What are Research-Based Best Practices for Environmental Education?

There is a large body of research into what works in environmental education, which is being added to and updated all the time. In addition, various efforts have been made to synthesize relevant research to identify what effective programs have in common, i.e. the elements of an environmental education program that help lead to desired outcomes, such as increased knowledge and awareness, positive attitudes towards the environment, critical thinking skills, stewardship intentions and behaviors, and enjoyment.

With respect to Whale Tail Grants, the Coastal Commission funds a wide range of program types and resources for a variety of audiences. There is no "one size fits all" set of recommendations that would be helpful and the links below will not apply to every situation. To some degree, programs reflect the uniqueness of the people, organizations, audiences, and geographies from which they emerge, which is a good thing. Nevertheless, it makes sense to learn from others in the field where possible, and signposts to help guide program design can be very helpful, both for new programs and for improving existing programs.

With this in mind we have identified several resources that help shed light on best practices. The different resources come at the issue from slightly different angles, and go into different levels of detail and depth. Some themes that come up repeatedly as contributing to positive outcomes: (1) longer and/or repeated experiences that include preparation and opportunities for reflection; (2) holistic, experiential, and project based programs; (3) consideration of social and cultural contexts, and focus on real world problems and settings that are relevant to the audience; (4) programs with affective components, relating to emotions, (5) programs that foster ownership and empowerment, and (6) programs with knowledgeable, sincere, relatable staffing.

Here are the resources. We have summarized and included excerpts from each document to give readers an idea of what is included.

Note that this is an evolving effort and a living document. As new insights and understandings emerge, we will try to add to and modify this resource. We welcome your feedback and ideas.

❖ **Research-Based Best Practices for Environmental Education Workshop Report**.
   August 27-28, 2012 Annapolis, Maryland. Scientific and Technical Advisory Committee to Chesapeake Bay Program.
   http://www.chesapeake.org/pubs/301_Schabow2013.pdf

One of the goals of this 2012 workshop was to "identify best practices of education programs and practices that lead to increased environmental literacy in K-12 students. " The workshop report describes a number of excellent presentations; two are highlighted here.

In "**Aligning best practices with outcomes,**" on page 7 of the Workshop Report, Dr. Marc Stern of Virginia Tech (1) describes a systematic literature review aimed at finding empirical evidence of what works in environmental education, and (2) summarized a large study of interpretive programs.

Excerpt from the Workshop Report regarding the literature review:

While the review revealed primarily circumstantial evidence in favor of virtually all of the consensus-based best practices contained in publications such as the NAAEE's guidelines for excellence, Stern and his colleagues focused on instances where specific claims made by authors about program characteristics linked to measured outcomes were empirically supported by data. The review found authors clearly honing in on the several best practices that appear to drive positive results in knowledge, awareness, skills, attitudes, intentions, behavior, and enjoyment. These include:

- Dosage (longer experiences)

- Experiential approaches

- Investigation, issue-based, and project-based approaches

- Reflection and relevance

- Efforts to explicitly provide students with a sense of empowerment

- Incorporating social components, such as involvement with communities facing real environmental problems and active group discussion

- Designing programs with specific goals in mind

Excerpt from the Workshop Report regarding the study of interpretive programs:

Dr. Stern then discussed an empirical study of 376 National Park Service interpretive programs, which collected data from more than 3,600 program attendees. The best predictors of positive outcomes included interpreters' confidence (comfort, eloquence, and apparent knowledge), passion, and sincerity, and the incorporation of interpretive principles including holistic story-telling, theme development, affective messaging, relevance to the audience, responsiveness, and provocation. The study also found that interpreters whose primary goal was to increase the knowledge of their audiences achieved less positive outcomes than those aiming to enhance audience members' appreciation of the resource.

While environmental education differs from interpretation on some levels, there are lessons from this interpretation study that clearly translate to best practices in environmental education. Most notably are the critical role of the instructor and the importance of a holistic approach that actively engages learners in a complete experience. Dr. Stern concluded his presentation with these overarching ideas about best practices:

- NAAEE guidelines are on the right track

- Longer experiences with preparation and follow-up were supported by literature

- IEEIA (Investigating and Evaluating Environmental Issues and Actions) and similar holistic experiential approaches that ground education in relevant real-world contexts show promise

- Explicit affective components may further enhance their effectiveness

- Explicit reflection appears to enhance outcomes

- Program design should be aligned with goals

- Commitment of educators to goals of program

❖ **Guidelines for Excellence Series**.
North American Association for Environmental Education.

https://naaee.org/eepro/publication/guidelines-excellence-series-set

The NAAEE Guidelines for Excellence Series is a deep dive into the underpinnings of effective environmental education in its many facets: programs for early childhood and K-12, non-formal programs, environmental education materials, professional development, and community engagement. Each publication defines the characteristics and indicators or attributes of outstanding environmental education for these different aspects of the field as a whole. The series began in the mid 1990's and continues to be updated and added to. The most recent guide (Community Engagement) was published in 2017.

Here is list of the guides, which are downloadable, along with a brief summary of the key characteristics of excellent EE, described in each guide:

Community Engagement: Guidelines for Excellence. Environmental education that successfully engages communities are: anchored within the context of community interests, issues, and capacities; based on sound environmental education principles; collaborative and inclusive; oriented toward capacity building and civic action; and reflect a long-term investment in change.

Early Childhood Environmental Education Programs: Guidelines for Excellence. Key characteristics include a clearly articulated overarching philosophy that focuses on the intrinsic value of nature; culturally appropriate goals and objectives; balance of risk and safety; developmentally appropriate practices; authentic experiences that are child-directed and inquiry based; play and exploration are

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central; curriculum fosters social-emotional, cognitive, physical, and language growth; careful consideration of places and spaces; and attention to educator preparation.

Non-formal Environmental Education Programs: Guidelines for Excellence This set of guidelines is a step-by-step guide to program development in the nonformal arena. Programs should (1) be based on a needs assessment to determine the environmental, educational, and community needs; (2) support and complement the parent organization's mission; (3) have well-articulated goals and objectives that will contribute to environmental literacy; (4) have the staffing, facilities and support materials to accomplish goals and objectives; (5) have quality instructional materials; (6) incorporate evaluation.

Environmental Education Materials: Guidelines for Excellence Key characteristics of high quality materials include: (1) Fairness and Accuracy, (2) depth, (3) emphasize skill building; (4) action oriented; (5) instructional soundness; (6) easy to use.

Guidelines for the Preparation and Professional Development of Environmental Educators These guidelines provide recommendations on the basic knowledge and abilities educators need in order to provide high quality environmental education. The six themes are (1) environmental literacy, (2) foundation of environmental education, (3) the professional responsibilities of the environmental educator, (4) how to plan and implement EE programs, (5) ability to foster learning, (6) capability of and commitment to conducting assessment and evaluation.

Excellence in Environmental Education: Guidelines for Learning (K-12)   These guidelines articulate what an environmentally literate person should know and be able to do. They include four strands: (1) questioning, analysis, and interpretation skills; (2) knowledge of environmental processes and systems; (3) skills for understanding and addressing environmental issues; and (4) personal and civic responsibility.

❖   **Stewardship Education Best Practices Planning Guide**.
May 2008. Association of Fish and Wildlife Agencies, Washington D.C.

http://www.fishwildlife.org/files/ConEd-Stewardship-Education-Best-Practices-Guide.pdf

This guide identifies and describes ten best practices for stewardship education programs, based on scientific research and empirical evidence. The guide includes worksheets for helping consider how a practice applies in a particular situation.

Excerpt – page 8:

Researchers have come to three important conclusions about environmental and conservation education:

1. Ecological awareness and knowledge are not enough to cause long-lasting behavior changes, but they can provide a basis or readiness for learning and participation.

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2. Ownership (a personal connection with one or more natural areas, and knowledge of and/ or investment in problems/issues) is critical to responsible environmental behaviors.

3. Instruction and experiences intended to foster ownership and empowerment (a sense of being able to make changes and resolve important problems, and use critical issues investigation skills to do so) often permit individuals and groups to change their behavior.

The best practices in this Planning Guide are based on and flow from these critical conclusions.

The Guide identifies "Ten Best Practices for Stewardship Education Programs." Effective programs:

- Have organizational mission, strategic vision, education program goals, and instructional objectives aligned with one another.
- Address each stage of a participant's progression from entry-level to ownership, to empowerment, and then to environmentally responsible behavior.
- Consider the role that ethical principles and reasoning can play in supporting stewardship.
- Provide opportunities for individuals to have positive and repeated contact with the outdoors over a long period of time. Match the developmental stages of the learner.
- Consider the social context in which the education takes place and provide avenues to enhance social support for learners.
- Help learners consider all aspects of the natural resource issue of interest (including historical, social, scientific, political, ecological and economic) with a systems-based approach.
- Encourage long-term stewardship behavior.
- Structure effective curricula to give learners a well thought-out and data-supported sequence of stewardship opportunities.
- Evaluate all aspects of the stewardship education program to determine what is working and where improvement is needed.

❖ **Urban Environmental Education: The North Bay Example**

This example reflects the results of a five year study of an urban environmental education program in Maryland that has achieved unusually positive results. The study was presented by Dr. Marc Stern as part of the **Research-Based Best Practices for Environmental Education Workshop Report**, previously mentioned, and is described on page 9 of the report.

Excerpts:

The North Bay Adventure Center in North East, Maryland, presents a unique case study of the successful use of the IEEIA (Investigating and Evaluating Environmental Issues and Actions) model for urban environmental education. At North Bay, the goal of implementing the IEEIA

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model is to use environmental issues as integrating contexts to teach students critical-thinking skills and to have students investigate issues from multiple perspectives, thus arriving at their own conclusions. The academic curriculum reflects the latest science, an emphasis on technology, and a hands-on, outdoor classroom approach.

The North Bay program uses metaphor to link daily environmental education lessons with multi-media presentations in the evenings to relate what the students are learning to their home environments. For example, when invasive species are examined during the day, the evening program focuses on drugs, crime, and other home challenges. Similar metaphors are drawn for biological diversity (cultural diversity) and ecological niche (empowering students to choose their own role in their communities). In Dr. Stern's five-year study, pre-experience, post-experience, and three-month follow-up surveys showed that the North Bay program has achieved uncommonly positive results with urban youth in the areas of environmental responsibility, character development and leadership, and attitudes towards school. Hypothesized factors contributing to these positive results include:

• Appropriately defining the "environment" to make sure environmental education is culturally relevant and strongly connected to the home communities of students

• Intermingling positive youth development with environmental education

• Empowering students to choose their own identity and take ownership over how they interact with their community

• Providing students with strong new role models

• Providing students with a holistic experience

• Enforcing an appropriate disciplinary approach and staff support

• Having experiences take place in a culturally appropriate, yet novel setting: the North Bay Adventure Center is located on the Chesapeake Bay next to a state park. The large facility includes a gym, cabins, a game room, basketball courts, a high ropes course, two rock walls, and a zip line that goes directly into the Bay. The location provides strong connections to the environment but has touchstones that connect urban students with the communities they come from, allowing them to feel safe and comfortable