

# Environmental Education Gaps Analysis in Baja California

Workshop Report  
Mexicali, Baja California, Mexico  
March 17, 2017





# Executive Summary

On March 17, 2017, scientists, environmental educators, government officials, NGO representatives, and museum professionals gathered for a one-day workshop in Mexicali, Baja California, Mexico. This group collaboratively assessed the state of environmental education in a region defined collectively by the group, defined gaps and opportunities, and discussed strategies for better serving the regional community. The workshop sought to pull together stakeholders to define a regional environmental education strategy, while strengthening relationships within the environmental education community.

Participants identified 35 environmental issues facing the region. These issues were then grouped under nine “environmental challenge” categories—Trash/Waste, Air, Water, Land, Extraction, Government/Policy, Threatened Ecosystems, Nature Deficit Disorder, Environmental Education. In addition, the group identified five strategic audiences that needed to be targeted:

1. government sector including city planners;
2. business sector including urban developers;
3. decision-makers;
4. education sector including formal, informal, and non-formal educators; and
5. general public including agricultural communities, residents of natural protected areas, and watershed residents.

Important messages were identified which addressed each of the five strategic audiences.



The four unifying themes that emerged as a result of the workshop were:

1. the environmental education community itself needs capacity building and better networking;
2. government officials, the business sector, and decision-makers are underserved by the environmental education community;
3. there is a need to make contemporary research in the peninsula more available to non-scientific audiences; and
4. there is a severe case of “nature deficit disorder” and lack of connection with nature among all sectors of the population.

# Introduction + Goals

The entire Baja California peninsula suffers from ongoing environmental degradation. In addition to overall climatic trends (i.e., severe long-term drought in San Diego-northern Baja California), threats like pesticide pollution, rock and species extraction, water supply and contamination, and change of land use are all affecting our regional ecosystems. Many of these threats are on a global scale, but become particularly concerning in water scarce regions where every drop is precious. The growth of land and water over extraction presents risks to the environment that include accelerated desertification, erosion, and loss of habitat. Meanwhile, the local predicted impact of climate change suggests a future of more frequent droughts, loss of vegetation and soils, and negative impacts on biodiversity. These are tough times for the ecologically-fragile but boundlessly unique Baja California peninsula.

Now more than ever, the Peninsula needs a unified strategy for environmental education, and the PROBEA program at the San Diego Natural History Museum is positioned to do that through a collaborative process with our peninsular partners.

*"Everything has changed but our way of thinking. We can't solve today's problems by using the same kind of thinking we used when we created them."*

Albert Einstein

## Why do we need a unified strategy for environmental education?

- There is a vast amount of research that is not being disseminated to the community. In addition, the community is not involved with and/or have access to the research.
- There is a strong need to describe the broad impacts the science will have once it reaches the community.
- There is a lack of outdoor education programs and organizations that encourage and provide opportunities for outdoor experiential learning.
- There is potential for collaboration between organizations to maximize resources and create opportunities for broader impact.

## Our Goals for the Workshop

- To start a dialogue between organizations with like-minded missions.
- To share resources and projects to promote collaboration.
- To define a more specific region within Baja California to start our focus.
- To identify major environmental issues in the region.
- To identify priorities and gaps in how these issues are being addressed.

# Workshop Participants

For this workshop, we invited a diverse group of organizations currently operating within Mexicali and Ensenada in Baja California. Although our organizations differ in operating procedures, mission goals, and audiences, we came together to share our experiences working in the region. The range of environmental education tactics used by each of our organizations provided a diversity of perspectives and insight into the needs of the communities we serve. As we worked together during this workshop, we found many opportunities to share ideas and resources, and address challenges.



Front (L to R): Guadalupe del Carmen Cornejo Gutiérrez, Alma Delia Giles Guzmán, Edith Santiago, Antonia García Sánchez, Carmen Muñoz, Lizz González, Paula Pijoan, Laura Martínez Ríos, Barbara Medina Escobedo.

Middle (L to R): Ana Marichal, Dzoara Rubio, Alejandra León, Margarito Quintero, Horacio de la Cueva, Sergio Hiraes, Claudia Schroeder.

Back (L to R): Laura Silvan, Estephany Gonzalez Martínez, Víctor Hugo Valenzuela Cabrera, David Zavala, Saúl Elizondo Solís, Michael Wall, Bradley Tsalyuk, Beth Redmond-Jones, Karen Levyszpiro.



# Workshop Participants

## TheNAT Staff

Michael Wall  
Vice-President of Research and Public Programs

Beth Redmond-Jones  
Senior Director of Public Programs

Karen Levyszpiro  
Binational Education Program Manager

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Binational Education Project Coordinator

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Pro Esteros A.C.

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Lizz González  
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Saul Elizondo Solis  
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SPA - Áreas Naturales Protegidas del Estado

Victor Hugo Valenzuela Cabrera  
Museo Sol del Niño

# Workshop

The full-day, bilingual workshop began with a group brainstorm to geographically define the region. Then, through a combination of group discussion and small breakout groups, we discussed the major environmental challenges that the defined region faces and the messages being communicated about these environmental challenges. We then discussed which organizations are addressing these environmental challenges, what messages were being communicated to the general public and how they are being communicated, and what audiences are being targeted. We also defined messages that participants felt were missing and/or needed to be targeted. Outlined below are the results of this workshop.

## Defining Our Geographical Region

Our first task was to geographically focus and define "Our Geographical Region." How do we define the region we want to talk about?

For this first workshop held in Mexicali, our region was defined as a polygon limited to the north by an almost straight line from the San Diego/Tijuana border to Tucson, AZ, running south from Tucson to Hermosillo, Sonora, northwest through Bahía de Kino across the Gulf of California into Bahía de los Ángeles to Santa Rosalita on the Pacific Ocean, and north to the Tijuana/San Diego border.



# Identifying Environmental Challenges

For the first task, we began with a group discussion about the greatest environmental challenges facing our defined geographical region.

## Environmental Challenges Identified:

### Trash/waste

- Legal and illegal waste disposal

### Air

- Pollution
- Respiratory/ health issues related to pollution
- Pesticides/ use of chemicals

### Water

- Fresh water pollution
- Overexploitation of aquifers
- Amount and quality
- Sewage, treatment, and water reclamation
- Lack of education in water matters
- Plastic pollution
- Vector transmitted diseases – digestive, ear issues in coastal areas/surfers

### Land

- Change of use – inconsistency even with the law
- Property, ownership
- Unnecessary clearing of land, deforestation
- Urban development pressure
- Invasive species
- Dumping
- Stray dogs
- Residential development
- Agricultural burning

*"The first thing we start with this morning is a brainstorming session. We want to start with identifying the environmental challenges of the geographical region we've defined."*

—Michael Wall

### Extraction

- Mining
- Rocks- pebbles, gravel, boulders
- Species – flora, fauna

### Threatened ecosystems

- Desert
- Wetlands
- Coastal sage scrub
- Most impacted from San Diego to the El Rosario Arroyo
- Lots of speciation for example: one species of Coastal sage scrub that lives in a soccer field-sized piece of land
- No bird list for Ensenada
- Islands, marine, riparian, hydrothermal vents, vernal pools, forest, oasis, dunes, salt marsh

### Nature Deficit Disorder

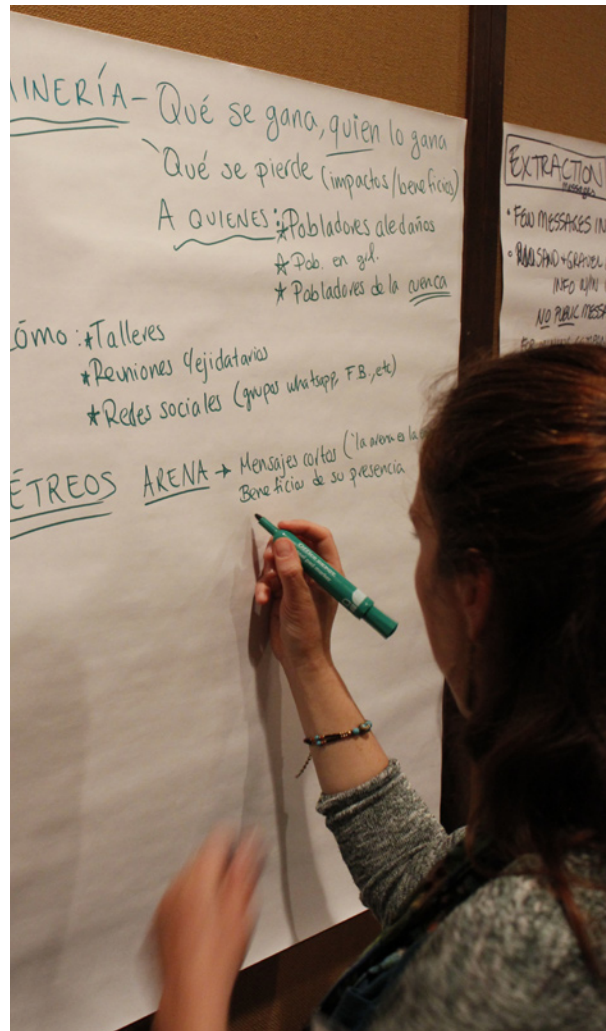
- Insufficient environmental education
- Lacking in nature-to-self connection
- Missing relationship to place and self

# Identifying Environmental Challenges

## Environmental Challenges Identified:

### Environmental Education

- Weak environmental education programs in government agencies
- Consumerism
- Lack of green consumerism in homes, schools, government, community
- Lack of smart choices
- Indifference, apathy towards the environment
- Illegal fishing
- Poaching, illegal hunting
- Climate change impacts
- Insufficient continuity of post-doc research –one-time programs/research then work is shelved Not enough critical and scientific thinking –not relating science to other issues and concepts –no interdisciplinary approach
- Not enough research on environmental education –no institutional organization
- Environmental Education not sufficiently integrated into programs, no technical training
- Environmental education –alignment of content
- Inability to change behaviors



### Government/Policy

- Weak legislation, laws
- Binational government relationship
- Not taking advantage of opportunities for collaboration due to external factors
- Not enough communication/social interaction between sectors
- Need to analyze environmental regulations for companies on both sides of the border
- Transient communities
- TJ + BC + California
- 90% of population city based
- 50% from other places



# Critical Messages

TheNAT team combined environmental challenges into larger categories. We then broke participants into smaller breakout groups and assigned each group with a challenge. Their task was to identify critical messages being communicated about a specific environmental challenge. The larger group then came back together for reporting out and discussion.

## Climate Change

- Not happening vs. it's real due to human activity
- Mixed messages via social media
- Climate change causes extreme weather events
- Climate change is destructive to society and humans
- As a result of climate change, polar ice cap is melting, earth is warming
- Mixed messages RE: if individuals can mitigate climate change
- Reduce use of fossil fuels to lower climate change
- Proper waste management
- Reforestation and conservancy can help mitigation
- Mediterranean ecosystem most vulnerable to climate change
- Climate change resilience – Background message
- Climate change action plans

## Air and Water Pollution

- Mexicali is one of the most polluted cities in the world
- Mexicali, TJ, Tecate are the most polluted cities in the country and the pose health risks
- Avoid agricultural burning because there are alternatives (alternatives are communicated to farmers but not to public)
- Let's talk about the fields – TV show about agricultural issues
- Pesticides – don't use, use alternative products and methods
- Water scarcity – last 20 years – political issue
  - \* Colorado river diverted –less water to BC
  - \* There won't be water quota in x, y, z today
  - \* No public water conservation messages – no connection to individuals and what residents can do
  - \* Utility water conservation –disconnect from utility message and how water is being managed
- Environment is another resource using water
- We are using fossilized (ancient) water

# Critical Messages

## Land Use

- Passive messages, not active campaigns
- Do whatever you want —no environmental consequences
- "We are another country's backyard"
  - \* US companies coming to Baja
  - \* Waste byproducts
  - \* Less strict environmental guidelines
  - \* "Open space is wasted space/land" No land conservation message
  - \* Let's take advantage of space and build
  - \* Ecosystem services messages insufficient
- Land conservation projects – some happening in violent ways
- CONANP—messages are for people living in specific protected areas and don't go outside those areas
- Invasive species
  - \* No regulations on what to plant
  - \* Reforesting – difficult to find native species
  - \* Any species is a good species as long as it creates green spaces
  - \* Green is life, brown is death – plant green plants
- Wetlands
  - \* Vulnerable ecosystem services
  - \* Use in sustainable ways
  - \* NGOs working to protect
  - \* Mixed messages – wasteland, use for dumping
- No strategic urban planning – public assumption
- Nature is dangerous, risky, it can kill you
- Land use change is easy to obtain regardless of planning
  - \* Regulations are not being enforced
  - \* Clearing land is simple and cheap
- Land conservation from financial point of view is minimal
- Car races through Baja
  - \* "Come off-roading in Baja, it's ok!"
  - \* Mixed message - tourism push



# Critical Messages

## Waste Management/Disposal

- All messages are positive but reality is different
- Messages are incomplete
- RRR – focus on recycle
- No burning trash
- Sorting - you should be sorting
- No dumping
- Good industry practices – Best practices in industry
- Buy local
- Use biodegradable materials
- Plastic bag ban
- Don't use straws
- Awareness of how micro plastics affect marine life
- Reduce use of disposable plastic products
- Trash is coming from Mexico only
- There are ways to address the issues

## Extraction and Exploitation

- Few messages in BC RE: mining; more in BCS
- Sand and gravel extraction
  - \* Info within universities
  - \* No public messaging
  - \* Ejidatarios complaining that their sand is being extracted
  - \* For mining companies there is info, practically no restrictions
  - \* "So what?" assumption – who cares if extraction happens – implicit message
  - \* Reformed law—mining is a primary activity that helps the country
- Illegal fishing
  - \* Fishing specific species – closed seasons
  - \* Messaging: you will get in trouble if you get caught and you will be in the news
- Flora and fauna
  - \* No messages within region
- Illegal hunting, poaching
  - \* In rural areas – signage no hunting
  - \* Mexicali – large hunting community





# Critical Messages

## Insufficient Education

- Nature deficit disorder– “Be a tourist in your own state”
- Get out to protected areas, but no education about responsible behavior outdoors
- Economically motivated, not about Nature deficit disorder, not about nature appreciation
- No conservation where one lives/state
- Clean waterways
- Forest service – national message about reforestation but not regionally specific
- Trash management message, but no resources to do it
- Reduce amount of plastic school collection – more plastic purchased so school “wins”
- Mixed message: not reducing, use more so school that gets the most plastic wins
- Plastic cheap and available – just use it , doesn't matter
- Convenience of plastic bottles and formula vs. breastfeeding – ingrained/ implicit in media
- Have to have latest x, y, z – rampant consumerism
- Very few educational materials available – where to get them is unclear



# Communication

Critical Messages that Need to be Communicated and Target Audiences

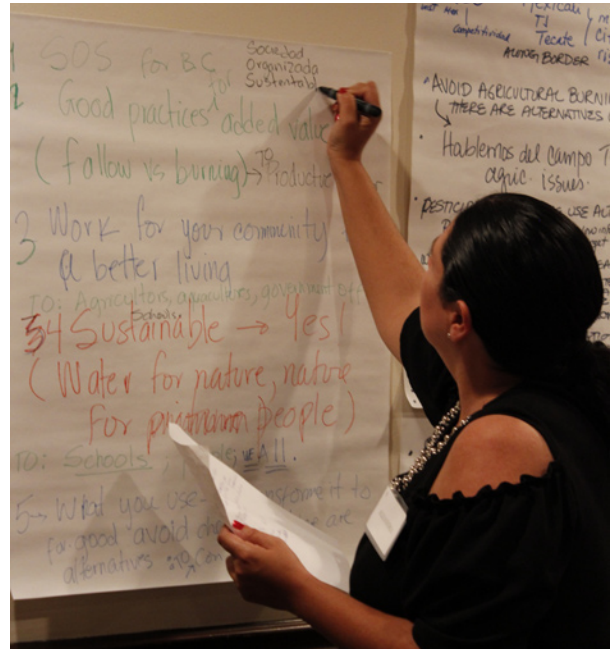
## Climate Change

Messages to communicate

- Climate Change is real, current, and is created by human activity
- Society needs to change its habits to mitigate and adapt to Climate Change
- We are part of the problem and part of the solution
- Reduction in the use of fossil fuels, reforestation, nature conservation, and efficient solid waste management contribute to mitigate Climate Change
- Government needs to create action plans to accomplish resilience for Climate Change

Target Audiences

- General Public
- Education sector
- Government sector



## Air and Water Pollution

Messages to communicate

- SOS for B.C. - Sociedad Organizada y Sustentable (Society Organized and Sustainable)
- Good practices for added value
- Work in your community for better living conditions
- Sustainability Yes! Water for nature, nature for people.
- Whatever you use transform it into something good
- Avoid chemicals, there are alternatives

Target Audiences

- Education sector
- Government sector
- Agricultural sector

# Communication

## Waste Management/Disposal

### Messages to communicate

- We are all responsible for a healthy environment
- Promote the co-responsibility of all
- Formal Education:
  - \* Show benefits/consequences of an integral trash management program
  - \* What kind of society do you live in/what kind of society do you want to live in
  - \* Be proud of your community
- \*NOTE: the way messages are shared must impact all our senses

### Target Audiences

- Education sector
- General public
- Business/industrial sector



## Land Use

### Messages to communicate

- Brown is the new green
- Open space is not wasted land
- The land provides ecosystem services
- The desert is not desert
- Invasive species
  - \* Any species is not always a good species
  - \* Native species are local heroes
- Urban planning
  - \* Compacted cities improve life quality
  - \* Respect urban planning and land use

### Target Audiences

- General public
- City planners, architects
- Urban developers
- Education sector
- Ejidatarios
- Tourists
- NGOs
- Government agencies



# Communication

## Extraction and Overexploitation

### Messages to communicate

- Mining—What are the benefits, who benefits, what are the benefits/impacts (good message for all themes)
- Rocks, sand, gravel, boulders short messages (sand is the sponge of the earth)
- Benefits of having rocks, sand, gravel
- Disadvantages of extraction: erosion, erosion, erosion
- Environmental value: WATER
- Boulders: disseminate info about consequences of extraction to legislators through fliers, environmental fairs, infographics
- Flora and fauna
- Value of vegetation in situ
- Sanctions
- Specific messages for each protected species

### Target Audiences

- General public, local residents, watershed residents
- Education sector
- Ejidatarios
- Tourists
- NGOs
- Government agencies, legislators



## Insufficient Education

### Messages to communicate

- Be a responsible tourist
- Transform an area of your brain
- The environment is you – know your region
- Phrases and eco-tips to reject the use of plastic products
- Improve community outreach and science dissemination

### Target Audiences

- General public
- Education sector
- Business sector
- Decision-makers
- NGOs
- Government agencies

# Next Steps

The participants then discussed as a group ideas for next steps regarding what was defined during the workshop. We prefaced the discussion with the following: "Given what we have defined today, and keeping in mind that we all have limited resources, budgetary challenges, and the political climate in Mexico and the US, what are the actions, activities, programs we would like to see happen?"

## Programmatic Needs

- Need for close collaboration between NGOs, government agencies, and educational institutions (internally and externally)
- Need for teacher training/capacity building for K-12 and college/university teachers within Teacher Training schools about environmental themes and issues
- Need for interpretation and pre/post materials for people visiting natural spaces
- Need to be more prepared to work with people in the field/with native species
- Need to teach teachers how to teach science
- Need to design and define programs to train individuals to do informal education
- Links between schools that teach EE and Universities and NGOs
- General subjects in college need to add core course about the environment, especially the environment of BC –need interdisciplinary approach
- Very little environmental science at university level
- Grades 8-12 – need to request mandatory EE class – how do we make it a need?
- Connect Environmental Education curricula to everyday life
- Need for informal Environmental Education programs for community – not everyone has access to formal education
- Need more outdoor education programs in BC
- Scientific information is available, but there's little outreach/access to public
- Need to make the science "accessible" to public, need materials to educate – a/v, photos, etc.
- Need for a Baja California Natural History Museum
- Trash management programs
- Training for government officials
- Social media campaigns with small powerful messages
- Strengthen educational research to create better programs
- Use and improve what has already been created
- Socio-environmental surveys in communities to determine interests and needs
- Research on environment, actions and applications of EE and community engagement

# Next Steps

## Potential Actions

- Sustainable practices manual for all industries
- Create specialized environmental education programs
- Technical/vocational career in environmental education at high school level
- Itinerant educators that go to schools to impart Environmental Education
- Create a formal and integrated effort to consolidate concerns and attitudes toward taking care of the environment
- Design programs to train decision-makers
- Design programs to train the economic sector: corporations, maquiladoras, retailers, developers, restaurant owners, etc.
- Create a portal of environmental information per locality with specific themes for each locality and opportunities to participate



## How Are We Going To Communicate The Messages That Need To Be Communicated?

- Workshops: Train trainers, capacity building for policy-makers, government officials, education officials, decision-makers, teachers and students.
- Trainings for outdoor educators.
- Meetings with ejidatarios
- Nature experiences
- Marketing in mass and social media
- Community events



# Conclusion

## Final Thoughts and Recommendations

### Climate Change

Climate change literacy and data about the effects of climate change on our geographical region can be used to inform planning. Decision makers need better access to climate change resiliency case studies and models.

There is a need to evaluate the climate change issues most relevant to the target audiences. Conservation land managers need better access to historic biodiversity data and contemporary locally relevant climate change studies.

### Air and Water Pollution

Basic literacy is needed about pollution, causes of pollution, and effects of pollution on communities and ecosystems. There needs to be education about visible and invisible pollution, how pollution enters the food chain, and the effects of pollution on the food people consume (soil contamination as an example). There is a need to explain how people can be part of the solution and take action. There are opportunities to use experiential educational techniques that are hands-on, not just lecture style.

There is a need to train and inform government officials about the importance of enforcing anti-pollution tactics. There are opportunities to educate policy makers about local laws that could prevent foreign companies from exploiting loose regulations.

Water is the basis for progress. There is a need to educate decision makers on the value of measuring and assessing water reserves. Likewise, there is a need to educate about the importance of protecting water resources from pollution and distributing water sustainably.

We are all responsible for a future with abundant and clean water. There is a need to educate land and water stewards about current and future usage and its effects. Educational opportunities include literacy about soil health in relationship to water absorption especially in regard to the effects of agriculture and land clearing.



### Waste Management/Disposal

There is a need to develop and coordinate long-term solutions to address and remediate problems associated with where and how to dispose of solid waste/trash to benefit the residents of our geographical region.

Addressing and remediating the waste management issue requires a collaborative, cross-border effort, and the establishment of partnerships between local, state, and regional entities.

### Land Use

There is a need to analyze the value of ecosystem services, educate decision makers about their value, and evaluate the impacts of actions taken in the ecosystem.

Policy-makers and decision-makers are poorly trained in matters of land use and there is a need to assess where the knowledge gaps are and how to best address them.

### Extraction and Overexploitation

There is a need to evaluate regulations and quotas to understand how effective they are in contributing to sustainability.

There is a need to educate land and water stewards about strategies to combat overexploitation. There is a need to inform land and water steward communities about endemism.

# Conclusion

## Insufficient Education

There is a lack of connection with nature that environmental education needs to address with more outdoor experiential programs.

There is a lack of understanding of the economic value of the natural resources themselves.

There is a need to increase the general public's, the decision-makers', and the students' awareness about environmental problems and solutions through education.

There is a general need for climate change literacy at all levels. People hear about climate change but don't understand the causes and can't fathom the consequences and repercussions. There is a need to explain the local impacts that climate change would have using local climate change related studies.

There is a lack of access to educational resources about pollution in cities and agricultural communities. Agricultural communities especially are underserved in environmental education about the effects of pesticides, and water and soil contamination, and their effects on the population.

Educators need better access to the science and economics of ecosystem services. There is a need to teach about what the land can provide through real examples. These examples can help communities identify the unique aspects of how they benefit from the ecosystem and opportunities to use the economic value of the ecosystem.

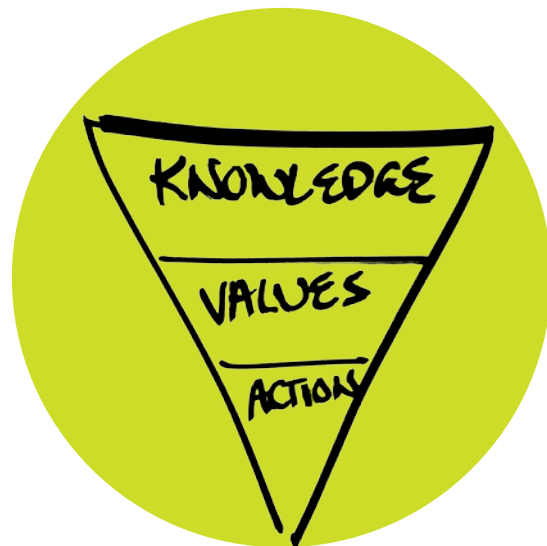
There is a need to inform communities about overexploitation and endemism. There is a need to educate about what rock extraction does to the environment. It is necessary to highlight the importance of localized community efforts to counteract overexploitation.

Habitat destruction decreases the quality of life and degrades ecosystems. There is a need for basic literacy on the consequences of urbanization to address the specific impacts that would affect communities. There is also an opportunity to educate about species of limited distribution and endangered species.

## Engagement

There is an underestimation of the amount of time it takes to increase engagement in a community and an overestimation about the amount of engagement that translates into a change in values or even action.

*"An upside down triangle can be used to illustrate the transition between dispersing information into a community and how that translates to actions taken by community members. As you move from one level of engagement to another, there is a smaller and smaller percentage of people reaching the deeper levels of engagement."*—Beth Redmond-Jones



This visual is a representation of ideas established in conservation psychology. The top level is knowledge, the information you give to a group of people. A level down is values. A smaller portion of the group are connecting to that knowledge and creating a change in their values. From there, even a smaller portion will take their change in values and participate in or instigate action.

# Resources

## *The 95 Percent Solution*

John H. Falk and Lynn D. Dierking  
American Scientist

Vol. 98, No. 6 (November-December 2010), pp.  
486-493

[http://uploads.sparked.com/11c7a9d407\\_1420357917\\_95%25+Solution+-++American+Scientist+Magazine.pdf](http://uploads.sparked.com/11c7a9d407_1420357917_95%25+Solution+-++American+Scientist+Magazine.pdf)

## *Don't Be Such a Scientist: Talking Substance in an Age of Style*

Randy Olson

<https://www.amazon.com/Dont-Be-Such-Scientist-Substance/dp/1597265632>

Good conservation psychology articles. You may have to get some of them through a university library. Others are PDFs.

[http://onlinelibrary.wiley.com/doi/10.1002/1520-6629\(199304\)21:2%3C128::AID-JCOP2290210206%3E3.0.CO;2-5/full](http://onlinelibrary.wiley.com/doi/10.1002/1520-6629(199304)21:2%3C128::AID-JCOP2290210206%3E3.0.CO;2-5/full)

<http://onlinelibrary.wiley.com/doi/10.1111/j.1530-2415.2005.00057.x/full>

<http://www.sciencedirect.com/science/article/pii/S0272494497900487>

<http://onlinelibrary.wiley.com/doi/10.1111/j.1523-1739.2006.00435.x/full>

<http://onlinelibrary.wiley.com/doi/10.1111/j.1523-1739.2011.01766.x/full>

<http://onlinelibrary.wiley.com/doi/10.1111/j.1523-1739.2006.00434.x/full>

<http://www.tandfonline.com/doi/abs/10.1080/1350462042000291056>

<http://www.humanecologyreview.org/pastissues/her102/102intro.pdf>

<http://www.humanecologyreview.org/pastissues/her102/102bottcantrilmyers.pdf>

<http://www.humanecologyreview.org/pastissues/her102/102monroe.pdf>

<http://www.humanecologyreview.org/pastissues/her102/102saunders.pdf>

<http://www.humanecologyreview.org/pastissues/her102/102forum.pdf>





