations find that teachers, parents, and students believe it to be a valuable experience for students and that it leads to enhanced environmental awareness and environmental learning among participants. Additionally, the program has, over the past years, adjusted its programming to meet the needs of emergent audiences in Ithaca. By adapting programming based on community need, the pathways project has been able to become relevant not only for a range of ages, but also across socioeconomic divides in the Ithaca area. For more information, see www.discoverytrail.net.

[50]Understanding why and how education for sustainable development can be established requires reference to an existing body of research, not only on environmental education best practices, but also on psychology, sociology, and learning theory more generally. Integrating these resources helps practitioners select the most productive programming to spend limited resources developing. Researchers such as Kyburz Graber et al. (1997) have successfully built environmental education programming based on a socio-ecological approach at the high school level that transformed student experiences from basic to more robust and effective by applying a case-study approach. Additionally, Krasny et al. (2009) use well-established understandings of socio-ecological processes to inform the design of environmental education. Specifically, they recognize the situated nature of most environmental education and recommend that it focus on local conditions and community goals and needs, and that it be built, in part, by the people it is intended to serve. Taking such research-based lessons into account grows the strength of program development. Kyburz Graber, R. (2004). Does case-study methodology lack rigour? The need for quality criteria for sound case-study research, as illustrated by a recent case in secondary and higher education, *Environmental Education Research, 10*(1), 53–65.

[51]Contribution analysis assesses the contribution of a program or initiative on observed outcomes. Development evaluation is an approach to monitoring that is geared toward social innovation partnerships and is used in complex and uncertain environments. Formative and summative evaluation provide feedback and aid learning. Summative evaluation is retrospective and is used to assess learning at a particular time, and is focused on summarizing what program participants learned during a specific education experience, program, or curriculum. For more information on contribution analysis, visit betterevaluation.org/plan/approach/contribution_analysis, or read John Mayne's 2008 ILAC Brief, "Contribution analysis: an approach to exploring cause and effect," available at www.cgiar-ilac.org/files/ILAC_Brief16_Contribution_Analysis_0.pdf. For more on developmental evaluation see betterevaluation.org/plan/approach/