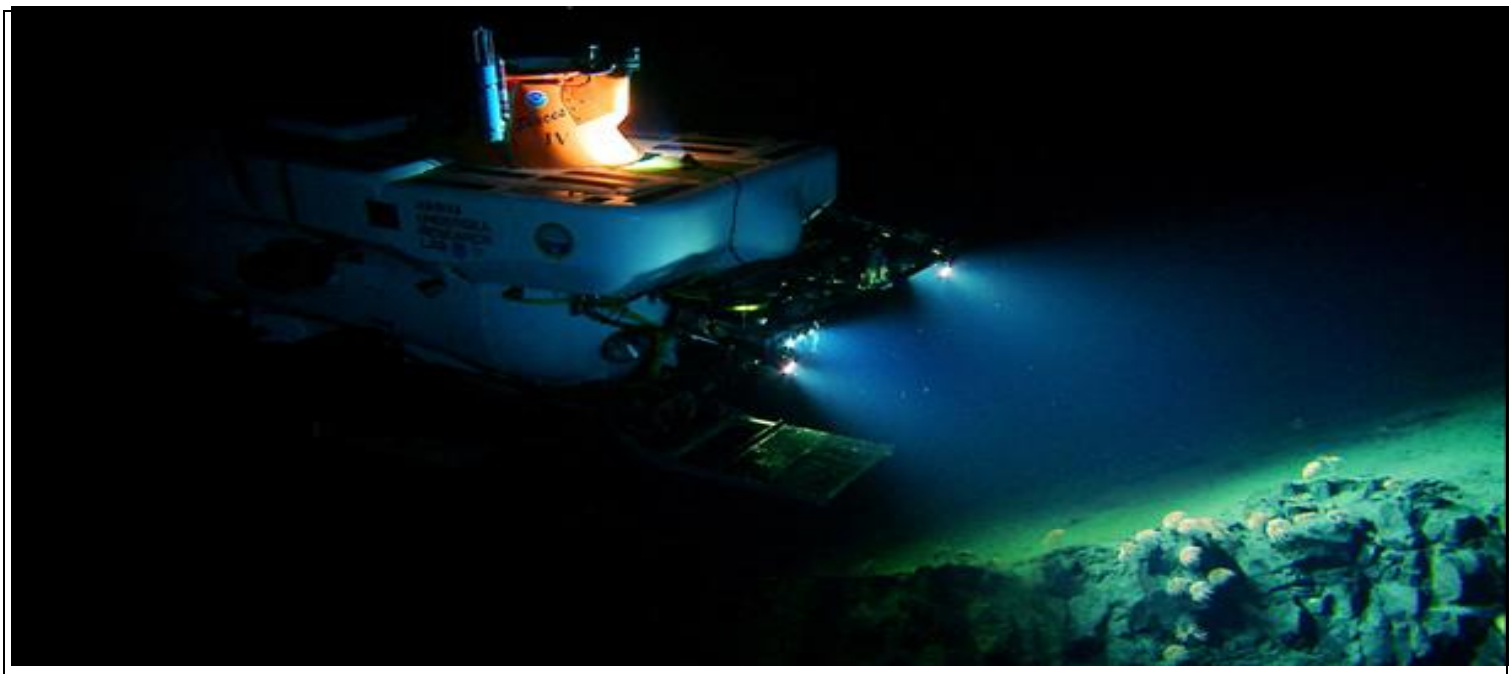

Summative Evaluation Report

Alien Deep

National Geographic Television

March 2014

Knight Williams Inc.

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Introduction

The Alien Deep. It's a place in the sea, thousands of feet beneath the surface, far from the first crack of light, where the planet's last and greatest secrets hide in the cold darkness of endless night. In this five-part series, Dr. Robert Ballard, famed explorer who found the Titanic at its final resting place, takes viewers into these underwater worlds where no man has gone before.
(http://channel.nationalgeographic.com/channel/alien-deep/)

Produced by National Geographic Television and funded in part by the National Science Foundation (NSF), *Alien Deep* is a multi-platform media project designed to increase public literacy about: the fundamental principles and concepts underlying ocean systems and functions, the importance and challenges of oceanographic research and exploration, and the impact of the ocean on humanity and humanity's impact on the ocean. The centerpiece of the project is a five-part mini-series that premiered on the National Geographic Channel in 2012. In addition to the five episodes, which were also made available as DVDs, the *Alien Deep* project produced a children's book and a variety of online resources including video clips, classroom activities and lessons, reference materials, photo galleries, a game, and an Interactive.

As part of the NSF funding for *Alien Deep*, the independent evaluation firm Knight Williams Inc., which specializes in the evaluation of informal science media projects, conducted a summative evaluation of the project's main deliverables. The evaluation team used a diverse set of methods to assess the appeal, clarity, and informal science learning value of the 5-part mini-series and supplemental educational resources as experienced by the audiences targeted by the project. As detailed below, two separate evaluations were conducted. The first evaluation focused on the impact of the mini-series with a public viewing audience. The second evaluation focused on use of the project's educational resources by formal and informal educators in diverse educational settings.

Part 1: Evaluation of the *Alien Deep* mini-series with a general audience

Background

The *Alien Deep* mini-series premiered on the National Geographic Channel in 2012. The first four episodes aired during the evening of September 16, while the fifth episode aired the following night.[1] During this premiere National Geographic Television (NGT) gathered an array of reach and ratings data for the broadcast, which are summarized in Appendix 1.[2] According to Nielsen ratings, the program reached over 6 million households and a total of 7.7 million people tuned in, two-fifths (43%) of whom were the program's core target demographic of viewers aged 25-54.

Following the premiere, Knight Williams Inc. conducted an in-depth evaluation of the immediate and longer term impacts of the *Alien Deep* mini-series with adult viewers recruited to watch the 5-episode program in a manner similar to that which occurred with the broadcast premiere in September 2012. This report summarizes the findings from the evaluation as supported by the responses of the adult audience that viewed and completed in-depth evaluation forms immediately after viewing and then again two-three weeks later.

Evaluation goals

The evaluation examined the informal science learning impacts of *Alien Deep*, focusing on the goals described in the project's original proposal to the NSF. These goals included increasing viewers':

- Understanding of the essential principles and fundamental concepts about the functioning of the ocean;
- Understanding of their influence on the ocean and the ocean's influence on them;
- Ability to communicate about the ocean in a meaningful way; and
- Ability to make informed and responsible decisions regarding the ocean and its resources.

The evaluation also assessed an audience goal that the project team subsequently added and then evaluated during the project's formative evaluation phase (Flagg 2012). This goal focused on increasing viewer appreciation of the importance of research and exploration of the oceans to the future of humanity.

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[1] *Alien Deep* aired Sunday, September 16, from 7 p.m. to 11 p.m. ET/PT and Monday, September 17, from 8 p.m. to 9 p.m. ET/PT, on the National Geographic Channel.

[2] This data revealed that the program averaged a 0.17 for the 25-54 age group across the five episodes, landing on average just under one-third (31%) below NGC's time period average for that quarter.

Because the evaluation was designed to assess viewers' experience with the entire mini-series, the evaluation goals prioritized learning of broader themes and repeated concepts, as opposed to specific content from individual episodes. Accordingly, the summative evaluation team sought input from the project team to adapt questioning strategies based on the final project goals.

In addition to answering questions designed to assess the program's educational impact, viewers were also asked a series of qualitative questions to explore what they found to be most interesting, salient, and personally impactful. Viewers also rated and provided feedback on the program's appeal, clarity, production values, storytelling, and density of information and science. Finally, the evaluation further explored the longer-term impact of the program within a few weeks of viewing, in this case focusing on the extent to which viewers made personal connections with the program and discussed, thought about, or engaged in any program-related activities.

Method

The evaluation team conducted a two-group posttest-only randomized study that examined recruited "Viewer" participants' experience with *Alien Deep*, as compared to a group of "Control" participants who didn't view the program but who completed the same set of demographic/background questions and a "quiz" on the main content presented in the program.[3]

Procedure

In order to implement the two-group posttest randomized study design, the evaluation team randomly assigned screened evaluation participants to one of two groups, which comprised:

- A Viewer group that viewed the program and completed a post-viewing questionnaire. Participants in this group viewed the first three episodes of *Alien Deep* at home. Between one and three days later, they attended a group screening session at one of eight local evaluation sites where they watched the last two episodes and completed an in-person post-viewing survey.[4]

- A Control group that completed a modified version of the Viewer group's post-questionnaire that included questions designed to assess the project's informal science learning goals. Participants in

[3] Although all participants completed a pre-viewing background and demographic questionnaire, administering a content-based pretest and posttest to the same group of participants in this case was neither a) practical given the challenges of maintaining participant cooperation, nor b) desirable given the specialized nature of the content addressed in the program and the potential for the pretest to sensitize Viewers to the program's content and affect their posttest performance given the evaluation timeframe. Typically, the shortcomings with the separate-sample design involve its failure to control for history, maturation, mortality, and their interaction. However, in the case of this program treatment, where the Viewer and Control group respondents completed the evaluation activities over a matter of days, group changes of this nature are unlikely. The separate-sample design controls for the main and interactive effects of testing and was deemed in this case a useful and cost-effective strategy for evaluating the program.

[4] The evaluation team spent considerable time exploring the most effective and efficient method for capturing viewers' experience with the program while attempting to mirror as closely as possible the way the program was initially premiered on television. Early recruiting and piloting feedback indicated that the chosen method of having participants watch three episodes at home and then convene in a group setting to view the final two episodes and complete the initial in-depth survey would help ensure the desired completion rates, timeliness, and implementation fidelity for the survey procedure.

this group did not view the program but instead only completed a questionnaire containing the same background, demographic, and content questions completed by the Viewer group, except for those asking for participants' reactions to the program itself.[5]

The evaluation then compared the results of these two groups to assess the immediate educational impact of the mini-series.

In addition, all Viewers who participated in the evaluation and indicated they were willing to be contacted about an opportunity to provide additional feedback were invited to participate in a follow-up survey two-three weeks after viewing to explore the longer term impacts of viewing, including the extent to which they thought about the mini-series, discussed it with others, researched or followed-up on information presented, visited the *Alien Deep* website, or did something new or different as a result of viewing.

Recruitment

The evaluation team recruited a planned sample of 140 adults from diverse regions of the U.S., allowing for a 10% attrition rate. The team aimed for a sample with equal gender representation and a range of ages from 18-65 while also prioritizing the program's target audience of 25-54 year olds. The team's recruiting strategy also focused on obtaining a diverse group of participants, including: approximately 25%-30% minorities, residents from both coastal and non-coastal geographic regions, and individuals that watched nature/science and National Geographic programming occasionally to regularly, and were not professional scientists or science teachers.[6]

Recruiting was conducted principally through evaluation associates located in the Northeast, North Central, South Atlantic, South Central, and Western regions of the US. The associates used diverse and regionally appropriate methods of announcing the evaluation opportunity to individuals fitting the target audience demographics, background, and media habits. As the screening of the final two episodes of *Alien Deep* and the initial evaluation phase were held at 8 local evaluation sites, participants were also recruited based also on their proximity to these sites, which were located in: Boston, MA; Portland, ME; Cleveland, OH; Nashville, TN; Albuquerque and Santa Fe, NM; and Sacramento and the Bay Area, CA..

As part of the recruiting process, participants were informed that: their participation in the evaluation was voluntary and they could quit at any time, their responses were confidential and would be reported in the aggregrate, and that they would be randomly assigned to complete one of two different sets of activities, in one case an online survey activity about topics featured in a National Geographic program and in the other a survey and viewing of a National Geographic program. Honorariums were offered in each case to help ensure timely completion and scaled to reflect the amount of time required to complete each activity.

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[5] A survey completion time of approximately 30-40 minutes was planned for each group. The timing of the Viewer group survey, which was completed in paper form, was monitored by the evaluation associate running the local group session. The timing of the Control group survey, which was completed as an online form, was monitored through timestamps taken at the beginning and end of the survey and instructions that requested participants complete the survey in approximately 30 minutes.

[6] Potential evaluation participants were also asked additional questions related to their schedule availability and access to a DVD player, email, and the internet. Although all recruited participants in this case did have access to each of these media, had they not, they wouldn't have been disqualified from participating but rather offered an alternative way of watching the program and completing the follow-up online survey.

Questionnaires

The initial screening questions asked by local evaluation associates as part of the recruiting process included demographic and background questions related to participants' age, gender, ethnicity/race, use of science in occupation, television viewing habits, and prior exposure to National Geographic programming.

The Viewer and Control group questionnaires that form the basis of this evaluation report included a 50 point knowledge assessment of three key topic areas addressed in the series: ocean properties, characteristics, and life forms; ocean research and discovery; and the ocean's importance to humanity. Both groups also completed a small set of supplemental questions directed at understanding participants' ocean-related beliefs and attitudes related to these themes.

The evaluation team identified the above set of evaluation themes and procedures by: reviewing the *Alien Deep* project proposal submitted to the NSF, consulting with the producers, reviewing the five episodes from the mini-series, and reviewing the project website. Where possible, the evaluation team used or adapted ocean knowledge, interest, and opinion survey items from nationally validated instruments. See Section 3 and the final References section for additional information about instruments used for these purposes. In cases where, because of the unique nature of the ocean content provided in *Alien Deep*, this was not feasible, the evaluators devised new items and subsequently pilot tested these items with adults fitting the target audience for readability, length, clarity, and level of difficulty.

In addition to completing the 50 point knowledge assessment, Viewers also completed questions that asked about the program's appeal, clarity, density of information, and personal learning value, focusing on the following questions:

- To what extent did the program appeal to the Viewers?
- How did Viewers rate the program in terms of storytelling, visual engagement, and content interest, and their likelihood of recommending the program to others?
- What did Viewers like and dislike about the program?
- How did Viewers respond to the program's clarity of presentation and the amount of information and science presented?
- What did Viewers learn from the program that interested them most?
- To what extent did the program cause Viewers to think or feel differently about the ocean?
- To what extent did Viewers discuss, think about, or engage in any program-related activities a few weeks subsequent to viewing?

Data analysis and reporting

Statistical analyses were conducted on all quantitative data generated from the evaluation. To explore for possible significant differences within and between the Viewer and Control groups, T-tests, Chi-Square, Kruskal-Wallis, and Mann-Whitney tests were applied as appropriate.[7] Statistically significant findings (hereafter referred to as "significant") at $p \leq .05$ are reported in the text. To help determine whether a significant difference was a difference of practical concern, effect sizes were also computed and reported in the text where appropriate.[8] [9] As explained by Thalheimer and Cook (2002) "whereas statistical tests of significance tell us the likelihood that experimental results differ from chance expectations, effect-size measurements tell us the relative magnitude of the experiment treatment. They tell us the size of the experimental effect." [10]

Content analyses were performed on the qualitative data generated in the open-ended questions. All analyses were conducted by two independent coders. Each coder independently coded randomly ordered open-ended responses, blind to group assignment. The analysis was both deductive, drawing on the program's objectives, and inductive, by looking for overall themes, keywords, and key phrases. Any differences that emerged in coding were resolved with the assistance of a third coder.

[7] When examining subgroups with two categories (e.g., gender) using the two-independent-samples *T-test*, Levene's test was first used to determine whether the separate-variance *t* test or pooled-variance *t* test was appropriate for testing the means of the measured variables. If the test indicated the variances were significantly different, the separate-variance *t* test was used.

[8] Following Cohen's (1992) interpretation, for T-tests d=.2 indicates a small effect, .5 a medium effect, and .8 a large effect. For non-parametric tests, r=.10 indicates a small effect, .3 a medium effect, and .50 a large effect.

[9] Cohen, J. (1992). A Power Primer. *Psychological Bulletin*, 112 (1), 155-159.

[10] Thalheimer, W. and Cook, S. (2002). How to Calculate Effect Sizes from Published Research: A simplified methodology, *Work-Learning Research*, p. 2.

Sample information

Of the 146 participants recruited for the evaluation, a total of 135 participants, including 71 Viewer and 64 Control group participants, completed the evaluation.[11] The table to the right summarizes the demographic and background information for the final evaluation group in each case.

Sample demographic/background information

Demographic/ background factor	Categories	Control (n=64)	Viewers (n=71)
Gender	Female	59%	52%
	Male	40%	48%
Age Group	Age range	(18-67)	(18-66)
	Mean	37	35
Racial/ethnic background	African-American/Black	9%	4%
	Asian	3%	8%
	White	73%	75%
	Multiracial/Other	4%	4%
	Hispanic Origin	11%	7%
Highest level of education	Less than high school	3%	6%
	High school degree	2%	1%
	Some college	22%	15%
	College degree	35%	31%
	Some graduate school	17%	11%
	Graduate degree	20%	35%
Occupational status	Employed	56%	61%
	Homemaker	5%	3%
	Retired	5%	4%
	Unemployed	8%	3%
	Student	27%	29%
Work as scientist or science educator	Yes	2%	6%
	No	98%	94%
Frequency of watching science/nature programs	Daily	8%	4%
	Weekly	45%	55%
	Monthly	42%	34%
	Less than once a month	5%	7%
Frequency of watching National Geographic programs	Daily	3%	1%
	Weekly	26%	34%
	Monthly	48%	42%
	Less than once a month	21%	23%
Frequency of watching programs on science of ocean	Daily	2%	1%
	Weekly	11%	10%
	Monthly	39%	38%
	Less than once a month	48%	50%

Group comparability

The evaluation gathered demographic and background information to determine whether the two independent samples (Viewer vs. Control) should be evaluated as having come from the same population. T-test and Chi-square analyses indicated that the two groups did not differ significantly with respect to the measured variables, which included: gender, race/ethnicity, age group, education, science background, and television viewing habits.

Viewer demographics/background

The Viewer portion of the sample included:

- A balance of females (52% to males 48%).
- A wide range of ages, spanning 18-66 years, with a mean age of 35.
- A racial/ethnic distribution comprising 75% White, 8% Asian, 4% African-American, and 4% mixed-race Viewers. Seven percent (7%) were of Hispanic origin.
- A majority of participants who were employed (61%), with the remaining participants classifying themselves as students (29%), retired (4%), unemployed (3%), or homemakers (3%).
- A majority of participants that did not work as professional scientists or science educators (94%).

[11] A total of 2 Viewer and 9 Control group participants did not complete the evaluation in the timeframe set aside for the evaluation due to work, travel, or family commitments.

- A combination of high school through graduate level-educated participants, including: 46% with some college education or a college degree, 46% with some graduate school education or a graduate degree, and 7% with a high school education or less.
- A majority of participants who watched science/nature programs daily or weekly (59%) with one-third watching monthly (34%), and relatively few watching less than monthly (7%).
- A majority of participants who watched National Geographic programs daily or weekly (35%) with two-fifths watching monthly (42%), and relatively few watching less than monthly (23%).
- A majority of participants who watched television programs on the science of the ocean monthly (38%) or less than monthly (50%) with few watching daily or weekly (11%).

The table to the right summarizes two additional parameters asked of both Viewer and Control participants: the last time they visited an ocean beach or shore and the last time they visited an aquarium, zoo, or museum where they learned about the ocean. With respect to the Viewers:

- The largest groups last visited an ocean beach or shore in 2013 (35%) or 2014 (41%). About one-quarter last visited in 2012 or before.
- More than half of Viewers (58%) last visited an aquarium, zoo, or museum where they learned about the ocean in 2013. Others last visited in 2012 or before (35%) or as recently as 2014 (7%).

Frequency of visiting ocean and informal science center where learned about the ocean

Demographic/ background factor	Categories	Control (n=64)	Viewers (n=71)
When last visited ocean beach or shore	2014	24%	41%
	2013	59%	35%
	2012 or before	17%	24%
When last visited aquaria, zoo, or museum where learned about ocean	2014	11%	7%
	2013	51%	58%
	2012 or before	38%	35%

Findings

This section includes findings on the overall appeal, clarity, comprehensibility, and learning value of *Alien Deep* as determined by the recruited Viewers and, in some instances, Control group participants' responses on the questionnaires completed for the evaluation. The evaluation findings are presented in 4 sections as follows:

Section 1: How appealing and engaging did Viewers find *Alien Deep*?

Section 2: How successful did Viewers find *Alien Deep* in terms of: clarity, pace, narration, focus on the host, density of science, and scientific explanations?

Section 3: What did Viewers learn from *Alien Deep*?

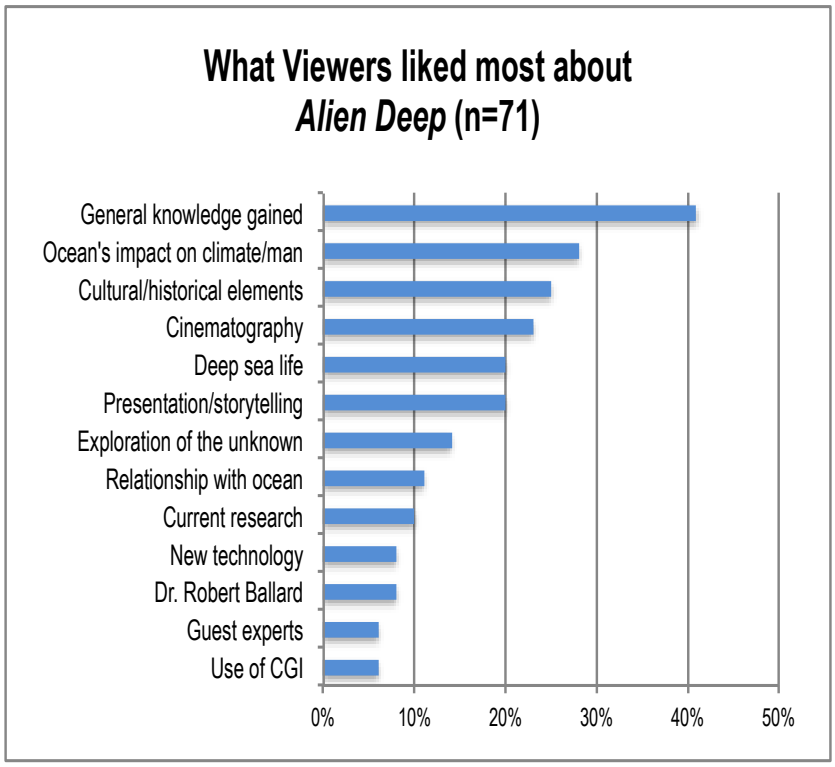
Section 4: What were the extended influences of *Alien Deep*?

Section 1: How appealing and engaging did Viewers find *Alien Deep*?

1.1 What did Viewers like most about *Alien Deep*?

All of the Viewers identified at least one aspect of *Alien Deep* that appealed to them, and most mentioned two or more aspects. Viewers were especially enthusiastic about the general educational value of the series. They frequently enjoyed learning about: the ocean's impact on the climate and humankind, cultural and historical elements, and deep sea life forms and ecosystems. Viewers were also often drawn to one or more elements of *Alien Deep*'s filmmaking.

Viewers were asked to describe what they liked most about *Alien Deep*. The chart below shows the aspects of the program that Viewers said they most frequently liked and the percentage of Viewers citing each aspect.



Learning value

Many Viewers focused on the program's learning value. About two-fifths of the group (41%) pointed to general knowledge they gained, as in new ideas, concepts and facts learned. More than a quarter (28%) expressed an appreciation for what they learned about the ocean's impact on the climate and on mankind. A quarter (25%) enjoyed the series' inclusion of cultural and historical elements, and a fifth (20%) liked its focus on deep sea life forms and ecosystems. Smaller groups of Viewers enjoyed the focus on the exploration of the unknown (14%), the way the series showed or influenced Viewers' personal relationships with the ocean (11%), and the study of current research (10%) or new technology (8%). Examples of Viewers' comments on the above themes follow below:

- **General knowledge gained (41%)**
  - I found it interesting and I learned new information in an entertaining format. It also led me to ask questions, which it later answered.
  - I learned about things I haven't thought about; exploration is fascinating to me; the ocean is so mysterious; would have liked to see more about shipwrecks.
  - Very informative I truly learned something new in viewing each episode. As a result I am more conscious about the ocean.
  - The discovery and the knowledge gained because I am now aware about the ocean and its dark secrets.
  - Informative, necessary, educational, alarming.
  - New ideas, concepts and facts learned.

- **Learning about the ocean's impact on humans and the climate (28%)**
  - The overall message that studying the deep ocean can help humankind figure out the ocean's role in sustaining our planet's life and how there is much more to uncover.
  - The last 3 episodes were extremely informative about how the oceans affect our daily lives and climate change.
  - The discussion of important and relevant topics concerning our coping strategies for the changes in climate that are happening now.
  - That it attempts to raise awareness of humanity's impact on the natural environment - which includes the ocean, and often overlooked and seemingly uninvolved component of the ecosystem.

- **The cultural and historical elements (25%)**
  - Episode #2 and the ancient sea exploration/ship discoveries. I enjoy history and seeing the advancements of ancient ships construction was entertaining.
  - I enjoyed the focus on how the ocean is important to different cultures and groups of people. It was interesting to see how the ocean has shaped modern culture throughout history. The ocean is not always exploited but it should be utilized in a safe and respectful manner. In order to do that, it needs to be further explored.
  - I liked the exploration part, and also seeing different parts of the world.
  - I also enjoyed learning about different cultures, albeit in small snippets.

- **Learning about deep sea life and ecosystems (20%)**
  - I most liked the sequences that depicted underwater life and the discoveries made in the deep - new life forms, ancient shipwrecks, geological features etc., I like learning new things, so these were the most appealing to me.
  - I enjoyed the underwater video of the deep sea and the animals than live in the volcano vents.
    I enjoyed learning about the depths of the ocean which I had always considered too vast, distant and unknown to think seriously about.

- **Focus on the exploration of the unknown (14%)**
  - I learned about things I haven't thought about; exploration is fascinating to me; the ocean is so mysterious; would have liked to see more about shipwrecks.
  - I liked the exploration of the unknown/undiscovered the most because this aids us in our knowledge of earth and allows humans to better coexist with our surrounding environment.

- **Personal impact on their relationship with the ocean (11%)**
  - The best part of the *Alien Deep* was when Dr. Ballard explored the new growth on a volcano in episode 3. This inspired a sense of awe and guided me towards a variety of insights about the Earth as one large organism. Quite frankly this has had a very significant impact on my way of looking at the world and my place in it.
  - The series introduced a lot of new and exciting knowledge to me. It helped me to appreciate the roles of the oceans in new ways. It gave me new hope even though it brought up some negativity about human behavior.

- **Learning about current research (10%)**
  - What kind of research is being done on the ocean.
  - I liked learning about what discoveries have been recently made.

- **Learning about new technology (8%)**
  - Discovery of new technology.
  - Saw new technologies and how they are used to learn about ocean floor, shipwrecks/early civil, where life started.

Filmmaking

Viewers were also drawn to one or more elements of *Alien Deep*'s filmmaking. Nearly a quarter (23%) commented on the programs' cinematography, a fifth (20%) appreciated the way the information was presented, and a few (6%) enjoyed the use of CGI. Less than a tenth each specifically liked Dr. Robert Ballard (8%) or the use of guest experts (6%). Overall, about one-sixth of Viewers (15%) said they liked the series because it was engaging and held their attention.

Examples of Viewers' comments on the above themes follow below:

- **Cinematography (23%)**
  - Episodes 1 and 3 were fascinating and beautiful and there was a lot of extraordinary footage coupled with lots of information. Rare footage and truly new landscapes made visible.
  - The images of the terrain using advanced technology, what we saw was beautiful.
  - The videography was very well done.
  - The photography of sea life was beautiful.

- **Presentation/storytelling (20%)**
  - I thought the lengths were extremely reasonable given the amount of information provide; the information was interesting and important; I loved all the music that was used; I liked how it would flip from documentary to interview; discs 2 and 4 were my fav.
  - The dedication to the backstory of each plot, and related efforts to explain concepts using visuals. I thought the shows did a wonderful job informing the viewer of how core concepts are formed or related to the central theme of each program.
  - While each episode focused on a single issue, that issue was explored from many different angles - so that it didn't seem like a lecture on a single topic**.**
  - I like how it was kind of mysterious and captured your attention.
  - Fast pace, keeping attention.

- **Dr. Robert Ballard (8%)**
  - Bob Ballard - he is a visionary of great things in our time and for the future of our planet.
  - The host is likeable, well educated, and interesting/has a good sense of humor.

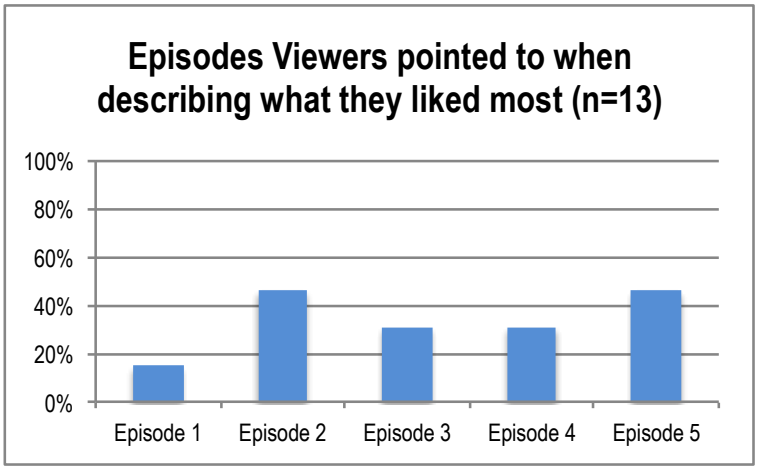
- **Guest experts (6%)**
  - Team or guest experts.
  - The variety of experts they brought in to work together.

- **Use of CGI (6%)**
  - I liked the computer generated animated diagrams explaining some of the more complex processes.
  - Explain and CGI of ships and how they related to archaeological finding (sewing ships).

Episodes most often mentioned

Additionally, just under a fifth of Viewers (18%) mentioned a specific episode or episodes in their responses about what they most liked.

As shown in the chart to the right, among the Viewers who pointed to specific episodes of *Alien Deep* (n=13), most often pointed to episodes 2 (46%) and 5 (46%), followed by episodes 3 (31%), 4 (31%), and, to a lesser extent, episode 1 (15%).



Examples of Viewers' comments on specific episodes follow below:

- **Episode 1 (15%)**
  - Episodes 1 and 3 were fascinating and beautiful and there was a lot of extraordinary footage coupled with lots of information. Rare footage and truly new landscapes made visible.
  - I don't know much about the ocean but I am fascinated by science and nature in general and find Bob Ballard's theories and explorations super interesting. I really liked how the first 2 episodes specifically on his explorations.

- **Episode 2 (46%)**
  - Episode #2 and the ancient sea exploration/ship discoveries. I enjoy history and seeing the advancements of ancient ships construction was entertaining.
  - I really enjoyed episode 2. I am a history buff so doing the research to find out how the ancient Greeks (Egyptians, etc.) traveled was interesting. Also finding the vessels from 7th century B.C. was awesome!

- **Episode 3 (31%)**
  - The best part of the *Alien Deep* was when Dr. Ballard explored the new growth on a volcano in episode 3. This inspired a sense of awe and guided me towards a variety of insights about the Earth as one large organism. Quite frankly this has had a very significant impact on my way of looking at the world and my place in it.
  - The last 3 episodes were extremely informative about how the oceans affect our daily lives and climate change.

- **Episode 4 (31%)**
  - Discs 2 and 4 were my fav.
  - The last two programs. The attempts to tie the study of the oceans to current policy debates. The images of the deep.

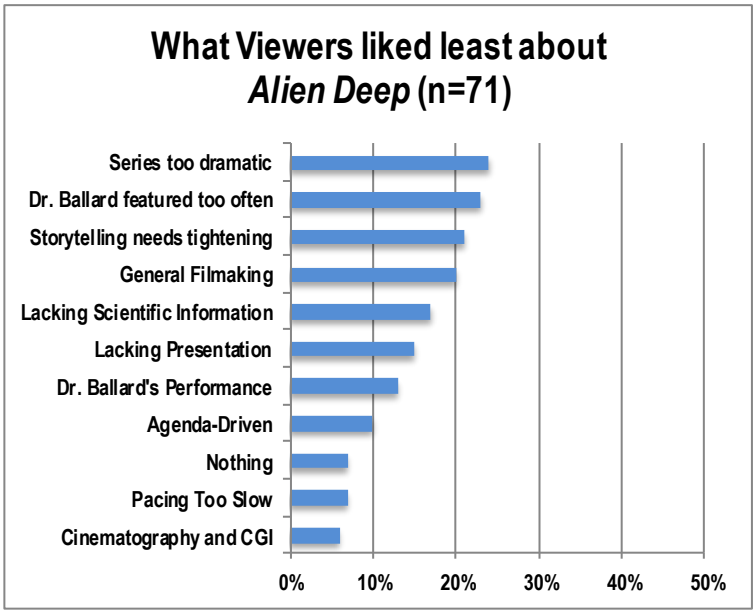
- **Episode 5 (46%)**
  - I really liked the last show talking about ways we could actually live in the ocean.
  - I really liked the 5th episode as it discussed our future through colonization. It made myself envision the future and raised awareness about what we should do now.

1.2 What did Viewers like least about *Alien Deep*?

Viewers didn't focus on any one particular theme when asked to identify something they didn't like about the series. The most frequent issues raised were that the program was too dramatic or sensational, that Bob Ballard was featured too often, or that the storytelling needed tightening. Some Viewers focused on the presentation of information, indicating that the series didn't contain enough science/information or that it was vague, one-sided, or poorly done.

Viewers were asked to describe what they liked least about *Alien Deep*. The chart below shows the main aspects Viewers pointed to and the percentage of respondents citing each aspect. Less than a tenth (7%) indicated that they liked everything about the series.

Filmmaking/storytelling



While no one problem stood out for a majority of Viewers, the largest groups focused on how the series was produced. Less than a quarter each: found the series too dramatic or sensational (24%), thought the storytelling needed tightening (21%), or disliked something about the filmmaking in general, including the title, length, and music (20%). Less than a quarter of Viewers (23%) thought Dr. Ballard was featured too often, and just over a tenth (13%) did not like Dr. Ballard's personality. Smaller groups thought the pacing was too slow (7%) or commented on the visuals, including cinematography and CGI (6%

Presentation of information

Small groups of Viewers also disliked something relating to the presentation of information in *Alien Deep*. Just over one-sixth (17%) felt that the programs didn't contain enough science or information. Additionally, about one-sixth of Viewers (15%) thought the presentation of information was lacking, and a tenth (10%) found parts of the program to be offputtingly agenda-driven.

Examples of Viewers' comments on the above themes follow below:

- **Series was too dramatic or sensational (24%)**

- Constant references to impending and imminent changes to manipulate my attention.
- Do not enjoy the dramatization and sensationalization of the program, it takes away from the content.
- I didn't like the anecdotal passages in some episodes (e.g. narrations of events taking place during a dive to make it seem more dangerous than it really is).
- It was a bit over-dramatic; too much reliance on dramatic music/footage to sway opinion rather than presenting real information and allowing people to process and make their own decisions.
- Some of the setbacks tended to be overdramatized by the narrator. The programs need for dramatic effect was evident. This is an issue with all programs of this type.

- **Dr. Robert Ballard featured too often (23%)**
  - Bob Ballard, every time he came on camera I found my attention waning. And I wanted to ask him what exactly he was a doctor of?
  - Didn't need to hear Bob Ballard's name 100 times.
  - I believe there was a little too much personal insight on Dr. Ballard.
  - Too much time given to Bob Ballard and while I respect him I would want other voices as well.
  - Repeating - "I discovered the Titanic" Big snore on the Titanic.
  - First 2 episodes seemed to be more about Dr. Robert Ballard and his accomplishments than any ocean "facts".

- **Storytelling needed tightening (21%)**
  - I thought at times it was slow during episodes and some editing could be done to better maintain an audience's attention for the duration of an episode.
  - It felt repetitive at times. The same shots were used more than once in a segment and the narrator often repeated himself.
  - There was NO flow between episodes. Episode 1 and 3 seemed like they kind of went together. Same with 4 and 5. But the order of the first 3 seemed confusing and the shift between episodes was kind of jarring.
  - Some episodes seemed to lack a story line/I was not sure where they would go next and the relation to what they had already covered.
  - The repetition- the show recapped what was going on after certain points (I assume they were commercial breaks), it sometimes felt like they spent more time recapping than providing new content. It felt like producers did not expect to keep the audience beyond a single commercial break - or that they only expected people to watch one portion. I don't like that assumption.

- **Filmmaking in general (20%)**
  - Very disappointed with the research and editing of narration. Poorly written. And many redundancies ("dead lifeless") and ambiguous phrases ("ancients" ancient who? And "mankind"). Also I thought in the early episodes it was strange that the land was gendered ("she").
  - Too much filler narration, trying to persuade the viewer that interesting things are interesting. Show, don't tell. Terrible, useless metaphors. BB walking through a field didn't help me better understand the distribution of undersea debris. And honestly, what the crud does the cyclone have to do with ocean currents? Totally lost me.
  - It felt to me like 90% of the first 3 shows were fluff and clichés and gimmickry.
  - Seemed too long, it could have been shortened by 10-12 minutes and still been effective.
  - Some clips used over and over, some over dramatic music, some clips (with Bob) scripted/acted, but I suppose you have to create transitions that are visually interesting.

- **Program didn't contain enough science/information (17%)**
  - I felt that the first two episodes could have had more information and knowledge. They were lacking and boring…Also no mention of plastic island and radiation, or the gulf spill and impacts from those on ecosystems.

- There could have been more content and more opinion provided; too much time given to Bob Ballard and while I respect him I would want other voices as well. Sometimes not enough scientific details. Not enough detail on biodiversity. Little attention given to Indian Ocean.
- The first episode was not as informative about "the facts" of how the coral life is able to live in deep oceans under that amount of pressure. The second episode was more about ancient history than the ocean. Seemed useless to the topic. First 2 episodes seemed to be more about Dr. Robert Ballard and his accomplishments than any ocean "facts".

- **Presentation of information lacking (15%)**
  - Too many abstract images and references. i.e. the Hawaiian men in DVD #1.
  - Silly analogies (cup of tea as waves, roller coaster analogy) seemed contrived but may be good for kids).
  - Unbalanced presentation of information - Ballard's point of view only.
  - I didn't like the anecdotal passages in some episodes (e.g. narrations of events taking place during a dive to make it seem more dangerous than it really is) I didn't like some of the dumbed down language and metaphors.

- **Dr. Robert Ballard's personality (13%)**
  - "I'm better than astronauts" Bob Ballard. He had a lot of hubris but I also appreciated his knowledge and experience.
  - Found Ballard pompous and egocentric, hard to listen to.
  - I respect Dr. Ballard for his accomplishment, at some point his ego needed to be checked.
  - Bob Ballard is a little bombastic and boastful, which makes him a little difficult to relate to.

- **Agenda-driven (10%)**
  - The series seemed to get a bit preachy toward the end and started using some cliched scare tactics. This turns me off as I feel like the next step is to ask for money and guilt me into buying something. This in turn makes me start to question the validity of the material presented.
  - The last episode felt like a sales pitch.
  - Seemed a bit political (although I agree with the politics).
  - I found the last 2 episodes too pedagogical and climate change agenda driven. I prefer to watch documentaries that highlight facts and findings and then decide how I feel about overall arguments. I understand that a bit of campiness helps a program expand its audience but I also think that pedagogy works to counteract any gains made through cinematic and popular appeal.

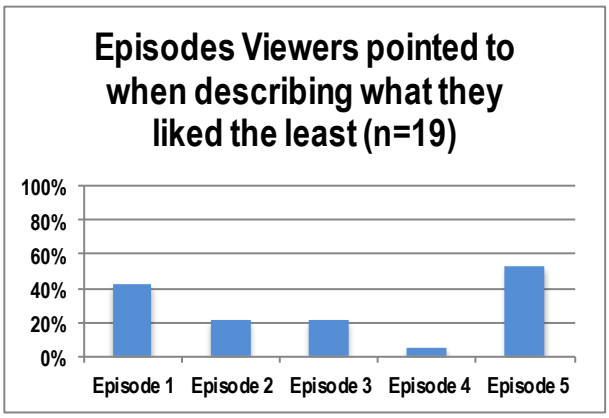
- **Nothing (7%)**
  - I cannot think of any serious problems or concerns I had with the series.
  - I loved it!

- **Pacing too slow (7%)**
  - I thought at times it was slow during episodes and some editing could be done to better maintain an audience's attention for the duration of an episode.
  - The program was slightly slower and I would have enjoyed more of a succinct story with a bit more scientific explanation. Stories were a little slow.

- **Cinematography and CGI (6%)**
  - Could have been more visual appealing at times but overall well done.
  - Too much CGI at times, more real footage.

Episodes most often mentioned

Additionally, more than a quarter of Viewers (27%) mentioned a specific episode or episodes in their responses about what they disliked. As shown in the chart to the right, among the Viewers who pointed to specific episodes of *Alien Deep* (n=19), they most often pointed to episode 5 (53%), episode 1 (42%), episodes 2 and 3 (21% each) and, to a lesser extent, episode 4 (5%). Examples of Viewers' comments on specific episodes follow below:



- **Episode 1 (42%)**
  - Too many abstract images and references. i.e. the Hawaiian men in DVD #1.
  - Episode #1,3,5 were choppy and did not flow as a cohesive story/episode.
  - It felt to me like 90% of the first 3 shows were fluff and clichés and gimmickry.
  - The first episode was not as informative about "the facts" of how the coral life is able to live in deep oceans under that amount of pressure.
  - First episode moved too slowly.
  - I disliked the first episode as the ending was disappointing and unfulfilling.

- **Episode 2 (21%)**
  - The second episode was more about ancient history than the ocean. Seemed useless to the topic.
  - Episode 2 was horribly boring and the fact it cost $1000 a minute is an unbelievable waste of resources.

- **Episode 3 (21%)**
  - The 3rd part in the series about how life began in the deep was too technical for me. I know it's an important issue for scientists but it was a little difficult for me as a non-scientist to get involved with.
  - I did not like the 3rd DVD as much because it was kind of slow.

- **Episode 4 (5%)**
  - Also episodes 4 and 5, while moderately informative, were just not up to par with past programming. Too much about the scientists (sitting at a coffee bar, getting into a taxi, at the controls; etc.) and too little actual footage. With all this money being spent, should be 95% footage and 5% about the scientists walking around.

- **Episode 5 (53%)**
  - There wasn't much I didn't like; however, I thought Dr. Ballard expressed his strong opinion in disc 5 slightly too much about his disliking of the thought of life on Mars.
  - How repetitive, especially the last episode, was on emphasizing the importance of the ocean over all i.e. space.
  - The last episode felt like a sales pitch.
  - After watching the first 4, the fifth (about space) seemed a little out of place.
  - I disliked disc 5 and how Ballard idea for a future focused on the ocean exploration vs. the other guy Buzz focused on Mars
  - I did not like the way ocean exploration is posed against space exploration in episode 5.

1.3 How did Viewers rate *Alien Deep* in terms of overall appeal, content interest, visual engagement, storytelling, tone, and the likelihood of recommending the program?

Viewers generally liked the mini-series and thought it featured interesting content, had engaging storytelling, and was visually exciting. Viewers also found the tone moderately hopeful and expected that they were likely to recommend the program to others.

Viewers were asked to rate *Alien Deep* for the extent to which they liked or disliked the program and found: the content boring or interesting, the program visually exciting or dull, the storytelling boring or engaging, and the tone hopeful or depressing. They were also asked to estimate their likelihood of recommending the program to others. The table below presents the median ratings based on a scale from 1 (rated the lowest) to 7 (rated the highest).

Overall median Viewer ratings of *Alien Deep* (n=71)								
	1	2	3	4	5	6	7	
Disliked						6.0		Liked
Boring content						6.0		Interesting content
Visually dull						6.0		Visually exciting
Boring storytelling						6.0		Engaging storytelling
Depressing tone					5.0			Hopeful tone
Would not recommend					5.0			Would recommend

The median ratings in each case indicate that, overall, Viewers liked the program (6.0) and generally agreed that it contained interesting content (6.0), was visually exciting (6.0), and had engaging storytelling (6.0). Viewers generally felt the tone was moderately hopeful (5.0) and indicated they were likely to recommend the program to others (5.0).

Mann-Whitney tests did indicate a few subgroup differences, as follows:

- Female Viewers rated their overall liking of the program significantly higher than did male Viewers (Mdn= 6.0 vs. 5.0).[12] The effect size in this case was considered a small effect (r=.27).

[12] (*U* = 441, *p*=.024, r=.27)

- Viewers 41 and older rated the program's visual interest significantly higher than did Viewers aged 17-28 (Mdn= 6 vs. 5.5).[13] The effect size in this case was considered a medium effect (r=.35).

- Compared to Viewers aged 29-40, Viewers 41 years and older also gave significantly higher ratings to their overall liking of the program (Mdn=6.0 vs. 5.0)[14], the program's storytelling (Mdn= 6.0 vs. 4.0),[15] and visual interest (Mdn=6.0 vs. 5.0)[16] and their likelihood of recommending the program (Mdn=6.0 vs. 5.0).[17] The effect sizes in each case were considered medium effects (see footnotes for r values).

Examples of Viewers' comments follow below.

- **Liked or disliked**
  - I liked it overall and would be interested in future shows like this.
  - Overall, I liked watching the series - and found it easy to follow.
  - This is a great educational program!
  - Good mix of great footage combined with educating the viewer.
  - Overall a good series, although Ballard is a bit of a blowhard and braggart.
  - I would have enjoyed it more had I not seen 5 episodes within 2 days.
  - In general, I felt annoyed by the extreme emphasis on the risks of the explorations, and by the abundance of unreferenced or not- fundamental opinions expressed there (specially episodes 1 and 5).
  - Unfortunately this show trends the same way Nat Geo magazines do these days- more dramatic pandering; lower complexity of language; less real, hard data; a lot of colloquialisms; too much CGI. I grew up reading my grandparents old collections of National Geographic Magazines. They were a bastion of good writing, unbiased reporting, reliable data, and incredible imagery. I feel those have been sacrificed in an attempt to reach a wider, nowadays less educated on the whole, audience.

- **Interesting or boring content**
  - Enjoyed the content, but did not like the way extra drama and excitement was attempted to be conveyed.
  - I enjoyed learning about the content.
  - Was not impressed with the content of first 2 episodes, but very much enjoyed episodes 3 through 5. Was more interested in the ocean itself than the story lines regarding machinery used.
  - At moments the episodes seemed really slow and stuffed with filler. I would appreciate it if they were more dense with actual data.
  - There wasn't enough actual science in the first 2 episodes.
  - The only reason I felt it was a bit dull is there was a lot of repetition.

- **Engaging or boring storytelling**
  - Storytelling- a little sporadic, not always able to tell what the goal of the episode is, especially Ocean's Turf.
  - Maybe a British narrator's voice could have helped (seriously!)
  - I did not love the editing. Strange and not very well developed associations between native/ancient peoples and the ocean. The tone seemed at times a bit nostalgic and imperialist. I enjoyed it best when it remained most objective and fact driven.

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[13] (*U*=167 p=.015, r=.43)
[14] (*U*=139 p=.003, r=.43)
[15] (*U* = 141, *p*=.003, r=.37)
[16] (*U* = 143, *p*=.003, r=.43)
[17] (*U*=139 *p*=.003, *r*=.44)

- I felt like the storytelling was less than captivating. I never felt like there was a clear plot or protagonist with which to identify, which is essential in telling a story.
- Some episodes better for a 30 min format.
- The storytelling was too dramatic, too "danger" (they said this like 10x each episode) oriented, and too Bob Ballard (they said his name 30x per episode… yes, I know who you are) focused.

- **Visually exciting or dull**
  - The locations and graphics were stunning.
  - The series was visually beautiful.
  - Very good use of CGI animation in the 4th episode.
  - The only suggestion I would make is to spice up the visuals some more. I enjoyed the CGI or animations of the ocean floor interspersed with real footage.
  - I would have preferred more actual footage and less animation. I'd find that more compelling to watch and more informative, and it would also help make the case that those expensive expeditions are yielding useful information.
  - Visuals- too much CGI.
  - There were some excellent visuals and simulations - but the detours into Bob Ballard's home life were unnecessary.
  - Some of the CGI used, especially when used to depict sea like appeared poorly done, the animals/fish did not look realistic.
  - I would have liked to see more footage of animals, underwater footage of wrecks, footage of storms etc. And less CGI and reenactments.

- **Depressing or hopeful tone**
  - 5 = I mean it was serious, not depressing, but not fluffy happy, made me care about the issue.
  - Tone made me feel like "what can I, as a single human, do to help?"
  - The story and tone are reality so no changing that.
  - The last two episodes were far more depressing than the first three.
  - Overall very interesting, but really feel "pitting" the Mars vs. Ocean exploration felt childish and spoke to a sense of limiting our possibilities by having to explore one over the other, didn't like negative commentary.

- **Would or would not recommend**
  - Would recommend to people who have an existing interest in this kind of programming.
  - I would recommend the first 3 in the series, after that I was a bit put off by the cranked up cheesiness, campiness, and pedagogy.
  - 2/5 episodes were good and I would recommend. 3/5 were confusing and choppy. The space episode was my least favorite (#5).
  - I would highly recommend episodes 1 and 3 but none of the others
  - Some people may not be as appreciative at its message so I'm uncertain if I'd recommend.

1.4 What did Viewers think of the host and his ability to inspire?

Viewers were generally positive about their experience watching Dr. Robert Ballard and indicated they were inspired by his passion and curiosity. When asked to describe the main words or phrases that came to mind when thinking of him, Viewers most often indicated that they thought he was passionate, intelligent, and successful, and/or that he had a large ego.

1.4a Perceptions of Dr. Ballard as a host

Viewers were asked to rate their experience watching Dr. Robert Ballard and indicate if and how inspired they were by his presentation. The table below presents the median ratings based on a scale from 1 (strongly disagree) to 7 (strongly agree).

Median Viewer ratings of the host and his ability to inspire (n=71)							
	Strongly Disagree 1	2	3	Neutral 4	5	6	Strongly Agree 7
I enjoyed watching Bob Ballard share his experiences exploring and studying the ocean					5.0		
I was inspired by Bob Ballard's passion and curiosity					5.0		

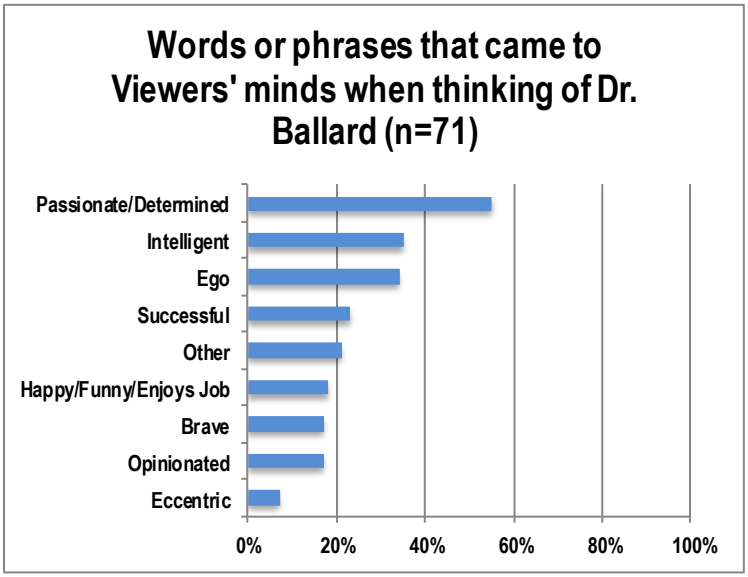
Viewers moderately agreed that they enjoyed watching Dr. Ballard share his experiences exploring and studying the ocean (5.0) and that they were inspired by his passion and curiosity (5.0). When given the opportunity to provide additional feedback, only a handful of Viewers commented, as follows:

- **I enjoyed watching Bob Ballard share his experiences exploring and studying the ocean**
  - Absolutely a wonderful program- should be shown to school age children to encourage more ocean research and exploration for future generations!

- **I was inspired by Bob Ballard's passion and curiosity**
  - I feel inspired to re-watch this series and learn more through other methods.
  - This program really increased my awareness and interest on how the ocean functions and the importance of it for life on our planet.

1.4b Words of phrases used to describe Dr. Ballard

As shown in the chart to the right, when asked to list the main words or phrases that came to mind when thinking of Dr. Ballard, more than half the Viewers (55%) described him as passionate or determined. About a third each commented on his intelligence (35%) or his ego (34%).



Nearly a quarter (23%) indicated that they thought he was successful. Less than one-fifth each noted that he was happy/playful/funny/seemed to enjoy his job (18%), opinionated (17%), and brave (17%). Less than a tenth thought he was eccentric (7%). Approximately one-fifth of Viewers gave miscellaneous answers (21%).

Examples of Viewers' comments follow below:

- **Passionate/determined (55%)**
  - Rebel with a cause
  - Determined, motivated
  - Passionate, driven
  - Focused and intense

- **Intelligent (35%)**
  - Thinks outside the box
  - Knowledgeable
  - Brilliant
  - Visionary, great thinker of our time
  - Extremely knowledgeable

- **Ego (34%)**
  - Self-absorbed
  - Arrogant
  - A bit arrogant (more so in disc 5)
  - Bombastic, boastful

- **Successful (23%)**
  - Accomplished
  - Amazing achiever!
  - Experienced
  - Water pioneer

    Boring as a host but his accomplishments are fascinating

- **Happy/playful/funny/enjoys job (18%)**
  - Warm, friendly
  - Nice person at the end

- Silly at times
- Funny
- Seems as though he cares about underwater exploration and the health of the ocean
- Fascinated by his work
- Excited about his job, caring

- **Opinionated (17%)**
  - Opinionated but founded, so I could respect his point of view
  - Stubborn

- **Brave (17%)**
  - Adventurous
  - Daring

- **Eccentric (7%)**
  - Crazy but groundbreaking
  - Quirky

- **Other (21%)**
  - Realistic
  - Needed
  - Creative
  - Energetic
  - Cool/collected
  - Closed minded

1.5 How did Viewers rate *Alien Deep* in comparison to other programs about the ocean?

The majority of Viewers felt *Alien Deep* compared favorably to other television programs they'd seen because of its presentation style and breadth/width of information.

As shown in the table to the right, when Viewers were asked to compare *Alien Deep* to other programs they'd seen about the ocean, more than half (56%) said it compared favorably, 30% said it was comparable, 23% said it compared unfavorably, and one Viewer declined to answer the question. Some Viewers selected more than one option.

Compared favorably

Among those who felt *Alien Deep* compared favorably, a variety of reasons were offered. Just under one-sixth each appreciated that the series covered topics that aren't usually examined in other ocean-focused films (15%) and that it took a "big picture" approach (13%). A tenth (10%) appreciated the filmmaking/ presentation of information. Less than one-tenth each thought it compared favorably because they: generally learned a lot (7%), found it engaging or interesting (6%), learned about the importance of the ocean and exploration (4%), thought Dr. Ballard was a good host (3%), and/or found that it increased their awareness (3%). A handful gave miscellaneous answers (6%).

Was comparable

Those who felt the series was comparable (30%) explained that *Alien Deep* seemed to present similar content in the same ways

How Viewers thought *Alien Deep* compared to other television programs they had seen about the ocean (n=71)

Compared favorably because…	**56%**
The series covered new topics	15%
The series took a "big picture" approach	13%
Filmmaking/presentation was well done	10%
Generally learned a lot	7%
Found it engaging or interesting	6%
Enjoyed learning about the importance of the ocean and its exploration	4%
Dr. Robert Ballard was a good host	3%
The series increased Viewer awareness	3%
Miscellaneous	6%
Comparable because…	**30%**
Presented similar content in the same way	27%
Haven't seen many programs about the ocean	3%
Compared unfavorably because…	**23%**
Disliked Dr. Robert Ballard or thought he was onscreen too often	8%
Thought the filmmaking was sub-par	8%
Thought the series was short on substance	7%
Viewers prefer programs with more information about ocean life	4%
Thought the series was overly dramatic	4%
Found the series to be agenda-driven	1%

as other ocean-focused series (27%) or said that they hadn't seen many other programs about the ocean (3%).

Compared unfavorably

Those who felt the series compared unfavorably (23%) pointed to different themes. These Viewers generally disliked Dr. Ballard or thought he was onscreen too often (8%) and/or took issue with the filmmaking, finding it poorly executed (8%), short on substance (7%), or overly dramatic (4%). A handful of Viewers indicated that they prefer programs with more information about ocean life (4%), and one Viewer said s/he found the series to be agenda-driven (1%).

Examples of Viewers' comments in each category follow below:

- **Compared favorably (56%)**

  The series covered new topics (15%)
  - I've only seen ocean shows that focus on the creatures/animals that live there. This had neat perspectives.
  - It covered a wide range of ocean related topics a much larger scope of material than most.
  - It doesn't stay in the past explanations of history and the ancients but develops and explains a vision for the future.
  - It treats topics about more rare aspects of the ocean.
  - This one was more about how oceans affect people and our future on earth and less about how we effect ocean and ocean life - seemed a more + thing
  - Ties in the importance to humans.

  The series took a "big picture" approach (13%)
  - It covered a wide range of ocean related topics a much larger scope of material than most.
  - It focuses on a much larger picture than just the ocean.
  - Liked the multi-directional process used to address the topic of each show.
  - It covered many topics and was very interesting.
  - It took a mix of broad and narrow approaches.
  - Perspective over time of one oceanographer.

  The filmmaking and presentation of information were well done (10%)
  - Good balance of science and visual
  - It used other things to explain/connect/illustrate importance of deep ocean exploration. (like surfing which I love).
  - The attention to detail in this series and the way that things were explained/shown was very comprehensive and easily understood.
  - It was so well videoed and recorded.

  Viewers generally learned a lot (7%)
  - I learned more than watching other programs.
  - I learned new things.
  - I really took a lot out of the program that I hope others will also learn.

  Viewers found it engaging or interesting (6%)
  - It covered many topics and was very interesting.
  - It is different from the programs I usually watch, and being an educational it was very engaging and interesting to watch.

- it is entertaining and educating.

Viewers enjoyed learning about the importance of the ocean and its exploration (4%)
- It highlighted many aspects of the impact oceans have.
- Views ocean as the linkage of the Earth to the land and life.
- Was very diverse in showing the uses of deep sea exploration.

Dr. Robert Ballard was a good host (3%)
- Bob Ballard is a really compelling and interesting human to narrate, regardless of how you feel about his theories.
- Bob Ballard's vast knowledge and experience adds to depth.

The series increased Viewer awareness (3%)
- It shows more use of current technologies and reasons why the average person should care.
- Never thought of the ocean as being colonize-able. (Although maybe that's a negative?)

Miscellaneous (6%)
- Funding seems strong.
- No commercial interruptions.
- I don't typically watch TV.
- I do not watch science TV (I do not watch TV).

- **Comparable (30%)**

Presented similar content in the same way (27%)
- I didn't learn many new things that significantly changed my views on the ocean's importance.
- It offers enough depth to be interesting, but not too much to lose me in the scientific details.
- It was educational and also had beautiful footage.
- It was extremely informative, the camera work/footage was compelling and the subject matter was timely and interesting.
- It's similar to other shows I've seen about the ocean.
- Less remarkable footage but interesting diverse content.
- Most I've seen are pretty good at achieving their goal.
- Sends the same message.
- They all talk about same thing.

Haven't seen many other programs about the ocean (3%)
- I haven't really seen many in deep ocean programs.
- I have not watched that many about oceans.

- **Compared unfavorably (23%)**

Viewers disliked Dr. Ballard or thought he was onscreen too often (8%)
- Bob is a bit arrogant.
- Over-glorification of Robert Ballard
- Too focused on Bob Ballard.
- Too much Ballard.
- Too much emphasis on 1 person, less on the topic of the ocean.

Viewers thought the filmmaking was sub-par (8%)

- As a five-part series, the episodes don't really connect with each other, the order of the episodes didn't make sense either.
- It relies on far too heavily on clichés and cheap storytelling devices.
- Somewhat unfavorably. Not as well written/researched.
- The concept is good but the execution is so-so. Use of CGI is sometimes cheesy.
- Not fully fleshed out information on any of the topics.

Viewers thought the series was short on substance (7%)

- Didn't feel it taught me a ton.
- Not enough in depth science and explanations.
- Not enough substance and focus on the topic supposedly being covered.
- Too little scientific information.

Viewers prefer programs with more information about ocean life (4%)

- [In comparison to Planet Earth] very specific and method based - less organism based.
- I assumed the series would be about exploring the ocean floor.

Viewers thought the series was overly dramatic (4%)

- Too much Drama, not enough substance.
- Too focused on…danger.
- Unnecessary drama creation.

Viewers found the series to be agenda driven (1%)

- Politically motivated.

Section 2: How successful did Viewers find *Alien Deep* in terms of: clarity, pace, narration, focus on the host, density of science, and scientific explanations?

2.1 How did Viewers feel about the clarity and pacing of presentation?

Viewers consistently felt the program was clear and well-paced.

Viewers rated *Alien Deep* for how they felt about the clarity of the program on a scale of 1 (confusing) to 7 (clear). They also rated how they felt about the program's pacing on a scale of 1 (too slow) to 7 (too fast), with 4 being "just right." The tables below show the median Viewer ratings in each case.

Clarity of presentation

The median rating in the table below indicates that Viewers generally found the program to be clear (6.0).

Median Viewer rating of the clarity of *Alien Deep* (n=71)								
	1	2	3	4	5	6	7	
Confusing presentation						6.0		Clear presentation

When invited to explain their ratings a few Viewers choose to do so. Examples of their comments follow below:

- Very understandable to the layman.
- Dr. Ballard used a lot of similes and metaphors that helped to understand the content better- I appreciated and enjoyed them.
- The organization was at times scattered but nothing that couldn't be followed.
- Sometimes a little unclear about the point of the episode but in general I learned interesting facts and angles I had not previously considered.
- A few times, I felt like the program went on a tangent without really coming back. At these times, I found myself trying to convey the material to the main topic, then missing a bit of new material.
- Some of the content from the end of episode 1 was slightly unclear.
- Again, the coherence of the programming didn't entirely make sense. I expected a lot of the program to be like episode 1 so when it jumped around it would take me awhile to get back in.

- Slightly lower value of clarity because of the ways the story is told from many people, but I learned a lot about the ocean I did not realize.
- While I learned things, the information was presented in a confusing manner. The dialogue and video didn't match up time-wise (something would be shown, but not introduced or vice versa for several seconds) creating a lapse in interest or cohesive thought
- The last episode seemed like it jumped around all over the place, the first 4 were more focused.
- I thought the 1st DVD was a little confusing, kind of jumpy from topic to topic.

Pacing

The median rating in the table below indicates that Viewers generally found the program to be paced appropriately (4.0). One subgroup difference was found as follows. Viewers aged 17-28 rated the program's pace significantly lower than did Viewers 41 and older who generally found it just right (Mdn= 3.0 vs. 4.0).[18] The effect size in this case was considered about a medium effect (r=.42).

Median Viewer rating of the pacing of *Alien Deep* (n=71)								
	1	2	3	4 Just right	5	6	7	
Pace was too slow	4.0							Pace was too fast

When invited to explain their ratings a few Viewers choose to do so. Examples of their comments follow below:

- Very good pace. But there was a constant focus on Ballard's theories and visions.
- The series was a bit slow in general.
- At times there was repetition that made the pace slow.
- There was a small pace issue with the first episode for me personally, it felt a bit slow and dull at points. I was fine with the lengths of the episodes, but for a more general audience a brief deduction in time might help keep things interesting.

[18] (*U*=149 p=.004, r=.42)

2.2 How did Viewers feel about the amount of narration and focus on Dr. Robert Ballard?

Viewers were largely in favor of the amount of narration and focus on Dr. Robert Ballard.

Viewers rated *Alien Deep* for how they felt about the amount of narration and focus on Dr. Robert Ballard. The table below presents the median ratings based on a scale of 1 (too little) to 7 (too much), with 4 being "just right."

Median Viewer ratings of narration and focus on Dr. Robert Ballard (n=71)								
	1	2	3	4	5	6	7	
Too little narration	4.0							Too much narration
Too little focus on Bob Ballard	5.0							Too much focus on Bob Ballard

The median ratings in the table above indicate that Viewers generally found the amount of narration to be about right (4.0) and the focus on Dr. Robert Ballard was about right or slightly too heavy (5.0).

Examples of Viewers' comments follow below:

- **Too much or too little narration**
  - I liked the amount of narration, however I felt that they could have added slightly more specifics instead of the people's opinions.
  - The narration was good although it was a little over dramatic.
  - I enjoyed the narration at times more than the interview.
  - Narration was good, but a caption with the speakers name and title would have been good. I didn't know who some of the speakers were despite being shown multiple times.
  - Too much poor and unfocused narration; well, unfocused on what I wanted to hear about: the scientific, cultural, and world information and knowledge
  - Narration needs to have meaningful (not repetitive) content. Lots of unnecessary and drama building content, not information dense.
  - Maybe my problem with the narration is that I disliked the writing so much.
  - As I said previously the narration felt repetitive at times.
  - Overall narration was slow and shallow. The instances of actual concrete and precise information and data were rare.
  - The narration wasn't really too much or too little; it was not informative enough and way too circular and repetitive. The "hero's journey" structure was less interesting than what was being studied.

- **Too much or too little focus on Bob Ballard**
  - Overall I thought it was great and have a new appreciation for Bob Ballard and his studies.
  - I felt like there was just enough focus Dr. Ballard; if it wasn't supposed to have him included often, he wouldn't have been in the introductions.
  - There was a lot about Bob Ballard but he is the leader of the expeditions.
  - I thought there was slightly too much of Bob Ballard despite his contributions to these discoveries.
  - I like Bob, but I think some more voices would contribute to the storytelling. He's a very "grandfatherly" figure. Very smart, clearly, but a little eccentric and very opinionated.
  - Ballard was an interesting protagonist but certainly strange and difficult for me to identify with.
  - I understand the focus on Ballard- but there was several people included that never got any recognition for the viewer to know who they were: i.e. Nye, Aldrin.
  - I felt Ballard had a huge presence, and I would've liked to hear from other people.
  - If this is a Bob Ballard miniseries, the title and focus should be shifted to that. If it is "*Alien Deep*" only deep water events should be shown. As an ocean based miniseries, too much Bob.

2.3 How did Viewers feel about the amount and level of science presented in the program?

Viewers felt that the amount and level of science presented in the program was about right.

Viewers rated *Alien Deep* for how they felt about the amount of science and level of scientific explanations. The table below presents the median ratings based on a scale of 1 (lowest rating) to 7 (highest rating), with 4 being "just right."

Median Viewer ratings of the amount of science and level of scientific explanations (n=71)								
	1	2	3	4	5	6	7	
Too little science	4.0							Too much science
Scientific explanations too shallow	4.0							Scientific explanations too deep

The median ratings in the table above indicate that Viewers generally found the amount of science to be about right (4.0) and the level of scientific explanations to be about right (4.0).

A few subgroup differences were found for gender and age, as follows.

- Females generally rated both the program's amount of science (Mdn=4.0 vs 3.0)[19] and level of scientific explanations (Mdn=4.0 vs. 3.0)[20] as about right, while males tended to find that the science erred on the side of being slightly too little and shallow. The effect sizes in each case were small effect sizes (r=.28, r=.27).

- Viewers aged 29-40 rated the level of scientific principles significantly higher than did Viewers aged 18-28 (Mdn= 50 vs. 4.0). The effect size in this case was considered a medium effect (r=.41).[21]

Examples of Viewers' comments follow below.

- **Too little or too much science**
  - Great pace + level of info. Loved the wheat field analogy of the side scan sonar technology used!
  - Perfect. Especially for a movie.
  - I thought it was enough science but didn't go over my head.
  - For a popular show [selected "4: just right"] - for education it should be more scholarly

[19] (*U*=442, *p*=.020, *r*=.28)
[20] (*U*=451, *p*=.024, *r*=.27)
[21] (*U*=164, *p*=.005, *r*=.41)

- More information. I'm watching this because I'm a nerd.
- More science please. What little there was seemed dumbed down.
- I would have appreciated more but I feel that I have more appreciation for science than your average TV viewer.

- **Scientific explanations too shallow or too deep**
  - Some of the science on life's origins was too abstruse for me.
  - I thought the explanations and breakdown were perfect.
  - I feel there was a good balance of visual content and explanation.
  - Depends on the target audience. Was slightly below what I would have understood (17 year old student).
  - I felt the program was interesting but easy to follow.
  - Even though I liked the easy to understand content, I could have dealt with more techy stuff.
  - Needed more scientific facts to back up opinions, explanations etc.
  - I would have liked more scientific content and explanations of that content i.e. what nutrients are in the ocean? How do the life forms exist under that much pressure?
  - Low information density fails to engage me.

Section 3: What did Viewers learn from *Alien Deep*?

Viewer learning from *Alien Deep* was assessed in multiple ways. From a qualitative standpoint, Viewers completed a combination of self-report and open-ended questions to indicate how much they felt they learned from the program and to explain: the most interesting things learned, what new information they learned about the ocean, whether and how they felt or thought any differently about the ocean, and whether and how they thought differently about the importance of ocean research and exploration to humanity as a result of viewing.

The learning impacts of the mini-series were further evaluated using a combination of self-report, open-ended, and forced-choice objective content-based assessment items, as well as a small set of belief and attitudinal items. Questions were based on the following overall themes, which were generally consistent with the Ocean Literacy Framework:

- Knowledge of ocean properties, characteristics, and life forms;
- Knowledge of ocean research and discovery;
- Perceptions of ocean health and problems;
- Perceptions of the importance of the ocean to humanity;
- Personal stewardship and ability to communicate about the ocean; and
- Personal relationship to the ocean.

To assess learning within these content areas both Viewer and Control group participants completed a 50 point "quiz" that included a combination of multiple choice, true/false, fill in the blank, and open-ended questions. Both groups also completed a small set of supplemental questions directed at understanding participants' ocean-related beliefs and attitudes related to the series' themes.

Where possible, items were borrowed or adapted from the project's formative evaluation or from nationally or regionally administered instruments including the: Ocean Project Public Opinion Survey (1999, 2010), Survey of Ocean Stewardship (SOS) Instrument (2008), Survey of Ocean Literacy & Experiences (SOLE) Instrument (2008), The Mellman Group for SeaWeb (1997), AAAS Public Opinion Survey (2009), The National Museum of Natural History visitor survey (1996), New Ecological Paradigm: Dunlap & Van Liere (2000), and The Centers for Ocean Sciences Education Excellence (COSEE) Ocean literacy principles (2005). References for each instrument are provided under References.

The main findings from the evaluation are detailed below.

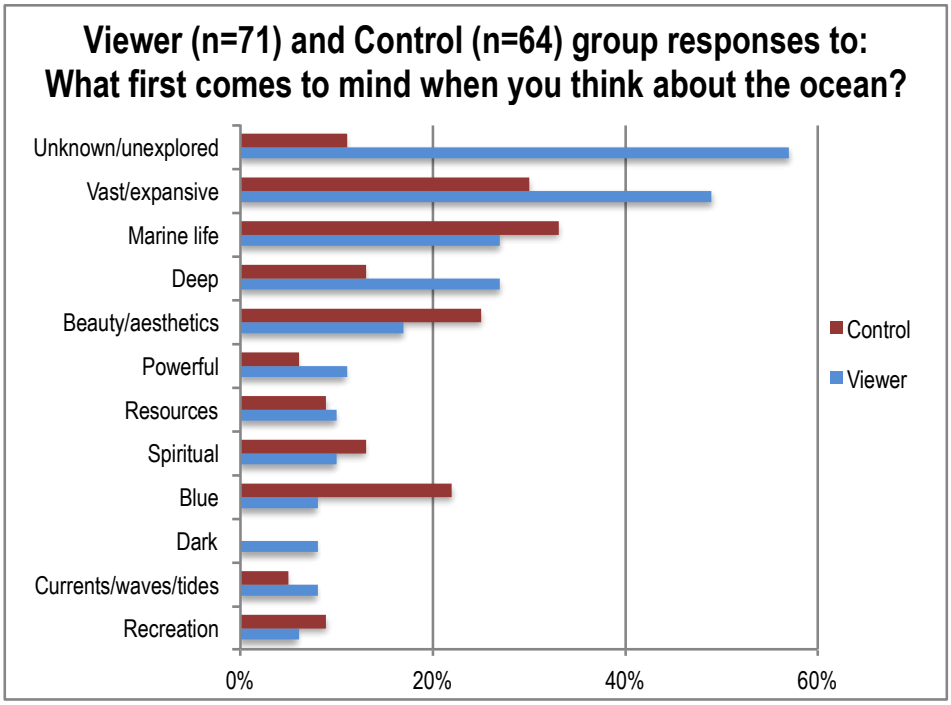
3.1 What words and phrases did Viewers use to describe the ocean immediately after watching *Alien Deep*?

After watching *Alien Deep*, Viewers most often described the ocean as unknown/unexplored, vast/expansive, and deep. Control group participants most often described the ocean in terms of its marine life, followed by descriptors that related to its vastness/expansiveness, beauty/aesthetics, or blueness.

Immediately after viewing *Alien Deep* Viewers were asked to list the first words or phrases that came to mind when thinking about the ocean. Control group participants also answered the same question upon beginning their survey. As the chart below shows, both groups frequently focused on the ocean being vast/expansive and deep, although in both cases substantially higher percentages of Viewers than Control group participants used these words (49% to 30% for vast/expansive and 27% to 13% for deep).

Additionally:

- The largest group of Viewers described the ocean as unknown or unexplored (57%), compared to a small group of Control participants (11%).
- About a third of Control group participants (33%) pointed to marine life, compared to just over a quarter of Viewers (27%).



- More Control group participants (25%) than Viewers (17%) pointed to the ocean's beauty/aesthetics. Similarly, more Control group participants (22%) than Viewers (8%) described the ocean as blue.
- Less than one-sixth of Control group participants described the ocean as spiritual (13%) or powerful (6%), or pointed to the ocean's resources (9%), recreation opportunities (9%), or currents/tides/waves (5%). No one in the Control group described the ocean as dark.
- Finally, less than one-sixth of Viewers described the ocean as spiritual (10%), powerful (11%), or dark (8%), or pointed to the ocean's resources (10%), recreation opportunities (6%), or currents/tides/waves (8%).

3.2 How much did Viewers feel they learned from *Alien Deep*?

Viewers generally learned a considerable amount from watching the mini-series, both in general and about the importance of the ocean.

Viewers rated *Alien Deep* for what they learned, both in general and about the importance of the ocean. The table below presents the median ratings on a scale of 1 (learned nothing) to 7 (learned a lot).

Median ratings of what Viewers learned in general and about the oceans (n=71)								
	1	2	3	4	5	6	7	
Learned nothing overall						6.0		Learned a lot overall
Learned nothing about the importance of our oceans						6.0		Learned a lot about the importance of our oceans

The median ratings in the table above indicate that Viewers generally learned a considerable amount from watching the 5-part mini-series, both in general (6.0) and about the importance of oceans in particular (6.0). One subgroup difference was found as Viewers aged 41 and older rated their overall learning from the program significantly higher than did Viewers aged 29-40 (Mdn=6.0 vs. 5.0). The effect size in this case was considered a medium effect (r=.35).[22] Examples of Viewers' comments follow below.

- **Learned a lot or a little overall**
  - Though I learned some about the role oceans play in the overall system, what I learned is too vague and general considering the time invested in watching the whole series.
  - I feel like I did learn some interesting facts, but I took issue with some of the opinions expressed in the series. Visually it was mostly interesting.
  - There was little I learned beyond what I already knew. I'm no specialist by any means- just a concerned, informed, being of this earth.
  - Because the ocean is not somewhere I have ventured much, it gave me a lot to think about.

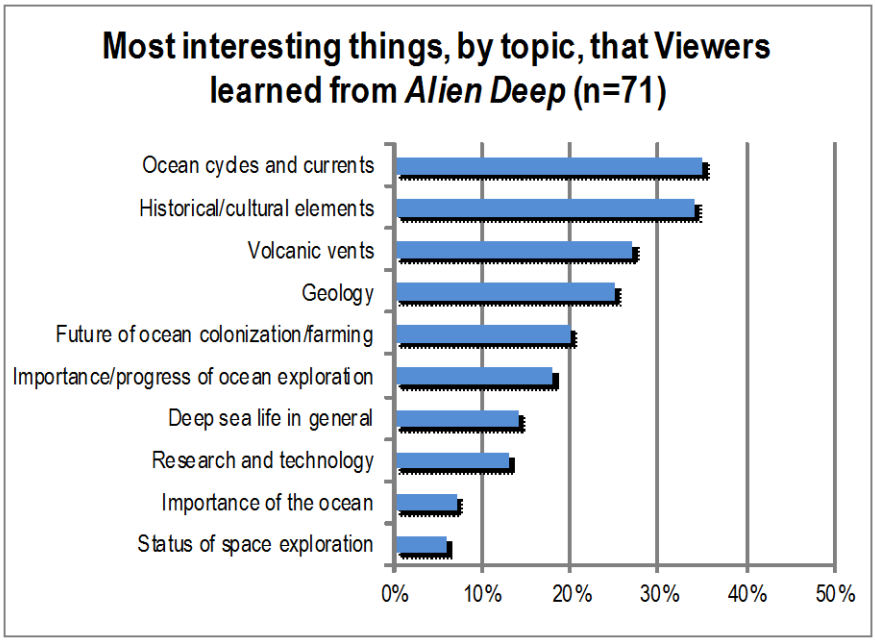
- **Learned a lot or a little about the importance of our oceans**
  - This was a great provocative series that will engage people to consider how their actions impact the oceans and how the oceans impact our lives!
  - I thoroughly enjoyed the program and feel a lot better off after watching it. I really think it gave me a new appreciation of our oceans across the globe.
  - I felt like I learned that the ocean is important but not as much of the why or in what ways as I wanted. It wasn't confusing so much as incomplete information in the presentation.
  - Learned about the global conveyer and how it affects conditions and climate cross the world. Learned about how small sea animals can generate large impacts in mixing water and generating waves.
  - What about environmental justice? What about the fact that most of the world's poor will be under water in 30 years. What about Mohamed Nasheed and the Maldives?
  - Still not clear on why the waves are getting bigger and the earth growing angrier.

[22] (*U* =166, *p*=.015, r=35)

3.3 What did Viewers feel were the most interesting things learned from *Alien Deep*?

When asked to describe the most interesting things learned from *Alien Deep*, all of the Viewers identified one or more topics of interest. Most often they pointed to information learned about ocean cycles and currents, followed by historical and cultural elements presented in the series, and information learned about volcanic vents and geology.

When asked to describe the most interesting things learned from watching *Alien Deep*, all of the Viewers identified one or more new things of interest. The chart below shows the ten main topics that Viewers most frequently pointed to and the percentage of Viewers citing each topic.



The largest group of Viewers, more than a third (35%), expressed an interest in ocean cycles and currents, such as the ocean conveyor belt and waves (rogue and otherwise). A slightly smaller group (34%) was interested in the historical and cultural elements of the series, such as the ancient mariners and the Vietnamese villagers who live on the ocean.

Just over a quarter of Viewers (27%) were interested in volcanic vents and the life they sustain. A slightly smaller group (25%) pointed to what they had learned about geology, specifically hot spots and plate tectonics while one-fifth (20%) mentioned the future of ocean colonization and farming. Less than a fifth (18%) enjoyed learning about the importance and progress of ocean exploration. Finally, a handful each pointed to: deep sea life in general (14%), research and technology (13%), the importance of the ocean (7%), and the status of space exploration (6%).

Examples of Viewers' comments on each theme follow below:

- **Ocean cycles and currents (35%)**
  - The discovery of another underwater conveyor (river).
  - I also was really interested in the research being done on the thermal conveyors- it excites me to learn that the systems are so complex.
  - The currents take 1000 years to complete a cycle around Earth. It's awesome to realize the scale!

- That water filters through the earth's center and comes back through deep ocean volcanoes and brings life necessary nutrients
- How the oceans waves are created by many different factors.
- How waves work and the mixing that fishes do.
- The role of the butterfly effect on ocean churning…. How currents work.
- Rogue waves and how they are getting "angrier", fascinating and scary.
- I was interested in the theory that sea life contributes more to sea water circulation than previously thought. I think this is potentially an exciting idea, but it seems far from being proven decisively.

- **Historical and cultural elements (34%)**
  - I really enjoyed the cultural elements - Hawaiian, Vietnamese - I think lots of the time these kinds of shows focus a lot on science without explaining the cultural points.
  - Ancient sea travel was riskier than previously thought, changed our perceptions of the ancient world. The water village in Vietnam.
  - There's a whole fishing village. I want to live there. You get rowed to school…Wine jug design advanced subtly but tellingly over like a millennium.
  - The maritime routes of ancient civilizations- because I enjoyed learning how they thought about mapping routes back then.
  - I also enjoyed learning about sunken ships that had gone down thousands of years ago.
  - Also, about how ancient sailors did not hug the coastline as had previously been taught, but made bold open sea voyages.

- **Volcanic vents (27%)**
  - I was very interested to learn about all the different thermal vents/black smokers located in so many different locations with such a variety of life surrounding them - each unique. I am so excited to learn about new discoveries in general and these especially.
  - Most interested in the super-heated water from the volcano vents providing minerals to the oceans.
  - The most interesting thing was the mineral clouds of hot water that were constantly being pumped into the ocean from the volcanic gaps. This shows that so much life and nutrients come from the ocean and are continuing to be added.
  - Volcanic vents. Completely changed my perspective on the ocean "life cycle".
  - The volcanic affect - I truly didn't know that there were volcanoes, lava underwater and its affects. Didn't know there were life forms in the deep sea. They were creepy but awesome to see.
  - That crabs live right by volcanic vents.

- **Geology (25%)**
  - There is a new Hawaiian island forming! Cool! How often does that happen? The Hawaiian islands formed as the plate moved over a hot spot. I always wondered about them forming in a line.
  - The formation of a new volcanic island and how the ecosystem of that island developed in such a short period of time.
  - That land is still being created up till today because they made me realize how special of a place earth is.
  - The role volcanoes play in our earth/land creations and how active they are underwater. Deep ocean topography, so cool mountains underwater!
  - The hot spots episode was the most informative and on topic. Seemed to be the most scientific and least political.
  - Why Iceland is the way it is in terms of its terrain.

- **Future of ocean colonization and farming (20%)**
  - The possibility of building more intricate colonies on the sea.
  - About the present and future theories for ocean inhabitation.

- The portion about retrofitting an oil rig for residential living was intriguing because previously that rig would just be scrapped at the end of its life.
- That so many people already live on the ocean. New farming techniques.
- I was happy to learn about modern attempts at marine farming.
- I liked the part about underwater fish farming; seems to me a good way to grow food in a sustainable manner.
- The kelp farms.

- **Importance and progress of ocean exploration (18%)**
  - I wouldn't classify it as "new knowledge" but the debate over where to put future resources towards exploration of space or oceans made me think. Dr. Ballard brought up compelling points to stick with oceans.
  - Space vs. Ocean- makes sense to spend the majority of resources to exploring the oceans that will help civilizations overall.
  - The fact that most humans would rather invest in space - outer space rather than invest in discoveries on our own planet earth! We need to make many more discoveries in the ocean than we do now.
  - The underfunding and under interest in ocean discovery.
  - Most of the oceans have not yet been explored.
  - How much exploration is being done in the ocean.
  - The whole process of deep sea exploration is interesting.

- **Deep sea life in general (14%)**
  - Discovery what types of living organisms can live in the deep.
  - Beautiful alien creatures.
  - I loved learning about the creatures that live in the harsh, deep environments.
  - I learned about…eels and an interesting species of sharks.
  - The deep ocean facts.

- **Research and technology (13%)**
  - It was amazing to see how new technologies can date shipwrecks from an image and sonar can make the ocean floor, most programs don't show us how new technologies are making these things possible.
  - I also enjoyed seeing how scientists explore the unknown depths of the ocean.
  - Technology of how to explore the deep ocean.
  - Wave prediction is possible despite being insanely complex.
  - How rogue waves are formed/tracked for surfing.

- **Importance of the ocean (7%)**
  - I know now how the ocean is important to everyone on this planet and the potential it holds for our future as humans.
  - I learned how much of an affect the ocean has to everyone on earth and how important it is to take care of our planet.
  - I was most intrigued by the importance of the ocean to the world in whole and what importance it holds to the future of the humanity/earth.

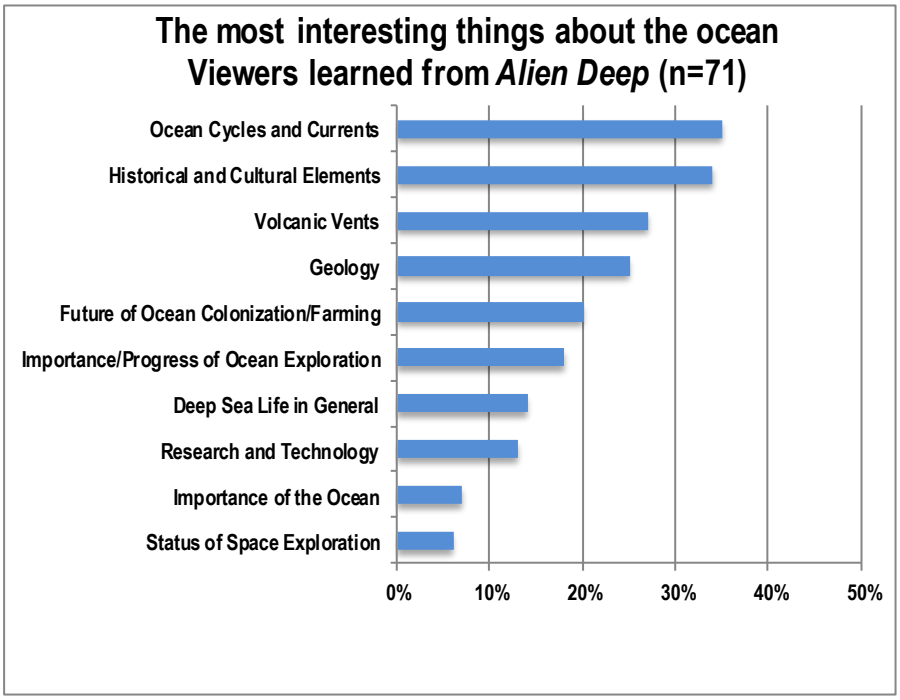
- **Status of space exploration (6%)**
  - Where we are at in preparing for further Mars exploration.
  - Outerspace exploration.
  - I enjoyed the inner and outer exploration comparisons. I learned that people are developing tech for Mars exploration.

3.4 What new information about the ocean did Viewers learn from watching *Alien Deep*?

When asked to describe three or more new things that they did not know about the ocean before watching *Alien Deep*, Viewers most often indicated that they learned about volcanic vents, the ocean conveyor belt, hot spots and plate tectonics, and current and future uses of the ocean.

Viewers were asked to describe three or more new things learned from *Alien Deep*. The chart below shows the fourteen topics Viewers most frequently pointed to and the percentage of Viewers citing each topic. Nine of these topics were mentioned by more than one-fifth of the group.

The largest group of Viewers, more than two-fifths (42%) of the group, indicated that they learned about volcanic vents and the life they sustain.
Roughly one-third each pointed to information learned about the ocean conveyor belt (34%), hot spots and plate tectonics (32%) or human's current and future use of the ocean (31%).



About one-quarter each of the Viewers focused on how little of the ocean has been explored (27%), the impact that small animals have on the ocean (25%), something they learned of historical/cultural significance (24%), and/or wave formation (particularly rogue wave formation) (23%).

Finally, about a fifth (21%) of the Viewers said they learned something about modern research and exploration, while smaller groups pointed to learning about undersea life more broadly (14%), general characteristics of the ocean (such as its depth, temperature, or pressure) (8%), something that gave them cause for (environmental) concern (8%,) the importance of the oceans (6%), and/or Dr. Ballard and his work (4%).

Examples of Viewers' comments on each theme follow below.

- **Volcanic vents and the life they sustain (42%)**
  - I learned about the variety and great quantity of thermal vents.
  - Undersea vents provide life-sustaining energy.
  - Deep-sea creatures gain life from volcanic vents.
  - There are thermal vents located even in areas that are not super deep.
  - Succession of vent ecosystem can be rapid (10 year scale)
  - Geothermal vents are massive sources of nutrients/minerals/chemicals. Some crabs farm food on their own bodies!
  - I learned about the crabs that survive off microscopic organisms who live in them and jockey for position around the warm water vents to help the bacteria/organisms grow.
  - That a type of crab grows its own food on its hairs via microbes who grow from nutrients and warmth of the vents.
  - Deep water volcanoes: life
  - Deep ocean processes could have been what caused life to first spawn on this planet.

- **Ocean conveyor belt (34%)**
  - New undiscovered ocean currents exist!
  - There is a new branch of the conveyor being mapped and discovered.
  - The currents take 1000 years to complete a cycle.
  - I was unaware of the Global Conveyor and its importance in stabilizing the climate and weather and that the entire system takes 1,000 years to circulate (right?)
  - The underwater current and how a cycle takes 10,000 years (or was it 1,000?)
  - The flow of the currents around the world - how fast they move.
  - That the oceans major currents take 1000 years to complete their circuit and flow 100 of Amazons with the volume.
  - It takes a thousand years for the water to pass along the "conveyor belt" around earth.

- **Hot spots and plate tectonics (32%)**
  - Volcanoes that are shaping the sea's terrain and soon to be land.
  - I learned that there are several active underwater volcanoes that in the future will form new lands and islands.
  - The island created from a volcano in the 1960s.
  - There is land being created in the ocean.
  - Tallest mountain is in Hawaii not Tibet.
  - That Mt. Everest is not the tallest Mt.
  - There are underwater volcanoes.
  - A new Hawaiian island is forming.
  - The fault line of the Atlantic Ocean comes ashore, near the shore in Iceland.

- **Man's current and future use of the ocean (31%)**
  - That humans will most likely inhabit the ocean in the not too distant future.
  - Possibility of building homes, oil rigs.
  - Ocean colonies are a viable option for humans and are much more reasonable than space colonies.
  - How it can be used for farming/as a place for us to live.
  - I didn't learn new things (except for the plans for large scale fish farming in the ocean).
  - There are thousands of people living in the Gulf of Mexico.
  - 90% of trade goes over the open ocean.

- **How little of the ocean has been explored (27%)**

- So much of it is unexplored because of the fear of the deep unknown.
- How unexplored the ocean is.
- I didn't know that the ocean has been explored at about 5%.
- That 95% is unexplored.
- I learned about deep sea exploration and how much of the oceans have gone unexplored. I found this difficult to believe and think the more exploration done, the more we can learn about earth/better understand our environment.
- National boundaries extend 200 miles off the coast, and they are not mapped well.
- That 1/2 of the US's territory is under ocean and yet Mars is better mapped.
- Little to no mapping of the floor is completed.

- **The impact of small animals (25%)**
  - The calculation that's missing in ocean's energy from fish and jellyfish and other sea creatures "moving" water along with tides and wind force.
  - Animals may significantly contribute to ocean water movement/blending.
  - The waters are affected by the movements of sea life.
  - The impact swimming animals having on "mixing" the oceans waters.
  - Fish could contribute to and influence currents which in turn influence weather.
  - That no one thought fish contributed to wave motion before.
  - The work of that scientist on water moved by fishes was new to me.
  - Researchers use dye to measure butterfly effect.

- **Historical and cultural information (24%)**
  - Did not know that the Egyptian boat building utilized such sophisticated processes when constructing their ship hulls.
  - How well ancient shipwrecks have been preserved and the quality of things we can learn about history from them.
  - That the amphoras were treated like trash.
  - That ancient explorers went into deep waters.
  - I learned that most wrecks of ancient vessels are identified by their cargo.
  - How ancient mariners made bold open sea voyages, not hugging the shore.
  - Polynesian facts, Vietnam house villages…facts about historical marines.
  - I learned about different cultures dependence on oceans.

- **Wave formation (23%)**
  - Wave patterns are caused by many different factors.
  - Ocean wave activity.
  - How rogue waves can be created.
  - Rogue waves can come out of nowhere.
  - How rogue waves are formed/what they are.
  - Rogue waves exist!
  - Rogue waves and rough water is more common and new patterns have developed causing concerns.

- **Modern research and exploration (21%)**
  - How little satellite imagery helps map the ocean.
  - Waves can be predicted up to three weeks in advance.
  - I also learned how scientists perform a dive in a manned submarine and an unmanned one. And lastly I learned how scientists choose locations to dive for deep sea wrecks.
  - New technology.
  - Risk of death for scientists going deep in the ocean.
  - I learned a bit more about…contemporary ocean mapping techniques.

- People are creating personal jet-like submersibles.
- That there is a new type of submersible that "flies" around under water much more like a plane

- **Undersea life in general (14%)**
  - Very few species live deep on the oceans floors.
  - There are many species of animals deep in the sea.
  - New species.

- **General information about the ocean (8%)**
  - How deep and cold it is.
  - Average depth is 12,000!
  - The deep, deep sea is really cold. (Obvious but hadn't thought of it.)
  - The pressure at depth is more than I realized.
  - The symmetry of the Atlantic Ocean's floor.

- **Environmental issues (8%)**
  - I was unaware that 1 large ship and 100s of smaller ships sink every month because of rogue waves and their growing intensity.
  - How much the ocean has risen in a short period of time.
  - The ocean is getting rougher and waves are getting higher- this fact is now confirmed by science.
  - Trawling the ocean bottom (bad!).

- **The importance of the oceans (6%)**
  - How much of the economy depends on the ocean.
  - I learned about deep sea exploration and how much of the oceans have gone unexplored. I found this difficult to believe and think the more exploration done, the more we can learn about earth/better understand our environment.
  - How important the ocean is to our existence.

- **Dr. Robert Ballard and his work (4%)**
  - Bob Ballard discovered the Titanic.
  - The land based "nautilus" command center in R.I.
  - How badass Bob Ballard is.

3.5 Did Viewers think or feel about the ocean in a new or different way after watching *Alien Deep*?

Most Viewers felt that the program *did* cause them to think or feel differently about the ocean. Those who felt that the program *didn't* cause them to think or feel differently most often indicated this was because they already cared about and understood the ocean.

Viewers were asked if their experience watching *Alien Deep* caused them to think or feel about the ocean in a new or different way. The table to the right presents the percentage of Viewers saying "Yes" and "No" to this question, followed by their reasons in each case.

Whether Viewers thought or felt differently about the ocean after watching *Alien Deep* (n=71)	
Now have better understanding of…	**72%**
Human's relationship with the ocean and future possibilities/potential	25%
Oceans in general	21%
Ocean research and exploration	17%
The importance of the ocean, shown through increased concern and awareness	10%
The importance of taking action	7%
Didn't cause to think/feel differently because…	**28%**
Already care about and understand the ocean	18%
But they did learn something from the series	4%
Disliked Dr. Robert Ballard	3%
Insufficient information provided	3%

Did feel or think differently

The majority of Viewers (72%) felt that the program *did* cause them to think or feel differently because they had a better understanding of: the ocean's possibilities and potential, particularly in terms of benefitting humans (25%); the oceans in general (21%); ocean research and exploration (17%); the importance of the ocean as shown through increased concern and awareness (10%); and/or the importance of taking action.

Didn't feel or think differently

Among those Viewers who indicated that the series *did not* cause them to think or feel differently (28%), a fifth (18%) indicated that they already cared about and understood the ocean. A handful of Viewers said that even though *Alien Deep* hadn't caused to think or feel differently about the ocean, they had learned something from the series (4%). Others said that they disliked Dr. Ballard (3%) or that they felt insufficient information had been provided (3%).

Examples of Viewers' comments on each theme follow below.

- **Now have a better understanding of… (72%)**

  <u>Man's relationship with the ocean and future possibilities/potential (25%)</u>
  - As a source of solutions to sustainability issues.

- How we can live on the ocean.
- I now realize the vast opportunities it could provide humankind.
- I felt a little more hope about the ocean's ability to flush human pollutants but felt this could be a dangerous proposition to rally people around; it is still an ecosystem relying on balance and with large, slow (relative to us) movements/cycles.
- Like I mentioned, it opened new possibilities to find a solution (not sure if it's extremely realistic) to the global warming agenda.
- Because I didn't know that the ocean has a lot of importance in the human race. Now I realize how important it is to keep updated on it.
- I feel as if I have a much greater appreciation of why the ocean is important to the future of humanity.

Oceans in general (21%)
- I didn't previously understand that ocean currents were a continuous system with such far-reaching effects.
- The importance of the ocean in sustaining life and adaptability of life to modify so quickly and to live in these deep places.
- Have a new sense of importance to overall life cycle.
- I rarely see what is going on in the ocean, I see it differently after learning about it.
- It made it seem less incomprehensible than before.

Research and exploration (17%)
- I did not realize how little of the ocean is unexplored and unknown.
- I feel more strongly about finding and importance of deep sea science.
- I feel that more of it really does need to be explored especially if we will one day living there.
- It definitely seems more important to explore the oceans and understand them.

The importance of the ocean, shown through increased concern and awareness (10%)
- It made me more worried about the health of the ocean.
- I feel more knowledgeable about the ocean/the problems it's facing.
- Heightened my awareness to issues the ocean is facing.

The importance of taking action (7%)
- I love the oceans and this just makes me more committed to save, not just animals, but the ocean and I would hate for agriculture to turn in to what land agriculture has become.
- It taught me that I could end up living there one day so I need to care for it.
- Importance of my knowledge to share as a parent about "it's all related" concept.

- **Didn't cause to think or feel differently (28%)**

Already care about and understand the ocean (18%)
- I already care deeply for and love the ocean, recognizing its impact and importance to the planet's health and survival.
- I already felt strongly about the importance of better understanding the oceans.

But they did learn something from the series (4%)
- I'm involved in environmental causes - But I did learn from the programs.

Disliked Dr. Robert Ballard (3%)
- Except that Bob Ballard is king of it.

Insufficient information provided (3%)
- Not enough new information to change perception.

3.6 Did *Alien Deep* change Viewers' perceptions of the importance of ocean exploration and research to the future of humanity?

Viewers generally felt the program gave them a greater sense of the importance of ocean exploration and research.

Viewers were asked to reflect on whether seeing *Alien Deep* changed their perception of the importance of ocean exploration and research to the future of humanity, choosing from the following response options: much more important, somewhat more important, perception stayed the some, somewhat less important, or much less important. As shown in the table below, most Viewers (81%) indicated that they had a greater sense of its importance as a result of viewing. More than two-fifths (43%) said they felt the topic was *much more* important and just under two-fifths (38%) said it was *somewhat more* important. About one-fifth of Viewers (18%) felt their perception *stayed the same*.

When invited to explain their ratings, less than half of Viewers (45%) elaborated. Among those who indicated that ocean exploration and research were *much more important* to the future of humanity, the largest group indicated that this was because the series raised their awareness and concern (14%). Less than one-tenth each pointed to the value of learning about: environmental relationships (6%), general knowledge gained (4%), an interest in colonizing the ocean (4%), and ways the oceans might benefit humans in the years to come (4%).

Among those who indicated that ocean exploration and research were *somewhat more important* to the future of humanity, the largest group indicated they already cared about and understood the ocean (11%). A tenth said that they learned something new about the ocean (10%), less than one-tenth pointed to their raised awareness and concern (6%), and one Viewer commented on ways the ocean might benefit humans (1%).

Whether Viewers felt *Alien Deep* changed their perception of the importance of ocean exploration and research (n=71)

Much more important	**43%**
The series raised awareness and concern	14%
Value of learned about environmental relationships	6%
General knowledge gained	4%
Interest in colonizing the ocean	4%
Ways the ocean might benefit humans	4%
Somewhat more important	**38%**
Already care about and understand the ocean	11%
Learned something new about the ocean	10%
Raised awareness and concern	6%
Ways the ocean might benefit humans	1%
Perception stayed the same	**18%**
Already aware of the importance of ocean exploration and research	13%

Of those who indicated that their *perception stayed the same*, these Viewers all noted that this was because they were already aware of the importance of ocean exploration and research (13%).

Viewers' comments on their increased interest in these themes follow below.

- **Much more important (43%)**

  <u>The series raised awareness and concern (14%)</u>
  - Awareness is education/education is awareness.
  - Critical to our survival on this planet! We must do more now, than we have ever done to better understand our oceans!
  - I already knew it was important, but I didn't realize how little was currently being done.
  - I am a lot more aware than I was before of the important issues
  - I guess I just hadn't thought much about it, but this series raised my awareness and concern.
  - It just made reflect again on the importance of science and the understanding of our world.

  <u>Value of learning about the relationship between the ocean and the land (6%)</u>
  - Connection b/w ocean/climate/animals/sea change.
  - I did not know how much the land actually relies on a healthy ocean. It actually creates land and life above water and underwater.
  - The amount that the oceans impact our entire climate and future was made clear. The answers to the impacts of global warming and hopefully some solutions could be found.
  - There is much in our environment on land we can attribute to the health of our oceans.

  <u>General knowledge gained (4%)</u>
  - Already knew the oceans were important - loved seeing the new research.
  - The ocean is essential for life.

  <u>Interest in colonizing the ocean (4%)</u>
  - As Bob says, more important than Mars living. Currently know more about ocean though still more unknown, but I feel that will be more useful to know about than Mars.
  - Ep. 5 did it for me, especially considering all the money and time spent on space exploration. It was not perfect, I feel like we needed more info- were people considering building Atlantis-like cities?
  - I like that the possibility of living on the ocean is higher than on Mars.

  <u>Ways the ocean might benefit humans (4%)</u>
  - It could help with planetary over-crowding.
  - New organisms increases chances of new uses of them. Food, medicine, etc.

- **Somewhat more important (38%)**

  <u>Already care about and understand the ocean (11%)</u>
  - Had a good idea how important the oceans are, but the series did teach me new things
  - Although I have always felt ocean exploration is extremely important, I feel after watching the series that we have a limited amount of time to help regulate the effects of global warming and reduce the damage to the oceans.
  - I already believed the ocean to be of great importance to our future as a race, but its more dependent than I believed and learned a lot while watching these films.

Learned something new about the ocean (10%)

- Didn't know much, so this taught me a lot.
- Didn't realize how little was explored.
- Had a good idea how important the oceans are, but the series did teach me new things
- I already felt it was important. I was given some new or more specific information around why I already felt it was important.
- I've always felt it's important, but the show raised issues that I hadn't previously thought about, such as territoriality issues.
- Have always been interested in the ocean and shore life - always watched Jacques Cousteau - thought of majoring in oceanography in the 1970s.

Raised awareness and concern (6%)

- Given I thought it was mildly important and how I see it is necessary, my perception has gone up.
- Although I have always felt ocean exploration is extremely important, I feel after watching the series that we have a limited amount of time to help regulate the effects of global warming and reduce the damage to the oceans.

Ways the ocean might benefit humans (1%)

- More important in terms of future opportunities to live there.

- **Perception stayed the same (18%)**

Already aware of the importance of ocean exploration and research (13%)

- 50+ years of interest- preaching to the informed choir (but I am unusual).
- I already felt it was important. I was given some new or more specific information around why I already felt it was important.
- I believed before, and still do, that the scientific research and exploration of the ocean is an under-prioritized effort.
- I feel that I already appreciate the importance of oceanic exploration.
- With a title like this, it should have shown more deep sea critters, I thought. I already know a lot about climate change. And this series just felt like "Bob Ballard's opinion about everything!"
- No new relevant information to change perception.

3.7 What was the impact of *Alien Deep* on Viewers' knowledge of the ocean?

Viewers significantly outperformed Control group participants on a content quiz designed to evaluate the impact of *Alien Deep* on Viewers' knowledge of three main topic areas addressed in the mini-series: ocean properties, characteristics, and life forms; ocean research and discovery; and the ocean's importance to humanity. Out of a total possible score of 50, the Viewer group averaged 39.5 correct responses, while the Control group averaged 21.8 correct responses. The Viewer group significantly outperformed the Control group overall, and on each of the three separate content areas assessed. In all instances, the resulting effect sizes were considered very large effects.

To evaluate the impact of *Alien Deep* on Viewers' knowledge of content covered in the program, participants in both the Viewer and Control groups were asked to complete a 50 point assessment consisting of multiple choice, true/false, fill in the blank, and open-ended questions. Each question was assigned a point value based on the relative importance the series placed on the content addressed.

Summary of findings

The Viewer group significantly outperformed the Control group on the assessment overall. Out of a total possible score of 50, the Viewer group averaged 39.5 correct responses, while the Control group averaged 21.8 correct responses.[23] The effect size in this case was considered a very large effect (d=2.8).

In addition to this higher overall score, the Viewer group also significantly outperformed the Control group for each of the three main topic areas assessed, as follows: For *ocean properties, characteristics, and life forms,* out of a total possible score of 17, Viewers averaged 12.9 correct responses while Control participants averaged 7.4.[24] For *ocean research and discovery*, out of a total possible score of 21, the Viewer group averaged 17.9 correct responses while the Control group averaged 8.7.[25] Finally, for the *ocean's importance to humanity*, out of a total possible score of 12, the Viewer group averaged 8.6 correct responses while the Control group averaged 5.5.[26] The effect sizes in each case indicated these effects were large effects (d=1.88, d=2.74, d=1.74 respectively)

Detailed results

The content assessment consisted of 3 sets of questions covering the main content areas in the program. The findings from each assessment are presented under the following three headings:

3.6a: Ocean properties, characteristics, and life forms

3.6b: Ocean research and discovery

3.6c: The ocean's importance to humanity

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[23] *t(104)=16.20, p<.001, two-tailed, d=2.82, 95% CI [15.5,19.9]*

[24] *t(133)=10.995, p<.001, d=1.88, 95% CI [4.5,6.4]*

[25] *t(104)=15.703, p<.001, d=2.74, 95% CI [8.0,10.3.5]*

[26] *t(133)=10.294, p<.001, d=1.74, 95% CI [2.5,3.7]*

3.7a Questions on ocean properties, characteristics, and life forms

To assess whether *Alien Deep* influenced Viewers' knowledge of ocean properties, characteristics, and life forms, both Viewer and Control group participants were asked 5 true/false questions, 4 multiple choice questions, and 1 fill in the blank question.

Overall findings

The Viewer group significantly outperformed the Control group on the question set relating to ocean properties, characteristics, and life forms. Out of a total possible score of 17, Viewers averaged 12.9 correct responses while Control participants averaged 7.4.[27] The effect size in this case was considered a very large effect (d=1.88).

Item results

The table below shows, for each group, the percentage of participants that correctly answered the true/false, fill in the blank, and multiple choice questions where participants were asked to select one answer only.[28]

Percentage of correct answers to true/false, multiple choice, and fill in the blank questions about ocean properties, characteristics, and life forms		
Control (n=64)		**Viewer (n=71)**
	True/false questions	
25%	Animals moving in the ocean produces energy that affects the size of waves (T)	76%
39%	The average temperature of the deep sea is near-freezing (T)	73%
33%	Scientists are discovering that only a few hundred species are capable of living in the deep ocean (F)	62%
42%	The deep sea is the harshest environment on Earth (T)	56%
16%	A tsunami is an extreme type of rogue wave (F)	25%
	Multiple choice questions with one correct answer	
80%	Approximately how much of the Earth is covered with ocean? (70%) (Other options: 30%, 50%, 90%)[29]	94%
11%	About how much of the ocean remains unexplored? (More than 90%) (Other options: less than 30%, 30%, 50%, 70%, 90%)[30]	76%
	Fill in the blank	
47%	Oceans waves have become larger and stronger over time due to_____ (climate change, increased energy).	85%

[27] *t(133)=10.995, p<.001, d=1.88, 95% CI [4.5,6.4]*

[28] Each multiple choice and T/F question earned a total possible score of 2 with the exception of the questions on rogue waves and animals moving in the ocean. These two questions and the fill in the blank question each earned at total possible score of 1.

[29] This question is adapted from the Survey of Ocean Literacy and Experience (SOLE) Instrument described in Greely (2008).

[30] This question is adapted from the Survey of Ocean Literacy and Experience (SOLE) Instrument described in Greely (2008).

Looking across the eight questions listed in the table on the previous page, on average, the percentage difference between the Viewer and Control groups was 31%. In terms of individual questions, the percentage differences ranged from a low of 9% for the question *A tsunami is an extreme type of rogue wave* in which one-quarter or less of either group correctly answered this to be false (25% Control group, 16% Viewer group) to a high of 65% for the question *About how much of the ocean remains unexplored*, in which three-quarters of the Viewers compared to one-tenth of the Control participants (76% vs. 11%) gave the correct answer of 90% or more.[31]

Two additional multiple choice questions[32] were asked as part of the 3.7a question set that allowed participants to select more than one answer. For both Viewer and Control groups, the table to the right shows the frequency breakdown for the question: *Which, if any, of the following may be found at or near deep sea volcanic vents*? *Please check all that apply*.[33] Substantially higher percentages of Viewer to Control participants selected the correct responses of bacteria, tubeworms, and crabs. The groups were more comparable in their selection of the correct response of octopuses and the incorrect responses of dolphin, starfish and filtered sunlight. Finally, a higher percentage of Viewer to Control participants incorrectly selected algae and coral reefs (see table to the right for individual percentages).

Viewer (n=71) and Control (64%) group responses: What may be found at or near deep sea volcanic vents		
Control (n=64)		**Viewer (n=71)**
True		
53%	Bacteria	89%
33%	Tubeworms	84%
17%	Crabs	80%
48%	Octopuses	38%
False		
3%	Dolphins	1%
33%	Algae	54%
17%	Coral reefs	39%
13%	Filtered sunlight	5%
11%	Starfish	13%

The table on the bottom right shows the frequency breakdown for the question: *What processes cause sea levels to change? Please check all that apply*.[34] In this case, comparable percentages of participants in both groups selected each of the three response options: plate tectonics, ice caps melt and grow, and sea water expands and contracts, although the Viewer group had a slightly higher percentage of responses in the first two categories, respectively. About a tenth of the Control group selected "don't know" compared to none of the Viewers.

Viewer (n=71) and Control (64%) group responses: What processes cause sea levels to change		
Control (n=64)		**Viewer (n=71)**
55%	Plate tectonics	61%
86%	Ice caps melt and grow	99%
28%	Sea water expands and contracts	27%
2%	Sea level does not change	0%
0%	None of the above	0%
9%	Don't know	0%

[31] Note that the question relating the amount of ocean undiscovered was weighted higher than the question about a rogue wave as this content was a recurring theme in the series. The information about rogue waves was presented in the episode *Ocean's Fury*, which focused on diverse content related to the forces behind the motion of the ocean and the reasons for the ocean becoming "*more dangerous by the day*." Other interpretations are possible and might be looked at by the project team.

[32] Each multiple choice question earned a total possible score of 2.

[33] This question was based on a question asked in a previous Knight Williams Inc. summative evaluation of *Volcanoes of the Deep Sea* produced by the Stephen Low Company. http://www.stephenlow.com/films/volcanoesofthedeepsea/

[34] This question is from the Survey of Ocean Literacy and Experience (SOLE) Instrument described in Greely (2008).

3.7b Questions on ocean research and discovery

To assess whether the program influenced Viewers' knowledge of ocean research and discovery, both Viewer and Control group participants were asked 2 true/false questions, 1 fill in the blank question, and 4 open-ended questions.

Overall findings

Viewers significantly outperformed Control participants on the question set about ocean research and discovery. Out of a possible score of 21, the Viewer group averaged 17.9 correct responses while the Control group averaged 8.7.[35] The effect size in this case was considered a very large effect (d=2.74).

Item results

The table below shows the percentage of correct answers to each true/false and the fill in the blank question for each group. Looking across the three questions, the average percentage difference between the Viewer and Control groups was 58%. In terms of individual questions, the percentage differences ranged from:

- a low of 50% for the question *Ancient mariners never ventured far from the coastline given the dangers of traveling in the open sea to themselves and their handcrafted wooden vessels*, in which almost all (97%) the Viewer group participants correctly designated this statement false compared to less than half (47%) the Control group participants; to

- a high of 65% for the question *Scientists discovered the Titanic by following a trail of debris*, which was answered correctly by almost all (96%) of the Viewer group compared to about a third (31%) of the Control group.

Percentage of correct answers to true/false and multiple choice questions about ocean research and discovery[36]		
Control (n=64)		**Viewer (n=71)**
	True/false questions	
31%	Scientists discovered the Titanic by following a trail of debris (T)	96%
47%	Ancient mariners never ventured far from the coastline given the dangers of traveling in the open sea to themselves and their handcrafted wooden vessels (F)	97%
	Fill in the blank	
3%	The ancient tradition of mountain sliding in Hawaii involved Native Hawaiians _____ ("lava sledding" on hardwood sleds down hardened lava slopes as sport/way to honor gods)	62%

[35] *t(104)=15.703, p<.001, d=2.74, 95% CI [8.0,10.3.5]*

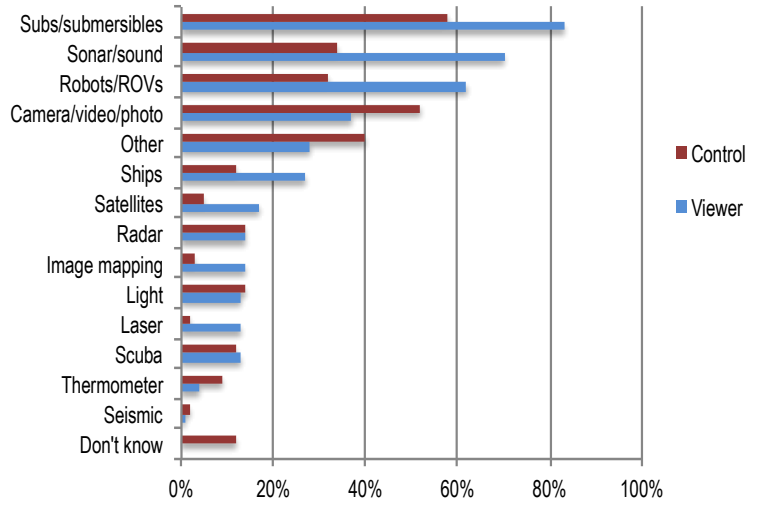
[36] Each T/F question earned a total possible score of 2. The fill in the blank question earned a total possible score of 1.

In addition to the above three questions, both Viewer and Control group participants were asked to answer four open-ended questions relating to: the tools scientists use to explore deep sea environments, the challenges scientists face in working in deep sea environments, the dangers pilots of deep sea submersibles face in exploring the ocean depths, and the accomplishments of Dr. Robert Ballard.

Tools scientists use to explore deep sea environments

Both Viewer and Control group participants were asked to answer the following question: *What types of tools do scientists currently use to explore deep sea environments? List as many different tools as you can think of.*[37] The chart and table to the right show the tools most frequently listed.

Most common Viewer (n=71) and Control (n=64) group responses: Types of tools scientists use to explore deep sea environments



Most common tools listed

Participants in both groups most often listed subs/submersibles, followed by robots/ROVs, and sonar/sound, although in each case substantially higher percentages of Viewer to Control group participants mentioned these tools (see table to the right for individual percentages).

Most common Viewer and Control group responses: Tools scientists use to explore deep sea environments

Control (n=64)		Viewer (n=71)
58%	Subs	83%
32%	Robots/ROVs	62%
34%	Sonar/sound	70%
52%	Camera/video/photo	37%
12%	Ships	27%
12%	Scuba	13%
5%	Satellites	17%
2%	Laser	13%
3%	Image mapping	14%
9%	Thermometer	4%
14%	Radar	14%
14%	Light	13%
2%	Seismic	1%
40%	Other	28%
12%	Don't know	0%

Number of tools listed

The table below shows the percentage of participants in each group that listed between 0 and 4 or more tools in response to this question. Most participants in both groups listed at least one tool (99% Viewer, 88% Control). However, twice as many Viewers listed 4 or more tools (65% to 30%).

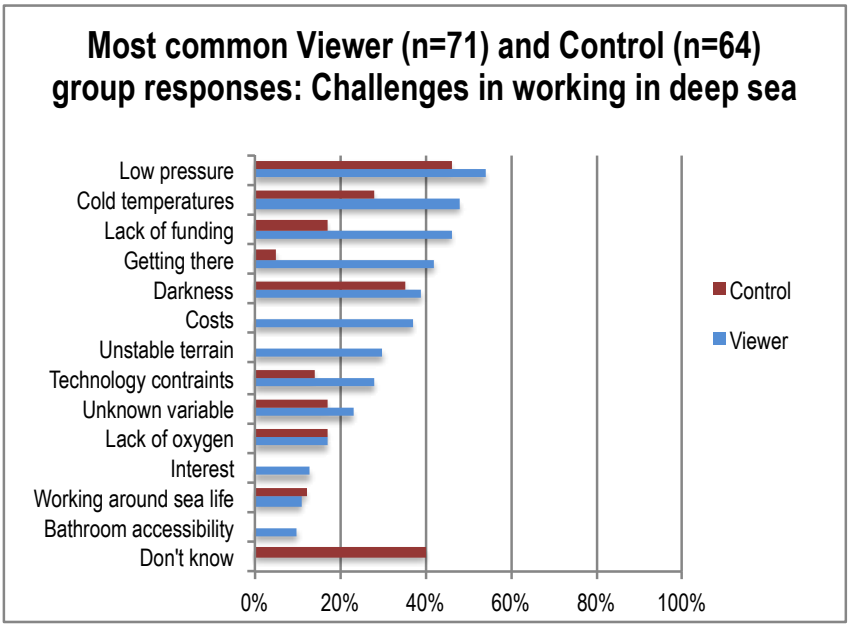
Number of tools participants listed that scientists use to explore the deep sea

Control (n=64)	Number listed	Viewer (n=71)
12%	0	1%
3%	1	1%
22%	2	11%
33%	3	21%
30%	4 or more	65%

[37] This question earned a total possible score of 4.

Challenges scientists face in working in deep sea environments

Both Viewer and Control group participants were asked to answer the following question: *What are some of the challenges scientists face in working in deep sea environments? Please list as many challenges as you can think of.* [38]



Most common challenges listed

The chart and table to the right show the challenges most frequently listed. Participants in both groups most often listed low pressure (54% Viewers, 46% Control). Seven other challenges were mentioned by at least one-quarter of the Viewers, including: cold temperatures, lack of funding, getting there, darkness, costs, unstable terrain, and technology constraints. Only two other challenges were mentioned by at least one-quarter of the Control participants, however, including darkness and cold temperatures (See table for individual percentages).

Number of challenges listed

The table below shows the percentage of participants in each group that listed from 0 to 3 or more challenges. Four-fifths (40%) of the Control group did not list any challenges. Meanwhile, all (100%) of the Viewers compared to nearly two-thirds (60%) of the Control group listed at least one challenge. Almost all (90%) of the Viewers compared to less than one-sixth (14%) of the Control participants listed 3 or more challenges.

Most common Viewer and Control group responses: Types of challenges scientists face in working in deep sea environments

Control (n=64)		Viewer
46%	Low pressure	54%
29%	Cold temperatures	48%
17%	Lack of funding	46%
5%	Getting there	42%
35%	Darkness	39%
0%	Costs	37%
0%	Unstable terrain	30%
14%	Technology constraints	28%
17%	Unknown/unexplored variables	23%
17%	Lack of oxygen	17%
0%	Lack of interest	13%
12%	Working around sea life	11%
0%	Bathroom accessibility	10%
40%	Don't know	0%

Number of challenges participants listed facing scientists working in deep sea environments

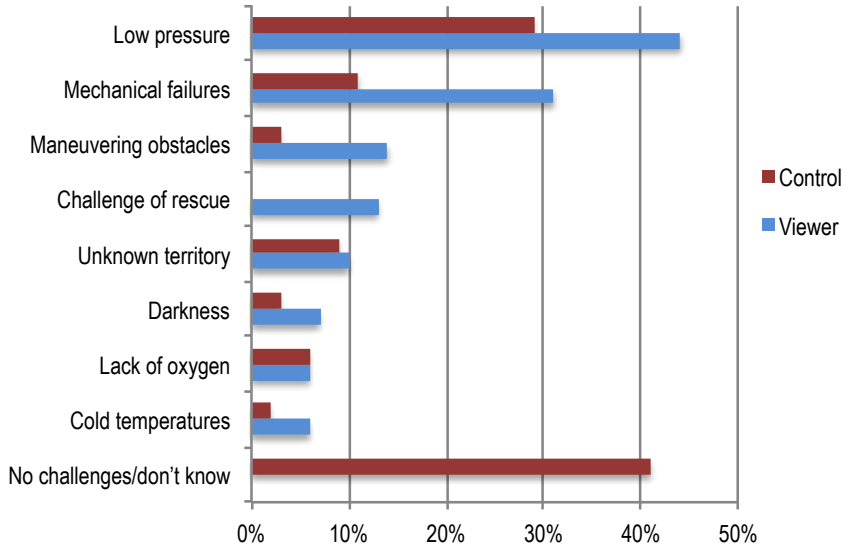
Control (n=64)	Number listed	Viewer (n=71)
40%	0	0%
23%	1	3%
23%	2	7%
14%	3 or more	90%

[38] This question earned a total possible score of 4.

Dangers pilots of deep sea submersibles face in exploring the ocean depths

Both Viewer and Control participants were asked to rate the level of danger they thought pilots of deep sea submersibles currently face in exploring the ocean depths on a scale from 1 (no danger) to 7 (extreme danger) and to list the types of dangers these pilots face.[39] A substantially higher percentage of Viewers (70%) than Control participants (47%) rated the danger level at 5 or higher.

Most common Viewer (n=71) and Control (n=64) group responses: Types of dangers deep sea submersible pilots face in exploring ocean depths



Most common dangers listed

The chart and table to the right show the dangers most often listed. While participants in both groups most often listed low pressure, mechanical failures, and maneuvering obstacles, in each case substantially higher percentages of Viewers mentioned these dangers (see table to the right for percentages).

Number of dangers listed

The table below shows the percentage of participants in each group that listed from 0 to 3 or more dangers. Where all (100%) of the Viewers listed at least one danger, two-fifths (41%) of the Control group didn't state any dangers, replied don't know, or indicated pilots don't face any particular dangers. More than one-third (37%) of Viewers listed 3 or more dangers, compared to a handful (5%) of Control participants.

Most common Viewer and Control group responses: Types of dangers deep sea submersible pilots face in exploring ocean depths

Control (n=64)		Viewer (n=71)
41%	No challenges/don't know	0%
29%	Low pressure	44%
11%	Mechanical failures	31%
3%	Maneuvering obstacles	14%
0%	Challenge of rescue	13%
9%	Unknown/unexplored territory	10%
3%	Darkness	7%
2%	Cold temperatures	6%
6%	Lack of oxygen	6%

Number of dangers participants listed facing deep sea submersible pilots

Control (n=64)	Number listed	Viewer (n=71)
41%	0	6%
33%	1	41%
22%	2	23%
5%	3 or more	37%

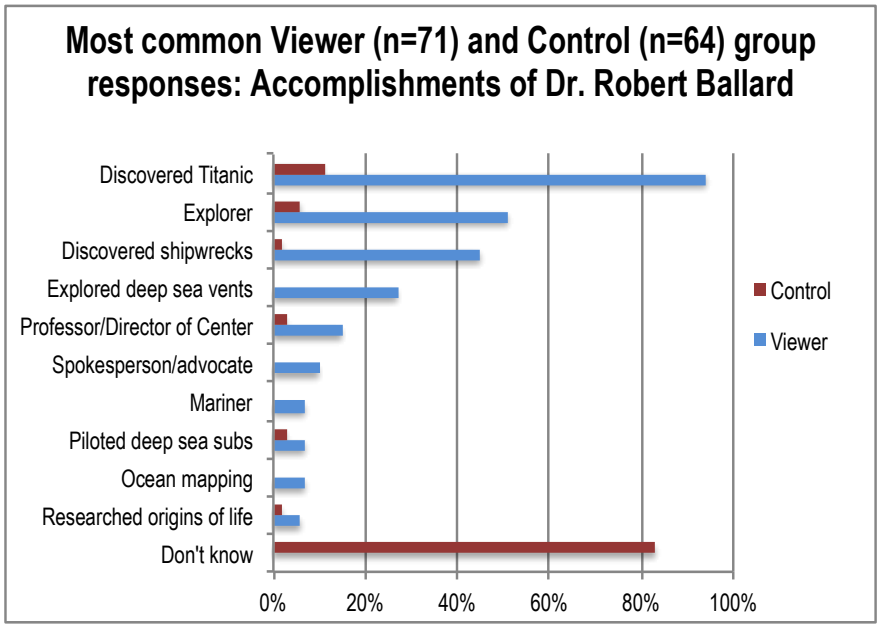
[39] The two question parts to this question earned a total possible score of 4.

Accomplishments of Dr. Robert Ballard

Both Viewer and Control group participants were asked to answer the following question: *What are some of the accomplishments of marine scientist Dr. Robert Ballard? List as many as you can think of*. [40]

Most common accomplishments listed

The chart and table to the right show the accomplishments participants most frequently listed. Both groups most often pointed to the Titanic discovery, followed by Dr. Ballard being an explorer, or involved in exploring shipwrecks other than the Titanic. However, substantially higher percentages of Viewer than Control participants mentioned these accomplishments (see table for individual percentages). Also, more than a quarter of Viewers stated that Dr. Ballard was involved in studying deep sea vents/volcanoes, while no Control participants mentioned this aspect of his work.



Number of accomplishments listed

The table below shows the percentage of participants that listed from 0 to 3 or more accomplishments. Nearly all (96%) of the Viewers compared to 16% of the Control participants described at least one accomplishment. Meanwhile, two-thirds (65%) of Viewers compared to less than a handful (2%) of Control group participants described three or more accomplishments.

Table 13: Number of accomplishments listed for Dr. Ballard

Control (n=64)	Number listed	Viewer (n=71)
84%	0	4%[41]
9%	1	13%
5%	2	18%
2%	3 or more	65%

Viewer and Control group responses: Dr. Ballard Accomplishments

Control (n=64)		Viewer (n=71)
84%	Don't know	0%
11%	Titanic discovery	94%
6%	Explorer	51%
2%	Other shipwreck discoveries	45%
0%	Explore/study deep sea vents/volcanoes	27%
3%	Professor/Director of Center	15%
0%	Spokesperson/advocate	10%
0%	Mariner	7%
0%	Ocean mapping	7%
3%	Piloted/worked on deep sea submersibles	7%
2%	Researched origins of life	6%

[40] This question earned a total possible score of 3.

[41] These Viewers discussed something other than Dr. Ballard's marine science accomplishments.

3.7c Questions on the ocean's importance to humanity

To assess whether *Alien Deep* influenced Viewers' knowledge of the ocean's importance to humanity both Viewer and Control group participants were asked 1 multiple choice question and 3 open-ended questions.

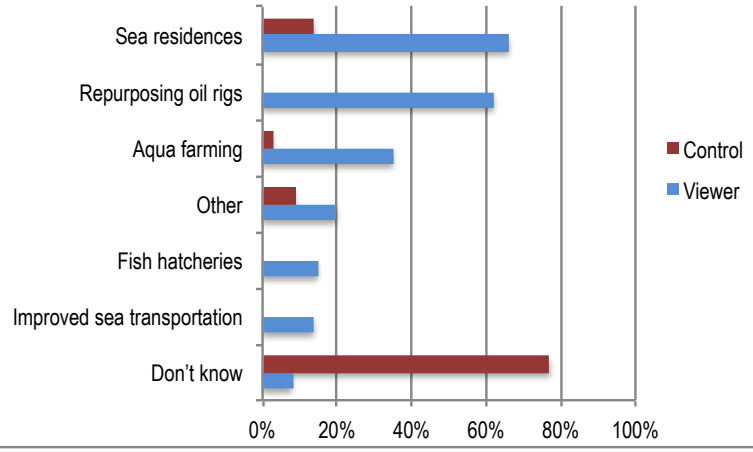
Overall findings

Viewers significantly outperformed Control participants on this question set about the ocean's importance to humanity. Out of a possible score of 12, the Viewer group averaged 8.6 correct responses while the Control group averaged 5.5.[42] The effect size in this case was considered a large effect (d=1.74).

Item results

The tables below show, for each group, the percentage of correct answers to the open ended and multiple choice questions about the ocean's importance to humanity.

Most common Viewer (n=71) and Control (n=64) group responses: Advancements/new practices that indicate future ocean colonies may be possible



Advancements to indicate future ocean colonies are possible

Both Viewer and Control group participants were asked to answer the following question: *Some scientists believe that humans will increasingly live on the ocean in the foreseeable future. Are you aware of any advancements/new practices that are currently underway to indicate that future ocean colonies (living on the ocean) may be possible? Please list as many advancements/new practices as you can think of.* [43]

Viewer and Control group responses: Advancements to indicate future ocean colonies are possible

Control (n=64)		Viewer (n=71)
14%	Sea residences	66%
0%	Repurposing oil rigs	62%
3%	Aqua farming	35%
0%	Fish hatcheries	15%
0%	Improved sea	14%
9%	Other	20%
77%	Don't know	8%

Most common advancements listed

The chart and table to the right show the advancements that each group most often listed. Participants in both groups most often pointed to examples of sea residences, although a substantially higher percentage of Viewer participants mentioned this advancement. More than two-thirds of Viewers compared to none of the Control participants focused on repurposing oil rigs. One-third of Viewers and a handful of Control participants mentioned aqua farming. Finally, about one-sixth of Viewers mentioned fish hatcheries or improved sea transportation, neither of which were mentioned by the Control group.

[42] t(133)=10.294, p<.001, d=.174, 95% CI [2.5,3.7]

[43] This question earned a total possible score of 3.

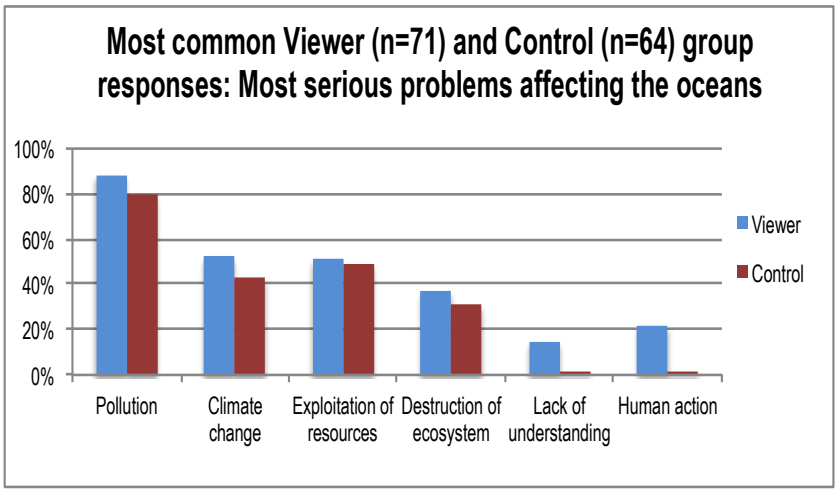
Number of advancements listed

The table to the right shows the percentage of participants in each group that listed between 0 and 3 or more advancements. Nearly all (91%) of the Viewers compared to one-quarter (28%) of Control group p described at least one advancement. Meanwhile, nearly two-fifths (38%) of Viewers compared to a handful (2%) of Control group described three or more accomplishments

Number of advancements listed to indicate future ocean colonies possible		
Control (n=64)	Number listed	Viewer (n=71)
72%	0	9%
20%	1	20%
6%	2	34%
2%	3 or more	38%

Most serious problems affecting the oceans

Both Viewer and Control group participants were asked to answer the following question: *What do you think are the most serious problems affecting the oceans? Please list as many problems as you can think of.*[44] [45]



Most common problems listed

The chart and table to the right show the problems that each group most often listed. Both groups most often pointed to examples of pollution, climate change, and exploitation of resources, although slightly higher percentages of Viewers mentioned these problems.

Viewer and Control group responses: Most serious problems affecting the oceans		
Control (n=64)		Viewer (n=71)
80%	Pollution	88%
43%	Climate change	52%
49%	Exploitation of resources	51%
25%	Destruction of ecosystem	36%
2%	Lack of understanding	15%
2%	Human action	20%

Number of problems listed

The table below shows the percentage of participants that listed 0 to 3 or more problems. All of the Viewers (100%) and nearly all (95%) of the Control participants described at least one problem. Meanwhile, nearly three-quarters (70%) of Viewers compared to half (52%) of Control participants listed three or more problems.

Number of problems participants listed as to the most serious problems		
Control (n=64)	Number listed	Viewer (n=71)
5%	0	0%
8%	1	9%
36%	2	21%
52%	3 or more	70%

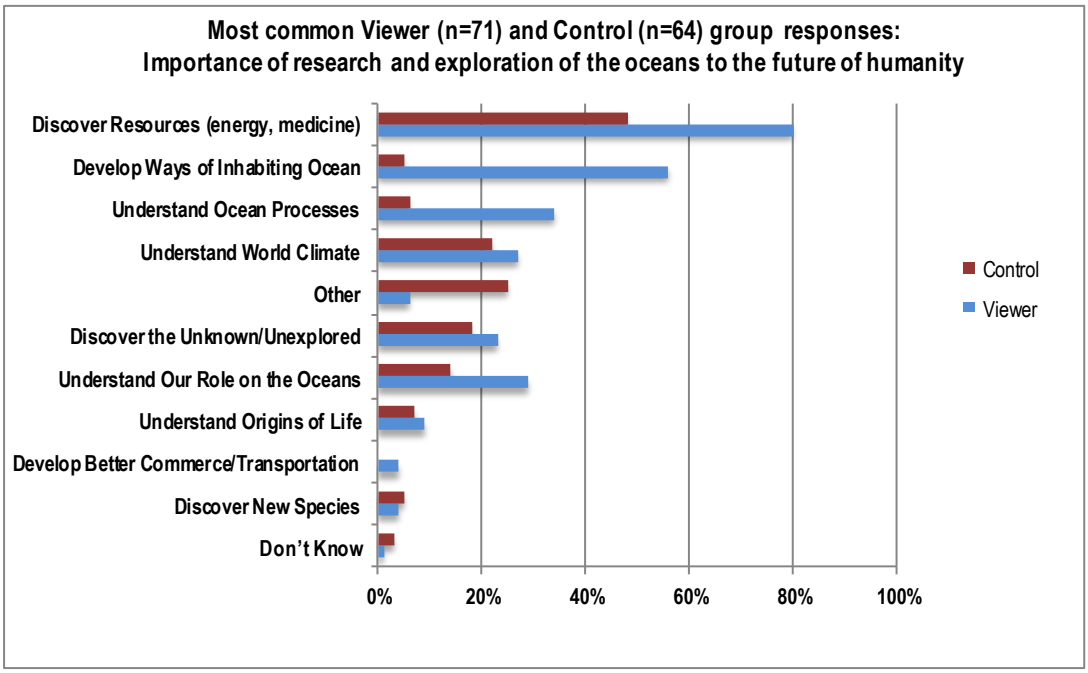
[44] This question is from the National Museum of Natural History national poll. Findings reported in 1996 showed the top five problems included: Pollution (91%), Exploitation of resources (30%), Human actions (23%), Extinction (6%), and Ecosystem problems (6%). See References for reference to this study.

[45] This question earned a total possible score of 3.

Importance of research and exploration to the future of humanity

Two questions relating to the importance of research and exploration to the future of humanity were asked of both Viewer and Control group participants.

First, participants were asked to answer the following question: *Why is research and exploration of the oceans important to the future of humanity? Please list as many different reasons as you can think of. The chart and table below show the reasons that each group most frequently listed*.[46]



<u>Most common reasons listed</u>
Viewers most often pointed to discovering resources, developing ways of inhabiting the ocean, understanding ocean processes, and understanding our role on the oceans. Control participants most often pointed to discovering resources, understanding world climate, and discovering unknown/unexplored worlds. With the exception of "discover new species" mentioned by less than a handful of participants in each group, all other themes were mentioned by somewhat to substantially larger percentages of Viewers (see table for percentages).

Viewer and Control group responses: Importance of research and exploration of the oceans to the future of humanity

Control (n=64)		Viewer (n=71)
48%	Discover resource	80%
5%	Develop ways of inhabiting	56%
6%	Understand ocean processes	34%
22%	Understand world climate	27%
18%	Discover unknown/unexplored	23%
14%	Understand our role on oceans	29%
7%	Understand origins of life	9%
0%	Better commerce/transport.	4%
5%	Discover new species	4%
25%	Other	6%

[46] This question earned a total possible score of 4.

Number of reasons listed

The table to the right shows the percentage of participants that listed between 0 and 3 or more reasons. Nearly all (99%) of the Viewers and (92%) of the Control participants described at least one reason. Meanwhile, more than half (56%) of Viewers compared to one-tenth (11%) of Control participants listed three or more reasons.

Number of reasons listed as to why research and exploration of the oceans is important to humanity		
Control (n=64)	**Number listed**	**Viewer (n=71)**
8%	0	1%
55%	1	10%
27%	2	32%
11%	3 or more	56%

The second (multiple choice) question[47] asked as part of the 3.7c question set allowed participants to select more than one answer. The question asked: *Why do humans need the ocean? Please check any that apply.*[48]

The table below shows the percentage of participants that answered each selection. Comparable percentages of Viewers to Control participants selected for freshwater and oxygen. Higher percentages of Viewers, meanwhile, selected to regulate the temperature and for new health cures (see table for individual percentages).

Viewer (n=71) and Control (64%) group responses: Why humans need the ocean		
Control (n=64)		**Viewer (n=71)**
55%	For freshwater	52%
61%	For oxygen	62%
86%	To regulate the temperature	94%
58%	For new health cures	79%
2%	None of the above	0%
6%	Don't know	3%

[47] This multiple choice question earned a total possible score of 2.

[48] This question is from the Survey of Ocean Literacy and Experience (SOLE) Instrument described in Greely (2008).

3.8 Did *Alien Deep* positively impact Viewers' knowledge and appreciation of the ocean, and their ability to communicate and make informed decisions about the ocean?

Viewers consistently agreed that the program had a positive impact on their knowledge and appreciation of the ocean as well as their ability to communicate and make informed decisions about oceans.

Viewers were asked for their level of agreement with a series of statements about the program's impact on them personally. The table below presents the median ratings on a scale of 1 (strongly disagree) to 7 (strongly agree).

Median Viewer ratings of *Alien Deep*'s impact on their knowledge and appreciation of the ocean, as well as their ability to communicate and make informed decisions about the ocean (n=71)

As a result of watching *Alien Deep*…	Strongly Disagree 1	2	3	Neutral 4	5	6	Strongly Agree 7
I better understand the ocean's influence on me						6.0	
I better understand my influence on the ocean						6.0	
I have a better appreciation for the fact that ocean exploration and research requires collaboration among people from many different backgrounds						6.0	
I have a better understanding of the methods scientists use to explore and study the ocean						6.0	
I better understand the basic principles and concepts about how oceans function					5.0		
I will be able to make informed and responsible decisions regarding the ocean and its resources					5.0		
I will be better able to communicate about the ocean in a meaningful way					5.0		

Viewers generally agreed that as a result of watching the series they had: a better understanding of the ocean's influence on them (6.0); a better understanding of their influence on the ocean (6.0); a better appreciation for the fact that ocean exploration and research requires collaboration among people from

many different backgrounds (6.0); and a better understanding of the methods scientists use to explore and study the ocean (6.0). Viewers moderately agreed that as a result of viewing: they had a better understanding of the basic principles and concepts about how oceans function (5.0), that they would be able to make informed/responsible decisions regarding the ocean and its resources (5.0), and that they would be better able to communicate about the oceans in a meaningful way (5.0).

Mann-Whitney tests indicated a few subgroup differences in this section, as follows:

- Female Viewers more strongly agreed than males that as a result of viewing the program they had a better understanding of their influence on the ocean (Mdn=5.0 vs.4.0).[49] The effect size in this case was considered a small effect (r=.25).

- Females also more strongly agreed that as a result of viewing they now had a better appreciation for the fact that ocean exploration and research requires collaboration among people from many different backgrounds (Mdn=6.0 vs. 5.0).[50] The effect size in this case was considered a medium effect (r=.32).

- Viewers 41 and older more strongly agreed than Viewers 17-28 that after watching the program they better understood the basic principles of how oceans function (Mdn=6.0 vs. 5.0)[51] and the methods scientists use to explore/study the ocean (Mdn=6.0 vs. 6.0).[52] The effect sizes in each case were considered medium effects (r=.42, r=.45).

- Viewers 41 and older also more strongly agreed than Viewers 29-40 that after watching the program they had a better understanding of the basic principles of how oceans function (Mdn=6.0 vs. 5.0)[53] and that they would be better able to communicate about the ocean in a meaningful way (Mdn=6.0 vs. 5.0).[54] The effect sizes were considered medium to large effects respectively (r= .45, r=.51). These older Viewers also more strongly agreed than those aged 29-40 that they would be able to make more responsible decisions about the ocean and its resources as a result of viewing (Mdn=6.0 vs. 5.0).[55] The effect size in this case was considered a large effect (r=.55).

- Viewers 41 and older more strongly agreed than Viewers 17-28 that after watching the program they would be better able to communicate about the ocean in a meaningful way (Mdn=6.0 vs. 5.0).[56] The effect size in this case was considered a medium effect (r=.39).

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[49] (*U*=448, *p*=.032, *r*=.25)
[50] (*U*=410, *p*=.007, *r*=.32)
[51] (*U*=147, *p*=.004, *r*=.42)
[52] (*U*=142, *p*=.002, *r*=.45)
[53] (*U*=156, *p*=.005, *r*=.41)
[54] (*U*=119, *p*=.001, *r*=.51)
[55] (*U*=106, *p*=.000, *r*=.55)
[56] (*U*=156, *p*=.001, *r*=.39)

Some of the Viewers provided additional feedback on these questions, as follows:

- **I better understand the ocean's influence on me**
  - I think someone with less awareness of the ocean could gain much from the last two shows.
  - I feel inspired to re-watch this series and learn more through other methods.

- **I better understand my influence on the ocean**
  - Could have gone more in-depth into choices that could be made on an individual level, and their effects on the ocean.
  - I am not sure I learned too much in a tangible sense about human influence ON oceans, more vice versa.

- **I have a better appreciation for the fact that ocean exploration and research requires collaboration among people from many different backgrounds**
  - This is interesting- I didn't think of it at the time… and he doesn't really show the people in the various disciplines actually working together, just Bob talking to them all.

- **I have a better understanding of the methods scientists use to explore and study the ocean**
  - Absolutely a wonderful program- should be shown to school age children to encourage more ocean research and exploration for future generations!

- **I better understand the basic principles and concepts about how oceans function**
  - This program really increased my awareness and interest on how the ocean functions and the importance of it for life on our planet.
  - The material was below my understanding.

- **I will be able to make informed and responsible decisions regarding the ocean and its resources**
  - Many resources were shown but too much time spent on problems.
  - Could have gone more in-depth into choices that could be made on an individual level, and their effects on the ocean.
  - I agree with many of these statements, however not as a result of watching *Alien Deep*.
  - This series made more hopeless because it didn't really help.

- **I will be better able to communicate about the ocean in a meaningful way**
  - When it comes to climate change, import/export, I feel I can explain it to others. Plus explain why it's a waste of money to explore outer space, rather than spend it on ocean exploration.
  - I didn't learn much new information, so it wasn't very impactful on my ability to converse on the topic of ocean exploration and importance.
  - Not so sure about that.

3.9 What was the impact of *Alien Deep* on Viewers' ocean-related beliefs and attitudes?

Viewers were significantly more likely than Control group participants to agree that learning about the ocean changed their ideas about how the world works and that they had enough background knowledge to write a substantive letter to their congressional representative about an issue affecting the ocean. Viewers were also significantly more likely to ascribe a greater level of importance to the role that the ocean plays in controlling the world's climate. In each of the above instances the effect sizes were small, indicating that the size of the differences between the Viewer and Control groups were small. Significant differences were not found between the groups for other beliefs asked about in the evaluation.

The evaluation measured a small set of beliefs and attitudes related to the ocean themes addressed in the series, concerning ocean health and problems, personal relationship to the ocean, and personal stewardship and ability to communicate about the ocean. Where possible the evaluation drew on items used in national population polls or research studies, as noted in the footnotes under each item listed in the table below. All but one of the items were presented as statements to which participants gave their level of agreement using a scale from 1 (strong disagree) to 7 (strongly agree), with 4 being neutral.

Significant differences were found between Viewer and Control groups for 3 of the 14 items, indicating exposure to *Alien Deep* influenced Viewers beliefs in these areas. Two of these statements are presented in the table below. In the first instance, using a scale from 1 (strongly disagree) to 7 (strongly agree), Viewers had a significantly higher level of agreement with the statement: *Learning about the ocean changes my ideas about how the world work*s (Mdn=6.0 vs. 5.0).[57] In the second instance, Viewers also had a significantly higher level of agreement with the statement *I have enough background knowledge to write a substantive letter to my congressional representative about an issue affecting the ocean* (Mdn=4.0 vs. 3.0).[58] In each case the effect sizes indicated were small effects (r=.22, r=.27).

Median Viewer and Control ratings of ocean-related beliefs and attitudes[59]

(Viewer n=71, Control n=64)	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
Learning about the ocean changes my ideas about how the world works.					5. 0 (C)	6.0 (V)	
I have enough background knowledge to write a substantive letter to my congressional representative about an issue affecting the ocean.			3.0 (C)	4.0 (V)			

[57] (*U*=1701.0, *p*=.009, *r*=.22)

[58] (*U*=1563.0, *p*=.002, *r*=.27)

[59] These two questions are from Cudaback, C. (2006). What Do College Students Know About the Ocean? *Eos, 87,* 418-421.

The median ratings for the additional 11 items presented in the table below were not significantly different.

Median Viewer and Control ratings of ocean-related beliefs and attitudes

(Viewer n=71, Control n=64)	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
We are approaching the limit of the number of people the Earth can support.[60]						6.0	
The health of the ocean is important to human survival.[61]							7.0
The ocean and coastal regions overall are so vast and healthy that they can continue to absorb pollution and other kinds of man-made stresses for the foreseeable future.[62]	1.0 (C)	2.0 (V)					
The oceans are so large, it is unlikely that humans will cause lasting damage to them.[63]	1.0						
Ocean health is overstated as an environmental issue.[64]	1.0 (V)	1.5 (C)					
The condition of the ocean has little relevance to my daily life.		2.0					
Understanding why the ocean behaves and reacts the way it does is important to me personally.					5.0		
The health of the ocean and its animals isn't affected by the actions of people like me.[65]	1.0						
We do not need to worry about the health of the oceans, because we will develop new technologies to keep them clean.[66]	1.0						
I worry about the future health of the ocean.[67]						6.0	
I feel able to make informed decisions regarding the ocean and its resources.[68]					5.0		
I have a personal responsibility to work for the health of oceans and its animals.[69]					5.0 (C)	6.0 (V)	

[60] New Ecological Paradigm: Dunlap & Van Liere (2000). *Journal of Social Issues* 56 (3), 448-442.

[61] Belden Russonello & Stewart, and American Viewpoint. 1999. *Review of Existing Public Opinion Data on Oceans.*

[62] American Association for the Advancement of Science (AAAS). 2004. AAAS Survey Report.

[63] Belden Russonello & Stewart, and American Viewpoint. 1999. *Review of Existing Public Opinion Data on Oceans.*

[64] *America and the Ocean v3.0, A Summary of the Findings* developed by the Ocean Project. (2010).

[65] Meyer, D, with Wong, D., and Mott, B. (2012) *Efforts to Advance Awareness, Understanding and Action around Ocean Acidification. Findings from baseline visitor surveys at leading partner institutions*, The Ocean Project.

[66] Belden Russonello & Stewart, and American Viewpoint. 1999. *Review of Existing Public Opinion Data on Oceans.*

[67] Meyer, D, with Wong, D., and Mott, B. (2012) *Efforts to Advance Awareness, Understanding and Action around Ocean Acidification. Findings from baseline visitor surveys at leading partner institutions*, The Ocean Project.

[68] Based on COSEE Ocean literacy principle The Centers for Ocean Sciences Education Excellence (COSEE) http://www.coseeca.net/programs/oceanliteracy/

[69] Cudaback, C. (2006). What Do College Students Know About the Ocean? *Eos, 87,* 418-421.

Finally, for the third item, based on a scale from 1 (not at all important) to 5 (extremely important), Viewers were significantly more likely than Control participants to assign a greater level of importance to the role that the ocean plays in controlling the world's climate (Mdn=5.0 both groups).[70] The effect size indicated the effect was a small effect (r=.18).

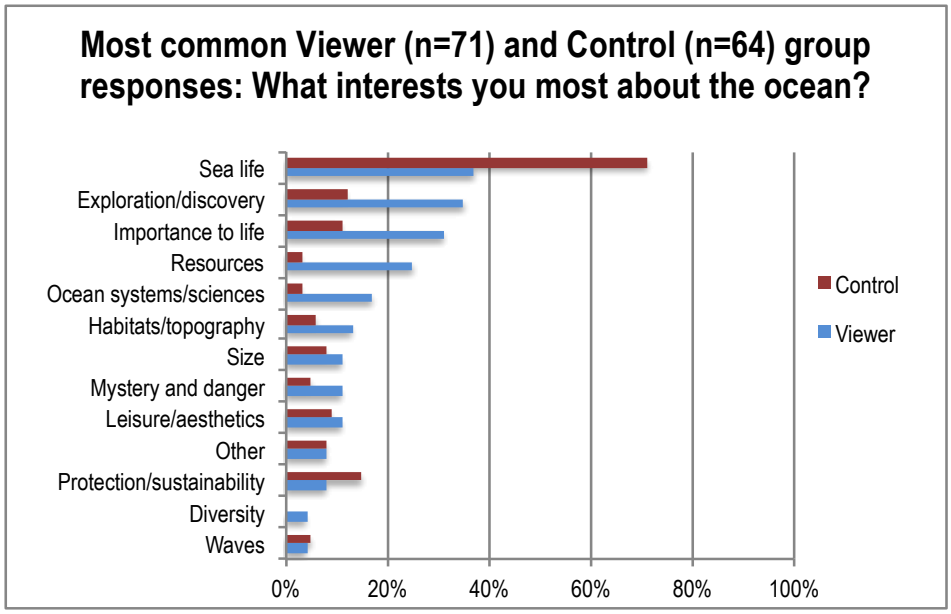
Level of importance Viewer and Control group participants assigned to the role that the ocean plays					
How important a role does the ocean play in…	**Not at all important**	**Slightly important**	**Moderately important**	**Very important**	**Extremely important**
Providing food protein for the people all over the world				4.0 (V)	5.0 (C)
Providing rainfall				4.5 (V)	5.0 (C)
Controlling the world's climate					5.0

[70] (*U*=1755.0, *p*=.037, *r*=.18)

3.10 How did *Alien Deep* affect Viewers' ocean interests?

After watching *Alien Deep* Viewers indicated that what most interested them about the ocean was: the sea life, ocean exploration/discovery, the importance of the ocean to sustaining life, and/or ocean resources. Control group participants who were asked this same question were most interested in sea life, protecting the ocean, ocean exploration, the importance of the ocean to life, leisure/aesthetics, and the size of the ocean.

Viewer and Control participants were both asked to describe what interested them about the ocean. Viewers were asked this as a general question, not specifically tied to the mini-series, to explore possible differences between the groups' general ocean interests that may have been related to viewing. As the chart below shows, both groups frequently focused on the ocean's sea life, ocean exploration/ discovery, the importance of the ocean to sustaining life, and the ocean's resources. However, a substantially higher percentage of Control participants than Viewers focused on sea life (71% to 37%) while substantially higher percentages of Viewers focused on ocean exploration/discovery (35% to 12%), the importance to sustaining life (31% to 11%), and resources (25% to 3%).



Additionally:

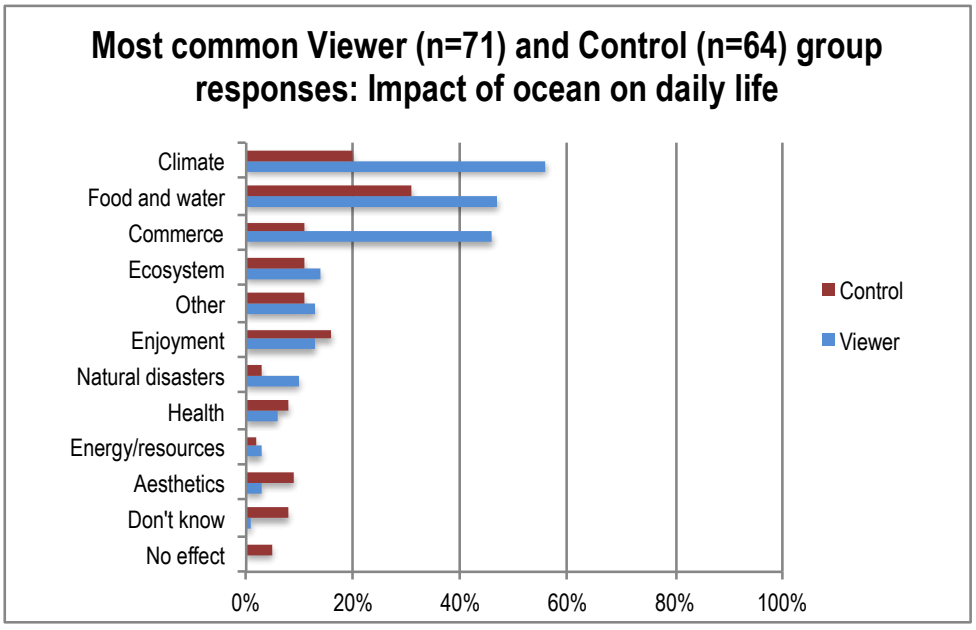
- Smaller groups of Viewers described interests related to ocean systems/sciences (17%), habitats/topography (13%), mystery and danger (11%), the ocean's size (11%), leisure/aesthetics (11%), protecting the ocean (8%), waves (4%), and the diversity of life forms (4%).

- Smaller groups of Control participants described interests related to protection/sustainability (15%), leisure/aesthetics (9%), size (8%), habitats/topography (6%), waves (5%), mystery and danger (5%), and ocean systems/sciences (3%).

3.11 After watching *Alien Deep*, how did Viewers describe the impact of the ocean on their daily lives?

After watching *Alien Deep*, Viewers indicated that the ocean impacted their daily lives through four principal ways: climate, food and water, commerce, and being part of the ecosystem. Control group participants who were asked this same question tended to focus primarily on food and water, followed by climate, enjoyment, commerce, and ecosystems.

Viewer and Control participants were both asked to describe the impact of the ocean on their daily lives. Viewers were asked this as a general question, not specifically tied to the mini-series, to explore possible differences between the groups' general perception of the ocean's impact that may have been related to viewing. As the chart below shows, both groups frequently focused on the ocean having an impact on the climate and food/water, though in both cases substantially higher percentages of Viewers than Control group participants focused on these impacts (56% to 20% for climate and 47% to 31% for food and water).



Additionally:

- Another large group of Viewers described impacts related to commerce (46%). Smaller groups of Viewers pointed to the ecosystem (14%) and enjoyment of the ocean (13%), followed by natural disasters (10%), health (6%), aesthetics (3%), and energy/resources (3%).
- Other than focusing on food/water and climate, Control participants described impacts related to enjoyment of the ocean (16%) followed by commerce (11%), ecosystems (11%), aesthetics (9%), health (8%), natural disasters (3%), and energy/resources (2%).

Section 4: What were the extended influences of *Alien Deep*?

To explore the longer term impact of *Alien Deep*, all Viewers who participated in the evaluation and indicated they were willing to be contacted about an opportunity to provide additional feedback (n=63) were invited to participate in a follow-up survey and/or interview two-three weeks after viewing.

The follow-up requests were sent to all Viewers via electronic mail. A total of 53 out of 63 respondents opened the email request within the four-day evaluation period, and 42 of these 53 recipients completed the online evaluation request, resulting in a response rate of 79%.

The follow-up evaluation questions asked Viewers to reflect on whether they had thought about, discussed, were reminded of, or took any actions related to their viewing of the mini-series.

The follow-up evaluations addressed seven issues, which are reviewed below:

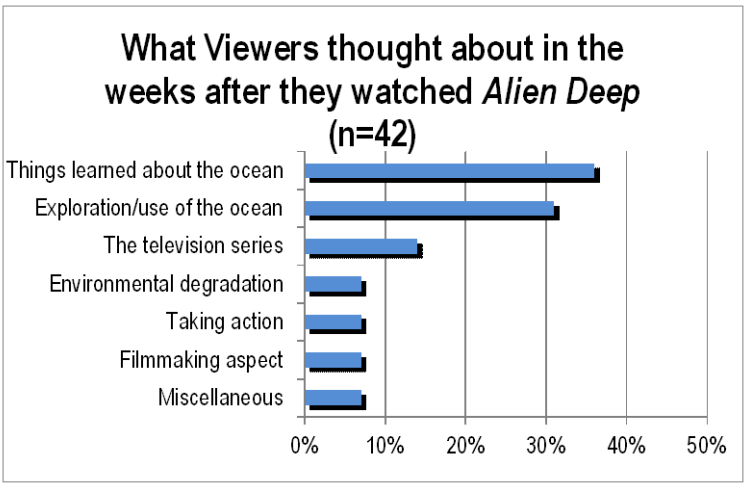
- Issue 1: Did Viewers think about *Alien Deep* in the weeks since watching the series?
- Issue 2: Did Viewers discuss *Alien Deep* with others?
- Issue 3: Did Viewers encounter anything in various media that brought the series to mind?
- Issue 4: Did *Alien Deep* have any other impact(s) on the Viewers?
- Issue 5: Did Viewers do anything new or different as a result of seeing *Alien Deep*?
- Issue 6: Did Viewers who identified themselves as a parent, grandparent, or educator share information about the program with youth?
- Issue 7: Did Viewers visit the *Alien Deep* website?

Issue 1: Did Viewers think about *Alien Deep* in the weeks since watching the series?

The majority of Viewers indicated that they thought about *Alien Deep* in the weeks since watching the series. They most often noted that they thought about something they had learned about the ocean and/or human use and exploration of the ocean.

Viewers were asked if they had thought about *Alien Deep* in the weeks since watching the series. Almost all of the 42 Viewers reported that they had. While 93% of these Viewers described a specific recollection, 2% said they couldn't recall whether they had thought about the program and 5% said they had not thought about the series.

When asked to rate how much they had thought about the program, on a scale from 1 (not at all) to 7 (a great deal), the Viewers' ratings ranged widely from a low of 1 to a high of 7, with the median rating being 3.5.



As shown in the chart to the right, when invited to elaborate, Viewers most often indicated that they specifically thought about something they had learned about the ocean (36%) or human use and exploration of the ocean (31%). Smaller groups thought about the series in relation to television (and the National Geographic Channel in particular) (14%), environmental degradation (7%), taking action (7%), or an aspect of the filmmaking (7%). Less than a tenth (7%) provided miscellaneous answers.

Examples of Viewer responses follow:

- **Thought about something they had learned about the ocean (36%)**
  - Some important points that I learned in the movie come up every time that I am engaged in a marine biology discussion (which has been twice since I saw the last part of the documentary).
  - I've thought about how the Earth gets much of its nutrients from the ocean floor, but I do not think about it too frequently.
  - I guess I have been thinking about all that we don't know like the volcano holes under the sea and all of the life forms that we do no know about.
  - I have spent time thinking about ocean exploration, the flora and fauna we know and don't know about, the possibility of living on water, re-looking at the importance of water politically, and jokingly, Bob Ballard.
  - Implication of weather patterns and changes with regard to waves, etc.
  - I read something about archeology and I thought of the experts on the show who identified the shipwreck artifacts.

- **Thought about human's future use and exploration of the ocean (31%)**
  - I find myself reflecting on the episode contrasting the potential for living on the ocean vs. living on Mars. Very thought provoking and relevant.
  - Thinking on the fears that so many people have about the ocean deep and how much our country and others are willing to spend on military and Space research; yet not on the necessary critical ocean research!
  - I'm intrigued by what was shown in the last episode, about how we could one day actually have cities on the sea. I know Dr. Ballard was passionate about how we need more sea exploration as opposed to space exploration. Although I don't see it as an either/or issue, I agree with him we need more sea exploration.
  - I have thought most often about fish-farming.

- **Thought about the series in relation to television and/or the National Geographic Channel (14%)**
  - I often remember if I see advertisement about similar shows on TV.
  - When will the program air on the NG channel? Also, have more episodes already been filmed aside from the ones that we were able to view?
  - I watched an episode of some show (I can't remember which one) on NatGeo and thought about *Alien Deep*.
  - I have considered watching the NatGeo channel more often.

- **Thought about environmental degradation (7%)**
  - My impression was as we learned that the water was recycling every 9 million years or so and contained all the nutrients necessary for sustaining life...I wondered what effect pollution was having ... this almost implied that all was well although I knew this could not be true. It was not until the Wave video that the effects of global warming and its origins were mentioned. I should not have been able to leave the first episode without at least a mention that this process of creation might be challenged by post industrial pollution, as well as the present practices of strip mining the land, trenching the sea and deforestation.
  - If one day we really will have to live at sea due to overpopulation on land.

- **Thought about taking action (7%)**
  - One question in particular from the survey stuck with me; how did the series affect/change my ability/desire to discuss ocean matters with friends. On the other side of the viewing experience now, I feel significantly more confident in my ability to talk about matters regarding the ocean in moderate detail, even if most of the material was not new.
  - I have thought about the ocean and how I can do little things in my daily life to pollute less.

- **Thought about an aspect of the filmmaking (7%)**
  - Sometimes it takes a while to fully process information, and after completing the first survey, I continued to think about the program in regard to the disconnect between its title and its subject matter, for example. The program left me with a desire to see and learn more about the *Alien Deep* - the deepest, least explored parts of the ocean. Instead, it felt to me that the episodes went in several different directions that, while they may have been indirectly related to the ocean, departed from the show's stated subject matter.
  - I probably would have thought about it more if I weren't in school and super busy with other things, but I have reflected a bit on the overall structure of the program (the differences between the episodes, filming style, messaging, etc.) and the way that I answered certain questions on the survey.

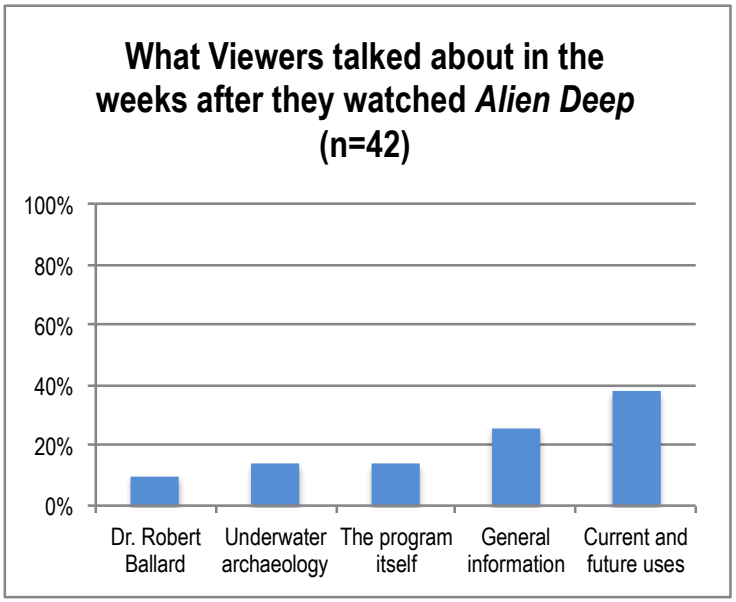
- **Miscellaneous (7%)**
  - I really haven't thought about it much, only about sending two of the DVDs to my dad because I thought he would like them.
  - I thought it was interesting to watch on my free time. But I just have no time to watch the program. But during the summer I plan on looking into it more for my interest.
  - I thought about what the others in the survey thought about the program.

Issue 2: Did Viewers discuss *Alien Deep* with others?

The majority of Viewers indicated that they had discussed an aspect of the series with others. They most often indicated that they had discussed the use, study, and exploration of the ocean and/or general information they had learned about the ocean.

Viewers were asked if they had discussed *Alien Deep* with others. The majority of Viewers indicated that they had discussed an aspect of the series with others in the weeks since viewing. These Viewers (79%) most often indicated that they had spoken with friends (48%) or family members (36%). A handful of Viewers indicated that they had spoken about the series with coworkers (7%), and one Viewer said s/he spoke with the students s/he tutors (2%). A few Viewers did not identify the people they spoke with about the series (7%). Nearly a fifth of Viewers (20%) declined to answer the question.

As shown in the chart to the right, when asked to describe what they discussed, the largest groups of Viewers pointed to current and future uses/study/exploration of the ocean (38%) and general things they learned about the ocean (26%). Smaller groups discussed the program itself (14%), the segment on underwater archaeology (14%), and Dr. Ballard (10%).



Examples of Viewer responses follow:

- **Current and future uses, study, and exploration of the ocean (38%)**
  - We discussed the possibilities of living under the ocean.
  - I've had a 3 or 4 10-minute conversations with friends, mostly regarding colonization of mars vs. the ocean.
  - I summarized the series to a friend and colleague at Harvard. My friend was most intrigued by the comparison of space research v underwater research.
  - I spoke with my husband, told him a few things about it, but thought he would be especially interested in the new underwater transportation technology.
  - Discussed it with a friend. Talked about the extraordinary discoveries they made.
  - Other students and family members, talked about the dangers of the deep sea exploration.

- **General information learned about the ocean (26%)**
  - That there is evidence that the origins of life could be the ocean floor….[and] that microbes thriving at the hot springs are genetically closer kin to humans than they are to each other.
  - Spoke with some friends about the underwater volcanoes and hot water vents.
  - I told my wife about it. We talked about the Hawaii episode, about how the islands were formed and that if we lived long enough, we'd have a new beach to visit on Lō'ihi. ;-)

- Daughter- about the currents that go all the way around the earth and about the theory of fish moving lots of water.
- I have had chats with my husband and daughter about things I learned about, i.e. underwater volcanoes…and underwater sea life.

- **The program itself (14%)**
  - Partner and I discussed how much I enjoyed the series.
  - I had a conversation with my wife, explaining her that the documentaries were interesting but lacked of a certain scientific rigor in the way they conveyed the information to the viewer.
  - I discussed the program with both my husband and my son (who also viewed the episodes.) Our consensus was that we thought there was too much emphasis on the danger associated with deep sea exploration and not enough scientific information about how the submersibles work, for example, and how they have been improved over the years. We also would have liked to see more footage of the dives and the creatures of the deep. We were in agreement that the segment about colonizing Mars was unnecessary to the program & actually took away from the overall experience.
  - I spoke with my husband about the differences between the first 2, the middle, and the last 2 episodes. He watched the last 2 episodes with me, and since I wasn't super impressed by the way it was formatted and the dogma of the last 2, I told him why I preferred the first 2. I also spoke about the survey process a bit with a friend.

- **Underwater archaeology (14%)**
  - Discussed the amphora/shipwrecks with a friend of mine who sails.
  - I visited the Cleveland Art Museum and recalled how pots were found at the bottom of the ocean from a certain time period, and we spoke about how amazing it is that they were in tact and looked similar to the old Greek pots.
  - We also discussed the findings of the Titanic ship and the other boats that they had discovered on the ocean floor. I told them about the things they found and how they were able to trace back the age and time period of the boats.
  - I talked to the friend I went to the museum with about the shipwreck discovery.

- **Dr. Robert Ballard (10%)**
  - We talked about who Dr. Ballard was and his discoveries related to the Titanic.
  - I recall speaking with a couple of different friends as well as a fellow participant. We discussed who Bob Ballard was and also the pieces of the show that I enjoyed, such as the last few regarding implications of exploration for the future of humanity.
  - A friend actually met Bob Ballard in college (attended Maine Maritime Academy) and said he was unfortunately not that nice and wasn't in the actual room when the Titanic was discovered; it was more one of his teams that discovered it. I have not further researched this though to confirm, and it still doesn't change my opinion of him and that based on the show *Alien Deep* he has done and continues to do good things for the ocean and our planet overall.

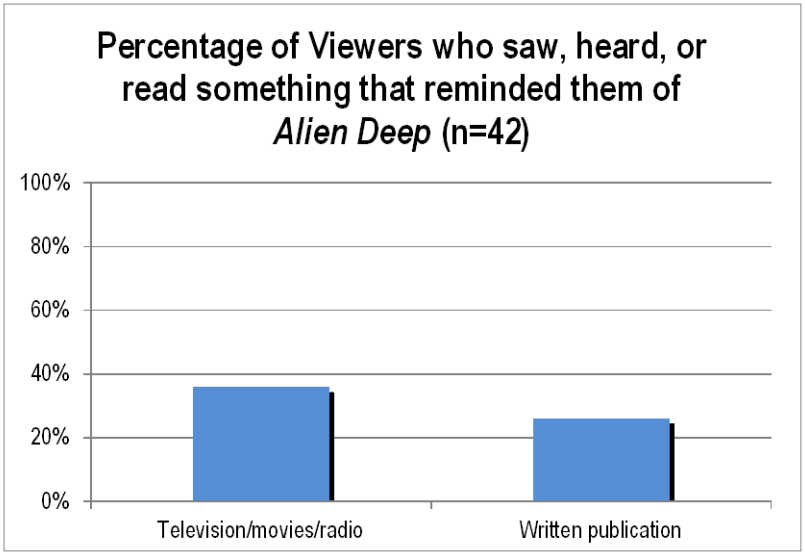
Issue 3: Did Viewers encounter anything in various media that brought the series to mind?

More than a third of Viewers were reminded of *Alien Deep* as a result of something they saw on television or in a movie or heard on the radio. About a quarter of Viewers read something that reminded them of the series in the weeks since viewing.

Viewers were asked if they had been reminded of *Alien Deep* as a result of something they saw, heard, or read about through another media experience in the weeks since viewing. As shown in the chart below, more than a third of Viewers (36%) indicated that they had seen something on television or in a movie or had heard something on the radio that made them think of *Alien Deep*, while more than a quarter (26%) indicated that they had read something that reminded them of the program.

Television, movie, or radio connections

Viewers who saw or heard something that reminded them of *Alien Deep* most often pointed to NPR stories that they had heard on the radio or to television documentaries, ads, or news programs that featured content that reminded them of the program. Examples of Viewers' responses follow.



<u>Radio</u>

- Recently I heard a story on NPR about a group of architects that designed a "floating city" for workers on Brazilian oil rigs. The rigs are moving further out to sea, which makes commuting to and from the mainland timely, expensive & impractical. The floating cities out in the oceans near the oil rigs would be designed to house the oil workers and their families along with supporting services such as markets, banks, medical facilities, etc. This reminded me of the segment in *Alien Deep* where they explored colonizing the oceans.
- Also heard a story on NPR last few months about the old Exxon Valdez spill from the 90s in Alaska and how terrible the consequences still are. We can't just keep exploiting the ocean... More exploration and less exploration just like Ballard discussed in the Alien Deep programs!
- I heard recent segments on both Radiolab and This American Life that dealt with the perils and technical hurdles of deep-sea exploration.

Television

- So I saw a 60 minutes program on TV on the all the container cargo barges loosing giant cargo boxes at sea- they lose them all the time in rough seas and they just litter the oceans! It all ends up polluting the ocean on the floor.
- This might be unusual, but I had not seen Food Inc and saw this recently, and when it came to sustainable farming etc I was reminded of the episode that looked at fisheries and ways of living better with the oceans
- I have thought about it when thinking about educational programming on tv which I rarely watch. Also talking about it with my students that I tutor it came up as we talked about future career options.
- I had just watched "Open Water" on DVD, and it made me think of all the big sea critters, besides sharks, under the surface that I saw on *Alien Deep*.
- While looking through the tv program guide, I saw a tv show on the ocean and I thought about *Alien Deep*. I just saw something about oceans on the program guide and I thought of *Alien Deep*.
- Because now when I see a science program I actually compare it to *Alien Deep*, or vice versa. I think ask if I am learning something or is it just superfluous filler. Too much of *Alien Deep* seemed like filler; i.e how many times did we really need to see him walk up and down the hills in Hawaii or stand on the cliff as the camera flew by? For me only one episode of the *Alien Deep* (I think the 4th) was interesting from start to finish. So generally, *Alien Deep* does not compare favorably to other science programs I have seen recently.
- I thought about *Alien Deep* when I saw some advertisement about FOX's new show Cosmos. It was just the fact that both are scientific shows what made me make the connection. Also, I probably thought whether Cosmos had the same reviewing process before airing.

After the evaluation period was over, three Viewers subsequently informed the evaluation team that they were reminded of *Alien Deep* while watching unfolding coverage of the search for the missing Malaysia Airlines Flight 370 in March 2014. They reflected as follows:

- With all of this world news about the missing Malaysian airplane, I have thought about *Alien Deep*. On the news they were saying that the plane may have crashed in an area that is much deeper than where the Titanic was discovered. Because one of the *Alien Deep* episodes was all about the locating of the Titanic cruise line, I thought of the *Alien Deep*.
- The recent disappearance of the Malaysian jetliner. First it was with helping to locate the plane, but after the new information has come out about where it went down, my thoughts have switched to exploring the site and possible recovery.
- I also find the search in the Indian Ocean for MH370 reminds me of how challenging ocean exploration is in general, and reminds me of the *Alien Deep*.

Print material connections

Viewers who read something that reminded them of *Alien Deep* most often pointed to articles in various publications, including National Geographic magazine (12%). About one-sixth (14%) were reminded of the series by miscellaneous sources: a flyer for an archaeology workshop, a marine archaeology textbook, Facebook posts from a family member who studies marine biology, poetry about Ulysses and the Odyssey, images of the deep sea, and Viewer interest in director James Cameron's work on the movie Titanic.

Examples of Viewer responses follow.

- **Articles in various publications (12%)**
  - The monthly subscription to the National Geographic magazine that had a section related to deep-sea discoveries. It reminded me about some creatures I saw at the documentary and their different living conditions.

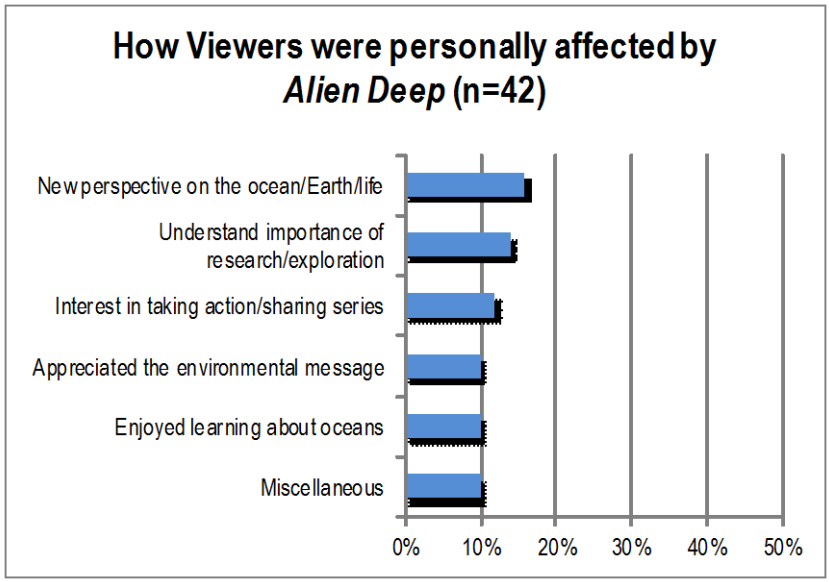
- Yesterday I read an article in the Verge describing what scientists found in a 23,000 feet deep trench in the New Hebrides in the Pacific. They found an abundance of Kusc-eels, large red shrimp and other crustaceans. I wondered if the "trench" was near any hydrothermal vents.
- I remember I read a Science magazine on a flight from Paraguay to Boston last week. I don't remember exactly what I was reading about, but I can recall making an association with *Alien Deep*.
- Two articles, one about Fukushima and the other about the oil spill in the Gulf of Mexico, both reminded me of *Alien Deep* when I thought about the vast expanse of life and earth and unexplored territory whose existence is all in very real danger from the way humanity at large treats the oceans. Out of sight, out of mind seems to be the modus operandi.
- I read about a shipwreck in which 500 containers were lost. The article further described what an environmental hazard and shipping danger these containers pose - and how common an occurrence it is. It directly reminded me of the segment in *Alien Deep* relating to container ships.

- **Miscellaneous answers (14%)**
  - I read about an archaeology workshop for teachers and thought of the experts who identified the shipwreck artifacts.
  - As above, I've been reviewing old [marine archaeology] texts.
  - Well, not exactly a publication, but my niece is studying to be a marine biologist, so every time she posts on Facebook, I think of the series.
  - Poetry about Ulysses and the Odyssey.
  - Occasionally I see pictures of the ocean or sea and I think of the program, very briefly though.
  - Reading about James Cameron's research of the Titanic for his movie and how much time he spent in deep water submarines learning about it.

Issue 4: Did *Alien Deep* have any other impact(s) on Viewers?

Just over half of Viewers indicated that *Alien Deep* impacted them personally. They most often noted that the series gave them a new perspective of the ocean, Earth, and life, and/or a better understanding of the importance of ocean research and exploration. Other Viewers commented on a new or renewed interest in taking action, an appreciation of the series' environmental message, and their enjoyment of the program.

When Viewers were asked to describe any other impacts *Alien Deep* had on them personally, more than half (57%) described an additional impact.



As shown in the chart to the right, the largest group of Viewers (16%) indicated that the series had given them a new perspective on the ocean, Earth, and life in general. Other Viewers commented on their understanding of the value of ocean research/exploration (14%), a personal interest in taking action or sharing the mini-series with others (12%), an appreciation for the series' environmental message (10%), and how much they enjoyed learning about the ocean (10%). A tenth (10%) gave miscellaneous answers. Additionally, just over a tenth (12%) criticized the series and just under a tenth (7%) praised the series. Less than a tenth (7%) said the program hadn't had any other impacts of them, and nearly a quarter (24%) declined to answer the question.

Examples of Viewer responses follow.

- **The series gave them a new perspective on the ocean, Earth, and life in general (16%)**
  - It has made me think differently about the importance of our Oceans and how there is just so much more out there to explore and therefore so much more to learn about.
  - It has made me think more about the oceans and how we need to protect this resource, even just to look at it.
  - I look at the structure of land masses differently now. Upon viewing pictures of a beach my friend sent me, I thought about how the Earth is formed from these underwater volcanoes.
  - I seriously look at life differently now…I want to get deep with their discoveries and learn more about it.

- Well, whenever I watch nature programs (which is pretty frequently), I am reminded of how large and diverse the planet is, and it helps me put the small daily things in perspective.
- It has expanded my knowledge and understanding of not only the ocean but in the world.

- **Understanding of the importance of ocean research/exploration (14%)**
  - Further justified my feelings that this country needs to spend and fund more oceanic research science than we do now. Our futures depend on it!
  - I enjoyed how the ocean but more importantly the research about the oceans can affect our daily lives.
  - It really made me think about what the ocean really is and what yet has to be explored.
  - I now know that there is much to still discover in the world.
  - The *Alien Deep* program reminded me of the importance of exploration into the unknown and all that we can learn and apply from what we discover.

- **Personal interest in taking action/sharing the mini-series with others (12%)**
  - I don't know if it has had a personal impact on me, but I definitely would like to know more. In fact, if any volunteer opportunities came up that were geared to non-professionals I would be interested.
  - It has made me think more about the oceans and how we need to protect this resource, even just to look at it. I already do a lot to conserve the environment, but I find myself wondering what else I can do. Always looking...
  - There is a lingering in the back of my mind that tells me I should do a little more research and learn more on the various topics so I can be more proactive and take the steps I can to ensure we are caring for our world and oceans.
  - I will share it with them [the Viewer's grandchildren] when I visit them this summer. They live by the coast and use our Outer Banks property.
  - I will share the shows with my son (13) who is only with me half the time.

- **Appreciation for the series' environmental message (10%)**
  - It has created a conversation or on going thought about the ocean, humanity's future, etc. I generally do think about politics, the environment and what our future may become but I did take in some new information from the show that has joined that thought.
  - The knowledge of climate change and its effects were reinforced. I think this is of great importance to the US public.
  - I also feel like the more people know and get fascinated about the naturally occurring phenomena on our planet, the more agency they will personally feel. The risk, however, is that people will also feel too small to have any sort of real impact.

- **Viewer enjoyment learning about the ocean (10%)**
  - It didn't have any long lasting effect on me, but I still keep thinking about certain facts showed on some of the episodes, especially the one about the quest for old ships in the Mediterranean, the one about the killer waves and the one about the volcanoes in the Atlantic Ocean.
  - It was just really eye opening the episodes I watched. I have a few friends who worked on the water like myself, fewer friends that dive for work, and one friend that did underwater research of aquatic species of something off the coast of Guam. Having worked for a photo agency started by NG photographers and just being an ongoing NG fan, I am familiar with some of the underwater photographers. So viewing *Alien Deep*, I found it all just very interesting since I have an interest in the ocean to begin with.

- **Miscellaneous (10%)**
  - It has given me pause to reconsider my childhood dream of being a marine biologist, which happens periodically, though this time it hit a slightly deeper chord in my heart.
  - I was a little embarrassed at first bc I didn't know who Robert Ballard was or that he discovered the Titanic, so I've filed that way, which is nice. Other than that....nothing really.

- Made me miss teaching science class and being able to share and discuss with high school students.

- **Criticism of the series (12%)**
  - I did want to mention that before I viewed the show, I thought that it was going to actually be about aliens, so I wasn't very interested.
  - Not a lot. It was an interesting viewing experience overall, but like many mini-series it seemed to be more entertainment/story-telling than a call to action for the planet/ocean.
  - Not to be too critical, but I am reminded about how disappointed I was with *Alien Deep* when I see other similar shows. And I find myself hoping there is not as much of a political bent to the show I am about to watch. *Alien Deep* was shallow on real content on most of the segments, but heavy handed on the global warming//climate change segment.

- **Praise for the series (7%)**
  - I actually had an enjoyable time watching this documentary. I would highly recommended since the tone and the information given was at a perfect pace with an average viewer that is interested in learning more about deep-see discoveries, concepts, and theories.
  - I thought 2 of the programs were great but that's it, they weren't life changing, they were just wonderful tv programs that were beautiful, educational and fantastical.
  - It really brought to my attention that people from my community lack engagement with the issues presented, and I wish this would change.

Issue 5: Did Viewers do anything new or different as a result of seeing *Alien Deep*?

About a fifth of Viewers indicated that they had done something new or different as a result of watching *Alien Deep*. The largest group noted that they conducted research on a variety of topics, while others indicated that the series had inspired them to take action.

Viewers were asked if they had done anything new or different as a result of seeing *Alien Deep*. Just over one-fifth of Viewers (21%) said they had done something that was influenced by the viewing experience. Most often they noted that they had conducted additional research on a variety of topics (14%), including marine archeology, undersea creatures, other theories about the origin of life, and marine researchers (including Dr. Ballard). A handful also indicated that the series had inspired them to take action in some way (7%) – to change their diet, be a more responsible consumer, and share information with others.

Examples of Viewer responses follow.

- **Conducted research (14%)**
  - Researched more on the amphora
  - Review my marine archaeology texts. I tread lightly on the earth and haven't eaten seafood for decades and live at 7,000 feet 800 miles from the ocean.
  - We looked up the "Hoff" crab on the Internet to learn more information about it.
  - Reviewed other theories of the origins of life...creation myths, big bang theory, black hole, etc.
  - I googled Dr. Ballard to learn more about him and the center at the University of Rhode Island.
  - I looked for information on others who have visited the ocean deeps.

- **Inspired to take action or share the film's message with others (7%)**
  - Like I mentioned, the fish-farming and sustainability viewing got to me, perhaps because of my own interests. I am now seriously considering changes to my diet and deeper engagement with food sustainability issues.
  - Stopped using plastic bags (or recycling all the ones I do get) and stopped using soaps with plastic micro beads.
  - I have focused on educating my child on the wonders of the ocean more than before and teaching her not to fear the unknown regarding our planet and discovery!

Issue 6: Did Viewers who identified themselves as a parent, grandparent, or educator share information about the program with youth?

About a third of Viewers identified themselves as a parent, grandparent, or educator. Of this group, two Viewers indicated that they had shared information about *Alien Deep* with their child(ren), grandchild(ren), and/or student(s).

Viewers were asked to identify themselves as parents, grandparents, and/or educators. Those who did were then asked if they had shared information about the program with youth. Overall, more than a third of Viewers (36%) identified themselves as a parent (24%), grandparent (2%), and/or educator (19%), some of whom shared information about the program with youth. While most of these Viewers indicated that they had not yet shared *Alien Deep* with their child(ren), grandchild(ren), or student(s), those who indicated that they had (4%) said that they discussed how they followed debris trail to find evidence of ancient ships (2%) and the need for planetary awareness (2%).

Viewers were then asked to describe any impacts that they thought the program has had on their child(ren), grandchild(ren), or student(s). One parent said that his or her daughter doesn't generally like documentaries and that maybe she will be more apt to give them a chance, while another parent observed a greater interest in the ocean deep than before and that exploration is cool.

Issue 7: Did Viewers visit the *Alien Deep* website?

Just under one-fifth of Viewers indicated that they had visited the *Alien Deep* website. Those who visited the website generally said they enjoyed their visit. Of those Viewers who did not visit the website, the largest group noted that they had not been aware of its existence.

Viewers were asked if they visited the *Alien Deep* website and if so, to describe what they did, what they enjoyed most, if there was anything they disliked, and what they learned that interested them most.

Nearly one-fifth of the Viewers (17%) indicated they had visited the *Alien Deep* website on the National Geographic website in the weeks since viewing the program. The largest group, one-tenth (10%), read about the episodes. Less than one-tenth each looked at photos (7%), played with the Interactive (5%), read other posts/articles (2%), watched video clips (2%), and/or "liked" the *Alien Deep* page (2%).

Overall, the Viewers who visited the *Alien Deep* website said they enjoyed their visit. On a scale from 1 (didn't enjoy at all) to 7 (enjoyed a great deal), their ratings ranged from 3 to 7, with the median rating being 4.0. When asked if they had learned anything new about ocean research or exploration, or a related topic, while visiting the site, the largest group said no or declined to answer the question (10%). One Viewer each indicated that s/he learned about cool species (2%) and the movement of the plates, and the cultural myths that surround their conception (2%). Finally, one Viewer (2%) answered with *I will*, which may indicate that s/he expects to learn something on follow-up visits to the website.

Among the majority of Viewers who indicated they had not visited the *Alien Deep* website (83%), in general, these Viewers noted that they were not aware the website existed (47%). A smaller group of Viewers said that they weren't interested in visiting the website (24%), and a handful indicated that they didn't have time (10%). One Viewer who indicated s/he had not visited the website declined to elaborate (2%).

Part Two: Evaluation of the *Alien Deep* educational resources with online visitors and educators

In addition to evaluating the five-part *Alien Deep* mini-series with a general audience, the evaluation team also examined the appeal, clarity, use, and learning value of the educational resources by visitors and educators who used these resources of their own accord. Section 1 of this report summarizes the evaluation team's collaboration with NGT to construct a summary of visitor activity and engagement with the project's online educational resource and social media pages. Section 2 provides an overview of educators' uses and impressions of the educational resources in formal and informal settings as indicated by their responses to an initial online survey. Section 3 provides an overview of educators' uses and impressions of the educational resources in formal and informal settings as indicated by their responses to a follow-up online survey.

Section 1: Summary of online visitor activity and engagement

To provide an overview of visitor activity and engagement for the *Alien Deep* educational resources and social media pages, the evaluation team summarized the online audience and visitor engagement metrics, as made available from NGT.

1.1 Online educational resource pages

The *Alien Deep* online educational resources include a series of online videos, reference materials, and an Interactive. Over a one year period, from January 2013 to December 2013, web metric data was gathered for the main *Alien Deep* 'Collection Page' and 15 related educational resource pages. This data was reviewed in early May 2013, soon after the resources were made live, and then reviewed again in December 2013 to allow time for additional visitor interactions to occur.[71] Reports on Pageviews, Time on Page, and Top Referrers were provided for the main resource features, including the following pages/sections: Collection Page, Ocean Exploration – Technology, Ocean Circulation/Butterfly Effect, Ocean Currents and Climate, Plankton Revealed, Economy of Shipping, Ancient Shipwrecks: Black Sea, Ancient Mariners, Hawaii Geology, Mauna Kea, Deep Sea Hydrothermal Vents, Plate Tectonics, Rogue Waves Revealed, Catching the Biggest Wave, Science of Surfline, and Rogue Waves.

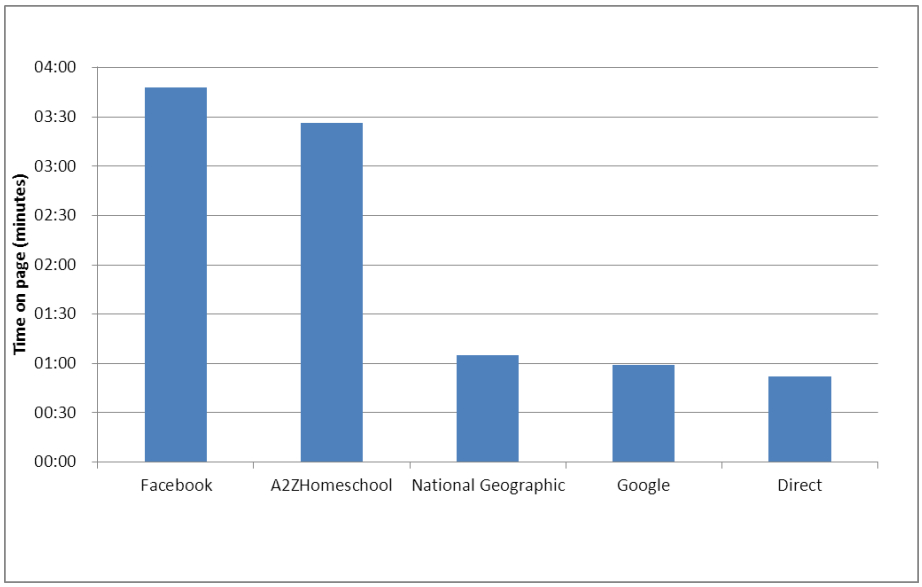
[71] Based on preliminary page findings, the National Geographic team confirmed that as of May 2nd 2013 the site was performing "very well" by internal standards, particularly given short period of time material was live. Time on Page for each resource was high, pulling in more than 5 minutes.

The final data report as of December 2013 showed the following with respect to Referring sites, Pageviews, and Time on Page during the previous one year period.

Referring sites

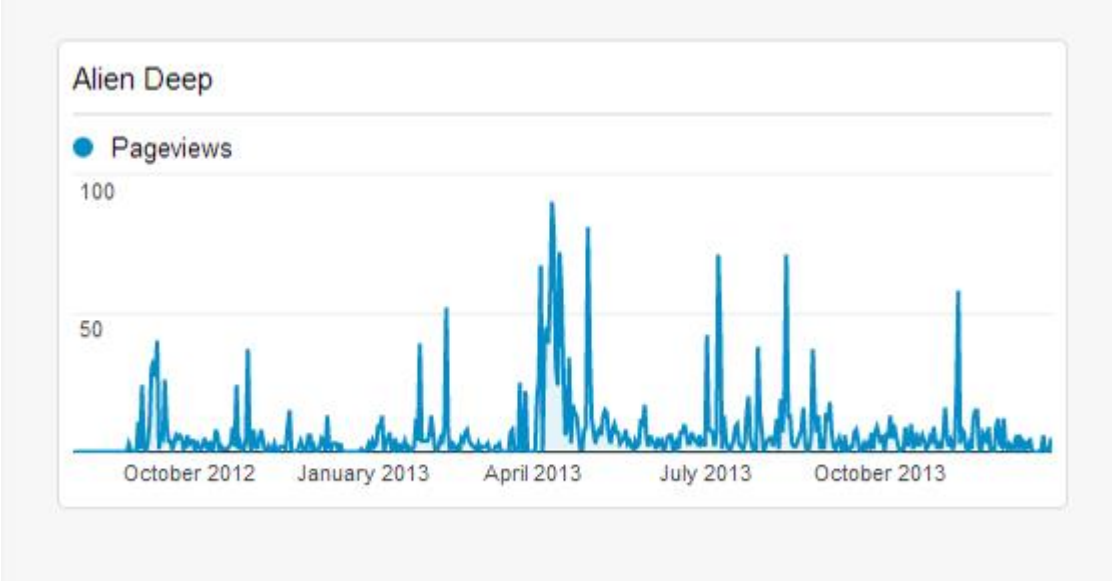
As illustrated in the chart to the right, the top 5 Referring sites to the *Alien Deep* educational resources included (with average Time on Page per referral denoted): Facebook (3:48 minutes), A2Z Homeschool (3:26 minutes), National Geographic (1:05 minutes), Google (59 seconds), and Direct (52 seconds).

Top 5 Referrers to *Alien Deep* educational resources (average Time on Page)



Pageviews

The chart below illustrates a timeline of the *Alien Deep* Pageviews between October 2012 and October 2013, which shows a spike in Pageviews between April –May 2013, soon after the resources were made available online.



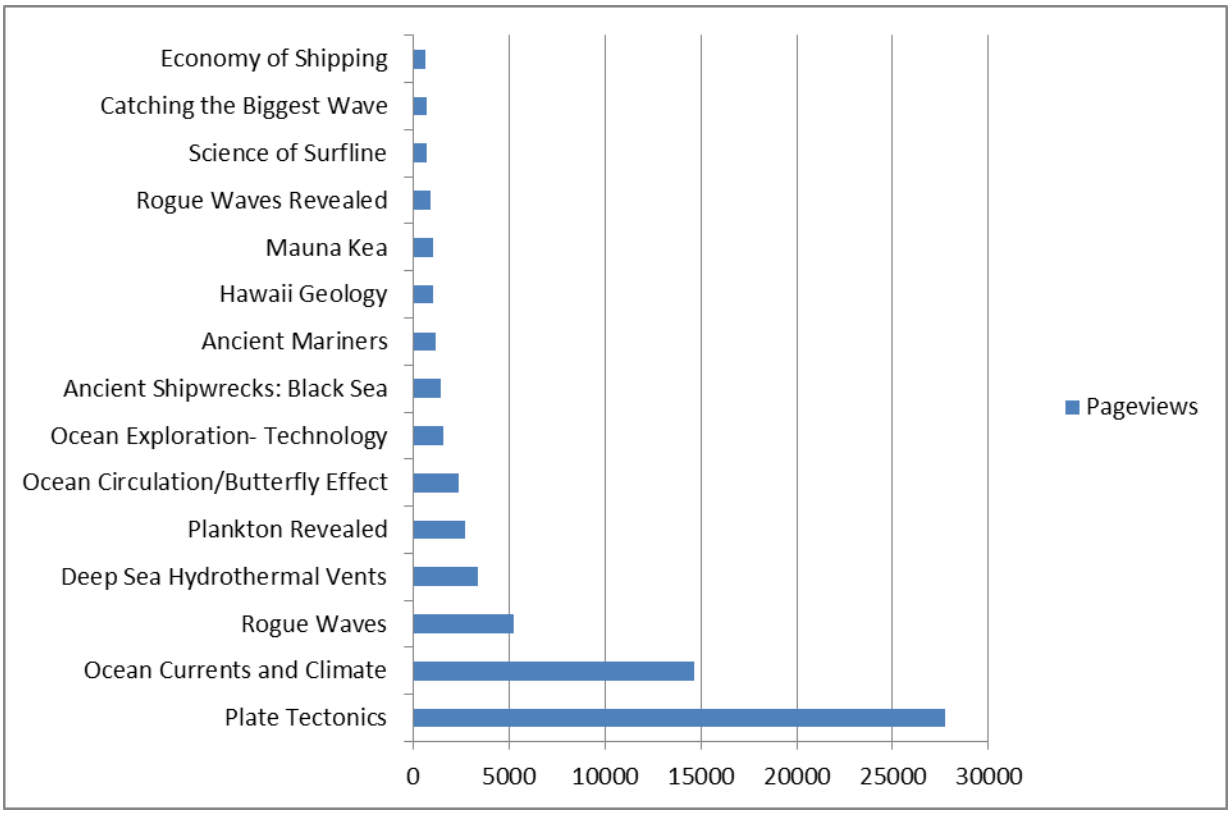
Collection page

Between January and December 2013, there were a total of 2,162 Pageviews of the main 'Collection Page' and visitors on average spent 2:44 (minutes) on this page.

Individual pages

As the chart below illustrates, the individual Pageview results ranged widely, from a low of 692 for Economy of Shipping page to a high of 27,746 for Plate Tectonics. After Plate Tectonics, the highest numbers of Pageviews were Ocean Currents and Climate (14,695), followed Rogue Waves (5,251), Deep Sea Hydrothermal Vents (3,400), and Plankton Revealed (2,725). The lowest Pageviews, in ascending order after Economy of Shipping, were found for Catching the Biggest Wave (700), Science of Surfline (753), Rogue Waves Revealed (911), and Mauna Kea (1038). The average number of Pageviews across the 15 *Alien Deep* pages shown in the chart below was 4,379.

Pageview rankings for *Alien Deep* educational resources

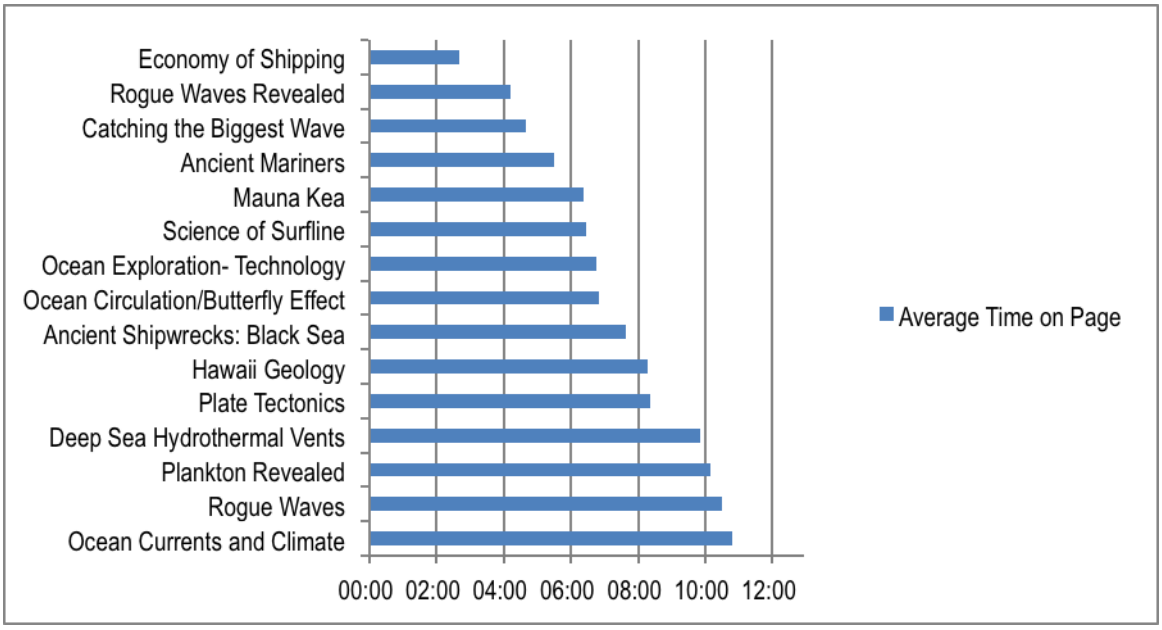


Time on Page

The chart on the following page shows the Time on Page for the 15 resource pages, ranked from least to greatest. The average Time on Page results ranged from a low of 2:40 (minutes) for Economy of Shipping to a high of 10:48 (minutes) for Ocean Currents and Climate. After Ocean Climate and Change, Viewers spent the most time, on average, visiting Rogue Waves (10:29 minutes), Plankton Revealed (10:09 minutes), and Hydrothermal Vents (9:51 minutes). After Economy of Shipping, Viewers spent the shortest

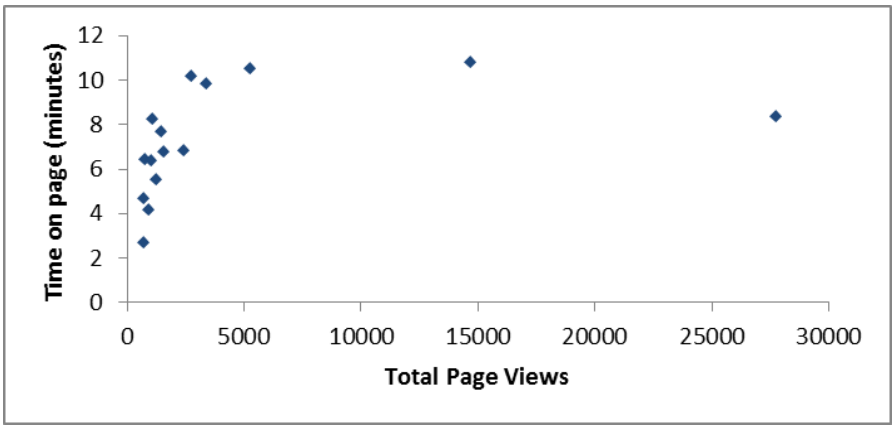
amounts of time, on average and in ascending order, visiting Rogue Waves Revealed (4:11 minutes), Catching the Biggest Wave (4:40 minutes), and Ancient Mariners (5:30 minutes). The average across the 15 resource pages was 7:16 (minutes).

Ranking of *Alien Deep* pages by average Time on Page



The chart below offers another view of the traffic data, as a scatterplot of Time on Page vs. Pageviews. The chart shows where most of the pages fell in terms of traffic (10 minutes or less, under 5000 Pageviews).

Scatterplot of *Alien Deep* Pageviews vs. Time on Page



1.2 Social media

The evaluation team reviewed the data provided by Insights and comparable analytics services, as provided by NGT, for the *Alien Deep* Facebook page and YouTube videos to report on both reach and engagement (likes and shares). The data revealed the following findings:

Facebook posts

The project team made a variety of Facebook posts related to the miniseries, including posts titled: Plate Tectonics, Main *Alien Deep*, Ocean Conveyor Belt, and Interactive. These and other relevant posts were captured by the National Geographic social media stats in May 2013. As shown in Image 2 to the right, a post related to *Alien Deep* in March 2013 invited visitors to explore the Interactive.

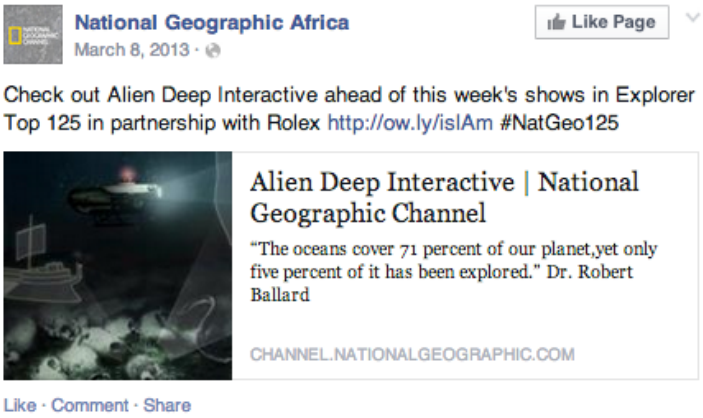


Image 2: Screenshot of National Geographic Africa's Facebook post about *Alien Deep*

Over the course of the project period, the social media results showed that the Main *Alien Deep* Facebook post had a Total Reach of 9,559 and obtained 116 Likes and 23 Shares. The related Plate Tectonics and Ocean Conveyer Belt Facebook posts achieved significantly higher levels of reach, at 302,929 and 303,163, respectively. These posts also obtained a higher number of likes, 1734 and 2391 respectively, as well as shares, 497 and 259 respectively.

YouTube videos

During the broadcast premiere in September 2012, National Geographic featured three video clips from the series on YouTube: More Dangerous Than Space, Planet in Crisis, and Hoff Crab. More Dangerous Than Space earned the highest number of views (30,000), followed by Hoff Crab (17,000) and Planet in Crisis (13,000).

Date	Video Title	Views (000)	Unique cookies (000)
9/1/12 - 9/30/12	*Alien Deep* - More Dangerous Than Space	30	22
	Alien Deep - Planet in Crisis	13	8
	Alien Deep - The Hoff Crab	17	11

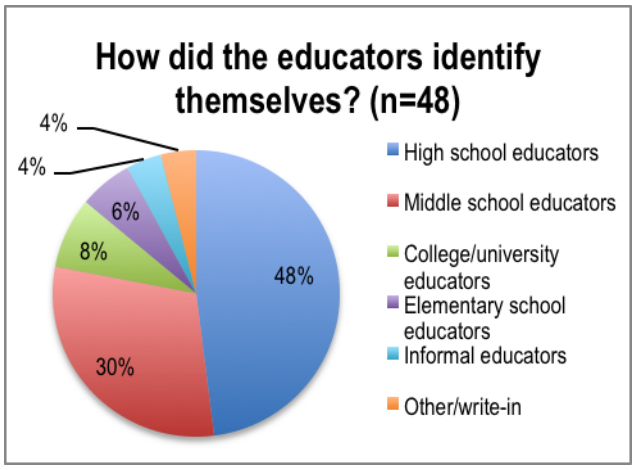
Section 2: Educator feedback on the *Alien Deep* educational resources

In order to provide an overview of use of the *Alien Deep* resources by educators who sought out the resources on their own accord, the evaluation team sent an evaluation invitation to a random sample of 300 educators who attended a National Science Teachers Association (NSTA) or National Marine Educators Association (NMEA) conference in 2013 and stopped by the National Geographic Education booth to inquire or learn about the *Alien Deep* and other educator resources. These educators provided NGT contact information for additional follow-up. Among this group of 300, a total of 85 educators opened the email invitation within the three week evaluation period. A total of 48 of these 85 educators completed the feedback survey and provided additional input, resulting in an overall response rate of 56%.

2.1 Background information

The largest groups of educators identified as high school or middle school teachers/instructors. Smaller groups identified as college/university educators, elementary school educators, informal educators, or other kinds of educators. The educators surveyed were from 22 states and all regions of the country.

As show in the chart to the right, when asked to describe their current or most recent role as an educator, the largest groups of educators identified as a high school (48%) or middle school (30%) teacher/instructor. Less than one-tenth each identified as a college or university teacher/instructor/ professor (8%), an elementary school teacher/instructor (6%), or an informal educator (4%). Two educators (4%) chose to define their positions with other, write-in answers. One described his/her work as teaching ESL families, adults, and children (2%) and the other wrote workshop for science teachers, program coordinator (2%).



The educators were from 22 states and all regions of the country. The largest groups of educators were from Texas (27%) and California (13%). Two educators each (4% each) live in the following states: Colorado, Connecticut, Illinois, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, and Virginia. One educator each (2% each) lives in: Arizona, Florida, Georgia, Kentucky, Louisiana, Maryland, Missouri, Mississippi, Montana, and South Carolina. One educator (2%) declined to answer the question.

2.2 Breakdown of educators who have reviewed, used, or intend to use the *Alien Deep* resources

Almost all of the educators indicated that they have reviewed one of more of the *Alien Deep* resources to date, and more than a third noted that they have used the resources in their educational settings. Additionally, the majority of educators reported that they have used or intend to use the *Alien Deep* resources.

Educators who have reviewed the resources

As shown in the table to the right, almost all of the educators (90%) indicated they had reviewed one or more of the *Alien Deep* resources. The largest group, more than two-thirds (69%), looked at the video clips. Around three-fifths each looked at the photo galleries (60%) and the classroom activities and lessons (58%). Two-fifths (40%) looked at the reference materials. About a third each looked at the *Alien Deep* Interactive (31%) and the My Ocean game (31%). Just under one-sixth (15%) looked at the *Alien Deep* children's book by Bradley Hague.

Breakdown of educators who reviewed the *Alien Deep* resources (n=48)

Educators who reviewed one or more of the resources	**90%**
Reviewed video clips	69%
Reviewed photo galleries	60%
Reviewed classroom lessons and activities	58%
Reviewed reference materials	40%
Reviewed *Alien Deep* Interactive	31%
Reviewed My Ocean game	31%
Reviewed *Alien Deep* children's book	15%

Educators who have used the resources

As shown in the table to the right, more than a third of educators (35%) indicated that they have used the *Alien Deep* resources in their educational settings. The largest group, nearly a quarter (23%), used the video clips. Around one-fifth used the photo galleries (19%), and more than a tenth (12%) used the classroom activities and lessons. Just under a tenth (8%) used the reference materials. One educator each used the *Alien Deep* Interactive (2%), the My Ocean game (2%), and the *Alien Deep* children's book by Bradley Hague (2%).

Breakdown of educators who used the *Alien Deep* resources (n=48)

Educators who used one or more of the resources	**35%**
Used video clips	23%
Used photo galleries	19%
Used classroom lessons and activities	12%
Used reference materials	8%
Used *Alien Deep* Interactive	2%
Used My Ocean game	2%
Used *Alien Deep* children's book	2%

Examples of educators' comments on their use of the resources follow below:

- **Used video clips (23%)**
  - Showed the videos in class.
  - Have shown clips in my classroom during lessons.
  - I use the videos to capture the attention of my students when introducing a topic.

- I've used the clips and photos when I covered a unit in my Earth and Space Science class on oceanography.
- I have used some of the videos to show my students some organisms with adaptations for life in the ocean.
- We did an oceanography unit in my Integrated Science course and students used the clips and the photos as research for their project based learning.
- I teach ESL (English as a Second Language) for a non-profit using STEM (Science Tech Engineering Math) I have used the material selected in our Earth discussions.
- I use some of the video clips in my classroom so that students can see real world situations.

- **Used photo galleries (19%)**
  - As engagement for middle school science curriculum. Illustrations of examples.
  - We did an oceanography unit in my Integrated Science course and students used the clips and the photos as research for their project based learning.
  - I've used the clips and photos when I covered a unit in my Earth and Space Science class on oceanography.
  - I have used them in Marine Biology for 7th and 8th graders.
  - I have used them as a supplement to my ocean unit in environmental science.
  - I use it when we are studying marine biomes. The kids love it!

- **Used classroom activities and lesson (12%)**
  - I use it when we are studying marine biomes. The kids love it!
  - We are working on adaptation on species to the environment.
  - For students' to study animal classifications.

- **Used reference materials (8%)**
  - I have gone through some of the reference material to help learn the content myself.

Educators who have used or intend to use the resources

The majority of educators (88%) reported they used or plan to use the *Alien Deep* resources. As noted above, more than a third of educators (35%) indicated that they have used the resources in their educational settings. Additionally, about two-thirds (65%) indicated that they intend to use the resources in their educational settings. (A handful of educators noted that they have used some resources and intend to use others.) Remaining respondents said that the resources were not relevant to their particular educational settings (6%), mentioned that they did not take any materials from the National Geographic NSTA booth but would be interested in looking at or using the *Alien Deep* resources in the future (2%), or declined to answer the question (2%).

Examples of educators' comments on the above themes follow below:

- **Intend to use the resources (65%)**
  - We are doing a theme unit on water next year with k-6 so we'll probably use some of them then.
  - I plan to use this as an intro to Ocean Acidification.
  - Plan to use different aspects of curriculum for specific parts of chemistry and biotechnology curriculum (e.g., dye diffusion in chemistry)
  - When students study tectonic places I hope to integrate some of the more extreme information like the ones seen in the videos and resources.

- My students complete a climate change science fair project each spring. I am interested in encouraging them to investigate the impact of climate change on oceans, so I will use the resources to help them build those connections.
- When I teach about the different forms of life and how the environment affects their form, *Alien Deep* is perfect.
- I will use video clips and perhaps other materials in my marine biology class if it goes this summer. Last summer it was cancelled due to low enrollment.
- I am planning to use it in my chemistry classes and oceanic science classes. I would like to show all cool pics and lead activities such as calcium carbonate and acid reaction and what kinds of reactions happens under the sea. I would like to show them images of sea temperatures too.
- I think it would be a great supplemental resource that would keep students engaged!

- **Have used the resources (35%)**
  - I teach ESL (English as a Second Language) for a non-profit using STEM (Science Tech Engineering Math) I have used the material selected in our Earth discussions.
  - I have used them as a supplement to my ocean unit in environmental science. I wasn't aware of the interactives- I will check them out!
  - We did an oceanography unit in my Integrated Science course and students used the clips and the photos as research for their project based learning.
  - I use it when we are studying marine biomes. The kids love it!
  - I use some of the video clips in my classroom so that students can see real world situations.
  - I use the videos to capture the attention of my students when introducing a topic. I have not had a chance to use the activities but I think that they will be great to reinforce concepts.

- **Resources not relevant to their educational settings (6%)**
  - I was unable to find a use for the lessons in my current teaching situation. I taught biology last year and could envision a use for some of the materials in that class. However, I am only teaching health science classes this year.
  - I have not had an opportunity to use any of the resources. I was a high school Earth Science teacher and would have used these resources frequently. However, I am now teaching at KU in a teacher preparation program. Although I would with students who are out in the field, I have not yet needed any of these resources yet.
  - I have looked at the resources but because I teach chemistry and physics it was hard to find a connection to relate the resources to my classroom.

- **Would be interested in the future (2%)**
  - I looked at the resources at the National Geographic NSTA booth but did not take any resources with me, so haven't used them in my classroom. I would like to have resources to use, of course.

2.3 How educators have used or intend to use the *Alien Deep* resources

More than two-thirds of educators noted that they have used or intend to use the *Alien Deep* resources in their classroom curricula. Of the various specified curricula, the largest number of educators pointed specifically to their water/ocean/marine biology units or classes.

When asked to describe how they used or plan to use the resources identified earlier in the survey, nearly three-quarters of the educators (71%) indicated that they had used or intended to incorporate the resources as part of their STEM classroom curricula.

Use in classroom curricula

As shown in the table to the right, more than a quarter (27%) pointed to their water, ocean, or marine biology units or classes. About one-sixth (17%) did not specify a curriculum. More than a tenth (13%) indicated that they used or intend to use the resources when discussing natural selection, adaptation, and classification. Less than a tenth each pointed to using the resources in their earth science/geology (4%), chemistry (4%), technology/biotech (4%), and/or climate change (2%) curricula.

How educators used or intend to use the *Alien Deep* resources (n=48)

Use in classroom curricula on…	**71%**
Water, ocean, marine biology	27%
Unspecified STEM curriculum	17%
Natural selection, adaptation, classification	13%
Earth science/geology	4%
Chemistry	4%
Technology/biotech	4%
Climate change	2%
Use in other ways….	**36%**
To introduce a curriculum	10%
For use on research projects	6%
To share with other educators	10%
Miscellaneous uses	6%
For the education of the instructor	2%
With a science club	2%

Use in other ways

Other educators described using the resources in other ways. A tenth (10%) noted that they would specifically be using the resources to introduce curriculum. Less than a tenth (6%) indicated that students would be using the resources to help develop research projects. Of those who specified non-curricular uses, a tenth (10%) indicated that they did or would be sharing the resources with other educators. Less than a tenth (6%) provided miscellaneous answers, expressing general interest in the resources. Finally, one educator (2%) noted that s/he had used the resources *to learn the content myself* and another (2%) indicated that s/he would be using the resources with an outside-the-classroom science club.

Examples of educators' comments on the above themes follow below.

- ***Used or intend to use in the classroom (71%)***

  Water, ocean, or marine biology units/classrooms (27%)
  - *I am planning to use it in my chemistry classes and oceanic science classes. I would like to show all cool pics and lead activities such as calcium carbonate and acid reaction and what kinds of reactions happens under the sea. I would like to show them images of sea temperatures too.*
  - *I've used the clips and photos when I covered a unit in my Earth and Space Science class on oceanography.*
  - *Will vary based on content that is being presented. Bathymetry-benthos&nekton. Snipits can be used to reinforce content. Will assist visually and conceptually.*
  - *We are doing a theme unit on water next year with k-6 so we'll probably use some of them then.*
  - *I plan to use this as an intro to Ocean Acidification.*
  - *I would use the information as anticipatory sets for the ocean unit.*
  - *I will use video clips and perhaps other materials in my marine biology class if it goes this summer. Last summer it was cancelled due to low enrollment.*
  - *These resources will support my science students' investigations into extreme environments and marine life.*
  - *May pull some when we talk about ecosystems to provide more exposure to the underwater ecosystems that we can't see on a daily basis.*
  - *I use it when we are studying marine biomes. The kids love it!*
  - *We did an oceanography unit in my Integrated Science course and students used the clips and the photos as research for their project based learning.*
  - *I have used them in Marine Biology for 7th and 8th graders. I would like to also view the My Ocean Game and the children's book as well.*
  - *I have used them as a supplement to my ocean unit in environmental science. I wasn't aware of the interactives- I will check them out!*

  Unspecified curriculum (17%)
  - *In the classroom as a demonstration.*
  - *I plan to use the video clips and photo galleries as an engagement for higher level lessons.*
  - *As engagement for middle school science curriculum. Illustrations of examples.*
  - *Have shown clips in my classroom during lessons.*
  - *I use some of the video clips in my classroom so that students can see real world situations.*
  - *I plan to use the video clips or the Interactive as a way to engage the student's interest. I plan to develop a rigorous webquest using a number of the resources listed.*
  - *I am so happy to receive this survey. I had completely forgotten about your product. Now I will be able to use it with my classes.*

  Natural selection, adaptation, or classification (13%)
  - *I plan to use the video clips & lessons when covering natural selection and adaptations.*
  - *I have used some of the videos to show my students some organisms with adaptations for life in the ocean.*
  - *How organisms adapt to deep ocean ecosystems. Both ecology and evolution.*
  - *When I teach about the different forms of life and how the environment affects their form, Alien Deep is perfect.*
  - *We are working on adaptation on species to the environment. I am going to show parts of the video as an intro. Students will be researching what adaptations organisms must make to survive in the deep.*
  - *For students' to study animal classifications.*

Earth science/geology (4%)

- *I teach ESL (English as a Second Language) for a non-profit using STEM (Science Tech Engineering Math) I have used the material selected in our Earth discussions.*
- *When students study tectonic places I hope to integrate some of the more extreme information like the ones seen in the videos and resources.*

Chemistry (4%)

- *I am planning to use it in my chemistry classes and oceanic science classes. I would like to show all cool pics and lead activities such as calcium carbonate and acid reaction and what kinds of reactions happens under the sea. I would like to show them images of sea temperatures too.*
- *Plan to use different aspects of curriculum for specific parts of chemistry and biotechnology curriculum (e.g., dye diffusion in chemistry).*

Technology/biotech (4%)

- *May also put together a design challenge of some sort by referencing some of the technology pieces you have put together.*
- *Plan to use different aspects of curriculum for specific parts of chemistry and biotechnology curriculum (e.g., dye diffusion in chemistry).*

Climate change (2%)

- *My students complete a climate change science fair project each spring. I am interested in encouraging them to investigate the impact of climate change on oceans, so I will use the resources to help them build those connections.*

- ***Use/used in other ways (36%)***

Resources used to introduce a curriculum (10%)

- *I plan to use the video clips as introductions to new material.*
- *I use the videos to capture the attention of my students when introducing a topic.*
- *We are working on adaptation on species to the environment. I am going to show parts of the video as an intro.*
- *I plan to use this as an intro to Ocean Acidification.*
- *I would use the information as anticipatory sets for the ocean unit.*

Have or will share the resources with other educators (10%)

- *Oceanography isn't part of my curriculum for 6th grade but I will pass on to information to other grade levels. I would use resources for discussion about plate tectonics, volcanoes, underwater earthquakes, food webs.*
- *I intended to share the information with teachers in my school in district since I do not teach an earth or marine science course.*
- *I have shared these with other MS teachers throughout the state of Mississippi to use for differentiated instruction.*
- *I will use them to model with pre-service teachers innovative ways to bring the world of science into their classrooms.*
- *The links to these resources have been shared with the campus science specialists throughout my district.*

Resources used to help students develop research projects (6%)

- *We are working on adaptation on species to the environment. I am going to show parts of the video as an intro. Students will be researching what adaptations organisms must make to survive in the deep.*
- *We did an oceanography unit in my Integrated Science course and students used the clips and the photos as research for their project based learning.*

- *My students complete a climate change science fair project each spring. I am interested in encouraging them to investigate the impact of climate change on oceans, so I will use the resources to help them build those connections.*

Miscellaneous/general interest (6%)

- *I think it would be a great supplemental resource that would keep students engaged!*
- *I'm planning to use the material later this spring.*
- *I haven't used but am glad you reminded me. A person comes away from those with so much information.*

Resources used to educate the instructor (2%)

- *I have gone through some of the reference material to help learn the content myself.*

Resources used with a group outside of class (2%)

I was hoping to use this material in those lessons/activities.

2.4 The usefulness of the *Alien Deep* resources

When asked to comment on the usefulness of the *Alien Deep* resources, the largest groups of educators indicated that they thought they were engaging/interesting and/or supportive of their curriculum goals.

When asked to comment on the usefulness of the *Alien Deep* resources in their current and future educational settings, the educators pointed many valuable attributes. As shown in the table to the right, the largest group of educators, more than a quarter (27%), felt that the resources (and in particular the visual resources) were useful because they were engaging and interesting. A quarter (25%) commented on how the resources did or could support their curriculum, as in very good for introducing and reinforcing marine life to students. More than a tenth (13%) provided general positive feedback, as in it is very useful.

What educators found useful about the *Alien Deep* resources (n=48)	
Engaging/interesting	27%
Supportive of curricula	25%
General positive feedback	13%
Ease of use	6%
Alignment with educational standards	6%
Accessible to many levels	2%
Online component	2%
Criticism of the resources	2%
Uncertain	6%
Haven't used yet	6%
Not appropriate for their settings	6%

Less than a tenth each commented on the: ease of use (6%), alignment with educational standards (classroom, state, or common core) (6%), accessibility to many levels (2%), and the value of having an online component (2%). One educator (2%) also felt that, though the Interactive was a good tool for one person, it was less successful on the classroom level. Remaining respondents said they were uncertain (6%), hadn't used the resources yet and didn't feel able to answer the question (6%), or that the resources weren't appropriate for their educational settings (6%).

Examples of educators' comments on the above themes follow below:

- **The resources are engaging and interesting (27%)**
  - Love the resources. I am able to use them directly over my smartboard, and the students enjoy the visual representation of what we are discussing in class - such as ocean currents and climate.
  - These resources were very useful in stimulating students interest about the study of the oceans.
  - I think that the resources are extremely useful. They are present accurate information and are engaging.
  - They seem useful and engaging.
  - Adds interest and motivation.
  - The photo galleries and video clips are great engagement resources for earth science units.
  - Videos are a great way to engage learning. The resources that are aligned with my classroom standards are also very helpful.
  - The video clips stimulate interest that still pictures lack.

- Pic think they will be very useful, but have not used them yet. Love NG so I am sure they will be great.
- Provides excellent illustration to make concepts come to life.
- Students did seem to choose to use your media more than other sites on the list.
- Somewhat useful, because my students have limited English and often limited education in the first language I generally stick with images - a picture is worth a 1000 words...
- Videos are incredible.

- **The resources did or could support curriculum (25%)**
  - I find the supplemental resources very useful. They help to present students with different ways to learn a concept.
  - Useful for injecting concepts into core concepts to engage students/apply techniques and concepts to real-world settings.
  - Very good to get kids out of their environments and into another.
  - Easy to access and provide a lot of detail for getting closer and more in depth looks at places we can't readily go.
  - For Aquatic Science all of the resources are relevant.
  - I think that this is a great resource and I plan to incorporate more of the activities into my science lesson plans this summer in order to be prepared for next year.
  - Some of the materials will be useful as online supplemental materials or added into presentations.
  - Great resource for teaching adaptations as well as technologies used in scientific research.
  - They are very good materials for introducing and reinforcing marine life to students. They also have been used by the art teacher who does various marine ecosystem biome boxes.

- **Generally positive feedback (13%)**
  - So far very useful!
  - Great resources!
  - It is very useful!
  - I think that the resources are extremely useful.
  - Teachers are always looking for additional classroom resources. As a science field coordinator for Mississippi state university. I find them resources to implement and use. I think the resources you have are very useful.

- **Ease of use (6%)**
  - Very teacher friendly and helpful.
  - Love the resources. I am able to use them directly over my smartboard, and the students enjoy the visual representation of what we are discussing in class - such as ocean currents and climate.
  - Easy to access and provide a lot of detail for getting closer and more in depth looks at places we can't readily go.

- **Alignment with educational standards (6%)**
  - With common core standards and ngss-can assist students with using data to write.
  - Videos are a great way to engage learning. The resources that are aligned with my classroom standards are also very helpful.
  - The resources here blend well with our State Science Standards, in particular, the references to geology of the ocean floor and ocean currents and climate.

- **Uncertain (6%)**
  - Not sure.
  - Uncertain.
  - I'm still figuring that out.

- **Haven't used the resources yet (6%)**
  - Hope to use these resources in the future.
  - Cannot answer because I have not yet really used them.
  - I did not use them.

- **Resources not relevant to their educational setting (6%)**
  - For me, these aren't too applicable to physics, but to the other teachers at my school and district they can be.
  - It would be useful but is not included in my scope and sequence. If it was I would definitely use resources.
  - I teach at the high school level and the resources are below the level of rigor for this setting.

- **Accessibility to many levels (2%)**
  - I have not used these resources yet. I feel they will be very helpful in teaching the variety of educational levels found in a middle school classroom.

- **Value of having an online component (2%)**
  - Online access is always a plus.

- **Criticism (2%)**
  - The interactive site is interesting for single person experience but is lacking for a successful lesson with a full classroom.

2.5 Use and value of the *Alien Deep* resources in various educational settings

The educators have already used or could foresee using the *Alien Deep* resources in a wide range of educational settings.

When asked if they have used or could foresee using the *Alien Deep* resources in a range of educational settings, the largest group of educators, more than half (54%), indicated that they have used or foresee using the resources in high school student programs. Less than half (44%) have used or foresee using the resources in middle school student programs, and a quarter (25%) have used or foresee using the resources in K-12 teacher programs. About one-sixth each have used or foresee using the resources in elementary school student programs (15%), public education programs (15%), and/or staff/development enrichment situations (13%). A tenth (10%) have used or foresee using the resources in volunteer/docent training settings. One educator each (2%) has used or foresees using the resources in an exhibit, an ESL program, and/or a community college course (2%).

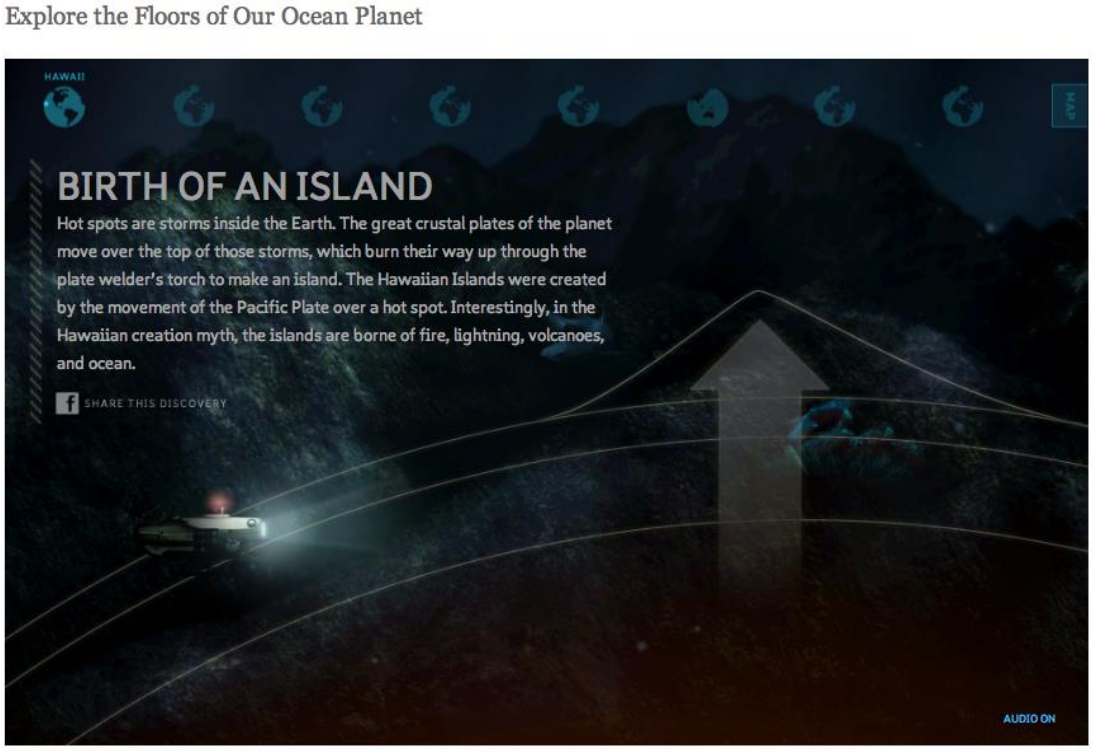


Image 3: Screenshot of the *Alien Deep* Interactive

Section 3: Follow-up evaluation with educators who used the *Alien Deep* resources

The educators who completed the evaluation described above and indicated that they had used or plan to use at least one *Alien Deep* educational resource were invited to provide more in-depth feedback. Out of the 48 educators that completed the evaluation, 33 confirmed willingness to be contacted for additional follow-up. A total of 23 educators completed the follow-up evaluation, resulting in a response rate of 70%.

The follow-up evaluation asked the educators to further reflect on the value of the educational resources, to estimate the number of students they reached or plan to reach with the resources, whether they had used the resources with underserved youth, the overall value of the video clips, and their reactions in terms of video length, comparability to other videos about the ocean, and usefulness in teaching geology content. They were also asked to provide follow-up information about the resources used to date, the perceived benefits and gains, students' reactions, and the impact on youths' ocean or STEM-related knowledge, beliefs, or attitudes, as well as any additional feedback they might like to share.

3.1 Value of the *Alien Deep* educational resources

The educators generally found the *Alien Deep* resources very valuable, with the largest groups pointing to their general value and the importance of positive scientist role models and resources that encourage careers in science.

Educators were asked to rate the educational value of the *Alien Deep* resources they reviewed or used on a scale from 1 (not at all valuable) to 5 (extremely valuable). Their responses ranged from 3.0 to 5.0, with the median rating being 4.0.

When invited to elaborate, more than one-sixth (17%) commented on the general value of the resources. More than a tenth (13%) pointed to the importance of positive scientist role models and resources that encourage careers in science. Just under a tenth (9%) said they plan to use the resources, while another tenth (9%) noted that they cannot fully incorporate the resources into their curricula. Finally, one educator (4%) described specific plans for using the resources in his or her classroom.

Examples of educators' comments on the above themes follow below.

- **General feedback on the value of the resources (17%)**
  - Love the use of technology! It is very accessible!
  - Good visuals for students, interesting content.
  - The resources are important ancillary materials that give the teacher a way to go into details that would not be possible in a classroom due to limited resources and funding.

- **Scientists and careers in science (13%)**
  - With our push to incorporate careers in science, this is exciting information to pass on to children.
  - Anytime I can show scientist really doing work and demonstrate how exciting science can be in the real world, I try to incorporate those resources as often as possible. These resources do just that.
  - There are not may resources which students can relate to, the fact that Ballard was an integral part in this allows students to become vested since they are already somewhat familiar with him or at least know of his name.

- **Plan to use (9%)**
  - My Earth Science students have an ocean unit that begins in the middle of April. At that time I will use your resources. As of now, I have not used them.
  - I haven't used the resources yet as we haven't gotten into the unit where I would, but plan to use them.

- **Cannot fully incorporate the resources into their curricula (9%)**
  - What I have found that matches my needs is very valuable, but there are something that just not match what I am teaching.
  - Based on standardized testing for Biology (Texas), the content in *Alien Deep* does have applicability; however, I cannot devote the time necessary to fully incorporate it.

- **Specific curriculum plans (4%)**
  - I am so excited to use the video about Hawaiian volcanoes and plate movements in our earth science classes. We invite students to join us for a field study to big island in the summer so this will be a great way to add interesting, current information about volcano formations while promoting our field study.

3.2 Approximate number of students reached with the *Alien Deep* resources

The educators who completed this question on the follow-up survey (n=21) estimated that the *Alien Deep* resources reached or would (within a year) reach nearly 4,000 students.

The educators were asked to approximate the number of students that they reached or will reach (within a year) with the *Alien Deep* resources. They were also asked to describe how they calculated their estimations.

Their responses ranged from a low of 20 students in a single class to a high of 1500 across a school district. The total number of students reported was 3,910. Of the educators who answered the question (n=21), the mean number of students who have been reached or will be reached in the coming year was 386 per educator. Not including the educator who reported that the resources would reach 1500 students district-wide, the mean number of students was 121 per educator.

As noted in the examples below, educators' responses and descriptions varied greatly:

- 1500 students across the district
- 375- 13 freshman Earth Science course and 75 Environmental science course
- 200 students across three grade levels (6-8)
- 100 general reaching and 150 in Science Club
- 180 students across 12 classrooms
- 157 students in 5 classes
- 110 students (20 students per five classes per day).
- 100 students over 4 class periods and using the resources over two years would bring it to about 200 students.
- ~80-100 through sharing these resources with other teachers in my community through list-serves and Facebook posting. This is estimated by the feedback I've received and based on the teachers I know who are teaching that in their curriculum at my school
- Approx. 75--3 classes of 25
- 60 students
- 20 students in one class that is offered once a year

3.3 Use of the *Alien Deep* resources with traditionally underserved youth

Almost half of the educators indicated that they had or would use the *Alien Deep* resources to reach traditionally underserved youth. Smaller groups noted that they do not work with any or many underserved youth, or that they had or would be using the resources with special needs students.

When asked if and how their work with the *Alien Deep* resources had been used to contribute to the project's overarching goal of reaching traditionally underserved youth, the largest group of educators, nearly half (43%) indicated that they had or would be using the resources with underserved students. About one-sixth (17%) reported that they do not work with any or many underserved students, and just over a tenth (13%) noted that they work with special needs students.

Additionally, just over a tenth (13%) of educators commented on the value of the *Alien Deep* resources for students who don't have access to the ocean. Just under a tenth (9%) commented on the educational and scientific value of the resources. About a sixth (17%) provided miscellaneous answers.

Examples of educators' comments on the above themes follow below.

- **Reached or will reach underserved students (43%)**
  - The demographics of the high school where I work is approximately 34% Hispanic, 33% African American, and 33% White. Over 80% of our students receive free/reduced lunch (which means low socio-economic-a typically underserved group).
  - My students are ESL and 70 percent live below the poverty line. The visuals that Alien Deep incorporates [are] excellent for these populations that might struggle with accessing written or spoken material.
  - Being able to use the resources in the classroom allows the students I have that don't have access to the Internet at home to enjoy them. Also, not being around oceans gives all of my students the chance to explore and discover.
  - Many of the students are English Language Learners and/or receiving free /reduced lunches.
  - We are a majority minority, Texas Title I school district (predominantly economically disadvantaged student demographic). All resources integrated into classroom instruction reach traditionally underserved youth.
  - Our school district is a title I school. Majority of our students are underserved youth. This resources help us from simple idea to complex for that community students.
  - We have many minority and ESL students who take our Earth Science curriculum. The picture galleries will be a great way to engage our ESL students while creating understanding of scientific concepts. This can be hard in a science class because the vocab tends to turn off many ESL students.

- **Educators who do not work with (any or many) underserved students (17%)**
  - Sorry. I don't have any minorities or undeserved youths in my classrooms.
  - It would not as I teach in an upperclass private school.
  - My students are from an urban/suburban community college. The course that will use this in is a marine biology course. This is a course that includes a field trip to Andros Island in the Bahamas. Since there is a cost involved the students generally are not considered underserved, however, they are from the midwest

and marine science in general is not familiar to them. Many have never been on an airplane prior to this experience.
  - I have not presented this curriculum to my children as of yet, our population is only about 25% under served youth! but am excited about using this in the future.

- **Educators who work with special needs students (13%)**
  - Our school focuses on students with learning differences that need small classes with a lot of individualized classes. Our students are all college bound, but need that extra help. In terms of socio-economic standard, they would not be considered underserved.
  - At my particular school, we do have several students that have learning disabilities that greatly benefit from exciting visual stimulation.
  - I am an educator in an alternative education private school and my special needs students are very attracted and stimulated by this type of presentation that also aligns with state academic standards.

- **Value for students who don't have access to the ocean (13%)**
  - The school in which I work is predominantly low income, and many of the students have never had a chance to visit an ocean, much less even imagine what is in its depths.
  - Not being around oceans gives all of my students the chance to explore and discover.
  - My students are from an urban/suburban community college. The course that will use this in is a marine biology course. This is a course that includes a field trip to Andros Island in the Bahamas. Since there is a cost involved the students generally are not considered underserved, however, they are from the midwest and marine science in general is not familiar to them. Many have never been on an airplane prior to this experience.

- **Educational/scientific value of the resources (9%)**
  - Our school serves low-income, minority students and as I said before, the more real I can make their science lessons, the more they are engaged. These resources definitely contribute to this goal.
  - I teach a marine biology elective at Park City Prep Charter School in Bridgeport, CT. My students receive free/reduced lunch and come to me with little to no science background. The resources allow me to teach marine biology at a level 7th & 8th graders can understand. The textbooks out there are geared for high schools. The *Alien Deep* resources are better for a younger audience. My own son (5th grade) has used information from this website on an explorer project for social studies that he did on Dr. Ballard.

- **Miscellaneous (17%)**
  - I have not used it yet. But I think the interactive graphics and tools would really grab students' interest. I have used National Geographic products in the past and have been extremely pleased!
  - It depends on how you define "underserved youth." Are my students considered minorities? Some are but some are not. Are any homeless? Yes, a few. Do they speak a language other than English at home? Many do.
  - This is always a tough issue to measure. The only way I can reach out to underserved youth is by making the materials available to all the teachers I know. I have that ability through our state science teacher's association. But resources at these schools are also an issue. I would strongly suggest aligning the content of *Alien Deep* with state science goals across grade levels and also align them with the Next Generation Science Standards.

3.4 Overall value of the *Alien Deep* video clips

The educators generally found the *Alien Deep* video clips very valuable and praised their educational value.

Educators were asked to rate the overall value of the *Alien Deep* video clips for use in their educational settings on a scale from 1 (not at all valuable) to 5 (extremely valuable). Their responses ranged from 3.0 to 5.0, with the median rating being 4.0.

When invited to elaborate, the largest group (39%) praised the video clips for their educational value. One educator (4%) criticized the clips. Examples of educators' comments on the above themes follow below.

- **Praise for the educational value of the *Alien Deep* video clips (39%)**
  - Great scientific information while holding student interest. I live that they can further explore Alien Deep on the NG channel at home. Ant time I can show them something in the classroom that they have seen on TV, I get immediate buy-in.
  - Students are able to view the world that they might never see (deep sea vents, for example).
  - It's always good to show students how what we learn/do in the classroom can apply to real life.
  - Some of this will be very new to my students at first, although I do anticipate that once they get past the "What in the world?" reaction, the value of the videos will increase as the students begin to accept their reality.
  - They cover topics that are unfamiliar to my students and difficult for them to imagine without seeing it.
  - The video clips are short and to the point. The photography/videography is very rich and detailed.
  - The video clips are fun ways to excite kids and to whet their appetite for wanting to know more and dig further into the subject.
  - It is very informative and explorative.
  - The students find them engaging and they find themselves needing to go back and rematch to remember to record the information they need.

- **Criticism of the *Alien Deep* video clips (4%)**
  - Felt weak with the content.

3.5 How educators thought the *Alien Deep* video clips compared to other ocean research and exploration videos

The majority of educators thought the *Alien Deep* video clips compared favorably to other ocean research and exploration videos they have used in the past.

As shown in the table to the right, when asked how they thought the *Alien Deep* video clips compared to other ocean research and exploration videos they have used in the past, the majority of educators (87%) indicated that they compared favorably. One educator (4%) thought they compared unfavorably.

How educators thought the *Alien Deep* video clips compared to other videos (n=23)	
Compared favorably	**87%**
Informative and/or engaging	57%
Generally favorable	17%
Appreciated the visuals	13%
Appreciated that the content was current	13%
Appreciated that they are open access	4%
Compared unfavorably	**4%**

Of those who thought the *Alien Deep* video clips compared favorably, the largest group (57% of all educators) described them as informative or engaging. About one-sixth (17%) described the video clips in generally favorable terms, and just over one-tenth each commented on their visuals (13%) or how current and up to date they were (13%). One educator (4%) specifically valued their accessibility via open access.
The one educator who felt they compared unfavorably indicated the videos were short and lacking in evidence for his/her purposes.

Examples of educators' comments on the above themes follow below.

- **Compared favorably (87%)**

  Informative and/or engaging (57%)
  - Yours is clear, concise and to the point. It is not full of fluff and time-fillers.
  - These videos are the perfect length of time to engage the student without and keep them engaged. Anything longer then you would lose them. Also these are concise enough that lessons and short assessments can be created by the teacher for them.
  - Definitely more engaging. The kids always ask if we can watch more after I show them a clip.
  - I think they are slightly better. The images are clearer and they are very informative.
  - These videos are actually interesting to young students.
  - Better than most, both in visual interest and information given.
  - *Alien Deep* videos are very information starting from basic research. Ocean research and exploration videos are used for field researches and it is not intended for the classroom use.
  - Other PBS specials (earth series) tend to be beyond comprehensible input for my students.
  - Informative but entertaining at the same time.
  - For the material that is covered I think that these are much more interesting. I like that there is a bit of a story going on with the information. The submersible is very cool and the kids will be interested in that

aspect of the videos. I have found that some videos that I have shown on oceans can get boring because it is a lot if the same. I like the variety within the Alien Deep videos.

Generally favorable (17%)
- I like them better.
- I think it rates very well!
- From what I have observed, they are superior to most.
- I think the quality is outstanding, superior to many of the videos I have used in the past.

Appreciated the visuals (13%)
- Well done with appropriate language for students and wonderful visuals.
- Better than most, both in visual interest and information given
- The images are clearer…I also tend to use some videos from Steve Irwin and Phillipe Cousteau, but the video quality wasn't very good.

Appreciated that the video clips were current/up to date (13%)
- These are more recent and more fixated on the scientific process.
- I haven't used very many resources in ocean research in the past. *Alien Deep* is probably the most up to date that I've seen, though.
- I have used "Why do we explore" and "How do we Explore?". This looks similar and better because it is current.

Appreciated that the video clips are open access (4%)
- I haven't encountered many resources for ocean exploration that were open access and applicable to my students. Other PBS specials (earth series) tend to be beyond comprehensible input for my students.

- **Compared unfavorably (4%)**
  - The main videos I have used are from the publisher's materials. They are short and cover small segments without as much scientific evidence.

3.6 What educators thought about the length of the *Alien Deep* video clips

Educators generally found the length of the *Alien Deep* video clips extremely useful, noting that they find this length short enough to keep students' attention and easy to fit into their lesson plans.

Educators were asked to rate the usefulness of the length (generally 5-7 minutes) of the *Alien Deep* video clips for their educational settings, on a scale from 1 (not at all useful) to 5 (extremely useful). Their responses ranged from 3.0 to 5.0, with the median rating being 5.0.

When invited to elaborate, the majority of educators (70%) indicated that this length was just right, in large part because they are short enough to keep students' attention and easy to fit into educators' lesson plans. A few educators (9%) indicated that they or their colleagues might also like to use longer clips and episodes, and one educator (4%) felt that the videos were too long.

Examples of educators' comments on the above themes follow below.

- **The *Alien Deep* video clips are the right length (70%)**
  - It is a great "hook" for lessons. When videos are too long, students lose interest!
  - They are long enough that they go into some detail without being so long that we lose the students interest and have it become a "video" day.
  - Anything longer than 7 minutes is too long to keep the students attention and focus on the topic.
  - Short clips are best so students don't start to 'tune out' or fall asleep.
  - It's just long enough to get attention and spark discussion.
  - 5-7 minutes is very appropriate for engaging the audience in this age bracket.
  - We are not allowed to play videos longer than 10 minutes.
  - Short clips are easy to embed in classroom presentations.
  - They are concise and to the point and relevant. They do not lose the student and they can be incorporated into other types of lessons.
  - I can easily toggle from video to lecture or text at this length format.
  - A short video fits into my teaching schedule better than a long one. They are long enough to provide a good explanation but not so long that students loose interest.

- **Might also like to use longer clips or episodes (9%)**
  - I would [also] be interested in longer/full shows as well for emergency sub days.
  - For 7th and 8th graders the videos are just right. I think for older students they could be in the range of 15 - 20 minutes.

- **The *Alien Deep* video clips are too long (4%)**
  - A length of 3-4 minutes is better to incorporate into my existing lessons.

3.7 Preferred length of video clips in educational settings

Nearly two-thirds of educators indicated that they generally prefer to use video clips that are 5-7 minutes in length.

Educators were asked what length they generally prefer when using video clips in their educational settings, and were asked to select one of five options: Less than 2 minutes, 2-4 minutes, 5-7 minutes, 8-10 minutes, or Other.

Nearly two-thirds of educators (65%) indicated a preference for clips in the 5-7 minute range. Just over a tenth each pointed to clips that are 8-10 minutes (13%) or 2-4 minutes (13%) in length. None of the educators selected clips less than 2 minutes (0%), and one educator selected Other (4%). When invited to explain, s/he commented: "It depends on the concept and grade level. Freshmen 3-8 min, AP environmental are more like 20 for complex case studies."

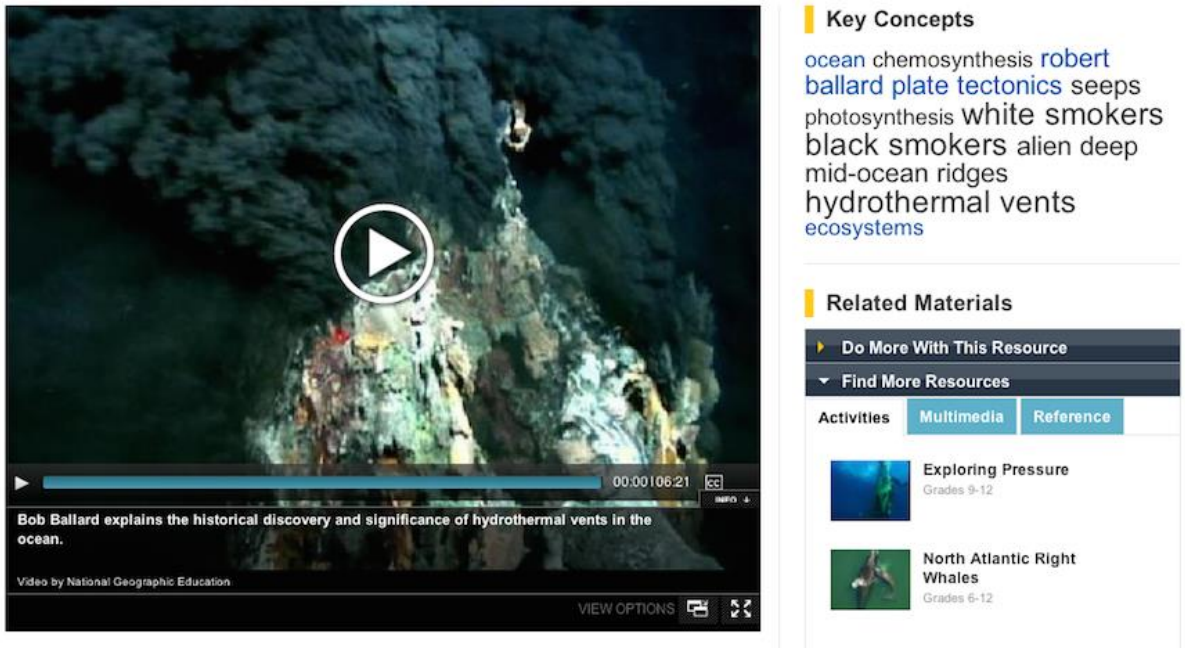


Image 4: Screenshot of an *Alien Deep* video clip that is 6:21 in length (available at education.nationalgeographic.com)

3.8 Value of *Alien Deep* video clips in communicating geology content

Just over half of the educators indicated that they had or could see themselves using the video clips to communicate geology content.

The educators were asked for their thoughts on the value of the *Alien Deep* video clips in communicating geology content. More than half of educators (57%) indicated that they had or could see themselves using the video clips to communicate geology content. Just over one-fifth (22%) said they had not and could not see themselves using the clips in this manner. Just over a tenth (13%) answered no but qualified their answer in a way that indicated the clips might still be used (by themselves or others) to present geological concepts. One educator (4%) answered maybe.

Examples of educators' comments on the above themes follow below.

- **Educators who answered 'yes' (57%)**
  - I think when you are teaching this type of content, it is valuable to use a variety of resources. This is an excellent one!
  - I could use these in our evolution unit when discussing the geologic time scale, fossil record, etc. When looking at the technology used, I think I could use the *Alien Deep* videos to communicate geology content.
  - Yes. We discuss plate tectonics and the seafloor spreading. The videos and the interactives will be helpful.
  - That's exactly what I use it for including plate tectonics and basic geology principles for my 8th grade students.
  - Yes, for Earth Science the volcanoes on Hawaii would be great! I also like the plate movement clip.
  - Earth composition and environment composition studies.
  - Certainly! The students can read about the bottom of oceans, but until they actually see these things for themselves, the words are pretty much meaningless.
  - Yes, I could . . . had not contemplated this until now. . .
  - Not yet, but I will in the future especially when discussing plate tectonics and the structure of the earth. It is also useful for exploring cycles in geology.
  - The video clips can easily be used to graphically demonstrate (and make relevant) geologic unit content.
  - I could use it but that is not my strength. I would need to design some lessons around the topic.

- **Educators who answered 'no' (22%)**
  - Not necessarily.
  - No...chemistry, physical science.
  - No, not yet.
  - No, not at this time.

- **Educators who answered 'no, but…' (13%)**
  - No but I might in the future.
  - Not yet but I will pass it onto the social studies teacher for their use.
  - I have not, but not for a lack of the program. I just do not teach geology.

- **Educators who answered 'maybe' (4%)**
  - Possibly, although if I use them in my oceans unit, I like to use different resources for different units.

3.9 *Alien Deep* resources the educators used in their educational settings

More than half of the educators indicated that they had used one or more of the *Alien Deep* resources in their educational settings to date. The educators also reported that the video clips and photo galleries were the most frequently used resources.

When asked to indicate which, if any, of the *Alien Deep* resources they had used in their educational settings to date, more than half (61%) of educators pointed to one or more resources. The largest group of educators (52%) indicated that they had used the video clips, while more than two-fifths (43%) pointed to the photo galleries. Smaller groups noted that they used the Interactive (9%) or the My Ocean game (4%). None of the educators indicated that they had used the *Alien Deep* children's book by Bradley Hague. Slightly less than two-fifths (39%) indicated that they had not used any of the resources.

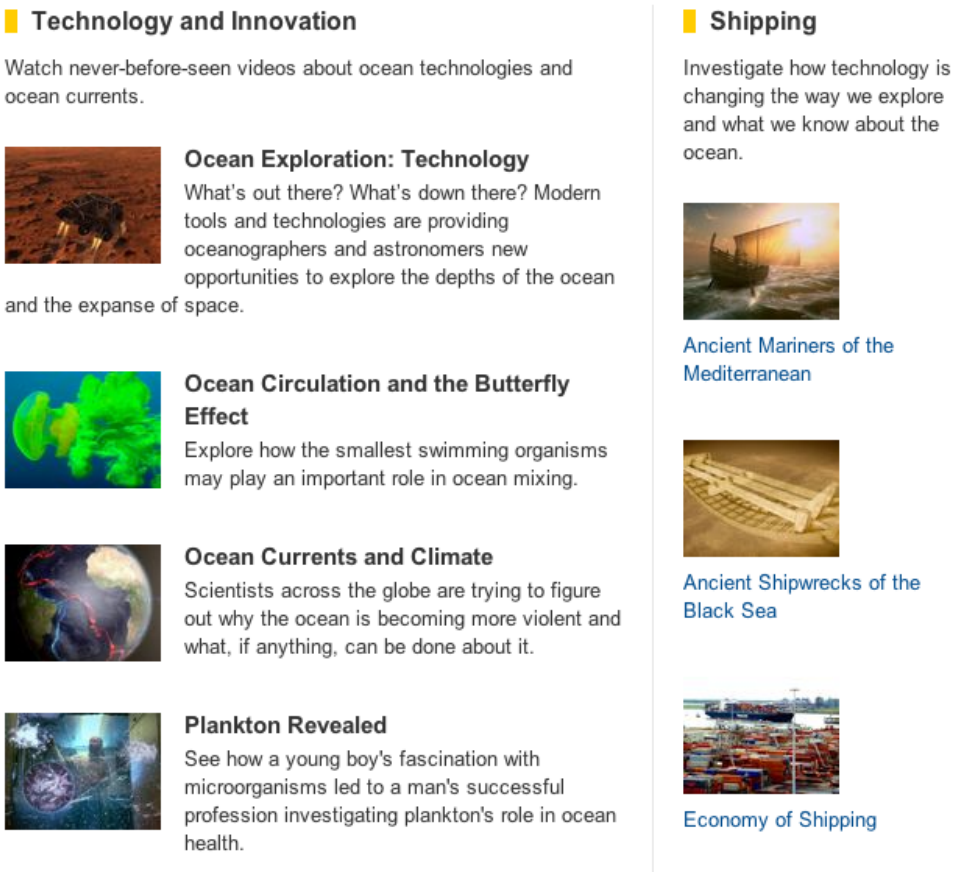


Image 5: Screenshot of some of the *Alien Deep* video clips available online

3.10 Perceived benefits and gains of using the *Alien Deep* resources

The educators who indicated that they had used one or more of the *Alien Deep* resources generally noted that their students had benefitted or gained from their use of the resources, with more than three-quarters (79%) pointing specifically to the benefits of increased knowledge or engagement in the classroom.

The educators who indicated that they had used one or more of the *Alien Deep* resources (n=14) were then asked if and how they thought their students had benefited or gained from using the resources. All of the educators indicated that they thought their students had benefitted or gained from use of the resources.

More than three-quarters (79%) specifically commented on the benefits of increased knowledge and engagement in the classroom. About one-sixth (14%) pointed to the value of *Alien Deep*'s scientist role models, and one educator each mentioned a use outside his or her classroom (7%) or made a suggestion about the project (7%).

Examples of educators' comments on the above themes follow below:

- **Students benefitted from increased knowledge and engagement in the classroom (79%)**
  - Providing the visual of things that I may talk about but they'll never get to see up close and personal always is a nice treat for my kiddos. They get to see that what I talk about is real and not just something I say from a script or book. The resources open up their world and always sparks their curiosity.
  - The students benefited form being able to see the live videos of what is talked about in class. The students I teach have never been exposed or spoken to about black smokers, ROVs, and deep sea submersibles. They didn't even know about Challenger Deep.
  - First, it is an excellent engagement due to the impressive visuals. Second, it provides a substrate to discuss several related ideas in science: energy, cycles, ecosystems, geological processes. A lot of under served students have not had the exposure and therefore lack the schema to access much content in these topics. *Alien Deep* provides a cohesive set of resources to build background knowledge.
  - They have mainly used your resources as a source of information for project based learning. Each student had to take an aspect of the ocean and choose how to teach it to the rest of the class. Some used your videos directly as a part of their instruction; others used it as a resource in collecting information that they later used in producing their project.
  - It was a good way to show the concepts being taught in class.
  - The photo galleries are great! The students like seeing the newly discovered deep sea creatures.
  - The videos give a real-world context to what they're reading and doing labs about in class. The more ways they can engage in the content, the better.
  - The student engagement was high. Many times that is my biggest challenge. Students actually request more and that in itself is invaluable.

- **Students benefitted/gained from exposure to new scientist role models (14%)**
  - Students saw real scientists doing real work.
  - They are excited and engaged by the material and about the people who are on these adventures. If for nothing else this gets them curious about an aspect of science that they may not have considered.

- **Potential for benefit/gain outside the educators' classroom (7%)**
  - The curriculum resources have been shared with our grade-level district specialists for possible future integration into district content curriculum.

- **Suggestion for project coordinators (7%)**
  - The one problem I am having is being able to access the miniseries itself as it is not on the website. The website directs me to check my local listings.

3.11 Students' reactions to the *Alien Deep* resources

When asked to describe specific examples or anecdotes that would provide insight into their students' reactions to the *Alien Deep* resources, the largest groups of educators pointed to in-class reactions and the impact the resources had on their students' hopes, dreams, and future plans.

The educators who indicated that they had used one or more of the *Alien Deep* resources (n=14) were then asked to describe any specific examples or anecdotes that would provide insight into their students' reactions to the materials. Half (50%) pointed to in-class reactions, such as asking questions and requesting to watch additional clips. Just over two-fifths (21%) indicated that the resources had affected their students' hopes, dreams, and future plans. One educator reiterated a miscellaneous comment about having shared the resources with district specialists (7%). Remaining educators either said no (14%) or declined to answer the question.

Examples of educators' comments on the above themes follow below:

- **In-class reactions (50%)**
  - While looking at the pictures, I had a few students ask lots of questions and want more information. Kiddos jotted down the website so they could continue exploring the information at home at their own leisure. The day after, I had a few students each hour come up to me and talk to me about other things they had seen and watched on the *Alien Deep* site.
  - Besides, "Oh, cool!!"?
  - My students like to quote my own reaction, after we watch each video, "science is cool, life is cool".
  - One of my main yardsticks is the engagement of the students and muttered comments - basically the Wow Factor!
  - They are high school students and tend to complain about everything, but they request to rematch the video clips.
  - This resource change my students interest and hooks to their new discovery
  - Students last year also developed science project for the state fair competition which were marine based because of the class and viewing the video clips and resources.

- **Stories about how the resources affected students' hopes/dreams/future plans (21%)**
  - Some of my students have not been to a beach before or gone swimming in an ocean. Many of them haven't left their small neighborhood their entire lives. A student said, after we played the my ocean game, "wouldn't it be cool to do your own experiments in the Boston ocean?"
  - Well, they all want to go in a submarine or other deep ocean explorer to actually visit the bottom of the ocean now. For us being, in Texas at least 6 hours from the coast, they are all ready to head to the gulf now on a field trip. Most of my students have never seen this ocean so for many of them, they are shocked at what's going on at the bottom.
  - I have students who are now considering going to Bridgeport Aquaculture school as a result of learning about the oceans.

- **Miscellaneous (7%)**
  - The curriculum resources have been shared with our grade-level district specialists for possible future integration into district content curriculum.

3.12 Educators' assessment/evaluation of the impact that *Alien Deep* resources had on youths' ocean or STEM-related knowledge, beliefs, or attitudes

About one-sixth (14%) of the educators who indicated that they had used one or more of the *Alien Deep* resources noted that they had had an opportunity to assess/evaluate how the resources impacted their youths' ocean or STEM-related knowledge, beliefs, or attitudes.

Of the educators who indicated that they had used one or more of the *Alien Deep* resources (n=14), about one-sixth (14%) noted that they had had an opportunity to assess/evaluate how the resources impacted their youths' ocean or STEM-related knowledge, beliefs, or attitudes.

When invited to elaborate, one of these educators wrote: "I routinely monitor mastery and find that when I couple this video with the other classroom materials, the comprehension is improved." The other reported: "Attitudes improved using a Likert scale assessment of overall impression of STEM. It increased from an average of 2.2 to 2.76 on a 4 point scale. 'How do you feel about the STEM field?' "

3.13 Additional feedback regarding the *Alien Deep* resources

When given the opportunity to provide additional feedback on the *Alien Deep* resources, the largest groups of educators praised the resources or commented on their future use.

Finally, all of the educators (n=23) were given the opportunity to provide additional feedback about the *Alien Deep* educational resources. More than a fifth each (22% each) praised the resources or commented on their future use. Just over a tenth of educators (13%) made a suggestion or asked a question, and one educator (4%) criticized the resources.

Examples of educators' comments on the above themes follow below:

- **Praise for the *Alien Deep* resources (22%)**
  - I wish I had access to things like this for every unit I taught.
  - I think it is great for teachers!
  - They are very useful.
  - Thanks for having it available for free.
  - Thank you, this is a great resource.

- **Comments regarding their plans to use the *Alien Deep* resources in the future (22%)**
  - I definitely look forward to using more of the resources and integrating them more into my curriculum.
  - I think these are great resources. However, the STAAR test trumps everything else. It feels like I have to say "if it's not on the test, I can't waste time on it," which sucks. I plan to use these resources after testing season.
  - Just excited to be using this in the coming year!
  - I have taken a look at a number of the videos and other materials from the *Alien Deep* educational resources. The course I plan to use them in is being offered during our summer session.
  - I look forward to integrating the use of these videos into my school's curriculum next year. I will be the Instructional Coach for my school and will share them with the appropriate teachers.

- **Suggestions or questions for *Alien Deep* project coordinators (13%)**
  - Please place the full miniseries on the NatGeo website for teachers (for free). Also consider attending the NSTA conferences and make the series available the way the HHMI does with its video series.
  - Anything about human impact on the oceans is helpful. I do like the resources you have, but the more the better on this. Maybe another interactive Hello! What are your kiddos favorite colors? For human impacts? Also a geology interactive to go with the volcanoes info would be great! It could include plate movements, earthquakes, tsunamis, deep sea vents and volcanoes.
  - Could I get some copies of the videos for a teacher workshop I am running soon on dark energy biosphere investigations?

- **Criticism of the *Alien Deep* resources (4%)**
  - The videos were good but not great. More content and more grade specific.

Conclusions

The Alien Deep. It's a place in the sea, thousands of feet beneath the surface, far from the first crack of light, where the planet's last and greatest secrets hide in the cold darkness of endless night. In this five-part series, Dr. Robert Ballard, famed explorer who found the Titanic at its final resting place, takes viewers into these underwater worlds where no man has gone before.
(http://channel.nationalgeographic.com/channel/alien-deep/)

Produced by National Geographic Television and funded in part by the National Science Foundation (NSF), *Alien Deep* is a multi-platform media project designed to increase public literacy about: the fundamental principles and concepts underlying ocean systems and functions, the importance and challenges of oceanographic research and exploration, and the impact of the ocean on humanity and humanity's impact on the ocean. The centerpiece of the project is a five-part mini-series that premiered on the National Geographic Channel in 2012. In addition to the five episodes, which were also made available as DVDs, the *Alien Deep* project produced a children's book and a variety of online resources including video clips, classroom activities and lessons, reference materials, photo galleries, a game, and an Interactive.

As part of the NSF funding for *Alien Deep*, the independent evaluation firm Knight Williams Inc. conducted a summative evaluation of the project's main deliverables using a diverse set of methods to assess the appeal, clarity, and informal science learning value of the 5-part mini-series and supplemental educational resources as experienced by the various audiences targeted by the project. As outlined below, two separate evaluations were conducted. The first evaluation focused on the impact of the mini-series with a public viewing audience. The second evaluation focused on use of the project's educational resources by formal and informal educators in diverse settings.

The findings highlighted in this report are presented in two parts, as follows:

- Part 1: Evaluation of the *Alien Deep* mini-series with a general audience; and
- Part 2: Evaluation of the *Alien Deep* educational resources with online visitors and educators.

Part 1: Evaluation of the Alien Deep mini-series with a general audience

This conclusion section summarizes the findings from the *Alien Deep* evaluation as supported by the responses of the adult audience that viewed and gave feedback on the mini-series when the first three episodes were viewed at home and the final two episodes were viewed in a group session, after which participants completed in-depth evaluation forms immediately after viewing and then again in two-three weeks.

Evaluation goals

The *Alien Deep* evaluation examined the educational impact of *Alien Deep*, focusing on the informal science learning goals described in the project's original proposal to the NSF proposal. These goals included increasing viewers':

- Understanding of the essential principles and fundamental concepts about the functioning of the ocean;
- Understanding of their influence on the ocean and the ocean's influence on them;
- Ability to communicate about the ocean in a meaningful way; and
- Ability to make informed and responsible decisions regarding the ocean and its resources.

The evaluation also assessed an audience goal that the project team subsequently added and then evaluated during the project's formative evaluation phase (Flagg 2012). This goal focused on increasing viewer appreciation of the importance of research and exploration of the oceans to the future of humanity.

Because the evaluation was designed to assess viewers' experience with the entire mini-series, the evaluation goals prioritized learning of broader themes and repeated concepts, as opposed to specific content from individual episodes. Accordingly, the Viewer and Control group questionnaires that form the basis of this evaluation report included a 50 point knowledge assessment of three key topic areas addressed in the series: ocean properties, characteristics, and life forms; ocean research and discovery; and the ocean's importance to humanity. Both groups also completed a small set of supplemental questions directed at understanding participants' ocean-related beliefs and attitudes related to these themes.

The evaluation team identified the above set of evaluation priorities by: reviewing the *Alien Deep* project proposal submitted to the NSF, consulting with the producers, reviewing the five episodes from the mini-series, and reviewing the project website. Where possible, the evaluation team used or adapted ocean knowledge, interest, and opinion survey items from nationally validated instruments. See Section 3 and the final References section for additional information about instruments used for these purposes. In cases where, because of the unique nature of the ocean content provided in *Alien Deep*, this was not feasible, the evaluators devised new items and subsequently pilot tested these items with adults fitting the target audience for readability, length, clarity, and level of difficulty.

In addition to answering questions designed to assess the program's educational impact, viewers were also asked a series of qualitative questions to explore what they found to be most interesting, salient, and

personally impactful. Viewers also rated and provided feedback on the program's appeal, clarity, production values, storytelling, and density of information and science. Finally, the evaluation further explored the longer-term impact of the program within a few weeks of viewing, in this case focusing on the extent to which viewers made personal connections with the program and discussed, thought about, or engaged in any program-related activities.

Method

The evaluation team conducted a two-group posttest-only randomized study that examined recruited Viewer participants' experience with *Alien Deep*, as compared to a group of Control participants who didn't view the program but who completed the same set of demographic/background questions and a "quiz" on the main content presented in the program.

In order to implement the two-group posttest randomized study design, the evaluation team randomly assigned the screened evaluation participants to one of two groups, which comprised:

- A Viewer group that viewed the program and completed a post-viewing questionnaire. Participants in this group viewed the first three episodes of *Alien Deep* at home. Between one and three days later, they attended a group screening session at one of eight local evaluation sites where they watched the last two episodes and completed an in-person post-viewing survey.

- A Control group that completed a modified version of the Viewer group's post-questionnaire that included questions designed to assess the project's informal science learning goals. Participants in this group did not view the program but instead only completed a questionnaire containing the same background, demographic, and content questions completed by the Viewer group, except for those asking for participants' reactions to the program itself.

The evaluation then compared the results of these two groups to assess the immediate educational impact of the mini-series.

In addition, all Viewers who participated in the evaluation and indicated they were willing to be contacted about an opportunity to provide additional feedback were invited to participate in a follow-up survey two-three weeks after viewing to explore the longer term impacts of viewing, including the extent to which they thought about the mini-series, discussed it with others, researched or followed-up on information presented, visited the *Alien Deep* website, or did something new or different as a result of viewing.

Recruitment

The evaluation team recruited a planned sample of 140 adults from diverse regions of the U.S., allowing for a 10% attrition rate. The team aimed for a sample with equal gender representation and a range of ages from 18-65 while also prioritizing the program's target audience of 25-54 year olds. The team's recruiting strategy also focused on obtaining a diverse group of participants, including: approximately 25%-30% minorities, residents from both coastal and non-coastal geographic regions, and individuals that watched nature/science and National Geographic programming occasionally to regularly, and were not professional scientists or science teachers.

Recruiting was conducted principally through evaluation associates located in the Northeast, North Central, South Atlantic, South Central, and Western regions of the US. The associates used diverse and regionally appropriate methods of announcing the evaluation opportunity to individuals fitting the target audience demographics, background, and media habits. As the screening of the final two episodes of *Alien Deep* and the initial evaluation phase were held at 8 local evaluation sites, participants were also recruited based also on their proximity to these sites, which were located in: Boston, MA; Portland, ME; Cleveland, OH; Nashville, TN; Albuquerque and Santa Fe, NM; and Sacramento and the Bay Area, CA..

As part of the recruiting process, participants were informed that: their participation in the evaluation was voluntary and they could quit at any time, their responses were confidential and would be reported in the aggregate, and that they would be randomly assigned to complete one of two different sets of activities, in one case an online survey activity about topics featured in a National Geographic program and in the other a survey and viewing of a National Geographic program. Honorariums were offered in each case to help ensure timely completion and scaled to reflect the amount of time required to complete each activity.

Data analysis and reporting

Statistical analyses were conducted on all quantitative data generated from the evaluation. To explore for possible significant differences within and between the Viewer and Control groups, T-tests, Chi-Square, Kruskal-Wallis, and Mann-Whitney tests were applied as appropriate.[72] Statistically significant findings (hereafter referred to as "significant") at $p \leq .05$ are reported in the text. To help determine whether a significant difference was a difference of practical concern, effect sizes were also computed and reported in the text where appropriate. Content analyses were performed on the qualitative data generated in the open-ended questions. All analyses were conducted by two independent coders. Each coder independently coded randomly ordered open-ended responses, blind to group assignment. The analysis was both deductive, drawing on the program's objectives, and inductive, by looking for overall themes, keywords, and key phrases. Any differences that emerged in coding were resolved with the assistance of a third coder.

Evaluation Sample

A total of 135 participants, including 71 Viewer and 64 Control participants, completed the evaluation. Demographic and background information was collected for all participants to determine whether the two independent samples (Viewer vs. Control) should be evaluated as having come from the same population. T-test and Chi-square analyses indicated that the two groups did not differ significantly with respect to the measured variables of gender, race/ethnicity, age group, and education. The Viewer sample included:

- A balance of females (52% to males 48%).
- A wide range of ages, spanning 18-66 years, with a mean age of 35.
- A racial/ethnic distribution comprising 75% White, 8% Asian, 4% African-American, and 4% mixed-race Viewers. Seven percent (7%) were of Hispanic origin.

[72] When examining subgroups with two categories (e.g., gender) using the two-independent-samples *T-test*, Levene's test was first used to determine whether the separate-variance *t* test or pooled-variance *t* test was appropriate for testing the means of the measured variables. If the test indicated the variances were significantly different, the separate-variance *t* test was used.

- A majority of participants who were employed (61%), with the remaining participants classifying themselves as students (29%), retired (4%), unemployed (3%), or homemakers (3%).
- A majority of participants that did not work as professional scientists or science educators (94%).
- A combination of high school through graduate level-educated participants, including: 46% with some college education or a college degree, 46% with some graduate school education or a graduate degree, and 7% with a high school education or less.
- A majority of participants who watched science/nature programs daily or weekly (59%) with one-third watching monthly (34%), and relatively few watching less than monthly (7%).
- A majority of participants who watched National Geographic programs daily or weekly (35%) with two-fifths watching monthly (42%), and relatively few watching less than monthly (23%).
- A majority of participants who watched television programs on the science of the ocean monthly (38%) or less than monthly (50%) with few watching daily or weekly (11%).
- A majority of participants who last visited an ocean beach or shore in 2013 (35%) or 2014 (41%) with about one-quarter having last visited in 2012 or before (24%%).
- A majority of participants (58%) reporting they last visited an aquarium, zoo, or museum where they learned about the ocean in 2013, with smaller groups reporting having last visited 2012 or before (35%) or in 2014 (7%).

Findings

The evaluation findings are summarized in 4 sections, as follows:

- Section 1: How appealing and engaging did Viewers find *Alien Deep*?
- Section 2: How successful did Viewers find *Alien Deep* in terms of: clarity, pace, narration, focus on the host, density of science, and scientific explanations?
- Section 3: What did Viewers learn from *Alien Deep*?
- Section 4: What were the extended influences of *Alien Deep*?

Section 1: How appealing and engaging did Viewers find *Alien Deep*?

➲ **When asked to describe what they liked about *Alien Deep*, Viewers most often commented on the educational value of the series.** More than two-fifths of Viewers (41%) pointed to general knowledge they had gained, as in new ideas, concepts and facts learned and the subject matter was interesting. More than a quarter (28%) expressed an appreciation for what they learned about the ocean's impact on the climate and on humankind. A slightly smaller group (25%) enjoyed the series' inclusion of cultural and historical elements, and a fifth (20%) liked its focus on deep sea life forms and ecosystems. Smaller groups enjoyed the focus on the exploration of the unknown (14%), the way the series showed or influenced Viewers' personal relationships with the ocean (11%), and the consideration of current research (10%) and new technology (8%).

Viewers were also drawn to one or more elements of *Alien Deep*'s filmmaking. Nearly a quarter (23%) commented on the programs' cinematography, a fifth (20%) appreciated the way the information was presented, and a few (6%) enjoyed the use of CGI. Less than a tenth each specifically liked Dr. Robert Ballard (8%) or the use of guest experts (6%). Overall, about one-sixth of Viewers (15%) said they liked the series because it was engaging and held their attention.

Just under a fifth (18%) of Viewers mentioned a specific episode or episodes in their responses. Among the Viewers who pointed to specific episodes of *Alien Deep* (n=13), the most frequently mentioned were episodes 2 (46%) and 5 (46%), followed by episodes 3 (31%), 4 (31%), and, to a lesser extent, 1 (15%).

"The variety of topics explored, the international nature of featured individuals and communities, the computer-generated imagery, the inner space vs. outer space episode." 28-year-old male from Somerville, MA

"The dedication to the backstory of each plot, and related efforts to explain concepts using visuals. I thought the shows did a wonderful job informing the viewer of how core concepts are formed or related to the central theme of each program." 41-year-old male from Nashville, TN

"I really enjoyed the cultural elements - Hawaiian, Vietnamese - I think lots of the time these kinds of shows focus a lot on science without explaining the cultural points." 28-year-old female from Saco, ME

"I've only seen ocean shows that focus on the creatures/animals that live there. This had neat perspectives." 27-year-old female from Santa Fe, NM

"The series seemed to get a bit preachy toward the end and started using some clichéd scare tactics. This turns me off as I feel like the next step is to ask for money and guilt me into buying something. This in turn makes me start to question the validity of the material presented." 46-year-old male from Sacramento, CA

➲ **When asked to describe what, if anything, they disliked about *Alien Deep*, Viewers as a whole didn't single out any one element.** The largest groups of Viewers focused on some aspects of how the series was produced. Less than a quarter each found the series too dramatic or sensational (24%), thought the storytelling needed tightening (21%), or disliked something about the filmmaking in general, including the title, length, and music (20%). Smaller groups thought the pacing was too slow (7%) or commented on the visuals, including cinematography and CGI (6%). Less than a quarter of Viewers (23%) thought Dr. Ballard was featured too often, and just over a tenth (13%) did not like Dr. Ballard's personality.

Small groups of Viewers also disliked something relating to the presentation of information in *Alien Deep*. Just over one-sixth (17%) felt that the programs didn't contain enough science or information. Additionally, about one-sixth of Viewers (15%) thought the presentation of information was lacking, and a tenth (10%) found parts of the program to be offputtingly agenda-driven. Less than a tenth (7%) indicated that they liked everything about the series.

Overall, more than a quarter (27%) mentioned a particular episode (or episodes) in their response. Among the Viewers who pointed to specific episodes of *Alien Deep* (n=19), the episodes most often mentioned were episodes 5 (53%), 1 (42%), 2 and 3 (21% each) and, to a lesser extent, episode 4 (5%)

- **Viewers gave *Alien Deep* high marks in terms of overall appeal, content interest, visual engagement, storytelling, clarity, and their likelihood of recommending the program.** Using a scale from 1 (lowest rating) to 7 (highest rating) the median ratings indicated that Viewers generally liked the program (6.0) and agreed it contained interesting content (6.0), was visually exciting (6.0), and had engaging storytelling (6.0). Viewers generally felt the tone was moderately hopeful (5.0) and indicated they were likely to recommend the program to others (5.0).

  A number of subgroup differences were found with the appeal ratings, as follows. Female Viewers rated their overall liking of the program significantly higher than did male Viewers. (Mdn= 6.0 vs. 5.0). Viewers 41 and older rated the program's visual interest significantly higher than did Viewers aged 17-28 (Mdn= 6 vs. 5.5). Finally, compared to Viewers 29-40 years of age, Viewers 41 years and older gave significantly higher ratings to: their overall liking of the program (Mdn=6.0 vs. 5.0), the program's storytelling (Mdn= 6.0 vs. 4.0) and visual interest (Mdn=6.0 vs. 5.0), and their likelihood of recommending the program (Mdn=6.0 vs. 5.0). The effect sizes in each case were considered medium effects (see report footnotes on pages 18-19 for details).

- **Viewers were generally positive about their experience watching Dr. Robert Ballard and indicated they were inspired by his presentation.** Using a scale from 1 (strongly disagree) to 7 (strongly agree), Viewers moderately agreed that they enjoyed watching Dr. Ballard share his experiences exploring and studying the ocean (5.0) and that they were inspired by his passion and curiosity (5.0).

  When asked to list the main words or phrases that came to mind when thinking of Dr. Ballard, more than half of Viewers (55%) described him as passionate or determined. About a third each commented on his intelligence (35%) or his ego (34%). Nearly a quarter (23%) indicated that they thought he was successful. Less than one-fifth each noted that he was happy/playful/funny/seemed to enjoy his job (18%), opinionated (17%), and brave (17%). Less than a tenth thought he was eccentric (7%). Approximately one-fifth of Viewers gave miscellaneous answers (21%).

- **The majority of viewers felt *Alien Deep* compared favorably to other television programs they'd seen because of its presentation style and breadth/depth of information**. When Viewers were asked to compare *Alien Deep* to other shows they've seen about the ocean, more than half (56%) said it compared favorably, 30% said it was comparable, 23% said it compared unfavorably, and one Viewer declined to answer the question. Some Viewers selected more than one option.

Among those who felt *Alien Deep* compared *favorably*, a variety of reasons were offered. Just under one-sixth each appreciated that the series covered topics that aren't usually examined in other ocean-focused films (15%) and that it took a "big picture" approach (13%). A tenth (10%) appreciated the filmmaking/presentation of information. Less than one-tenth each thought it compared favorably because they: generally learned a lot (7%), found it engaging or interesting (6%), learned about the importance of the ocean and exploration (4%), thought Dr. Ballard was a good host (3%), and/or found that it increased their awareness (3%). A handful gave miscellaneous answers (6%).

Those who felt the series was *comparable* (30%) explained that *Alien Deep* seemed to present similar content in the same ways as other ocean-focused series (27%) or said that they hadn't seen many other programs about the ocean (3%).

Those who felt the series compared *unfavorably* (23%) pointed to different themes. These Viewers generally disliked Dr. Ballard or thought he was onscreen too often (8%) and/or took issue with the filmmaking, finding it poorly executed (8%), short on substance (7%), or overly dramatic (4%). A handful of Viewers indicated that they prefer programs with more information about ocean life (4%), and one Viewer said s/he found the series politically motivated (1%).

Section 2: How successful did Viewers find *Alien Deep* in terms of: clarity, pace, narration, focus on the host, density of science, and scientific explanations?

- **Viewers consistently felt the program was clear and well-paced**. On a scale of 1 (confusing) to 7 (clear) Viewers generally indicated that they found the program to be clear (6.0). On a scale of 1 (too slow) to 7 (too fast), Viewers generally indicated that they found the program to be paced appropriately (4.0). One subgroup difference was found as follows. Viewers aged 17-28 rated the program's pace to be significantly slower than did Viewers 41 and older who generally found it was paced just right (Mdn= 3.0 vs. 4.0). The effect size in this case was considered a medium effect (r=.42).

- **Viewers were largely in favor of the amount of narration and focus on Dr. Robert Ballard**. On a scale of 1 (too little) to 7 (too much), Viewers indicated that the amount of narration was about right (4.0), and that the focus on Dr. Robert Ballard was also about right or slightly too heavy (5.0).

- **Viewers felt that the amount and level of science presented in the program was about right.** On a scale of 1 (too little) to 7 (too much), with 4 being "just right," Viewers generally felt the program struck the right balance in terms of the amount of science (4.0) and the level of scientific explanations (4.0). A few subgroup differences were found for these questions, as follows. Females rated both the amount of science (Mdn=4.0 vs 3.0) and level of scientific explanations (Mdn=4.0 vs. 3.0) significantly higher than did males, who indicated the science erred on the side of being slightly too little and shallow. The effect sizes in each case were small effect sizes (r=.28, r=.27). Meanwhile, Viewers aged 29-40 tended to rate the level of scientific explanations on the higher end of the scale than did Viewers aged 18-28 (Mdn= 5.0 vs. 4.0). The effect size in this case was considered a medium effect (r=.41).

"The attention to detail in this series and the way that things were explained/shown was very comprehensive and easily understood." 29-year-old female from Sacramento, CA

"While each episode focused on a single issue, that issue was explored from many different angles - so that it didn't seem like a lecture on a single topic" 28-year-old female from Saco, ME

"I didn't like the anecdotal passages in some episodes (e.g. narrations of events taking place during a dive to make it seem more dangerous than it really is) I didn't like some of the dumbed down language and metaphors." 31-year-old male from Cambridge, MA

"Bob Ballard is a really compelling and interesting human to narrate, regardless of how you feel about his theories." 33-year-old female from Somerville, MA

"I felt at times it was too dramatic or simplistic. There could have been more content and more opinion provided; too much time given to Bob Ballard and while I respect him I would want other voices as well. Sometimes not enough scientific details. Not enough detail on biodiversity. Little attention given to Indian Ocean." 28-year-old male from Somerville, MA

"The title seems to suggest a major animal exploration of the deep ocean, yet investigated other topics. It's not bad, just a little bit confusing at first." 23-year-old female from Cambridge, MA

Section 3: What did Viewers learn from *Alien Deep*?

Viewer learning from *Alien Deep* was assessed in multiple ways. From a qualitative standpoint, Viewers completed a combination of self-report and open-ended questions to indicate how much they felt they learned from the program and to explain: the most interesting things they learned, what new information they learned about the ocean, whether and how they felt or thought any differently about the ocean, and whether and how they thought differently about the importance of ocean research and exploration to humanity as a result of viewing.

Content learning from the mini-series was further evaluated with a combination of self-report, open-ended, and forced-choice objective content-based assessment items, and a limited set of belief and attitudinal items. Questions were based on the following overall themes, which were generally consistent with the Ocean Literacy Framework:

- Knowledge of ocean properties, characteristics, and life forms;
- Knowledge of ocean research and discovery;
- Perceptions of ocean health and problems;
- Perceptions of the importance of the ocean to humanity;
- Personal stewardship and ability to communicate about the ocean; and
- Personal relationship to the ocean.

To assess learning within these target areas both Viewer and Control group participants completed a 50 point "quiz" type assessment that included a combination of multiple choice, true/false, fill in the blank, and open-ended questions. Both groups also completed a small set of supplemental questions directed at understanding participants' ocean-related beliefs and attitudes related to the above themes.

"I enjoyed learning about the depths of the ocean which I had always considered too vast, distant and unknown to think seriously about. I found it useful to learn the potential the ocean holds for humans as well as the dangers associated with its destruction." 23-year-old female from Boston, MA

"I loved learning about the creatures that live in the harsh, deep environments. And, the prospect of using the sea/oceans for human habitats and farming." 27-year-old female from Santa Fe, NM

"I enjoyed the focus on how the ocean is important to different cultures and groups of people. It was interesting to see how the ocean has shaped modern culture throughout history. The ocean is not always exploited but it should be utilized in a safe and respectful manner. In order to do that, it needs to be further explored." 18-year-old male from Sacramento, CA

"The most interesting thing I learned is the way geology and oceanography relate to keeping the earth alive. However these explanations were vague and lacked more precise information about the processes and mechanisms that constitute the planetary life cycle." 31-year-old male from Cambridge, MA

Where possible, items were borrowed or adapted from the project's formative evaluation or from nationally or regionally administered instruments including the: Ocean Project Public Opinion Survey (1999, 2010), Survey of Ocean Stewardship (SOS) Instrument (2008), Survey of Ocean Literacy & Experiences (SOLE) Instrument (2008), The Mellman Group for SeaWeb (1997), AAAS Public Opinion Survey (2009), The National Museum of Natural History visitor survey (1996), New Ecological Paradigm: Dunlap & Van Liere (2000), and The Centers for Ocean Sciences Education Excellence (COSEE) Ocean literacy principles (2005).

The main findings from the evaluation are summarized below.

- **When asked to list the first words or phrases that came to mind when thinking about the ocean, Viewers most often described it as unknown/unexplored (57%), vast/expansive (49%), and deep (27%).** In contrast, just over a tenth of Control participants (11%) described the ocean as unknown/unexplored, about a third (30%) described the ocean as vast/expansive, and slightly more than a tenth (13%) described the ocean as deep. Additionally, about a third of Control participants (33%) pointed to marine life, compared to just over a quarter of Viewers (27%), and more Control participants (25%) than Viewers (17%) pointed to the ocean's beauty/aesthetics. More Control participants (22%) than Viewers (8%) also described the ocean as blue. Small groups of Viewers and Control participants described the ocean as spiritual, powerful, and dark, or pointed to the ocean's resources, recreation opportunities, or currents/tides/waves.

- **When asked to estimate how much they learned from *Alien Deep*, Viewers indicated they learned a considerable amount from watching the 5-part mini-series, both in general and about the oceans in particular.** On a scale from 1 (learned nothing) to 7 (learned a lot), the median rating for the group was 6.0 for each item. One subgroup difference was found for this question as Viewers aged 41 and older rated their overall learning from the program significantly higher than did Viewers aged 29-40 (Mdn=6.0 vs. 5.0). The effect size in this case was considered a medium effect (r=.35).

- **When asked to describe the most interesting things learned from *Alien Deep*, all of the Viewers identified one or more topics of interest.** The largest group of Viewers, more than a third (35%), expressed an interest in ocean cycles and currents, such as the ocean conveyor belt and waves (rogue and otherwise). A slightly smaller group (34%) was interested in the program's historical and cultural elements, such as the ancient mariners and the Vietnamese villagers who live on the ocean. Just over a quarter of Viewers (27%) were interested in volcanic vents and the life they sustain. One-quarter pointed to what they had learned about geology, specifically hot spots and plate tectonics (25%), and one-fifth mentioned the future of ocean colonization and farming (20%). Less than a fifth (18%) enjoyed learning about the importance and progress of ocean exploration. Finally, a handful each pointed to: deep sea life in general (14%), research and technology (13%), the importance of the ocean (7%), and the status of space exploration (6%).

  "I already appreciated the ocean. What it made me realize is that we need to spend more energy on research." 28-year-old female from Somerville, MA

  "I didn't consider its importance as much before, now I know that there are biological, climate, economic, and spiritual effects of the oceans health on humanity." 27-year-old female from Santa Fe, NM

  "I love the idea of exploring the unknown and to think parts of our planet have gone unseen when we know so much about space is wild to fathom." 24-year-old male from Westlake, OH

- **When asked to describe three or more new things that they did not know before watching *Alien Deep*, Viewers most often pointed to learning something about the ocean or about human's relationship with the ocean.** The largest group of Viewers, more than two-fifths (42%), indicated that they learned about volcanic vents and the life they sustain**.** Others who indicated that they learned something about the ocean itself pointed to the subjects of the ocean conveyor belt (34%), hot spots and plate tectonics (32%), the impact that small animals have on the ocean (25%), wave formation

(particularly rogue wave formation) (23%), undersea life more broadly (14%), and something general about the ocean, such as its depth, temperature, or pressure (8%).

Of those who commented on what they learned about human's relationship with the ocean, the largest group, nearly a third (31%), commented on human's current and future uses of the ocean. Other Viewers noted how little of the ocean has been explored (27%) or indicated that they learned something historical/cultural (24%). About a fifth (21%) learned something about modern exploration and research, and less than one-tenth each learned something that gave them cause for (environmental) concern (8%), learned about the importance of the oceans (6%), and/or learned about Dr. Ballard and his work (4%).

- **When asked whether their experience watching *Alien Deep* caused them to think or feel differently about the ocean, most (72%) Viewers confirmed that the program *did* cause them to think or feel differently.** A quarter of all Viewers (25%) felt they had a better understanding of the ocean's possibilities and potential (particularly in terms of benefitting humans), and about a fifth (21%) felt they gained a better understanding of oceans in general. About one-sixth (17%) expressed a new or increased appreciation for research and exploration. One-tenth of Viewers (10%) pointed to a better understanding of the importance of the ocean, as shown through increased concern or awareness, and less than a tenth (7%) pointed to the importance of taking action.

  Of those Viewers who indicated that the series didn't cause them to think or feel differently (28%), about a fifth (18%) indicated that they already cared about and understood the ocean. A handful of Viewers said that even though *Alien Deep* hadn't caused to think or feel differently about the ocean, they had learned something from the series (4%). Others said that they disliked Dr. Ballard (3%) or that they felt insufficient information had been provided (3%).

- **When asked how viewing *Alien Deep* had changed their perception of the importance of ocean exploration and research to the future of humanity, most Viewers (81%) indicated that they now had a greater sense of its importance**. More than two-fifths (43%) said they now thought this topic was much more important and just under two-fifths (38%) said it was somewhat more important. About one-fifth of Viewers (18%) felt their perception stayed the same.

  Of those who indicated that they thought ocean exploration and research were much more important to the future of humanity, the largest group indicated that this was because the series raised their awareness and concern (14%). Less than one-tenth each pointed to the value of learning about environmental relationships (6%), general knowledge gained (4%), an interest in colonizing the ocean (4%), and ways the oceans might benefit humans in the years to come (4%).

  Of those who indicated that they thought ocean exploration and research were somewhat more important to the future of humanity, the largest group indicated they already care about and understand the ocean (11%). A tenth said that they learned something new about the ocean (10%), less than one-tenth pointed to their raised awareness and concern (6%), and one Viewer commented on ways the ocean might benefit humans (1%).

  Of those who elaborated on why they felt their perception stayed the same, the Viewers all noted that they were already aware of the importance of ocean exploration and research (13%).

➲ **When asked to complete a knowledge assessment of the main content areas featured in *Alien Deep*, the Viewer group significantly outperformed the Control group, overall, and on each of three separate content areas assessed**. Out of a total possible score of 50, the Viewer group averaged 39.5 correct responses, while the Control group averaged 21.8 correct responses. The effect size in this case was considered a very large effect (d=2.8).

In addition to this higher overall score, the Viewer group also significantly outperformed the Control group for each of the three main topic areas assessed, as follows: For *ocean properties, characteristics, and life forms,* out of a total possible score of 17, Viewers averaged 12.9 correct responses while Control participants averaged 7.4. For *ocean research and discovery*, out of a total possible score of 21, the Viewer group averaged 17.9 correct responses while the Control group averaged 8.7. Finally, for the *ocean's importance to humanity*, out of a total possible score of 12, the Viewer group averaged 8.6 correct responses while the Control group averaged 5.5. The effect sizes in each case indicated these effects were large effects (d=1.88, d=2.74, d=1.74 respectively).

➲ **Viewers consistently agreed that the program had a positive impact on their knowledge and appreciation of the ocean as well as their ability to communicate and make informed decisions about oceans**. Viewers were asked for their level of agreement with a series of statements about the program's impact on them personally, using a scale from 1 (strongly disagree) to 7 (strongly agree). Viewers generally agreed that as a result of watching they had: a better understanding of the ocean's influence on them (6.0); a better understanding of their influence on the ocean (6.0); a better appreciation for the fact that ocean exploration and research requires collaboration among people from many different backgrounds (6.0); and a better understanding of the methods scientists use to explore and study the ocean (6.0).

Viewers generally moderately agreed that as a result of viewing: they had a better understanding of the basic principles and concepts about how oceans function (5.0), that they would be able to make informed/responsible decisions regarding the ocean and its resources (5.0), and that they would be better able to communicate about the oceans in a meaningful way (5.0).

Several subgroup differences were found in this section, as follows.

- Female Viewers more strongly agreed than males that as a result of viewing the program they had a better understanding of their influence on the ocean (Mdn=5.0 vs.4.0). The effect size in this case was considered a small effect (r=.25). Females also more strongly agreed that as a result of viewing they had a better appreciation for the fact that ocean exploration and research requires collaboration among people from many different backgrounds (Mdn=6.0 vs. 5.0). The effect size in this case was considered a medium effect (r=.32).

- Viewers 41 and older more strongly agreed than Viewers 17-28 that after watching the program they better understood both the basic principles of how oceans function (Mdn=6.0 vs. 5.0) and the methods scientists use to explore/study the ocean (Mdn=6.0 vs. 6.0). The effect sizes in each case were considered medium effects (r=.42, r=.45). Viewers 41 and older more strongly agreed than Viewers 17-28 that after watching the program they would be better able to communicate about the ocean in a meaningful way (Mdn=6.0 vs. 5.0). The effect size in this case was considered a medium effect (r=.39).

- Viewers 41 and older also more strongly agreed than Viewers 29-40 that after watching the program they had a better understanding of the basic principles of how oceans function (Mdn=6.0 vs. 5.0) and that they would be better able to communicate about the ocean in a meaningful way (Mdn=6.0 vs. 5.0). The effect sizes in these cases were considered medium to large effects (r= .45, r=.51). These older Viewers also more strongly agreed that they would be able to make more responsible decisions about the ocean and its resources as a result of viewing (Mdn=6.0 vs. 5.0). The effect size in this case was considered a large effect (r=.55).

➲ **Although short duration media projects are unlikely to impart major belief or attitudinal change, *Alien Deep* achieved some success in this regard.** The evaluation measured a small set of attitudes and beliefs related to the ocean themes addressed in the series, drawing on items used in national population polls or research studies. Significant differences were found between Viewer and Control groups for three items. In the first instance, using a scale from 1 (strongly disagree) to 7 (strongly agree), Viewers had a significantly higher level of agreement with the statement: *Learning about the ocean changes my ideas about how the world works* (Mdn = 6.0 vs. 5.0). In the second instance Viewers also had a significantly higher level of agreement with the statement *I have enough background knowledge to write a substantive letter to my congressional representative about an issue affecting the ocean* (Mdn= 4.0 vs. 3.0). Finally, for the third item, using a scale from 1 (not at all important) to 5 (extremely important), Viewers were significantly more likely to ascribe a greater level of importance to the role that the ocean plays in controlling the world's climate (Mdn=5.0 both groups). In all three instances the effect sizes were considered small effects (r=.22, r=.27, r=.18, respectively).

➲ **When asked to describe what interested them about the ocean, Viewer and Control participants frequently focused on the ocean's sea life, ocean exploration/discovery, the importance of the ocean to sustaining life, and the ocean's resources.** However, a substantially higher percentage of Control participants than Viewers focused on sea life (71% to 37%) while substantially higher percentages of Viewers focused on ocean exploration/discovery (35% to 12%), the importance to sustaining life (31% to 11%), and resources (25% to 3%). Additionally, smaller groups of Viewers described interests related to ocean systems/sciences (17%), habitats/topography (13%), mystery and danger (11%), the ocean's size (11%), leisure/aesthetics (11%), protecting the ocean (8%), waves (4%), and the diversity of life forms (4%). Smaller groups of Control participants, meanwhile, described interests related to protection/sustainability (15%), leisure/aesthetics (9%), size (8%), habitats/topography (6%), waves (5%), mystery and danger (5%), and ocean systems/sciences (3%).

➲ **When asked to describe the impact of the ocean on their daily lives, groups frequently focused on the ocean having an impact on their climate and food/water, although in both cases substantially higher percentages of Viewer to Control participants focused on these impacts (56% to 20% for climate and 47% to 31% for food and water).** Additionally, another large group of Viewers described impacts related to commerce (46%) while smaller groups of Viewers pointed to the ecosystem (14%) and enjoyment of the ocean (13%), followed by natural disasters (10%), health (6%), aesthetics (3%), and energy/resources (3%). Other than focusing on food/water and climate, Control participants only described impacts related to personal enjoyment (16%) followed by commerce (11%), ecosystems (11%), aesthetics (9%), health (8%), natural disasters (3%), and energy/resources (2%).

Section 4: What were the extended influences of *Alien Deep*?

To explore the longer term impact of *Alien Deep*, all Viewers who participated in the evaluation and indicated they were willing to be contacted about an opportunity to provide additional feedback (n=63) were invited to participate in a follow-up survey and/or interview two-three weeks after viewing.

The follow-up requests were sent to all Viewers via electronic mail. A total of 53 out of 63 respondents opened the email request within the four-day evaluation period, and 42 of these 53 recipients completed the evaluation request, resulting in a response rate of 79%.

The follow-up evaluation questions asked Viewers to reflect on whether they had thought about, discussed, were reminded by, or took any actions related to their viewing of the mini-series. The main findings from the evaluation are summarized below.

"One question in particular from the survey stuck with me; how did the series affect/change my ability/desire to discuss ocean matters with friends. On the other side of the viewing experience now, I feel significantly more confident in my ability to talk about matters regarding the ocean in moderate detail, even if most of the material was not new….It has given me pause to reconsider my childhood dream of being a marine biologist, which happens periodically, though this time it hit a slightly deeper chord in my heart." 29-year-old Male from Santa Fe, NM

"Sometimes it takes a while to fully process information, and after completing the first survey, I continued to think about the program in regard to the disconnect between its title and its subject matter, for example. The program left me with a desire to see and learn more about the *Alien Deep* - the deepest, least explored parts of the ocean. Instead, it felt to me that the episodes went in several different directions that, while they may have been indirectly related to the ocean, departed from the show's stated subject matter." 55-year-old female from Yarmouth, ME

"It has created a conversation or ongoing thought about the ocean, humanity's future, etc. I generally do think about politics, the environment and what our future may become but I did take in some new information from the show that has joined that thought. Such as: further evidence of earlier trade and exploration than previously thought, wanting to know we have resources in our oceans but also not wanting it to be pillaged like land resources, knowing that people are spending many hours and lots of money on the possibility of living on Mars (which will be just for the wealthy I'm sure)." 28-year-old Female from Santa Fe, NM

"I look at the structure of land masses differently now. Upon viewing pictures of a beach my friend sent me, I thought about how the Earth is formed from these underwater volcanoes." 22-year-old female from Cleveland, OH

- **Almost all of the Viewers reported they thought about *Alien Deep* in the weeks since viewing.** While 93% of the Viewers described a specific recollection, 2% said they couldn't recall whether they had thought about the program and 5% said they had not thought about the series. When asked to rate how much they had thought about the program, on a scale from 1 (not at all) to 7 (a great deal), the Viewers' ratings ranged widely from a low of 1 to a high of 7, with the median rating being 3.5.

  When invited to elaborate, Viewers most often indicated that they specifically thought about something they had learned about the ocean (36%) or human use and exploration of the ocean (31%). Smaller groups thought about the series in relation to television (14%), environmental degradation (7%), taking action (7%), or an aspect of the filmmaking (7%). Less than a tenth (7%) provided miscellaneous answers.

- **Most of the Viewers indicated that they had discussed an aspect of the series with others in the weeks since viewing *Alien Deep*.** These Viewers (79%) most often indicated that they had spoken with friends (48%) or family members (36%). A handful of Viewers indicated that they had spoken about the series with coworkers (7%), and one Viewer said s/he spoke with the students s/he tutors (2%). A few Viewers did not identify the people they spoke with about the series (7%).

  When asked to describe what they discussed, the largest groups of Viewers pointed to current and future uses, study, and exploration of the ocean (38%) and general things they learned about the ocean (26%). Smaller groups discussed the program itself (14%), the segment on underwater archaeology (14%), and Dr. Ballard (10%).

  "I recall speaking with a couple of different friends…We discussed who Bob Ballard was and also the pieces of the show that I enjoyed, such as the last few regarding implications of exploration for the future of humanity. The "feud" between Bob Ballard and Buzz Aldren because it was humorous but also in discussing people actually wanting to live on Mars. Then we would talk about the cultures that live on the ocean and how I liked learning about that piece and need to research more about that." 28-year-old female from Santa Fe, NM

  "I do think that the Mars vs Ocean Floor was a key discussion. For those reviewers younger than 35 I think a mention of Sputnik and how the race to the moon was a metaphor for who was winning the "cold war" with Russia would have somewhat explained to them what happened to the respective budgets. My inner city generation grew up with Jacque Cousteau, looked with wonder at the Undersea World and sang Aye Calypso with John Denver. The ocean was beautiful, mysterious and wondrous place. We all hoped to get to these places someday, and learn to snorkel. Buzz Aldrin going off to Mars would, however, bring the 12 Step Program to new heights, so to speak. What we saw of the ocean floor was not exactly beautiful to the non-explorer. It was just downright scary. If there ever was an inverse of heaven, purgatory and hell this was it. I thought Dante had already been there and this was the last circle. Freudian and Jungian archetypes were present in some unconscious level also. And the creation stories of my Catholic and Wanabaki background were challenged just as I thought I had found my own truth in the spiritual blending of both influences. I look to the sky, the sea and mostly trees to find my strength and even faith. I now have to fit in this bubbling magma on a cross continental divide, where renewal is taking place 19,000 feet under sea level. Dear Lord. * The Hoff crabs were a feminist's nightmare. My only consolation is the irony of the naming of the species…." 66-year-old female from Somerville, MA

- **More than a third of Viewers (36%) indicated that they saw something on television or in a movie or heard something on the radio that made them think of *Alien Deep*, while more than a quarter (26%) indicated that they read something that reminded them of the program.** Viewers who saw or heard something that reminded them of *Alien Deep* most often pointed to NPR stories that they had heard on the radio or to television documentaries, ads, or news programs that featured content that reminded them of the program. Viewers who read something that reminded them of *Alien Deep* most often pointed to articles in various publications, including National Geographic magazine (12%). About one-sixth (14%) were reminded of the series by miscellaneous sources: a flyer for an archaeology workshop, a marine archaeology textbook, Facebook posts from a family member who studies marine biology, poetry about Ulysses and the Odyssey, images of the deep sea, and Viewer interest in director James Cameron's work on the movie Titanic.

- **When asked to describe any other impacts *Alien Deep* had on them personally, more than half the Viewers described an additional impact.** Among this group (57%) the largest group of Viewers (16%) indicated that the series had given them a new perspective on the ocean, Earth, and life in general. Other Viewers commented on the value of ocean research/ exploration (14%), a personal interest in taking action or sharing the mini-series with others (12%), an appreciation for the series' environmental message (10%), or how much they enjoyed learning about the ocean (10%). A tenth (10%) gave miscellaneous answers. Additionally, just over a tenth (12%) criticized the series and just under a tenth (7%) praised the series. Less than a tenth (7%) said the program hadn't had any other impacts of them, and nearly a quarter (24%) declined to answer the question.

- **Just over one-fifth of the Viewers indicated that *Alien Deep* influenced something they had specifically *done* in the weeks since viewing the program.** These Viewers (21%) said they had done something that was influenced by the viewing experience. Most often they noted that they had conducted additional research on a variety of topics (14%), including marine archeology, undersea creatures, other theories about the origin of life, and marine researchers (including Dr. Ballard). A handful also indicated that the series had inspired them to take action in some way (7%) – to change their diet, be a more responsible consumer, and share information with others.

- **Overall, more than a third of Viewers (36%) identified themselves as a parent, grandparent, and/or educator, some of whom shared information about the program with youth.** While most of these Viewers indicated that they had not yet shared *Alien Deep* with their child(ren), grandchild(ren), or student(s), those who indicated that they had (4%) said that they discussed the search for ancient shipwrecks (2%) and the need for planetary awareness (2%). Viewers were then asked to describe any impacts that they thought the program has had on their child(ren), grandchild(ren), or student(s). One Viewer said that his or her daughter doesn't generally like documentaries and that maybe she will be more apt to give them a chance, while another Viewer noted that there is a greater interest in the ocean deep than before and that exploration is cool!

- **Not quite one-fifth of the Viewers indicated they had visited the *Alien Deep* website on the National Geographic website in the weeks since viewing the program.** These Viewers (17%) explored a range of features on the page, browsed/reviewed *Alien Deep* educator resources, and/or shared content from the page. The largest group, one-tenth (10%), read about the episodes. Less than one-tenth each looked at photos (7%), played with the Interactive (5%), read other posts/articles (2%), watched video clips (2%), and/or "liked" the *Alien Deep* page (2%). Among the majority of Viewers who indicated they had not visited the *Alien Deep* website (83%), in general, these Viewers noted that this was because they were not aware the website existed (47%). A smaller group of Viewers said that they weren't interested in visiting the website (24%), and a handful indicated that they didn't have time (10%).

  Overall, the Viewers who visited the *Alien Deep* website said they enjoyed their visit. On a scale from 1 (didn't enjoy at all) to 7 (enjoyed a great deal), their ratings ranged from 3 to 7, with the median rating being 4.0. When asked if they had learned anything new about ocean research or exploration, or a related topic, while visiting the site, the largest group said no or declined to answer the question (10%). One Viewer each indicated that s/he learned about cool species (2%), the movement of the plate and the cultural myths that surround their conception (2%). Finally, one Viewer (2%) answered with *I will*, which may indicate that s/he expects to learn something on follow-up visits to the website.

Part 2: Evaluation of the *Alien Deep* educational resources with online visitors and educators

In addition to evaluating the five-part *Alien Deep* mini-series with a general audience, the evaluation team also examined the appeal, clarity, use, and learning value of the educational resources by visitors and educators who used these resources on their own accord. Section 1 of this report summarizes the evaluation team's collaboration with NGT to construct a summary of visitor activity and engagement with the project's online educational resource and social media pages. Section 2 provides an overview of educators' uses and impressions of the educational resources in formal and informal settings as indicated by their responses to an initial online survey. Section 3 provides an overview of educators' uses and impressions of the educational resources in formal and informal settings as indicated by their responses to a follow-up online survey.

Section 1: Summary of online visitor activity and engagement

To provide an overview of visitor activity and engagement for the *Alien Deep* educational resources and social media pages, the evaluation team summarized the online audience and visitor engagement metrics, as made available from NGT.

Online Educational resource pages

The *Alien Deep* online educational resources include a series of online videos, reference materials, and an Interactive. Over a one year period, from January 2013 to December 2013, web metric data was gathered for the main *Alien Deep* 'Collection Page' and 15 related educational resource pages. This data was reviewed in early May 2013, soon after the resources were made live, and then reviewed again in December 2013 to allow time for additional visitor interactions to occur.[73] Reports on Pageviews, Time on Page, and Top Referrers were provided for the main resource features, including the following pages/sections: Collection Page, Ocean Exploration – Technology, Ocean Circulation/Butterfly Effect, Ocean Currents and Climate, Plankton Revealed, Economy of Shipping, Ancient Shipwrecks: Black Sea, Ancient Mariners, Hawaii Geology, Mauna Kea, Deep Sea Hydrothermal Vents, Plate Tectonics, Rogue Waves Revealed, Catching the Biggest Wave, Science of Surfline, and Rogue Waves.

The final data report as of December 2013 showed that during the previous one year period:

- The top 5 Referring sites to the *Alien Deep* educational resources included (with average Time on Page per referral denoted): Facebook (3:48 minutes), A2Z Homeschool (3:26 minutes), National Geographic (1:05 minutes), Google (59 seconds), and Direct (52 seconds).

- There were 2,162 Pageviews of the main 'Collection Page' and visitors on average spent 2.44 minutes on this page. While the individual Pageview results ranged widely, from a low of 692 for Economy of Shipping page to a high of 27,746 for Plate Tectonics. After Plate Tectonics, the highest numbers of

[73] Based on preliminary page findings, the National Geographic team confirmed that as of May 2nd 2013 the site was performing "very well" by internal standards, particularly given short period of time material was live. Time-on-page for each resource was high, pulling in more than 5 minutes.

Pageviews were Ocean Currents and Climate (14,695), followed Rogue Waves (5,251), Deep Sea Hydrothermal Vents (3,400), and Plankton Revealed (2,725). The lowest Pageviews, in ascending order after Economy of Shipping, were found for Catching the Biggest Wave (700), Science of Surfline (753), Rogue Waves Revealed (911), and Mauna Kea (1038). The average number of Pageviews across the 15 *Alien Deep* pages was 4,379.

- The average Time on Page results ranged from a low of 2:40 (minutes) for Economy of Shipping to a high of 10:48 (minutes) for Ocean Currents and Climate. After Ocean Climate and Change, Viewers spent the most time, on average, visiting Rogue Waves (10:29 minutes), Plankton Revealed (10:09 minutes), and Hydrothermal Vents (9:51 minutes). After Economy of Shipping, Viewers spent the shortest amounts of time, on average and in ascending order, visiting Rogue Waves Revealed (4:11 minutes), Catching the Biggest Wave (4:40 minutes), and Ancient Mariners (5:30 minutes). The average across the 15 resource pages was 7:16 (minutes).

Social media

The evaluation team reviewed the data provided by Insights and comparable analytics services, as provided by NGT, for the *Alien Deep* Facebook page and YouTube videos to report on both reach and engagement (likes and shares). The data revealed the following findings:

Facebook posts

- The project team made a variety of Facebook posts related to the miniseries, including posts titled: Plate Tectonics, Main *Alien Deep*, Ocean Conveyor Belt, and Interactive. These and other relevant posts were captured by the National Geographic social media stats in May 2013.

- Over the course of the project period, the social media results showed that the Main *Alien Deep* Facebook post had a Total Reach of 9,559 and obtained 116 Likes and 23 Shares. The related Plate Tectonics and Ocean Conveyer Belt Facebook posts achieved significantly higher levels of reach, at 302,929 and 303,163, respectively. These posts also obtained a higher number of likes, 1734 and 2391 respectively, as well as shares, 497 and 259 respectively.

YouTube videos

- During the broadcast premiere in September 2012, National Geographic featured three video clips from the series on YouTube: More Dangerous Than Space, Planet in Crisis, and Hoff Crab. More Dangerous Than Space earned the highest number of views (30,000), followed by Hoff Crab (17,000) and Planet in Crisis (13,000).

Section 2: Educator feedback on the *Alien Deep* educational resources

In order to provide an overview of use of the *Alien Deep* resources by educators who sought out the resources on their own accord, the evaluation team sent an evaluation invitation to a random sample of 300 educators who attended a National Science Teachers Association (NSTA) or National Marine Educators Association (NMEA) conference in 2013 and stopped by the National Geographic Education booth to inquire or learn about the *Alien Deep* and other educator resources. These educators provided NGT contact information for additional follow-up.

Among this group of 300, a total of 85 educators opened the email invitation within the three week evaluation period. A total of 48 of these 85 educators completed the feedback survey and provided additional input, resulting in an overall response rate of 56% to the evaluation request.

- **When asked to describe their current or most recent role as an educator, the largest groups of educators identified as a high school (48%) or middle school (30%) teacher/instructor.** Less than one-tenth each identified as a college or university teacher/instructor/professor (8%), an elementary school teacher/instructor (6%), or an informal educator (4%). Two educators (4%) chose to define their positions with other, write-in answers. One described his/her works as teaching ESL families, adults, and children (2%) and the other wrote workshop for science teachers, program coordinator (2%).

- **The educators were from 22 states and all regions of the country.** The largest groups of educators were from Texas (27%) and California (13%). Two educators each (4% each) live in the following states: Colorado, Connecticut, Illinois, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, and Virginia. One educator each (2% each) lives in: Arizona, Florida, Georgia, Kentucky, Louisiana, Maryland, Missouri, Mississippi, Montana, and South Carolina. One educator (2%) declined to answer the question.

- **Almost all of the educators (90%) indicated they had reviewed one or more of the *Alien Deep* resources.** The largest group, more than two-thirds (69%), looked at the video clips. Around three-fifths each looked at the photo galleries (60%) and the classroom activities and lessons (58%). Two-fifths (40%) looked at the reference materials. About a third each looked at the *Alien Deep* Interactive (31%) and the My Ocean game (31%). Just under one-sixth (15%) looked at the *Alien Deep* children's book by Bradley Hague.

- **More than a third of educators (35%) indicated that they used the *Alien Deep* resources in their educational settings.** The largest group, nearly a quarter (23%), used the video clips. Around one-fifth used the photo galleries (19%), and more than a tenth (12%) used the classroom activities and lessons. Just under a tenth (8%) used the reference materials. One educator each used the *Alien Deep* Interactive (2%), the My Ocean game (2%), and the *Alien Deep* children's book by Bradley Hague (2%).

- **Most educators (88%) reported they had already used or plan to use the *Alien Deep* resources.** As noted above, more than a third of educators (35%) indicated that they have used the resources in their educational settings. Additionally, about two-thirds (65%) indicated that they intend to use the resources in their educational settings. (A handful of educators noted that they have used some resources and intend to use others.) Remaining respondents said that the resources were not relevant

to their particular educational settings (6%), mentioned that they did not take any materials from the National Geographic NSTA booth but would be interested in looking at or using the *Alien Deep* resources in the future (2%), or declined to answer the question (2%).

- **When asked to describe how they used or plan to use the resources identified earlier in the survey, more than two-thirds of educators (69%) indicated that they had used or intended to incorporate the resources in their classroom curricula.** More than a quarter (27%) pointed to their water, ocean, or marine biology units or classes. About one-sixth (17%) did not specify a curriculum, as in [I] have shown clips in my classroom during lessons. More than a tenth (13%) indicated that they used or intend to use the resources when discussing natural selection, adaptation, and classification. Less than a tenth each pointed to using the *Alien Deep* resources in their earth science/geology (4%), chemistry (4%), technology/biotech (4%), and/or climate change (2%) curricula.

  A tenth of educators (10%) noted that they would specifically be using the resources to introduce an aspect of the curriculum. Less than a tenth (6%) indicated that students would be using the resources to help develop their research projects.

  Of those who specified non-curriculum uses, a tenth (10%) indicated that they did or would be sharing the resources with other educators. Less than a tenth (6%) provided miscellaneous answers, expressing general interest in the resources. Finally, one educator (2%) noted that s/he had used the resources to learn the content myself and another (2%) indicated that s/he would be using the resources with an outside-the-classroom science club.

"Love the resources. I am able to use them directly over my smartboard, and the students enjoy the visual representation of what we are discussing in class - such as ocean currents and climate." Middle school teacher from Illinois

"We did an oceanography unit in my Integrated Science course and students used the clips and the photos as research for their project based learning." High school teacher from Georgia

"I am planning to use it in my chemistry classes and oceanic science classes. I would like to show all cool pics and lead activities such as calcium carbonate and acid reaction and what kinds of reactions happens under the sea. I would like to show them images of sea temperatures too." High school teacher from Texas

"May pull some when we talk about ecosystems to provide more exposure to the underwater ecosystems that we can't see on a daily basis. May also put together a design challenge of some sort by referencing some of the technology pieces you have put together." Middle school teacher from Montana

"Students did seem to choose to use your media more than other sites on the list." High school teacher from Georgia

"The interactive site is interesting for single person experience but is lacking for a successful lesson with a full classroom" Middle school teacher from Colorado

"We are working on adaptation on species to the environment. I am going to show parts of the video as an intro. Students will be researching what adaptations organisms must make to survive in the deep." Middle school teacher from Arizona

- **When asked to comment on the usefulness of these resources in their educational settings, the educators pointed to many valuable attributes.** The largest group of educators, more than a quarter (27%), felt that the resources (and in particular the visual resources) were useful because they were engaging and interesting. A quarter (25%) commented on how the resources did or could support their

curriculum, as in very good for introducing and reinforcing marine life to students. More than a tenth (13%) provided generally positive feedback, as in it is very useful.

Less than a tenth each commented on the: ease of use (6%), alignment with educational standards (classroom, state, or common core) (6%), accessibility to many levels (2%), and the value of having an online component (2%). One educator (2%) also felt that, though the interactive was a good tool for one person, it was less successful on the classroom level. Remaining respondents said they were uncertain (6%), hadn't used the resources yet and didn't feel able to answer the question (6%), or that the resources weren't appropriate for their educational settings (6%).

"Useful for injecting concepts into core concepts to engage students/apply techniques and concepts to real-world settings" High school teacher from California

"Somewhat useful because my students have limited English and often limited education in the first language I generally stick with images - a picture is worth a 1000 words..." ESL teacher from California

"The resources here blend well with our State Science Standards, in particular, the references to geology of the ocean floor and ocean currents and climate." Middle school teacher from Texas

"Teachers are always looking for additional classroom resources. As a science field coordinator for Mississippi state university. I find them resources to implement and use. I think the resources you have are very useful." Program and workshop coordinator from Mississippi

- **The educators already used (or could foresee using) the resources in a wide range of settings.** The largest group, more than half (54%), have used or foresee using the resources in high school student programs. Less than half (44%) have used or foresee using the resources in middle school student programs, and a quarter (25%) have used or foresee using the resources in K-12 teacher programs. About one-sixth each have used or foresee using the resources in elementary school student programs (15%), public education programs (15%), and/or staff/development enrichment situations (13%). A tenth (10%) have used or foresee using the resources in volunteer/docent training settings. One educator each (2%) has used or foresees using the resources in an exhibit, an ESL program, and/or a community college course (2%).

Section 3: Follow-up evaluation with educators who used the *Alien Deep* resources

The educators who completed the evaluation described above and had used or plan to use at least one *Alien Deep* educational resource were invited to provide more in-depth feedback. Out of the 48 educators that completed the evaluation, 33 confirmed willingness to be contacted for additional follow-up. A total of 23 educators completed the follow-up evaluation, resulting in a response rate of 70%.

The follow-up evaluation asked the educators to further reflect on the value of the educational resources, to estimate the number of students they reached or plan to reach with the resources, whether they had used the resources with underserved youth, the overall value of the video clips and reactions in terms or length, comparability to other videos about the ocean, and their usefulness in teaching geology content,

- **The educators generally found the *Alien Deep* resources very valuable.** When asked to rate the educational value of the *Alien Deep* resources they reviewed or used on a scale from 1 (not at all valuable) to 5 (extremely valuable), their responses ranged from 3.0 to 5.0, with the median rating being 4.0. When invited to elaborate, more than one-sixth of educators (17%) commented on the general value of the resources. More than a tenth (13%) pointed to the importance of positive scientist role models and resources that encourage careers in science. Just under a tenth (9%) said they plan to use the resources, while another tenth (9%) noted that they cannot fully incorporate the resources into their curricula. Finally, one educator (4%) described specific plans for using the resources in his or her classroom.

- **When asked to approximate the number of students that they reached or would reach (within a year) with the *Alien Deep* resources, the educators estimated they had or would reach nearly 4,000 students.** Their responses ranged from a low of 20 students in a single class to a high of 1500 across a school district. The total number of students reported was 3,910. Of the educators who answered the question (n=21), the mean number of students who have been reached or will be reached was 386 per educator. Not including an educator who reported that the resources would reach 1500 students district-wide, the mean number of students was 121 per educator.

- **Almost half of the educators (43%) indicated that they had or would use the *Alien Deep* resources to reach traditionally underserved youth. Smaller groups noted that they do not work with any or many underserved youth (17%), or that they had or would be using the resources with special needs students (13%).** Additionally, just over a tenth (13%) of educators commented on the value of the *Alien Deep* resources for students who don't have access to the ocean. Just under a tenth (9%) commented on the educational and scientific value of the resources. About a sixth (17%) provided miscellaneous answers.

- **The educators generally found the *Alien Deep* video clips very valuable and praised their educational value.** When asked to rate the overall value of the *Alien Deep* video clips for use in their educational settings on a scale from 1 (not at all valuable) to 5 (extremely valuable), responses ranged from 3.0 to 5.0, with the median rating being 4.0. When invited to elaborate, the largest group (39%) praised the video clips for their educational value. One educator (4%) criticized the clips.

- **When asked how they thought the *Alien Deep* video clips compared to other ocean research and exploration videos they have used in the past, the majority of educators (87%) indicated that they compared favorably.** One educator (4%) thought they compared unfavorably. Of those who thought the *Alien Deep* video clips compared favorably, the largest group (57% of all educators) described them as informative or engaging. About one-sixth (17%) described the video clips in generally favorable terms, and just over one-tenth each commented on their visuals (13%) or how current and up to date they were (13%). One educator (4%) specifically valued their accessibility via open access.

- **Educators generally found the length of the *Alien Deep* video clips extremely useful.** When asked to rate the usefulness of the length (generally 5-7 minutes) of the *Alien Deep* video clips for their educational settings, on a scale from 1 (not at all useful) to 5 (extremely useful), responses ranged

from 3.0 to 5.0, with the median rating being 5.0. When invited to elaborate, the majority of educators (70%) indicated that this length was just right, as it is short enough to keep students' attention and easy to fit into their lesson plans. A few educators (9%) indicated that they or their colleagues might also like to use longer clips and episodes, and one educator (4%) felt that the videos were too long.

- **The largest group of educators indicated that they generally prefer to use video clips that are 5-7 minutes in length.** Educators were asked what length they generally prefer when using video clips in their educational settings, and were asked to select one of five options: Less than 2 minutes, 2-4 minutes, 5-7 minutes, 8-10 minutes, or Other. Nearly two-thirds of educators (65%) indicated a preference for clips in the 5-7 minute range. Just over a tenth each pointed to clips that are 8-10 minutes (13%) or 2-4 minutes (13%) in length. None of the educators selected clips less than 2 minutes (0%), and one educator selected Other (4%). When invited to explain, s/he commented: It depends on the concept and grade level. Freshmen 3-8 min, AP environmental are more like 20 for complex case studies.

- **When asked for their thoughts on the value of the *Alien Deep* video clips in communicating geology content, more than half of educators (57%) indicated that they had or could see themselves using the video clips to communicate geology content.** Just over one-fifth (22%) said they had not and could not see themselves using the clips in this manner. Just over a tenth (13%) answered no but qualified their answer in a way that indicated the clips might still be used (by themselves or others) to present geological concepts. One educator (4%) answered maybe.

- **When asked to indicate which, if any, of the *Alien Deep* resources they had used in their educational settings to date, more than three-fifths (61%) of the educators pointed to one or more of the resources.** More than half (52%) indicated that they used the video clips, while more than two-fifths (43%) pointed to the photo galleries**.** Less than one-tenth each noted that they used the Interactive (9%) or the My Ocean game (4%). None of the educators indicated that they had used the *Alien Deep* children's book by Bradley Hague. Slightly less than two-fifths (39%) indicated that they had not used any of the resources.

- **The educators who indicated that they had used one or more of the *Alien Deep* resources (n=14) generally thought their students had benefitted or gained from their use of the resources.** More than three-quarters (79%) specifically commented on the benefits of increased knowledge and engagement in the classroom. About one-sixth (14%) pointed to the value of *Alien Deep*'s scientist role models. One educator each mentioned a use outside his or her classroom (7%) and another made a suggestion about the project itself (7%).

- **When asked to describe specific examples or anecdotes that would provide insight into their students' reactions to the *Alien Deep* resources, half (50%) of the educators who indicated that they had used one or more of the resources (n=14) pointed to in-class reactions, such as asking questions and requesting to watch additional clips.** Just over two-fifths (21%) indicated that the resources had affected their students' hopes, dreams, and future plans. One educator reiterated a miscellaneous comment about having shared the resources with district specialists (7%). Remaining educators either said no (14%) or declined to answer the question.

- **About one-sixth (14%) of the educators who indicated that they had used one or more of the *Alien Deep* resources (n=14) noted that they had had an opportunity to assess/evaluate how the resources impacted their youths' ocean or STEM-related knowledge, beliefs, or attitudes.** When invited to elaborate, one of these educators wrote: I routinely monitor mastery and find that when I couple this video with the other classroom materials, the comprehension is improved. The other reported: Attitudes improved using a Likert scale assessment of overall impression of STEM. It increased from an average of 2.2 to 2.76 on a 4 point scale. "How do you feel about the STEM field?"

- **When all of the educators who completed the follow-up survey were given the opportunity to provide additional feedback on the *Alien Deep* resources, the largest groups praised the resources (22%) or commented on their future use (22%).** Just over a tenth of educators (13%) made a suggestion or asked a question, and one educator (4%) criticized the resources.

Final remarks: Evaluation of the *Alien Deep* mini-series with a general audience

The evaluation findings show that *Alien Deep* appealed to the Viewers recruited for the evaluation and had a significant impact on their knowledge of the ocean and their understanding of human's relationship with the ocean. Overall, Viewers liked the mini-series, thought the content was interesting, and felt the program was visually exciting, clear, well-paced, and moderately hopeful. Viewers also generally judged that the series struck the right balance in terms of the amount of science and scientific explanations provided, and expected to recommend it to others. While Viewers were somewhat divided about their use or even awareness of the program website, the follow-up surveys revealed that nearly all those surveyed ultimately made some connection to the program, thought about it further, or pursued a follow-up activity within a few weeks of viewing.

It is notable that relatively few subgroup differences were found across the evaluation findings. The few that were found generally involved female Viewers and older Viewers (41 years and older) tending to rate some individual aspects of the film higher than male and younger Viewers. Females, for example, tended to rate their overall liking of the program higher than did males, and they rated the program's science density as just about right while men tended to rate it as slightly lacking. They also agreed more strongly that viewing the program had increased their understanding of the ocean's influence and enhanced their appreciation for the collaborative nature of ocean research and exploration.

Meanwhile, older Viewers tended to rate various aspects of the program's appeal somewhat higher than younger Viewers, including the program's storytelling, visual interest, and their likelihood of recommending the series. Older Viewers also tended to more strongly agree that as a result of viewing *Alien Deep* they had a better understanding of how the ocean functions and the methods scientists use to study the ocean. Older Viewers also tended to more strongly agree that they were better able to communicate about the ocean in a meaningful way and could make more responsible decisions about the ocean and its resources.

In each of these cases though, it is important to bear in mind that the ratings in all of these cases were very high to begin with, as the median ratings spanned 5.0-6.0 on a scale of 1 (lowest rating) to 7 (highest rating). Therefore, taken together with the program's overall lack of other major subgroup differences, the findings indicate that *Alien Deep* was well received by and successful with both males and females, as well as with individuals of varying ages, levels of education, and occupations.

The evaluation results indicate that *Alien Deep* was a successful informal science learning initiative with the general viewing audience recruited for the summative evaluation. As always, caution should be taken in drawing broad implications from any one study. In this case, *Alien Deep* is a multi-faceted media project, which presented many alternative ways to evaluate the project's success in meeting its informal science learning goals. This study focused on the experience of recruited Viewers watching and providing immediate and follow-up feedback on a viewing schedule similar to the broadcast premiere of the series in September 2012. Below, we briefly summarize aspects of the program that stood out for Viewers in this study, looking across the findings and at themes that emerged in numerous places, not just in response to specific questions.

Reflecting on the findings that stood out from this vantage point, we highlight 11 themes, each of which we briefly discuss below with one or two sample Viewer comments that capture the spirit of the theme:

- That never occurred to me: Viewers repeatedly noted that the program featured interesting and unfamiliar facts, some of which ran counter to what they previously thought to be true. That this new information was a selling point of the series was also evidenced by Viewers' in-depth discussion of the interesting things they learned, their propensity to point to facts and specific segments of *Alien Deep* when discussing what they liked and learned from the series, and their high scores on the quiz. These findings collectively indicate that the film's learning value was high and that the learning process was engaging, perhaps in part due to this focus on the unfamiliar and unexpected. As one Viewer indicated: "I found it interesting and I learned new information in an entertaining format. It also led me to ask questions, which it later answered."

  Additionally, a number of Viewers who indicated that they had not learned a lot from *Alien Deep* still made mention of their appreciation of the information presented in the program and its impact on their ability to communicate about the ocean. As summarized by one Viewer: "On the other side of the viewing experience now, I feel significantly more confident in my ability to talk about matters regarding the ocean in moderate detail, even if most of the material was not new."

- What really got me were the historical and cultural elements: Many Viewers enjoyed the historical and cultural facts that were woven throughout the series, as captured by one Viewer's comment: "I really enjoyed the cultural elements - Hawaiian, Vietnamese - I think lots of the time these kinds of shows focus a lot on science without explaining the cultural points." In part, these comments further indicate that Viewers were attracted to the new and unfamiliar information as noted above, but, in addition, Viewers repeatedly highlighted their enjoyment of the historical and cultural context presented within the program's science content.

- I liked learning about ocean discoveries: Viewers generally appreciated the series' focus on discoveries of undersea life and ocean processes. As summarized by one Viewer: "I was very interested to learn about all the different thermal vents/black smokers located in so many different locations with such a variety of life surrounding them - each unique. I am so excited to learn about new discoveries in general and these especially. I also was really interested in the research being done on the thermal conveyors- it excites me to learn that the systems are so complex." In part, these comments further indicate that Viewers were attracted to the new and unfamiliar, as noted above. In addition, Viewers repeatedly pointed to an interest in information that was not only new to them, but also new to the scientific community.

- I liked that it focuses on a larger picture than just the ocean and deep sea creatures: In addition to appreciating the series' examination of ocean-related subjects, as noted above, many Viewers also enjoyed *Alien Deep*'s "big picture" approach and liked that the series covered topics that aren't always considered in ocean-focused films. As summarized by one Viewer: "I've only seen ocean shows that focus on the creatures/animals that live there. This had neat perspectives."

  At the same time, a handful of Viewers thought the title of the series misleadingly indicated that undersea creatures would be more heavily featured in *Alien Deep*. As summarized by one Viewer: "Sometimes it takes a while to fully process information, and after completing the first survey, I continued to think about the program in regard to the disconnect between its title and its subject matter, for example. The program left me with a desire to see and learn more about the *Alien Deep* - the deepest, least explored parts of the

ocean. Instead, it felt to me that the episodes went in several different directions that, while they may have been indirectly related to the ocean, departed from the show's stated subject matter."

- I was able to understand the science, which helps me better understand my relationship with the ocean: Viewers' ratings of the film's density of information and science, their quiz results, and their comments indicated that the science provided in *Alien Deep* was understandable to those without a science background. Additionally, many Viewers generally indicated that their increased understanding of the oceans has helped them better appreciate their importance. As summarized by one Viewer: "This program really increased my awareness and interest on how the ocean functions and the importance of it for life on our planet."

- More science, please: Some Viewers indicated that they had hoped to learn even more from the series, which they found dumbed down, not informative, and low density. As one Viewer commented: "Unfortunately this show trends the same way Nat Geo magazines do these days- more dramatic pandering; lower complexity of language; less real, hard data; a lot of colloquialisms; too much CGI. I grew up reading my grandparents old collections of National Geographic Magazines. They were a bastion of good writing, unbiased reporting, reliable data, and incredible imagery. I feel those have been sacrificed in an attempt to reach a wider, nowadays less educated on the whole, audience."

- I feel more strongly about the importance of deep sea science: In general, the series increased Viewers' understanding of the importance of ocean research and exploration. Though many Viewers thought that Episode 5, which compared ocean and space exploration, made a compelling argument for ocean exploration over space exploration, others thought the episode set up a false dichotomy. However, even those who took issue with the either/or premise of the episode still generally agreed with Dr. Ballard's argument in favor of ocean exploration, as summarized by one Viewer: "I'm intrigued by what was shown in the last episode, about how we could one day actually have cities on the sea. I know Dr. Ballard was passionate about how we need more sea exploration as opposed to space exploration. Although I don't see it as an either/or issue, I agree with him we need more sea exploration."

- It seemed a bit political: Some Viewers found parts of the series one-sided, politically motivated, or agenda-driven. As summarized by one Viewer: "I found the last 2 episodes too pedagogical and climate change agenda driven. I prefer to watch documentaries that highlight facts and findings and then decide how I feel about overall arguments. I understand that a bit of campiness helps a program expand its audience but I also think that pedagogy works to counteract any gains made through cinematic and popular appeal."

- Bob Ballard's vast knowledge and experience adds to the depth of the program: Viewers were generally positive about Dr. Robert Ballard and indicated that they were inspired by his presentation, passion, and intelligence. As one Viewer summarized: "Bob Ballard is a really compelling and interesting human to narrate, regardless of how you feel about his theories."

  Some Viewers, however, felt that the series was overly focused on Dr. Ballard and his accomplishments, or thought he had a large ego. As one Viewer noted: "Bob Ballard is a little bombastic and boastful, which makes him a little difficult to relate to."

- I think additional voices would contribute to the storytelling: Viewers generally enjoyed learning about guest experts' research on a variety of topics, such as underwater archaeology, the ocean conveyor belt, and the impact of small animals. Though Dr. Ballard was the narrative thread between most of these segments, some Viewers expressed a desire to learn less about Dr. Ballard and more about the

opinions and research of other scientists, as noted by one Viewer: "There could have been more content and more opinion provided; too much time given to Bob Ballard and while I respect him I would want other voices as well."

- I want to do my part to protect the ocean: Although *Alien Deep* wasn't heavily oriented toward promoting Viewer "action" beyond seeking out additional information and inspiring conversations around the film's topics, a number of Viewers – in both the post-screening and follow-up surveys – indicated that they were inspired to take some course of action, with some inclined to move toward a greener lifestyle, including making changes to their diets and becoming more responsible consumers. As one Viewer reflected: "The fish-farming and sustainability viewing got to me, perhaps because of my own interests. I am now seriously considering changes to my diet and deeper engagement with food sustainability issues."

  Meanwhile, a number of Viewers indicated that the film did not motivate them to do anything different, perhaps because they already care about and understand the importance of the oceans, and thus may not have felt newly encouraged to take action. As one Viewer noted: "I already care deeply for and love the ocean, recognizing its impact and importance to the planet's health and survival."

  Again, though, for a film that wasn't designed to necessarily promote changes in consumer behavior or lifestyle changes, the fact that it got people deliberating about the issue is noteworthy.

Finally, the above list of 11 themes are ones that we found to be most pertinent to the goals of the current evaluation, and with possible implications for future work produced by National Geographic Television and other groups focused on producing television documentaries funded by NSF's Advancing Informal STEM Learning Division. Future evaluations could benefit from further exploring both the unique and synergistic contributions of these, and other themes that emerged from the findings, to Viewers' engagement with and learning from programs like *Alien Deep*.

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Appendix 1

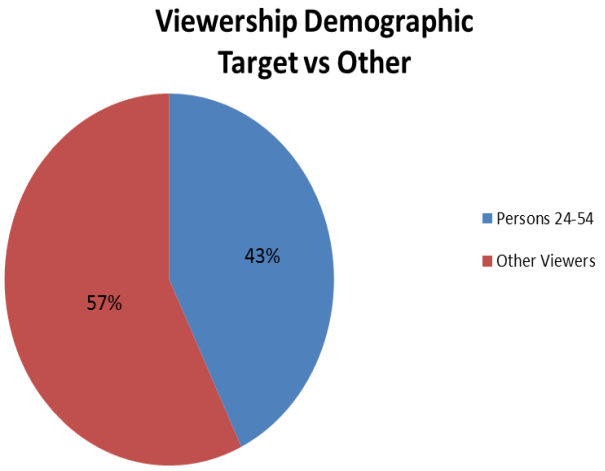
Alien Deep ratings and viewership information

During the first three days of its premiere, *Alien Deep* reached over 6 million households. A total of 7.7 million people tuned to the show. *Alien Deep* reached 3.3 million people within the target demographic P25-54.

Program	Demographic	AA Reach Projection (000)	AA Reach %
Alien Deep	Household	6,354	7.58
	Persons 2 - 99	7,724	3.56
	Persons 25 - 54	3,305	3.70

**Source: Nielsen NPower, NGC coverage area reach estimates across all *Alien Deep* telecasts (6a-6a, 9/16/12-9/18/12), 1 minute viewing qualifier

The pie chart below shows the proportion of persons aged 24-54 fitting the program's target demographic. More than two-thirds (43%) of the persons were in this age bracket.



The table below summarizes the ratings performance for *Alien Deep*. *Alien Deep* averaged a 0.17 P25-54 across five premiere telecasts, landing below NGC's time period average for that quarter.

Network	Program	Period	Episode	Premiere	Time	P 25-54 Ratings	% Diff. to Time Period Avg.	Telecast	Duration
NGC	*ALIEN DEEP* WITH BOB BALLA	9/16/2012	FIRES OF CREATION	P	07:00P - 08:00P	0.18	-25%	1	60
		9/16/2012	WRECKS OF THE ABYSS	P	08:00P - 09:00P	0.19	-24%	1	60
		9/16/2012	ITS ALIVE	P	09:00P - 10:00P	0.20	-20%	1	60
		9/16/2012	OCEANS FURY	P	10:00P - 11:00P	0.15	-40%	1	60
		9/17/2012	INNER VS. OUTER SPACE	P	08:00P - 09:00P	0.14	-44%	1	60
					Overall Average	**0.17**	**-31%**	**5**	**60**

The chart below presents the same information graphed by episode in relation to the average rating for *Alien Deep* and the National Geographic Channel (NGC).