

NOAA Education Strategic Plan Draft: Comment List

ID	Page	Line	Comment	Suggested Action	Response
367	0	0	A very big term and new movement in education today has to do with "service learning." At our school, a K-8 charter school of inquiry, this means engaging students early and often with opportunities to volunteer in the environmental education field(s), and to make volunteerism a life choice	Have both groups consider this concept.	
Carter, Beth Teacher at Sea					
340	0	0	The plan ignores traditional ecological knowledge which has a longer, more successful and much more comprehensive history than NOAA in understanding and managing environments, ecosystems and natural phenomena	Sent to Fisheries. Respond if Magnuson-Stevenson is relevant.	
Kaaiaai, Charles NOAA Office					
596	0	0	Strategies. Goal 1 has 24 strategies and Goal 2 has 12 for a total 36 strategies. Implementation of 36 strategies may be cumbersome. Measuring accomplishment may also be complex.	Suggest that working groups consider reducing the number of strategies.	
Kuester, Scott NEP					Also consider specific strategies being targeted in each of the 5 year implementation plans
507	0	0	We feel the need to include social science, history, maritime archeology, and economics need to be better emphasized. We have suggested several areas in which references to these other disciplines should be mentioned. Mention of these fields are particularly lacking in Goal 2	Add education examples and language to Mission Critical Fields	
Martin, Michiko NOAA Office					Add to bulleted examples on page 16
505	0	0	There is no strong "delight factor" at all in this strategic plan with regard to education and learning which is ultimately what makes it real and engaging for the participants. The excitement and adventure of learning need to be reflected in this document		
Martin, Michiko NOAA Office					
148	0	0	Lisa Brochu's book on interpretive planning and our definition for interpretation (borrowed from the NPS tenets of interpretation and morphed to match our broader audience needs) have led us to focus more on "visitor experience design" in interpretive planning with logic model objectives. Pine and Gilmore's book on the Experience Economy is also a part of our curricula in certification courses. We are helping interpreters plan facilities and programs with a broader understanding of the entire visitor experience	Send to Env Literacy	
Merriman, Tim Informal Education					Place Based Education, promoting environmental literacy (strengthen)

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		design process from decision to entry to connections to exit to commitment (changed behavior).		
510	0	0	Although this is not an implementation plan, we think the plan should contain some reference to the agency's environmental literacy grants programs as a vehicle for supporting work by the broader community.	Consider ELG in examples of how agency supports external group efforts to promote Env Literacy
Peart, Leslie Other- Education				
551	0	0	6. Similar to #2 above, because the viewpoint of the plan is Western and excludes humans as an intricate part of the environment, the plan promotes a Western relationship to nature, i.e., humans using technology to gather data and manipulate the environment, rather than a traditional relationship to the environment that gathers data through generations of non-intrusive observation	Sent to Fisheries. Respond if Magnuson-Stevenson is relevant.
Spalding, Sylvia NOAA Office				
552	0	0	7. The plan relies on a continued emphasis on Western science (limited in time) and Western ways of relating to the environment (manipulate the environment as something that is other than self) as a means to protect the environment that has degraded precisely because of Western ways. It uses a top down approach with NOAA and partners with similar mindsets as experts to inculcate their knowledge and ways of relating to the world to others rather than engaging in a two-way educational process with communities who are environmental experts through tradition and/or use. Because the current social structure requires nearly all children to be in a Western styled educational system, traditional knowledge is endangered. Yet it has been acknowledged by NOAA scientists that these experts hold more place-based knowledge than any scientists has or can hope to have. Traditional knowledge is tied to practice. NOAA has a moral obligation to protect these practices and this knowledge and to halt their further erosion. It is time to stop the colonization process and allow the few remaining intact native communities to flourish. In this process, the families and communities are the teachers. The planet and its people would benefit. The NOAA educational plan should clearly acknowledge this so these initiatives can receive federal funding and be acknowledged in state and national educational standards	Sent to Fisheries. Respond if Magnuson-Stevenson is relevant.
Spalding, Sylvia NOAA Office				

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549	0	0	4. The use of science seems to imply the physical sciences only and does not provide emphasis to the social sciences (anthropology, cultural studies, economics, etc.)	
Spalding, Sylvia NOAA Office				
546	0	0	1. The plan is based solely on Western science and Western viewpoints of education. It is therefore a tool that will do further damage to indigenous cultures	Sent to Fisheries. Respond if Magnuson-Stevenson is relevant.
Spalding, Sylvia NOAA Office				
550	0	0	5. The plan does not acknowledge the 2006 reauthorized Magnuson-Stevens Fishery Conservation and Management Act and its mandates concerning marine education and training and traditional knowledge	
Spalding, Sylvia NOAA Office				
632	6	0	<p>Methodology — one of the biggest challenges the public faces in regard to climate change is a feeling of helplessness. We know that a very large majority of Americans think climate change is occurring, that humans are at least partly responsible for it, and that it will be harmful overall (Krosnick, Leiserowitz). We also know that people adopt larger numbers of sustainable behaviors when family members talk about climate change and agree about the basic ideas (Maibach). Maibach’s survey results make sense: we know that behavioral change is hindered by social norms that easily and often unconsciously undermine low-carbon choices (Roser-Renouf). Taken together, these results suggest that learning in social settings where conversation and collective problem-solving should be a top outreach priority. When people speak openly about an issue and solve problems together they begin to acknowledge new priorities and alter social norms.</p> <p>One of the most efficient social settings in which to accomplish this for adults is in the workplace. People identify with their occupations and the organizations they work for. If we can engage them in this setting we begin to break down the sense of isolation and helplessness that people feel about climate change and begin to build new social norms that could be very powerful. It seems likely that this work would filter out into people’s social and family lives.</p>	
Bowman, Tom Other - General				

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301	6 5	Statement of Goal 1, page 6, line 5: consider changing the last word, “sciences” to “science contexts.”		
Marcinkowski, Tom Higher Education		The reasoning for this is as follows. It is recognized that NOAA’s mission and activities pertain to oceans, coastlines, the Great Lakes, weather, and climate, and therefore that these remain NOAA’s “focal points.” However, the use of “science” appears to delimit the understanding of environmental literacy that has evolved over the past 40 years. Further, science alone is insufficient to support and advance the strategy of developing a public that will “share stewardship responsibilities” (line 35). Finally, NOAA’s mission and activities are not limited to science; they also encompasses resource stewardship, education and outreach, and other agency activities. This suggested change in wording would allow NOAA to maintain these “focal points” and attention to sound science in a manner that enfranchises NOAA’s other activities and products, allows for greater consistency with evolving research-based conceptions of environmental literacy, and provides adequate room to support public participation in stewardship and associated problem-solving activities		
118	6 8	Achievement of NOAA’s strategic vision is dependent upon an environmentally literate public who is aware of the agency’s services and understands how scientific observations, forecasts, and regulatory activities affect their personal, business, and community decisions. How will this be proven effective?		
Haynes, Susan E. NOAA Office				
349	6 8	lines 8 – 20 – the beginning of the paragraph seems to talk about something different from the end of the paragraph. An environmentally literate public may not know anything of the services and activities of NOAA that affect their personal, business and community decisions and may still be environmentally literate. The most important environmental information for the citizenry from NOAA is clearly the weather service. Any other services provided seem superfluous and, even, malevolent. For instance, curtailment of traditional harvests of certain species based on a determination made by a community who has little interest in the survival of a people or a culture is malevolent no matter what the so-called science says. A determination of overfishing after changing the way that catch is measured seems arbitrary and useful only to those who have little invested in conducting the activity. How many times is the		
Kaaiai, Charles NOAA Office				

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		<p>unexpected crash of a stock or change in an ecosystem accompanied by the litany “oh, sure, but my model still works”? So, by an environmentally literate public do we mean a group that will accept and support what NOAA says is important or is it a citizenry that will question what they believe is wrong in actions that NOAA takes? And, what is the opportunity for the public to refute the actions of NOAA?</p>		
<p>322 Sprague, Shannon NOAA Office</p>	<p>6 9</p>	<p>Lines 9-10: “...environmentally literate public who is aware of the agency’s services and understands how scientific observations, forecasts, and regulatory activities affect...” This is not a representative list of NOAA’s interests and does not flow well into the next few sentences that speak of “interconnected systems” and making “informed decisions about environmental problems”. Suggest “...environmentally literate public who is knowledgeable of earth systems and understands how the agency’s services can be used in their personal, business, and community decisions.”</p>		
<p>282 Diaz, Heather Teacher at Sea</p>	<p>6 12</p>	<p>I think the words: “ability to apply knowledge” are hugely important here...so much of what is focused on at the K-12 level is rote memorization. NOAA’s priority needs to be building “learn by doing” experiences...and, that is precisely the area wherein most teachers lack confidence in their teaching abilities. I love the fact that the plan emphasizes the idea of “experiential learning”! That is wonderful to see!</p>		
<p>302 Marcinkowski, Tom Higher Education</p>	<p>6 13</p>	<p>Opening paragraph beneath Goal 1, page 6, lines 13-17: slightly expand the description to read: “NOAA defines an environmentally literate person as someone who has an fundamental understanding of the systems of the natural world, the relationships and interactions between the living and non-living environment, the ability to understand and utilize scientific evidence to make informed decisions regarding environmental problems and issues, and the dispositions and ability to participate in stewardship and associated problem-solving activities in a responsible and effective manner. These problems and issues involve uncertainty, as well as economic, ethical, aesthetic, and other social considerations.” (see justification in raw comments)</p>		

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308	6 13	lines 13-14: modify and expand the definition/description of “Informal education” to read “Learning in site-specific and non-site-specific settings outside the established formal system that address specified objectives through organized educational activities. While the science education community includes all such programming under the heading of informal, the environmental education community often refers to site-specific programming as non-formal (e.g., centers, camps, zoos and aquaria, state and federal areas), and non-site-specific programming as informal (e.g., community, Internet, and media-based programming).”		
Marcinkowski, Tom Higher Education				
252	6 15	Lines 15&16 “to make informed decisions regarding environmental problems” -I think we want a literate person make informed decisions on ALL levels from personal everyday life choices to global leaders making policy. I think that scope should be articulated here or somewhere in the intro. -I thought the word “problems” is focusing on the negative. We want a literate person to address problems with an informed mind but we also want them to consider issues BEFORE they become a problem and be pro active on issues and make decisions that will mitigate a growing problem or prevent it from becoming a problem		
Payne, Diana L. NOAA/Sea Grant				
172	6 18	“the agency will pursue...” what agency??? NOAA???	Suggestion...approach of interdependent actions that NOAA will pursue to achieve this vision of developing...	
Hildreth, Carol Other - General				
303	6 19	Opening paragraph beneath Goal 1, page 6, line 19: slightly expand the description to read “... NOAA’s vision of enhancing environmental knowledge, skills, dispositions, and stewardship within the Nation’s citizenry.”		
Marcinkowski, Tom Higher Education		The primary rationale for this addition is presented above. However, this does not necessarily mean that NOAA will take or advocate direct (inculcative) approaches to the development of these dispositions. Rather, available research evidence indicates that attention to the development of these dispositions can be infused into formal and non-formal program strategies that are designed to foster knowledge and skills.		

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350	6 22	<p>line 22, page 7, page 8 – Promoting stewardship, while once having the tone of husbandry, that is, being part of the ecosystem and managed resources, now seems to be a naked call to imperialism. Consider that most of the raw material resources are now found in third world countries and those third world societies are the poorest of the poor, and then that stewardship in the US is about conserving natural resources not managing them for use. One can see that stewardship of US natural resources results in subjugation of the third world poor for the advantage of the first world. How is that good on a global scale?</p> <p>True, over the last hundred years human actions have greatly altered natural resource systems and ecosystems but consider that for the preceding 10,000 years human actions did not but we are basing this initiative on what we learned over the last few years. That is folly. And, I don't know the word for admin-centric.</p>		
Kaaia, Charles NOAA Office				
483	6 24	<p>Line 24 or Line 33: Recommend adding the following concept/point either with the caption to the MERITO image (line 24) or in text around line 33: Add a reference to recent national projections released in August 2008 by the US Census Bureau that indicates by 2042 minorities are projected to become the majority, making up more than half of the US population. Developing environmental literacy and a stewardship ethic with culturally diverse audiences will be very important in influencing behavior change to reduce ocean-related threats. (Again, this can follow sentence on globalization of world markets, population shifts, and the race for economic growth forecasted for the 21st century on line 33, or it can be added in the caption to the photo referenced on line 24. Regardless, it is an important concept to capture somewhere.)</p>		
Martin, Michiko NOAA Office				
588	6 27	<p>"restoration of ocean, coastal, and Great Lakes natural and *maritime heritage* resources".</p>		
Martin, Michiko NOAA Office				
555	6 30	<p>after “systems” add “including humans”</p>		
Spalding, Sylvia NOAA Office				

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305	6 35	<p>Under Promoting Stewardship, page 6, lines 35-36: add the following, to parallel material on page 7 in lines 31-32: “NOAA embraces three educational methodologies that have been shown to be effective in enabling and supporting participation in stewardship and associated problem-solving efforts: issue-and-action instruction, action research, and service-learning (e.g., Hines & Hungerford, 1984; Hungerford & Volk, 1990; Volk & McBeth, 1997; Zelezny, 1999; Marcinkowski, 2004; Billig et al, 2008).” (see justification in raw comments)</p>		
<p>Marcinkowski, Tom Higher Education</p>				
304	6 35	<p>Under Promoting Stewardship, page 6, line 35: change “the first” to “a major”</p> <p>The rationale for this change is as follows. From the manner in which prose is presented throughout this section, one might infer that the underlying thinking is that increases in scientific knowledge (and skills) will foster public support and automatically lead to responsible and effective stewardship behavior. This closely resembles the “knowledge-awareness/attitude-behavior” (or K-A-B) model that has been implicit in many science and environmental education circles for several decades. In the context of that model, the existing prose in can be interpreted as suggesting that the development of environmental literacy only involves the development of scientific knowledge (and skills), and serves as “the first step” toward participation in stewardship</p> <p>(see additional justification in raw comments)</p>		
<p>Marcinkowski, Tom Higher Education</p>				
216	6 41	<p>add technology?</p>		
<p>Bell, Rebecca K-12 Education</p>				
306	6 41	<p>lines 41-42: Following the sentence that begins “Developing the skills of ... “ add a sentence that reads something like this: “Developing the dispositions for responsible and effective participation in stewardship and associated environmental problem-solving efforts will require more careful and increased attention by formal and informal education.” The sentence that follows this (lines 43-44) would then apply to both the development of skills and of dispositions. (see comments for</p>		
<p>Marcinkowski, Tom Higher Education</p>				

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		rationale)		
26	6	41		
McCaffrey, Mark Higher Education		Environmental literacy is a lifelong process "and the ocean, weather, water and climate systems which are the focus of NOAA science are inherently of interest to people of all ages, backgrounds and education levels. Yet, all too often, the science is conveyed in ways that fail to engage their intended audience, resulting in poor science literacy in general and environmental literacy in particular."		
315	6	43		
LaDochy, Steve Higher Education		I agree there is a need and a responsibility for NOAA to address the deficiencies in STEM education especially at K-12. There are many excellent programs available for teacher training, such as AMS Education Datastreme Ocean and Atmosphere, DLESE resources, COSEE seminars and workshops and many other summer workshops. But these do not reach the majority of K-12 teachers. NOAA could help greatly by expanding these and other programs to reach more teachers. These teachers then impact many more students.		
		Teacher training is the key. K-12 teachers are often not trained in the sciences or have not kept up with recent developments. Teachers are also required to teach to the test in order to help their schools get funding under No Child Left Behind. This removes some of the creativity that makes teaching exciting. Given more flexibility and more new tools that enhance the learning experience of their students, teachers may be able to spark the interests of their students. National and state standards also need to address deficiencies and keep updated. Included in these standards should be a greater emphasis on earth and space sciences.		
		Besides teacher training, NOAA should also support science camps and similar opportunities, especially for underrepresented minorities. Getting students interested in the sciences would help to increase the workforce in this critical area		
556	6	48		
Spalding, Sylvia NOAA Office		after "teachers" add "families and communities" (note: traditional education in through families and communities)		

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629	7	1	Add language about interdisciplinary learning and problem solving skills to the description of “Facilitating Change in Education Systems” - especially the paragraph beginning on page 7, line 1.	
Bowman, Tom Other - General				
397	7	1	lines 1-6: rewrite the paragraph for clarity: “There are effective, informal, education programs and products addressing the needs of ocean, coastal, Great Lakes, weather, and climate sciences, but more must be done to equip these programs with contemporary instructional resources and methods. NOAA is committed to improving informal education to enhance environmental literacy, in part through careful evaluation of these programs’ methods and effectiveness. NOAA must be engaged in the improvement of this system, as well as in achieving this goal, because of the critical role informal education plays in developing environmentally literate citizens.”	
Bragg, John NOAA/NERRS				
185	7	1	need to define informal education with examples. Most people don't know what that means.	
Friedman, Alan J. Informal Education				
119	7	1	The programs and products of the informal education sector are better developed in the areas of ocean, coastal, Great Lakes, weather, and climate sciences (than what? The formal education system?) but more must be done to infuse this community with current resources and methodologies. NOAA is committed to facilitating improvement of program effectiveness evaluation in informal settings to enhance environmental literacy. (What about providing more resources and methodology education for informal education facilities and staff?) NOAA must be engaged in the improvement of this system as well as the formal education system to achieve this goal because these venues are important to the development of literate citizens and to the long-term maintenance of their skills and knowledge.	
Haynes, Susan E. NOAA Office				
307	7	3	lines 3-4: the sentence pertaining to the use of program evaluation should be modified and expanded to read “NOAA is committed to facilitating the improvement of programs at each stage of their development and implementation, leading up to outcome and impact evaluations of the effects and effectiveness	
Marcinkowski, Tom Higher Education				

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		<p>of informal programming on enhancing environmental literacy, including participation in stewardship activities, and on improvements in environmental conditions."</p> <p>(see comments for rationale)</p>		
441 McAvoy, Jean NOAA/NERRS	7 3	<p>NOAA is committed to facilitating improvement of program effectiveness evaluation in informal settings to enhance environmental literacy.</p> <p>Rewrite as: NOAA is committed to improving its evaluation of the effectiveness of programs that provide environmental literacy education in informal settings.</p>		
186 Friedman, Alan J. Informal Education	7 4	<p>want to mention the NSF Frameworks document here? It makes this paragraph concrete about what NOAA means about evaluation. Otherwise, the less rigorous "outputs" type of evaluation (how many people did we reach, rather than how did we affect them) might be presumed by readers</p>		
442 McAvoy, Jean NOAA/NERRS	7 4	<p>NOAA must be engaged in the improvement of this system as well to achieve this goal because these venues are important to the development of literate citizens and to the long-term maintenance of their skills and knowledge.</p> <p>Is there a citation for the research that supports this statement?</p>		
154 Fortner, Rosanne W. NOAA/Sea Grant	7 8	<p>I hope you will consult with Dr. Joe Heimlich [heimlich@ILINET.ORG] for the best definitions and examples of the terms you have chosen, and take his advice about possible alternatives. In particular you need to distinguish between informal and free-choice.</p>		
430 McAvoy, Jean NOAA/NERRS	7 8	<p>Terms are defined on pages 7 and 15: These are the same terms defined differently. This needs to either be acknowledged, as different audiences are involved, or be consistent. Also, the terms "outreach and communication" and "training and extension" should not be lumped together with one definition.</p>		
147 Merriman, Tim Informal Education	7 8	<p>Our current definition of interpretation as "a mission-based communication process that forges emotional and intellectual connections between the interests of the audience and meanings inherent in the resource" has been used in certification programs to better define what we think interpretation does. This led to an</p>	<p>Informal Education, do we add "Interpretation" concept?</p>	

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		<p>overall effort to better define specific non-formal or informal approaches to education and interpretation, or free-choice learning. With the aid of an EPA grant we assembled 15 nonprofit associations and five federal agencies in 2006 to hammer out a non-formal educators lexicon and its available at www.definitionsproject.com <http://www.definitionsproject.com>.</p>		
297	7 8	<p>Raymond, Ronald An Other- Education</p>	<p>One comment I do have is geared to the term, “informal” and the interdependency requirement of each of the education methods specified. The plan states three distinct methodologies of learning in education, formal, informal, and free-choice earning; however, in my opinion the plan does somewhat lack explanation of how these three methodologies must interdependently interact upon each other. Further, and again in opinion, the term “informal” would be better defined as “experiential” or “informal & experiential” education.</p>	
152	7 8	<p>Ucko, David A. Other - General</p>	<p>We define the term "informal learning" or "informal science education" as voluntary, self-directed learning. Although there isn't universal agreement, that appears to be the term used most commonly. For example, the ACC working group in this domain was called Informal Education and Outreach. NASA has a division of Informal Education in its Office of Education. The forthcoming report from the National Academy of Sciences will address Learning Science in Informal Environments. What your Plan defines as "informal" education is often called "nonformal" education, though we tend not to make that distinction since the boundaries are fuzzy. Of course, there are other terms, such as "free-choice learning" that John Falk and Lynn Dierking have introduced, but they are less widely used. (If you Google "free-choice learning," you get 22,600 hits vs. 1.13 million hits for "informal learning.")</p>	
623	7 10	<p>Arzayus, Krisa NEP</p>	<p>lines 10-20 – It is good that the education council is developing formal definitions of the various types of education and outreach; however, for formal education we recommend clarifying whether post docs be considered formal education. Numerous labs across NOAA have post docs and this issue comes up every time the Education Council asks for information on the education activities within each goal. These definitions are an opportunity to be very clear and provide examples. The way they are written now still leaves some interpretation.</p>	

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423	7 10	line 10-19 –Add example NOAA programs for each definition representing the full continuum of education provided by the agency.		
Elmer, Heather NOAA/NERRS				
157	7 10	line 10-16. These definitions are written in “educationese” and need examples to clarify them. I suggest these:		
Fortner, Rosanne W. NOAA/Sea Grant		<p>Formal Education [frequently used synonymously with classroom education, in which learners are fairly homogeneous in terms of age and/or background experience]</p> <p>Informal education [I think you mean nonformal here, but the distinction is often fuzzy. In EE we use the term to describe voluntary, structured learning activities that take place outside of a formal learning setting. Workshops, seminars, service groups, zoos, tours, and nature centers are typical settings]</p> <p>Free-choice learning [most typically occurs while people visit museums or other cultural institutions, watch television, read a newspaper, talk with friends, attend a play, or surf the Internet]</p> <p>I suggest you look at Joe Heimlich’s ERIC Bulletin [attached] that attempted to clarify these terms. Free-choice learning is a newer term that Heimlich [a leader in the field] uses. Please see his edited special issue of EER: Heimlich, J.E. Ed. 2005. Special Issue: Free-choice learning and the environment. Environmental Education Research. 11(3).</p>		
187	7 13	lines 13 and 17: again, I think examples are needed. "Free choice" and "informal" are often used as synonyms. For some, "free choice" includes individual learning through books or hobbies, which are not always included in "informal." My own preference is to take "free choice" and "informal" as synonyms, with "free choice" being a bit better descriptor. Museum, aquaria and related institutions may have agenda of their own, but the visitors are still free to come and go as they wish, and modify their own learning at will, so these activities are still free choice.		
Friedman, Alan J. Informal Education				

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283	7 16	I didn't see anywhere previously where "free choice learning" had been used. I might have missed it...but, I couldn't find it. I saw it later in the plan though...is it meant to be for the whole document or just that section?		
Diaz, Heather Teacher at Sea				
198	7 18	For consistency with the items above, "Outreach" should not be capitalized.		
Drinnen, Kelly L. NOAA Office				
371	7 21	Joint Fact Finding: Scientists and professional resource managers working with members of the general public to gain increased mutual understanding of anthropogenic and ecosystem processes.		
Hodge, Sharon Informal Education				
352	7 24	<p>Experiential education is one form of education that is sorely needed. The need for the citizenry to close off areas and ban extractive practices is enhanced by a disconnection from nature. If one eats from the environment one is less likely to pollute or allow sewage to be pumped there. If one does not eat from there it is much easier to elect to ban the harvest of resources.</p> <p>Place based education is good because all resource management decisions must be made on site. Management measures from a distant, centralized, insulated authority are most often ill informed and erroneous and do not serve the community, though it enhances the authority's sense of pre-eminence and unassailability.</p>		
256	7 24	<p>Page 7, line 24 - Page 8, line 2</p> <p>Section on "Connecting Citizens to Nature and the Community" I think this section is great, and I was especially glad to read the section on place-based education. However, I think one missing piece here is connecting place-based learning and service learning. Place-based learning alone is a good way for learners of all ages (through both formal and informal education) to increase their understanding of local heritage, culture, landscape, relevant environmental management issues, etc., but it doesn't necessarily imply the kind of robust engagement with and educational contributions to the community that service learning does. I think if the intention of including this section is truly to connect citizens to nature and the community, then some element of service</p>		
Payne, Diana L. NOAA/Sea Grant				

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		learning (i.e. working with and giving back to the community, rather than just using the local environment and community as a classroom) should be mentioned.		
379	7 24	Schmidt, Cynthia Other- Education	Under "Connecting Citizens to Nature and the Community," two strategies are embraced: experiential education and place-based education. These are powerful strategies, but they reach a very small audience for the investment. To have widespread impact, they must include virtual experiences such as a virtual field trip to a remote island, or a virtual encounter with a tornado. This sort of interactive module or video could be widely distributed and could introduce students and adults, virtually, to NOAA scientists.	
557	7 28	Spalding, Sylvia NOAA Office	after "scientific information" add "traditional knowledge"	
27	7 32	McCaffrey, Mark Higher Education	add after experiential and place-based education "use of narrative to convey the process of science." Then add a paragraph below in appropriate place that says something like: "The use of narrative to convey the process of scientific research and to provide a context for how data are collected, analyzed, modeled and communicated is well known by science writers and in the informal science education realm and is verified by research literature. (see http://ipydis.org/data/data_story_rationale.html). Cognitive scientists note that the human brain is wired for stories, and the use of storytelling to describe the "who, what, where, when, how, and why" of NOAA research project, going beyond the quick overview and "cut to the chase" summary of the results, will help people get to "know NOAA" in a human context that helps bring alive the process of science. Moreover, this approach will lend itself to involving citizen scientists who can share their data, and their stories, with their community. This is precisely the approach of the NOAA-supported Community Collaborative Rain, Hail and Snow Network, which has a weekly update from director Nolan Doesken that includes stories of the "who, what, where, when, how and why" within the network."	

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413	7	32	italicize “experiential education and place-based education” so that it is clear that those are the two things addressed in the next two paragraphs	West, Jennifer NOAA/NERRS
398	7	34	lines 34-35: A simpler way to say this is that experiential education means learning by doing.	Bragg, John NOAA/NERRS
284	7	34	Lines 34-41: I love this paragraph! YES! And, for those states that have science high-stakes testing (like the FCAT here in Florida) it is imperative that students engage in exactly these experiences in order to do well on these high-stakes tests...since they rely more on application of knowledge rather than fact recall.	Diaz, Heather Teacher at Sea
578	7	34	There is a lot of discussion of Earth’s systems (actually throughout the whole document.) Perhaps at some point acknowledgement of and connection to Earth System Science Education as a format for understanding and interacting with natural phenomena would be appropriate. I may be premature on this and including it in the next phase may be better.	Peterson, Barney Teacher at Sea
217	7	43	Place-based is very important. I am concerned that place-based approach has overshadowed the teaching of global systems. This would be appropriate for high school and some topics as an intro in middle school. In our area (Maryland, for example, we use the Chesapeake Bay a great deal, but have ignored the ocean and larger interaction of systems. We can do both- global and where we are in relation to the global picture.	Bell, Rebecca K-12 Education
285	7	43	Lines 43-49: I would also like to add that by engaging students in place-based education we are making the knowledge meaningful, and therefore it will be retained much longer than something to which the learner has no personal connection. I also believe that by focusing on the climate, heritage, culture, landscape, etc. of the individual area (by NOAA’s regional sanctuaries and reserves) you will bring in experiences and knowledge that students would never be able to get from a textbook that has been written to cover the entire United States, not a specific region or area. Textbooks are a “one size fits all” solution, and our students and schools have individual needs that can never be met by a textbook (which is the	Diaz, Heather Teacher at Sea

ID	Page Line	Comment	Suggested Action	Response
		tool most schools give teachers to use!).		
485	7	43	Lines 43-44: “Place-based education immerses the learner...for the study of language arts, mathematics, social studies, science, history, and other subjects.” - add “history”	
Martin, Michiko NOAA Office				
579	7	43	– My personal experience has been that NOAA is better known in the education community in areas of ocean literacy. There are many opportunities, through place-based education, to promote climate literacy as a way to help learners be proactive in their communities. I think that recent major events such as Hurricane Katrina brought attention to the roles of many government agencies, NOAA included. Building upon the interest generated by those crises has presented opportunities for developing citizen understanding and needs to be capitalized upon.	
Peterson, Barney Teacher at Sea				
300	7	46	lines 46-47. ...Place-based education – any inland initiative(s) for ozone awareness?	
Elder, Adrienne K-12 Education				
486	7	46	Lines 46-47: Reword sentence as follows: “The NOAA National Marine Sanctuary System and National Estuarine Research Reserves provide excellent place-based locations to offer “living classrooms,” which provide a real world context for learning and stimulating “hands-on/minds-on” opportunities for education.” Note changes from original sentence in plan.	
Martin, Michiko NOAA Office				
630	8	0	In “Using Emerging Technologies” on page 8, add language that supports problem-solving oriented interactive media. Relatively few people have the expertise to interpret data and its meaning without some form of mediation (a teacher, the architecture of an interactive storyboard, etc.) Interactive technologies have great potential to bring new data into problem-solving activities. Unfortunately, these technologies can also be used to do nothing more than page through factoids	
Bowman, Tom Other - General				

ID	Page Line	Comment	Suggested Action	Response
286	8	0	<p>“Using Emerging Technologies”: I would also add that providing teachers and students with ideas on ways to use the technologies is also very important. For example, it is wonderful to be able to look at the National Hurricane Center’s website and see all the buoy data....but, as a teacher, I don’t necessarily have any idea about how to use this data with my students. So, not only is it important to get the information out there and to use all these different ways to do it...it is also important to guide people on how this information might be used and applied in the classroom (both informal and formal!).</p>	
Diaz, Heather Teacher at Sea				
339	8	4	<p>Last but not least, newer generations tend to be good with technology, they are very visual and love to play, so, instead of fighting why not ally. One of the biggest complaints, from students, is that the educational process is boring, so lets make it interesting by creating games that teach at the same time they are daring promote competence</p>	
Guzmán, Gretchen Other- Education				
120	8	14	<p>considers a broad array of methodologies in communicating environmental literacy concepts to the public, the use of new, innovative, and engaging technologies to increase the efficiency and utility of this information is a high priority for the agency. Do we have any idea what is getting the most use? Second Life, You Tube, etc?</p>	
Haynes, Susan E. NOAA Office				
28	8	16	<p>Add "These tools and technologies may include web-based "webinars" as well as interactive video conferences with scientists and educators, along with low-tech solutions such as a tool-kit for students and citizens to foster their own resilient communities."</p>	
McCaffrey, Mark Higher Education				
445	8	22	<p>The study of these physical systems requires a broad array of scientific disciplines, technology, mathematics, and engineering. Rewrite as: The study of these physical systems requires a broad array of scientific disciplines, mathematics, engineering and technology</p>	
McAvoy, Jean NOAA/NERRS				
446	8	27	<p>Add ecotourism after fisheries management</p>	
McAvoy, Jean NOAA/NERRS				

ID	Page Line	Comment	Suggested Action	Response
287	8 28	You mentioned the social sciences previously in the paragraph, but left it out of the coral reef example. I would add that observing coral reef health is also dependent on culture, heritage, and human interaction. (For example, the Chinese culture uses the fins of sharks to make soup...thereby threatening the shark population). Or, it might be that it is culturally appropriate to believe that the ocean is not important (like in Jamaica, for example). So, culture and society must be examined as well....not just the Earth sciences.		
Diaz, Heather Teacher at Sea				
447	8 29	substitute social sciences for sociology		
McAvoy, Jean NOAA/NERRS				
29	8 31	Add "Demystifying NOAA science and making it more meaningful and accessible to broad audiences through the use of best practices and narrative processes will both strengthen and expand the foundations of NOAA science education.		
McCaffrey, Mark Higher Education				
218	9 0	Outcome 1- So far I have not seen a definition of environmental literacy. We use the Hungerford/Volk definition. It involves moving from knowledge to action, not only for a one-day or even multi-day project or experience, but involves changing personal behaviors		
Bell, Rebecca K-12 Education				
188	9 0	seems to be all about formal education. Need to reference informal evaluation and research as well. The current NRC study of research in informal will be out any week now, and the NSF Framework book is a good reference for informal learning evaluation.		
Friedman, Alan J. Informal Education				
353	9 0	Not sure what page 9 is discussing, but is clear that NOAA is unhealthily wedded to science. Consider that scientific analysis is conditional and unstable, governed by personalities, and almost always erroneous NOAA should reconsider their dependence on science for information and balance that with public participation and consultation.		
Kaaiai, Charles NOAA Office				

ID	Page Line	Comment	Suggested Action	Response
309 Marcinkowski, Tom Higher Education	9 1	The title of this Outcome should read: Assessment, Evaluation, and Research		
		<p>The rationale for this change is as follows. While the once-relatively distinct meanings of the terms evaluation (judge and improve specific programs) and research (generate knowledge), these two have blended with the increased acceptance and use of qualitative methods. While large-scale assessments of student achievement such as NAEP, TIMMS, PISA and the recent NELA (McBeth, et al., 2008) are relevant to NOAA’s plans and programs, it is not clear that these kinds of studies fall under the heading of either research or evaluation. Consequently, it is suggested that this term be added so as to include these kinds of studies, and provide wider coverage than may be had under just the original two terms. While the distinction between assessment and evaluation is as vague as between research and evaluation, the following simplified distinction may be of some relevance: assessment focuses on the collection and scoring of evidence of student/participant growth and learning, while evaluation focuses on the collection, analysis, and use of evidence about features of programs as these contribute to and/or hinder the quantity/quality of their growth and learning. (See uses of assess and assessment on: p. 10, Outcome 1.2, Strategy e), and p. 14, Outcome 1.6, Strategy c).</p>		
		Suggested parallel changes in Strategies:		
		a) “Support and use educational practices based on summaries of the best available evidence to inform ...” [This language is consistent with that used in scientific and applied science circles such as natural resource management regarding the construction of models, as is common in the educational practice of logic modeling.		
		b) Develop and implement a framework of assessment and evaluation strategies that both add to and are based on educational research findings, and that are consistent with interagency assessment and evaluation efforts”		
		c) (leave as is)		

ID	Page Line	Comment	Suggested Action	Response
323	9 1	Outcome 1.1: This outcome seems misplaced to be first as it talks about evaluation and best practices. While this is pervasive and overarching, getting to the points that directly address the audience(s) reads less bureaucratic.		
Sprague, Shannon NOAA Office				
265	9 20	lines 20 – 22 I'm concerned that the statement "Building evaluation capacity of NOAA educators and developing a coordinated system to capture and share these findings are key elements in achieving this outcome." is an important one that is not captured in Outcome 1.1 (Lines 25 – 37). Strategy b – "Develop and implement a framework of evaluation strategies based on educational research findings and consistent with interagency evaluation efforts." comes closest to addressing it, but does not capture the intent of that statement. I think a stronger, more direct statement closer to line 20 – 22 is warranted as part of Outcome 1.1		
Payne, Diana L. NOAA/Sea Grant				
122	9 25	Outcome 1.1: NOAA education programs are based on the best available science related to effective environmental and science education. Strategies a) Support and use educational practices based on research to inform the development and implementation of education programs and products. b) Develop and implement a framework of evaluation strategies based on educational research findings and consistent with interagency evaluation efforts. c) Contribute to educational research about effective science and environmental education. (Will someone in the Office of Ed. make this info available to line offices now doing education or will all be expected to find info out on own?)		
Haynes, Susan E. NOAA Office				
10	9 26	Page 9 Lines 26-35 Suggestion Outcome 1.1 Evaluation and Research for Effective Programs If there is anyone out there that knows the student population and the curriculum, it is the teachers. Why not ask teachers for their input on the types of programs that would work for their students and the subjects that would matter most to them? Each city is different in terms of natural landscapes and resources so it would be impossible to make curriculum try to fit everyone in all cities		
Joiner, Jennifer K-12 Education				

ID	Page Line	Comment	Suggested Action	Response
		the same way.		
450	9	26	Outcome 1.1: NOAA education programs are based on the best available science related to effective environmental and science education. Rewrite: NOAA education programs are designed using the best available scientific research on the effectiveness of environmental and science education.	
McAvoy, Jean NOAA/NERRS				
449	9	26	line 26 to 35: In these sections the use of the term educational research paired with term science and environmental education, is confusing. Also, you could expand the text to explain what educational research includes, such as how people learn, pedagogical studies, cognitive science and other social sciences.	
McAvoy, Jean NOAA/NERRS				
380	9	26	NOAA should partner with an existing organization that tests and evaluates environmental literacy, like NEEF, and ask them to compare specific groups targeted by NOAA to national comparison groups tested by NEEF	
Schmidt, Cynthia Other- Education				
365	9	33	My other thought to add - but again pretty specific was in reference to the research to support the education. I am not only a TAS alum but also a PolarTREC teacher and we use a computer generated testing system that students take before my expedition and then a year later. I am hoping to see good results from that	
Eubanks, Elizabeth Teacher at Sea				
158	9	33	re line 33. Sub-item b [when it comes time for implementation] should consult the new web site supported by USEPA and the Forest Service for nonformal program evaluation: www.meera.snre.umich.edu	
Fortner, Rosanne W. NOAA/Sea Grant				
399	9	34	do you mean "intragency"?	
Bragg, John NOAA/NERRS				
30	9	36	Add "d) share best practices and case studies of "what works, what doesn't" relative to effectively conveying NOAA science to broad audiences."	
McCaffrey, Mark Higher Education				

ID	Page Line	Comment	Suggested Action	Response
219	10	0	Perhaps NOAA can help get the ocean and climate principles integrated into the national science standards (AAAS and NSES) when they are revised? Outcome 1.2 c professional development based on nationally recognized standards	
Bell, Rebecca K-12 Education				
278	10	0	1. I see that ocean and climate literacy principles were stated in Outcome 1.2. I wondered why the other 2 current literacy initiatives --earth science literacy and atmospheric literacy-- were not specifically mentioned; but I realize that these other initiatives may be at an earlier stage. The Earth science literacy initiative (ESLI) is funded by NSF and is described at: http://www.earthscienceliteracy.org/	
Bishop, Kristina Other- Education				
354	10	0	The main environmental literacy principle is that the Earth is changing and has always and will always change until we become a raging fireball some millions of years from now. The second environmentally literate principle that should be expressed is the cyclic-ness of nature, nature is cyclic – there are seasons, 2 year cycles, 4 year cycles, 10 year cycles. These cycles are not governed by annual funding cycles and election horizons and other artificial human cycles. Native people understand these cycles because their survival depended on cycles - spawning, winter, dry and wet seasons. It is the improper conduct, the actions outside of nature’s bounteous ability to absorb anomalies that damage the natural order and threaten the survival of people.	
Kaaia, Charles NOAA Office				
250	10	0	I thought the k-12 component was mentioned but not with any kind of strength. Without a solid k-12 education in sciences with experiences students won’t be ready to major in any STEM areas or NOAA areas. As some teachers say here “where do those university people expect to get all of those smart students if they don’t support k-12 education”	
Payne, Diana L. NOAA/Sea Grant				
254	10	0	It seems that there needs to be another outcome here “citizens understand literacy principles”...	
Payne, Diana L. NOAA/Sea Grant				

ID	Page Line	Comment	Suggested Action	Response
584	10 1	using ocean data – this important section should add that comprehensive evaluation and metrics be established to ascertain what is working/not working to identify best practices		
Babb, Ivar Higher Education				
381	10 1	We strongly support the idea that NOAA integrate environmental literacy into professional development. NOAA staff could benefit from a partnership with the NOAA-funded COMET Program which reaches some 3000 NOAA employees. To benefit teachers, NOAA could partner with the NASA-funded GLOBE Program. To benefit the general public, NOAA could partner with NEEF and the American meteorological Society (AMS) to support the station scientist program that trains weather broadcasters. NOAA needs partners to make progress.		
Schmidt, Cynthia Other- Education				
310	10 2	As noted in prior comments, within the environmental education community, environmental literacy is usually conceived of as including: knowledge, skill, affective disposition, and behavioral components (Unesco, 1978; Roth, 1992; Simmons, 1995; Wilke, 1995). There is a substantial and strong body of research evidence to support this conception (e.g., Cook & Berrenberg, 1981; Hines, 1986/87; Volk & McBeth, 1997; Zelezny, 1999; Bamberger & Moser, 2007; McBeth et al., 2008). Unfortunately, few colleagues in the science education community are aware of attuned to this conception or this research base. If NOAA wishes to take advantage of this body of thought and work in its efforts to advance an “environmentally literate citizenry” (line 2), it may be appropriate to review existing frameworks and documents related to ocean and climate literacy. [It may not be necessary to alter any of the prose in the top two paragraphs or in Strategy a) to accommodate this, as any such effort may go on “behind the scenes.”]		
Marcinkowski, Tom Higher Education				
266	10 3	lines 3 – 6 and 26 - 28 The literacy principles referred to in the aforementioned lines are a start toward the complex process of integrating ocean literacy content into state standards, and ultimately into teaching, learning, and student performance. Unfortunately, based on my experience, there is much left to do to the principles and supporting documents to achieve effective integration. The principles as currently presented are prone to simple “check-mark” alignment, which excludes the in-depth performance expectation alignment that		
Payne, Diana L. NOAA/Sea Grant				

ID	Page Line	Comment	Suggested Action	Response
		<p>truly informs teaching and learning. It is too easy to take the current set of principles and go down the list and check off those that are currently “taught,” and presume from that exercise that the principles and the teacher’s curriculum and instruction are aligned. There are significant performance assumptions inherent in properly worded content standards that can significantly impact the depth to which a particular standard must be taught and learned. In most states there are also stated performance expectation descriptions that, in the context of content standards, can significantly impact how the content is taught. Overt references to performance are missing from the principles, and I believe are a necessary component to effective integration.</p>		
247	10 4	<p>line 4 of lines 4-6 NOAA together with partner agencies and 4) organizations AND INDIVIDUALS? (I AM THINKING TEACHERS, EDUCATORS NOT IN AN ACTUAL ORGANIZATION)—just trying to get the full inclusivity of the process. in the science community have developed ocean and climate environmental literacy frameworks that identify the essential principles and fundamental concepts individuals need to understand in order to make appropriate decisions about human activities that affect our planet</p>		
298	10 28	<p>In the case of “experiential education” terminology and semantics are not issues of mere consequence, (in my opinion) the term “experiential education” best defines how “formal education” is best to reach test & performance based metrics of it well (and sometimes overly) regulated system. By gaining “hands-on” experience in science, the young mind relates what is learned in the class room to real world socio-economical and environmental impact; (in my opinion) this makes the single largest impact on literacy framework. This type of learning method is increasingly more salient to pay attention to in today’s public and private education system; irrelevant of public or private funding, it is increasingly more salient to inter-relate “formal and traditional” classroom based learning methods to out of the classroom “experience”.</p>		

ID	Page Line	Comment	Suggested Action	Response
388	10 32	There should be a stronger commitment to the development of a curriculum meant for at least K-8, best for K-12 that could be used by schools to cover the Ocean Literacy : The Essential Principles of Ocean Sciences. Teachers are quite busy and having curriculum with lesson plans that cover these essential principles would be a huge help to teachers, and to our country, as it would extend the education of these principles to all who had access to the curriculum. Teachers need to know how to access it, once it is completed. I realize the implementation of the goals is next...but this goal is a bit more concrete and would be beneficial to the goals of NOAA and our citizens		
Pearson, Amy K. Teacher at Sea				
299	10 32	I certainly agree with the statement stemming from Penuel et al. 2005 that by raising levels of experiential learning it in turn raises the bar of public scientific enquiry, thereby raising awareness for the spectrum of related global stewardship needs. I laud NOAA for taking the concept of experiential learning into the plan; making outcomes of each learning methodology successful is purely dependent on how inter-dependent all three become.		
Raymond, Ronald An Other- Education				
159	10 36	lines 36-45 [Outcome 1.2 box] I am concerned that saying environmental literacy throughout does not effectively portray the science basis for the literacy principles that are emerging for climate, atmosphere, water, and Earth science. Whether we agree with it or not, the term “environmental” continues to carry baggage that causes some people to hold it at arm’s length. Can we consider using “environmental/Earth systems literacy” or another term that opens the door to show the science? If you determine that this is warranted, it would require a full search of the document to change the term. I will not list the lines in which environmental literacy is mentioned.		
Fortner, Rosanne W. NOAA/Sea Grant				
11	10 38	Page 10 Lines 38 Question Outcome 1.2 Educators Understand and Use Literacy Principles How is the NOAA going to disseminate pertinent and scientific environmental information that is not tied to political agendas? How will the public know that the federally funded NOAA is not just pushing an agenda? And how will the NOAA give out accurate information that goes against general political ideas? As a teacher I try to teach to the facts as much as possible and try to show all sides of the issues. It is difficult sometimes when the		
Joiner, Jennifer K-12 Education				

ID	Page Line	Comment	Suggested Action	Response
		political agenda screams one thing and I have to back-pedal to help my students understand the real issue(s).		
311	10 38	Strategies		
Marcinkowski, Tom Higher Education		<p>a)see comment in italics above</p> <p>b)“Integrate environmental literacy components, including specific concepts, principles, skills, and dispositions, into ...”</p> <p>c)(leave as is)</p> <p>d)“Provide greater support for research-based experiences and approaches that help to build environmental literacy, including experiential and place-based education, issue-and-action instruction, action research, and service-learning.” [For the rationale, see prior comment regarding Promoting Stewardship, page 6, lines 35-36]</p> <p>e) “partner with groups outside NOAA to infuse environmental literacy into state and national standards, curricula, assessments, educator certification, and the informal educational landscape.” [drop “principles” so as to allow attention to the wider range of environmental literacy components and the experiences/approaches associated with them]</p>		
324	10 38	“Support the development...of environmental literacy principles” by whom (i.e. state department of education, school divisions, schools, principles, non-formal educators)? The strategies following this do a better job of providing audiences. Do you need this one?		
Sprague, Shannon NOAA Office				
267	10 40	Outcome 1.2, Strategy b I believe the statement “Integrate environmental literacy principles into professional development programs” might be better worded as follows:		
Payne, Diana L. NOAA/Sea Grant		<p>“Develop and implement professional development programs that support the integration of the environmental literacy principles into STEM teaching, learning, and student performance.” Integrating the principles into professional development is very different from making the process of effective principle</p>		

ID	Page Line	Comment	Suggested Action	Response
		integration the goal of professional development, which I believe is (or ought to be) the goal. Acknowledging the existence of the principles is far different from actually understanding how to integrate them into the teaching, learning, and performance expected of related state standards.		
368 Carter, Beth Teacher at Sea	10 42	d) add "and increase opportunities for students to participate in service learning projects and volunteerism in the areas of environmental education and conservation." (see raw comments on "service learning")		
288 Diaz, Heather Teacher at Sea	10 43	Outcome 1.2: I didn't see anywhere in the preceeding paragraphs where item "e" was addressed.		
437 McAvoy, Jean NOAA/NERRS	10 43	L43-45: create new outcome for item e, focused on 'Facilitating Change in Ed. Systems'		
268 Payne, Diana L. NOAA/Sea Grant	10 43	lines 43-45: Outcome 1.2, Strategy e. I believe the word "infuse" is too weak, and lacks the clarity and intention of "adoption" or "integration." I agree that partnering in the process is critical, but that the intent of the process ought to address both the need for improved student performance relative to STEM standards and the environmental literacy principles. I prefer the word "integration" to "adoption" because I believe the wholesale adoption of the environmental literacy principles into state standards is unrealistic given the pressures teachers currently face. I believe a deeper collaborative and reasoned integration of environmental literacy principles into state standards based upon a process cognizant of the current standards, assessment, and accountability environment provides for the best likelihood of success for all.		
253 Payne, Diana L. NOAA/Sea Grant	10 43	lines 43-45 Strategy "e" "infuse environmental literacy principles into several disciplines or across the curriculum (consider adding) into state and ...		

ID	Page Line	Comment	Suggested Action	Response
316	10 43	In some instances, instructor certification is based on a cumulative process, score, etc. Mastery, or training in all areas may not be needed to demonstrate readiness for the classroom. Therefore, I recommend that you include "teacher preparation." It may extend the reach of NOAA if education materials and support, similar to the NOAA's teacher workshops, are widely disseminated to student teachers and the receipt of training is included in their pre-service program. All NOAA programs, outcomes, and strategies should include dissemination to pre-service teachers at grade-levels appropriate to the outcomes (ie workforce-related materials can be written at the introductory level for middle level teachers and heavily emphasized in high school materials.)		
Redlinger, Ginger Teacher at Sea				
325	10 43	Lines 43-45: Recommend moving Strategy e) up to Strategy b) as it is more broad reaching than the specifics detailed in strategies b) - d).		
Sprague, Shannon NOAA Office				
558	10 45	add new lines and item "f) develop environmental literacy supplements as appropriate (e.g., Great Lakes, traditional knowledge)"		
Spalding, Sylvia NOAA Office				
220	11 0	Can you also consider an issues-based approach to environmental EE? Issues-based is also place-based; place-based does not necessarily mean issues-based.		
Bell, Rebecca K-12 Education				
624	11 1	Evidence-based Earth System Science. The title for this outcome can lead to conclusion that the Education Council will be involved in the research and development of Earth System Science. However, the text below is speaking to connecting students and educators to the new and evolving science NOAA does. Consider revising the title of the outcome so that it doesn't imply a direct research role.	Send to Frank for consideration	
Arzayus, Krisa NEP				
608	11 1	Under outcome 1.3 there is discussion of data translation. This discussion does not include any focus on science translation to decision-makers. This is either an oversight or left out because of the emphasis on k-12. Regardless, it is important to emphasize that NOAA science is translated into products and information that	Send to WG for consideration	
Corso, Bill NEP				

ID	Page Line	Comment	Suggested Action	Response
		help decision-makers at all levels to improve their decisions about NOAA relevant issues. If it is in appropriate for 1.3 then this issue should be addressed under outcome 1		
189 Friedman, Alan J. Informal Education	11 15	line 15, 32: "students and educators" seems to be focused all on K-12 formal. While informal is discussed next, I am not sure what is served by separating them. The examples on this page include many informal education programs, like Science on a Sphere and others cited. It is also worth mentioning the "citizen science" movement, which includes hundreds of thousands of people in collecting data as part of authentic, professional science research. Cornell University is the originator and remains a leader in this work. Again, the participants in citizen science include both formal and informal education organizations, as well as individuals on their own.		
559 Spalding, Sylvia NOAA Office	11 15	after "scientific investigations" add "(physical and social sciences)"		
245 Schuster, Glen Other- Education	11 21	Page 11 Line 21. Signals of Spring-ACES [Animals in Curriculum-based Ecosystem Studies] has excellent evaluative data demonstrating NOAA data and visualizations that are adopted into school curriculum. This project is currently beginning year III of an Environmental Literacy Grant. The grantee is U.S. Satellite Laboratory. Contact information is: gschuster@us-satellite.net The goal of Ocean Literacy is being well-addressed. Web address (see Maps and Data) is: www.signalsofspring.net/aces		
609 Corso, Bill NEP	11 22	Comment: IOOS is the Integrated Ocean Observing System and the acronym has recently been approved for Registered Trademark	Send to WG for consideration	
		Recommendation: Change "U.S. Integrated Ocean Observation System (IOOS)" to ""U.S. Integrated Ocean Observing System (IOOS®)"		
487 Martin, Michiko NOAA Office	11 23	"...to help learners recognize patterns and processes..." – change from "process"		

ID	Page Line	Comment	Suggested Action	Response
326	11 23	The correct title for the buoys is “Chesapeake Bay Interpretive Buoy System (CBIBS)”.		
Sprague, Shannon NOAA Office				
177	11 26	26-28 also...Project Atmosphere, The Maury Project, The DataStreme Project		
Hildreth, Carol Other - General				
328	11 26	Outcome 1.3: This outcome is centered around the collection and utilization of data. This is where the authors have chosen to highlight the B-WET Program, however, the program is not intended to reach this goal for NOAA. There are projects that support this goal, but there are an equal or greater number of projects that do not. To facilitate this and other important experiential programs (i.e. Teacher at Sea, NOAA & DC Educators Moving Ocean Science Forward (NEMO), Emerging Scientist Project (ESP)), suggest adding an additional outcome that specifically talks about the importance of local and regional place-based education in the formal education setting. There is a good discussion of this in Outcome 1.4, but it is limited to informal settings and is not appropriate to discuss B-WET and other programs here.		
Sprague, Shannon NOAA Office				
289	11 28	I am so happy to see Teacher-At-Sea mentioned! I think the TAS program is vital to the sustainability of NOAA’s longterm goals...since, the change has to begin with the teachers! Maybe we could put TAS first in the list of all the programs??? Also, as mentioned before, so much of the gap in environmental literacy exists because teachers are, quite simply, poorly prepared to teach the subject and they lack the resources to do it properly! Most districts provide only the county-adopted science textbook...and, at best, they address the topics mentioned in this plan only a few times throughout the course of an entire year. Maybe the middle school and high school course texts are better...but at the elementary level, the books are pitiful and the teachers have one or two courses in college in science and teaching science at the most! Perhaps the place where the gap could be best addressed would be at the college level where teacher education and teacher preparation is concerned! And, nowhere in the plan did I see		
Diaz, Heather Teacher at Sea				

ID	Page Line	Comment	Suggested Action	Response
		anything mentioned about addressing teacher preparation.		
489	11 28	Do you need to reference what “JASON” is?		
Martin, Michiko NOAA Office				
123	11 29	Continued efforts in this area will strengthen the skills of the and abilities of the learners and help build long-term relationships (between NOAA and who? External groups??) with NOAA.		
Haynes, Susan E. NOAA Office				
560	11 33	after “science data” add “and traditional knowledge”		
Spalding, Sylvia NOAA Office				
490	11 34	Lines 34-35: “...and make informed decisions regarding the environment and its resources.” – Perhaps this part of Outcome 1.3 should be broken out? Just need to recognize that the evaluation for this outcome will become tricky. We may find that this audience can use this data to understand, but not achieve application of that knowledge. The strategies seem to focus on use and understanding—not necessarily informed decision making. So, also consider adding a new strategy that addresses informed decision making		
Martin, Michiko NOAA Office				
329	11 37	This Outcome references experiential learning in the narrative, but none of the strategies address it. Outcome 1.4 does reference experiential learning, however, it is limited to an informal setting. Recommend revising strategy a) to read: “Support and implement professional development and experiential learning to strengthen science...”		
Sprague, Shannon NOAA Office				
561	11 38	after “science” add “and traditional knowledge”		
Spalding, Sylvia NOAA Office				

ID	Page Line	Comment	Suggested Action	Response
290	11	40		
Diaz, Heather Teacher at Sea		I would like to add that the products and services must also be developmentally appropriate to reach a wide range of student needs. (For example, while the resource center has a lot of GREAT things for teachers and students...not a lot of it has been produced that targets the primary grades (K-3)).		
12	11	40		
Joiner, Jennifer K-12 Education		Page 11 Line 40 Suggestion Outcome 1.3 Evidence-based Earth System Science Ready-to-use materials in the form of workbooks and/or texts that also include data on a disk would work well to support and strengthen science understanding. Many times networks and internet options are not readily available or in working order to download real-time data. It would be helpful for you to have some basic and/or core data for teachers to use in their classrooms. Most of the time teachers have to come up with the lessons as well as find the materials and the data to use; it all takes so much time that NOAA could help in that respect.		
382	11	40		
Schmidt, Cynthia Other- Education		End-users of NOAA products need NOAA sponsored and funded professional development. For example, when new satellite products from NESDIS are produced in the next two years, users across the country and across many different user categories (from weather forecasters to land managers) will need to have professional development for NOAA/NESDIS to realize full value from their investment in new satellite systems. NOAA could also partner with the Unidata program and enhance the distribution of NOAA products to the university community across the nation NOAA should also consider pairing professional development about a product with the product itself on NOAA websites. A quick check of one product as an example, SST Anomaly, had information about what the product was but not about how it was created or about the data collected from space		
533	11	43		
Cabezas, Miriam Other- Education		We support NOAA's proposal to engage and partner with external organizations to increase environmental literacy and disseminate scientific information relevant to NOAA's work. However, we are concerned that to date such NOAA efforts have not included adequate outreach to Hispanic technical membership based organizations. NOAA should partner with these types of organizations to identify strategies to effectively reach Hispanics		

ID	Page Line	Comment	Suggested Action	Response
		who have not benefited from NOAA education outreach efforts proportionate to the size of the Hispanic student population.		
221	12	0	We have found it to be most effective when informal ed partners with school systems to develop programs that are mutually beneficial- i.e. school systems need activities that help teachers teach their curriculum. It works best when the informal partner plans the activity or display with formal ed. If the informal program does not directly address the curriculum, teachers cannot and will not use the program. The collaboration also helps in getting the display or activity on the appropriate grade-level.. Many high school teachers are saying that informal ed programs, while fun and interesting, lack content rigor. Also many informal educators do not have science training- maybe some standards for these folks, not only in science content but in pedagogy. Often we see the “lecture in a canoe” format or they ask a series of questions for which the kids have no background and call it “inquiry” (I see there is mention of training for informal ed).	
Bell, Rebecca K-12 Education				
190	12	0	again need to cite the current NRC study of research in informal will be out any week now, and the NSF Framework book which is a good reference for informal learning evaluation. Already the NRC study website has lots of good references to research and evaluation. See also CAISE (www.insci.org) and www.informalscience.org	
Friedman, Alan J. Informal Education				
31	12	0	do you want to specifically call out citizen science programs like GLOBE, NEON, COCORHS?	
McCaffrey, Mark Higher Education				
585	12	2	Informal education – where the importance of diversity was expressed in formal education, it was not emphasized in informal education. It is equally, if not more important to recognize the importance of diversity in informal education. As the US demographic changes the informal education program will be focused on a decreasing percentage of the population. The need for diversity in informal venues is important since it is difficult for members of underrepresented groups to pursue careers that their culture is unfamiliar with.	
Babb, Ivar Higher Education				

ID	Page Line	Comment	Suggested Action	Response
453	12	<p>2 Conceptually this process allows each individual to incorporate current scientific, economic, and social data into daily decision making adding to their personal knowledge base throughout their lives.</p> <p>Rewrite as: Conceptually this process allows each individual to incorporate current scientific, economic, and social data and information into their personal knowledge base and use it in their daily decision making.</p> <p>However see my comments above how knowledge does not in itself cause appropriate decisions to be made.</p>		
McAvoy, Jean NOAA/NERRS				
145	12	<p>2 Science organizations tend to focus on learning or education as outcomes. Interpretation is more focused on mission-based efforts to encourage stewardship or elicit specific changes in attitudes, beliefs and behaviors. Sam Ham spoke to our Region 9 workshop this past spring in Eureka, California, and asserted that social science research does not support the idea that "learning leads to loving." Knowing more about a subject, does not result in love for the subject or resource, and make actually result in an opposite reaction if the motivations for learning are harsh. I still do not like math, though I use it pretty effectively because formal education gave me the motivation to graduate. I have attached a paper of Sam's that explains well the social science foundations for moving people toward stewardship. I think we still use the word education in an all-encompassing way, but scientists tend to equate it with cognitive learning while interpreters are more interested in behavior change. We sometimes write cognitive objectives into curricula for interpretive programs without realizing that we really are not as interested in the specific gain in knowledge as the change in behavior.</p>	<p>Send to Env Literacy</p> <p>Place Based Education, promoting environmental literacy (strengthen)</p>	
Merriman, Tim Informal Education				
563	12	<p>3 after "economic" add "cultural,"</p>		
Spalding, Sylvia NOAA Office				
454	12	<p>4 Line 4: Quality learning opportunities beyond the K-12 education system and academia must be made available to continue this process.</p> <p>Rewrite as: Quality learning opportunities beyond the scholastic and collegiate setting must be made available to continue this process.</p>		
McAvoy, Jean NOAA/NERRS				

ID	Page Line	Comment	Suggested Action	Response
124	12 6	process. The science attentive public, those citizens that actively display an interest in learning about the scientific process, provide an ideal audience for introducing environmental literacy concepts. (What about the non-science attentive public?)		
Haynes, Susan E. NOAA Office				
491	12 16	“...Nation’s natural resources are managed and the importance of these resources are to every individual is a key...” – add “to every individual” to strengthen the connection.		
Martin, Michiko NOAA Office				
255	12 18	lines 18-19 Making these connections is where Sea Grant comes in. However if NOAA is to be successful they need to hit all 50 states not just the coastal states.		
Payne, Diana L. NOAA/Sea Grant				
355	12 23	Before we connect citizens with natural resources needing protection, we need to vet the ESA and other protection process through the public. Quite probably a bacteria or fungus going extinct matters little to the public but the reported potential of a charismatic mega-fauna species, and the way it is reported, going extinct brings a whole litany of biodiversity this and environmental disaster that. Does the extinction of a bacteria or fungus have the same value to the environment and biodiversity as a rare seal, or not, and why?		
Kaaia, Charles NOAA Office				
455	12 24	Connecting citizens directly to natural resources needing protection through hands-on experiences is a key element of the NOAA educational approach. Rewrite as: Connecting citizens directly to natural resources through hands-on experiences is a key element of the NOAA educational approach.		
McAvoy, Jean NOAA/NERRS				
492	12 31	“...assist with maritime archaeology and ...” – change “marine” to “maritime,” which is more commonly used		
Martin, Michiko NOAA Office				

ID	Page Line	Comment	Suggested Action	Response
456	12 36	<p>Outcome 1.4: Lifelong learners are provided with informal science education opportunities focusing on ocean, coastal, Great Lakes, weather, and climate topics.</p> <p>Rewrite as:Lifelong learners are provided with informal science application and education opportunities focusing on ocean, coastal, Great Lakes, weather, and climate topics</p>		
<p>McAvoy, Jean NOAA/NERRS</p>				
534	12 39	<p>We support the outlined strategies to promote lifelong learning through informal science education. However, Hispanic technical membership based organizations must be included to identify and implement successful practices that will effectively reach and engage the Hispanic community.</p>		
<p>Cabezas, Miriam Other- Education</p>				
383	12 43	<p>should consider and describe what will be done - dissemination of information via mobile devices, RSS feeds, the AMAZON Kindle, etc. where will NOAA consider going?</p>		
<p>Schmidt, Cynthia Other- Education</p>				
580	12 44	<p>lines 44 and 45 Programs engaging citizens as scientists are time consuming and labor intensive to set up, but have long-lasting benefits to the communities in which they are found. However, citizens must feel important in the contributions they are making if programs are to be sustained over time. An excellent example of this type of program is CoCoRaHS, a program started by Nolan Doesken, formerly of the CSU Colorado Climate Center. A key speaker at a March 2008 meeting of past and present winners of Presidential Awards for Excellence in Math and Science Teaching presented this topic as a way to galvanize communities to support environmental stewardship. Guidance and support for setting up these programs ins critical</p>		
<p>Peterson, Barney Teacher at Sea</p>				
331	12 46	<p>Line 46-47: “Provide place-based experiences that facilitate hands-on exploration, protection, and/or restoration of natural environments.” Many of NOAA’s programs go beyond exploration, such as bay grass plantings, riparian restorations, etc.</p>		
<p>Sprague, Shannon NOAA Office</p>				