

# Final Evaluation of Frontier Scientists, 2014 - 2016

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*Prepared for*  
***Frontier Scientists***

*by*  
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# EXECUTIVE SUMMARY

## Final Evaluation of Frontier Scientists, 2014 - 2016

### Introduction

Frontier Scientists is comprised of a website and portfolio of videos created for distribution web-wide and through television broadcast. The goal of this program is to excite the general public about ongoing science in Alaska and the Arctic. This is the summary evaluation of a three-year National Science Foundation grant received by Frontier Scientists. Frontier Scientists contracted PEER Associates to conduct the evaluation. Over the course of the three years, the evaluation was focused on both formative (intended to inform and improve programming) and summative (what has the program accomplished thus far) efforts. The foci of this evaluation were the following: *program implementation* - an



investigation of how the project was in fact implemented on the ground, including formative recommendations for program implementation activities; and *program outcomes*, including: a) the efficacy of scientist video-training workshops (Years 1 and 2); b) video viewer changes in interest, awareness, knowledge, and attitudes about Alaska/Arctic science (Years 1, 2, and 3); and c) website and video use (Years 1 and 2).

### Methods

**Program Implementation** was measured in Year 3 using the following method:

- Interviews (n=7) with collaborators by phone

**Scientist Video Workshops** were measured in Years 1 and 2 (when workshops were offered) with tools:

- Survey of workshop participants (n=51)
- Interviews of workshop participants (n=10)

**Video Viewer** outcomes were measured in all years through focus groups/interviews including:

- Focus groups with potential tourists/students and teachers outside of Alaska (n=23)
- Interviews with tourists on an Alaskan cruise ship (n=3)
- Interviews recruited at a Frontier Scientists live event (n=6)
- Interviews with tourists recruited at Visit Anchorage tourist bureau (n=4)
- Interviews with Alaskan residents who watched Frontier Scientists TV show (n=2)

**Website and Video Use** was measured in Years 1 and 2 using the following tools:

- Website Google Analytics
- Website YouTube Analytics

### Findings

#### Program Implementation (Year 3)

- Collaborators saw value in working with Frontier Scientists to create videos about their science.
- Collaborators valued working with staff, but about half felt unclear about the full scope of collaboration, including video-making and outreach/promotion.

### Scientist Video/Storytelling Workshops (Years 1 and 2)

- Scientist workshop participants reported high levels of satisfaction with the workshop.
- Participants reported some improved skills and confidence, but did not leave entirely proficient.
- Participants reported interest in and intentions to use what they learned, but perceived obstacles.

### Video Viewers (All years)

- Most video viewers enjoyed watching the videos and many learned something new from them.
- Evidence was mixed about whether watching the videos contributed to change in viewer attitudes.
- Most viewers expressed an interest in viewing more Frontier Scientists videos.

### Website and Video Use (Years 1 and 2)

- Frontier Scientists website use was relatively consistent in 2014, and then lower overall in 2015.
- There was no clear upward or downward trend in the viewing of videos during 2014 and 2015.

## Conclusions and Recommendations

**Program Implementation.** Frontier Scientists is providing a useful service in presenting Arctic science to the general public. Improvements in collaboration with stakeholders and enhanced promotion to audiences might help further the organization and its mission.

*Recommendation:* Nurture collaborator relationships to increase commitment and community.

**Scientist Workshops.** Scientist workshops were enjoyed and perceived as valuable by participants, and even improved some scientists' ability to communicate about their research to non-scientists using video. Frontier Scientists decided not to conduct additional workshops in the third year of this grant. However, depending on which audience segments are targeted for future endeavors, it may be worth reconsidering.

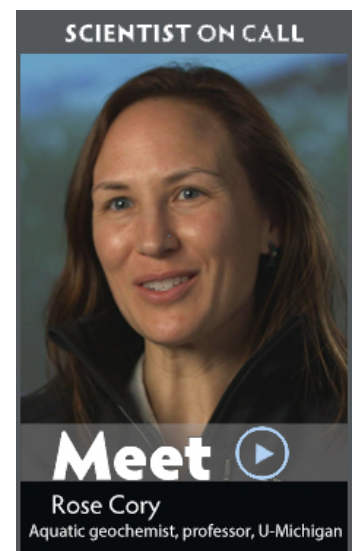
*Recommendation:* Consider finding a venue that would allow for longer and possibly more in-depth workshops.

**Video Viewers.** Viewers reported acquiring new and interesting information, but changes in attitudes were not widespread. This may represent the *entry-level* of environmentally significant behaviors, as defined by some conservation researchers<sup>2</sup>. There could be room to deepen attitude change, and to amplify this outcome to a wider audience with the addition of new strategies for promoting the videos.

*Recommendation:* Determine target audience(s) and focus content and outreach on those audiences.

**Website and Video Use.** Overall, in years one and two of the project, website usage and video viewing were relatively consistent over the time measured. If Frontier Scientists is interested in building its audience beyond its established base, additional outreach and promotional activities will be necessary.

*Recommendation:* Increase outreach and promotion (as above, with a sharp focus on the targeted audiences) and consider strategies such as refinement of the newsletter and developing the distribution list to match selected audiences.



<sup>2</sup> Stern, P. C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. *Journal of social issues*, 56(3), 407-424.

# Final Evaluation of Frontier Scientists, 2014 - 2016

*Prepared for Frontier Scientists*

*by PEER Associates, primary authors: Rachel Becker-Klein and Chris Hardee*

*September 2016*

## Introduction

Frontier Scientists is comprised of a website and portfolio of videos created for distribution web-wide and through television broadcast. The goal of this program is to excite the general public about ongoing science in Alaska and the Arctic. Frontier Scientists puts viewers “in the front row” to observe breaking scientific news from leading Arctic scientists in Archaeology, Geology, Anthropology, the Humanities, Biology, Marine Biology, Ecology, Chemistry, and more. Frontier Scientists has been created for travelers, teachers, students, aspiring scientists, and anyone interested in scientific discovery in one of the last great unexplored regions – the Alaskan Arctic.<sup>3</sup> In addition, Frontier Scientists staff led scientist workshops on creating videos to communicate Arctic research at the American Geophysical Union (AGU) conference in 2014 and 2015, and at the University of Alaska Fairbanks (UAF) in 2014.

This is the summary evaluation of a three-year National Science Foundation grant received by Frontier Scientists. Frontier Scientists contracted PEER Associates to conduct the evaluation for this grant. Over the course of the three years, the evaluation was focused on both formative (intended to inform and improve programming) and summative (what has the program accomplished thus far) efforts. Evaluation activities for the project included planning and prioritizing (Year 1), and data collection, analysis, and reporting for formative and summative purposes (Years 1, 2, 3).

*Program implementation* was one of the two primary foci of this evaluation. This focus involved an investigation of how the project was in fact implemented on the ground. It was also aimed at formative refinement of program implementation activities. Evaluation questions for this effort included:

1. What are the best practices and challenges of Frontier Scientists’ methods, which include producing new videos for the website, developing TV shows, and training scientists in video storytelling?
2. What are the contextual conditions that influence program implementation?

The second focus of the evaluation was targeting three *program outcomes* including: 1) the efficacy of scientist video-training workshops (Years 1 and 2); 2) video viewer changes in interest, awareness, knowledge, and attitudes about Alaska/Arctic science (Years 1, 2, and 3); and 3) website and video use (Years 1 and 2). Specific evaluation questions for this effort included:

1. To what extent did scientists who participated in workshops show changes in their ability to communicate about their research to non-scientists using video?
2. To what extent do viewers who watch Frontier Scientists videos change their knowledge and attitudes about the range of science being conducted in Alaska and the Arctic?
3. How much and how are the Frontier Scientists website and videos used?

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<sup>3</sup> Taken from [www.frontierscientists.com](http://www.frontierscientists.com)

## Methods

**Program Implementation (Year 3)** - To assess program implementation, we conducted seven interviews with collaborators by phone, with interviews averaging approximately 25 minutes and ranging in length from nine to 34 minutes. Questions focused on: 1) their relationship with Frontier Scientists; 2) the successes, challenges, and factors for success of their video; and 3) if they were scientists, whether and how the experience had impacted their work (see Appendix 1a). The individuals interviewed constituted a purposeful sample selected from a list of 21 collaborators provided by Frontier Scientists. The list included scientists as well as staff and administrators from partner organizations such as museums, government agencies, universities, and public television. The sample was selected to include a variety of roles and perspectives and to focus on individuals who had worked closely with Frontier Scientists in the video-making process.

**Scientist Video Workshops (Years 1 and 2)** - The evaluation of this program component focused on measuring the impact that the Frontier Scientists' video training workshops (at the American Geophysical Union [AGU] annual meeting) had on scientists' ability to communicate about their research to the general public, as well as assessing their satisfaction with the workshop. Tools for this evaluation activity included: 1) a survey of workshop participants (see Appendix 1b for survey); and 2) interviews of workshop participants (see Appendix 1c for interview guide). Table 1 below summarizes data collected at workshops.

**Table 1. Summary of Data Collected for Scientist Video Workshops**

Evaluation Year	# Surveys (N)	# Interviews (N)
Year 1	36	5
Year 2	15	5
Year 3	-	-
<b>TOTAL</b>	<b>51</b>	<b>10</b>

**Video Viewers (Years 1, 2 and 3)** - The focus of this evaluation activity focused on website viewers' interest, awareness, knowledge, and attitudes about the range of scientific research being conducted in Alaska and the Arctic. Several strategies were used to find viewers:

- In the first year of the evaluation, a survey was developed and made available on the Frontier Scientists' website; however, only 10 people filled out the surveys, so this strategy was abandoned.
- In the second year, evaluators worked closely with program staff to determine and prioritize potential groups of viewers. Evaluators then conducted focus groups with viewers who most closely matched the criteria from prioritized groups (e.g. potential tourists to Alaska, tourists who had previously visited Alaska, environmental studies teachers, and high school/graduate students). These focus groups were conducted either in-person or by phone, and lasted an average of 30 minutes, ranging from 2 to 60 minutes.
- In the third and final year, an evaluator visited Alaska and conducted focus groups with tourists (on a cruise ship and at various tourist locations around town) and with Alaskan residents who attended a live viewing of Frontier Scientists videos. This event included an accompanying Question and Answer session with three scientists featured in the videos. Interviews lasted an average of 5 minutes, ranging from 2 to 30 minutes (longer interviews occurred with Alaskan residents). Since interviews happened as most people were touring and pressed for time, they were fairly short.

Table 2 below summarizes focus groups/interviews conducted (see Appendix 2 for interview guide).

**Table 2. Summary of Number of Viewers who Participated in Focus Groups/Interviews**

	Tourists/Students/ Teachers	Frontier Scientists Live Event	Tourists at Visit Anchorage	Tourists on a Cruise Ship	Residents of Alaska
<b>Year 2</b>	23	-	-	-	-
<b>Year 3</b>	-	6	4	3	2
<b>TOTAL</b>	<b>23</b>	<b>6</b>	<b>4</b>	<b>3</b>	<b>2</b>

**Website Use (Years 1 and 2)** - This evaluation activity focused on the use of the Frontier Scientists’ website and the viewing of videos. Tools included: website Google Analytics (see Appendix 3 for sample report) and website YouTube Analytics. Data were collected during the first and second years of the evaluation. In the third year, it was determined that evaluation resources could be more effectively spent on other activities, such as conducting on-site interviews and focus groups in Alaska.



**Permafrost Thaw by 2060 in Alaska**

## Findings

### Program Implementation (Year 3)

All collaborators saw value in working with Frontier Scientists to create videos about their science.

"[The process] led us down a path to using video more. It certainly demystified the videography process.... Working with Frontier Scientists opened a door to a new format for us. It helped us understand the format, how it was done, and gave us a template for doing future work."  
- Frontier Scientists Collaborator

A number of collaborators reported that the work with Frontier Scientists helped to introduce them to video, taught them about the process, and stimulated them to use more video as a communication vehicle. They also were extremely positive about the actual end product that was the result of the collaboration, which one described as "done very well... a nice vehicle for communicating the depth and complexity of our science." Another collaborator summarized the usefulness of the videos in this way:

"Frontier Scientists has found a very clever or friendly way to take complex material that is dense and hard for the public to understand and package it in a way that people can digest. The videos weren't too long or too short. They were the right length. I think that Frontier Scientists is doing a good service for the general public in choosing this format to communicate science."

One scientist collaborator reported to evaluators that the video project had opened up new opportunities for their research, and several similar stories were collected by Frontier Scientists. This scientist said, "I've been contacted by people based on what they've seen covered by the [Frontier Scientists] program, and this led to some new opportunities for me in discussions about my research."

In another such example, the scientist was contacted by Public Radio's "Science Friday" and asked to be part of the program. In another instance, a national television organization approached a scientist and then aired a story about their work. Yet another collaborator characterized Frontier Scientists as a "very savvy promoter." This scientist added that it could be useful to promote the research through press releases, internet and TV coverage, many activities which were already part of the Frontier Scientists process. Other promotional tactics mentioned included writing papers and participation in conferences.

A number of collaborators commented on the importance and necessity of communicating their science to the general public and thought that Frontier Scientists was providing a helpful service in making their research interesting and understandable to a wider audience. One collaborator said, "One thing that I've struggled with is how to reach the general public with my science. That was what was attractive about the Frontier Scientists opportunity."

Several collaborators said that they felt that working with Frontier Scientists was a worthwhile investment of time, and that they found the process of making a video valuable and would do it again, as evidenced by this quote, "Based on my experience with Frontier Scientists, the way they work and the quality of their work, it's a great idea to continue collaboration."

Collaborators valued working with staff, but about half felt the full scope of collaboration was unclear.

“I felt very much like we were partners in the work and we had an important say in the way it was done...but we felt a little in the dark about the broader process”  
- Frontier Scientists Collaborator

Collaborators described their working relationship with Frontier Scientists in a variety of positive ways using words and phrases such as “very professional,” “the process worked smoothly,” “they’re a willing collaborator,” “they were a good partner,” and “very dedicated.” A number of the collaborators described the interviewing style used by Frontier Scientists as appropriate and effective for getting them to talk about their research in terms that were understandable. One collaborator reported that the sharing of resources and co-promotion of videos with Frontier Scientists was very positive and worked well.

However, some collaborators pointed out a number of factors in the video-making process that were not perceived as positive and that could be improved. The most common suggestion was that it would have been helpful to have a broader context for the project before beginning, despite the fact that Frontier Scientists communicated the scope and process in an introductory conversation. Another collaborator suggested that “an outline or abstract ahead of time to see how [Frontier Scientists] envisions the process” would have been helpful. A few collaborators also reported that they felt too much time pressure, and one person said that Frontier Scientists staff did not seem to “always understand that there were competing needs and demanding workloads” to factor in when creating the videos.

Another challenge for collaborators, was that the target audience(s) was not clearly articulated. There were several collaborators who would like to have known more about how the videos were going to be used and who the intended audience was. One collaborator summarized the sentiment by saying, “It would be good to know who the audience is...It would help us to know how much impact [the programs] could have.”

In addition, while all of the collaborators were eager and willing to participate in the video-making process and appreciated the value of short videos in the communication of their scientific research, a number of them were uncertain about the full scope of the collaborative process including general process, specific steps, outreach and promotion, and the overall timeline for the video-making project.

### **Scientist Video/Storytelling Workshops (Years 1 and 2)**

Scientist workshop participants reported high levels of satisfaction with the workshop.

“I think it’s good that the workshop is happening... The fact that so many people signed up for it shows that there is great interest and need.”

- Scientist Workshop Participant

Participants reported high levels of satisfaction with the workshop in their surveys, with higher levels reported in Year 2 than in Year 1 (see Tables 3 and 4 in Appendix 4 for comparison by years). For the AGU 2014 workshop, participants generally agreed that:

- Goals and objectives were clearly specified at the outset (mean=3.8 out of 4)
- Materials provided enhanced participant learning (mean=3.7 out of 4)
- New practices were effectively modeled (mean=3.6 out of 4)
- Sufficient time was provided for activities (mean=3.5 out of 4)
- Activities were well planned and organized (mean=3.5 out of 4)



In interviews, scientists had many positive things to say about the workshop and its specific components. One interviewee said, "I was really happy with the format of it, I walked away wanting more." Other participants agreed that the workshop should be offered regularly and that they would consider attending again at future conferences. Many also commented on the value of communicating science to the general public and of video communication training in general. Others mentioned their intentions to initiate or continue their participation in efforts to create videos. As one interviewee noted, "The more you practice, the better you are."

In open-ended survey comments, several participants said that they found workshop content useful and interesting. Some participants even requested that the workshop be longer or that additional workshops be offered. In fact, one workshop participant commented that, "If I had to give one big piece of advice, it would be to make the workshop all day."

#### Participants reported some improved skills and confidence, but did not leave entirely proficient.

"Scriptwriting, I feel pretty comfortable with. Maybe they could have talked more about editing software and given us a chance to play with it."

- Scientist Workshop Participant

In surveys, participants reported higher levels of confidence (that were statistically significant) in all skill areas after participating in the workshop. However, in Year 2 they still rated themselves only "moderately proficient"<sup>4</sup> for most skills, and only "fairly proficient" for editing software (see Tables 5 & 6 in Appendix 4):

- Write an engaging video story (mean=1.9 before, mean=2.7 after,  $F=7.9^{**5}$ )
- Use a camera to shoot a video (mean=1.9 before, mean=2.7 after,  $F=6.3^{**}$ )
- Use editing software to edit video (mean=1.7 before, mean=2.1 after,  $F=4.8^{**}$ )
- Effectively communicate with non-scientists (mean=2.9 before, mean=3.1 after,  $F=2.7^{**}$ )

In interviews, scientists felt that the storytelling and camera components of the workshop were effective. Many scientists stated that editing was not covered adequately or in enough detail. One participant commented that, "The camera work is where I felt most improvement and most confident," whereas another participant lamented, "We didn't really get into the editing." The younger scientists (graduate students) expressed satisfaction and confidence saying that they had learned a lot in the workshop and/or that it had reinforced things they already knew. Scientists who were more advanced in their careers were less positive, saying that there was not enough substance for them.

In open-ended survey comments, some participants mentioned that they had acquired new information about how to shoot video and create storylines. Other participants felt that they had been introduced to several relevant ideas, but that the workshop was not long enough to have increased their skills in those areas; some wrote that they had plans to pursue additional information related to those skill areas.

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<sup>4</sup> 1=Not very proficient yet; 2=Fairly proficient; 3=Moderately proficient; 4=Proficient

<sup>5</sup> F is a statistical measure of the difference in means,  $** = p < .01$  indicating a high level of probability that these means are indeed different from each other.

### Participants reported interest in and intentions to use what they learned, but perceived obstacles.

"In this day and age we're expected to be better communicators and do outreach activities. But we don't get rewarded for that and we don't get funding for that. We have to do it on our time and our dime."

- Scientist Workshop Participant

Workshop participants reported in surveys that they were fairly likely to use the skills they learned in the workshop (see Table 7 in Appendix 4):

1. American Geophysical Union 2013 workshop: mean=3.4 out of 4
2. University of Alaska at Fairbanks: 2014 workshop: mean=3.1 out of 4
3. American Geophysical Union 2014 workshop: mean=3.3 out of 4

In interviews, scientists expressed interest in learning how to create videos and how to use video to communicate their work. One scientist said, "I do have an interest [in using] video in my outreach." However, this same scientist further explained that, "I haven't had the opportunity yet, because I've mainly been writing [articles]." Other scientists echoed the sentiment that they did not necessarily have enough time or funding to create videos, as it was not their core job responsibility.

In open-ended survey comments, several participants wrote that they would like to continue to learn about how to create and edit scientific videos. Some participants mentioned that they would appreciate other opportunities to learn, practice, and apply the skills taught in the workshop.

### **Video Viewers (Years 1, 2, and 3)**

Most video viewers enjoyed watching the videos and many learned something new from them.

"I definitely learned some new things. I didn't really know anything about the ground squirrel. Interesting to learn that their blood goes below freezing but doesn't freeze - fascinating. Interesting that they wake up from hibernation a couple of months before they can even eat! They still have to survive. I loved learning about ground squirrels."

- Video Viewer, Alaskan Tourist

Focus group participants recruited in Alaska (both tourists and residents alike) enjoyed the videos they watched and felt that they acquired some new interesting pieces of information. For instance, one tourist in Alaska was amazed when watching a bird migration video and commented, "I never knew how they track the birds - cool!" Another visitor who had been to Alaska four times previously remarked that although there was not a lot of novel information, it did "refresh my memory" about some interesting facts. Several participants mentioned that they appreciated how the videos were not overly technical and could appeal to multiple audiences. One participant called them "palatable science."

Participants in the focus groups from 2015 were intrigued by information about the arctic ground squirrel, noting, for instance, that its body temperature went below freezing but the animal was still able to survive. One high school teacher exclaimed that even after having taught about the Arctic, "I saw and learned new things I never knew about the Arctic." All potential tourist and visitor focus group participants mentioned that learning about arctic ground squirrels was more interesting than polar bears. One visitor mentioned that they already knew a lot about the arctic bears and their plight, and that the novelty of the arctic ground squirrel information was intriguing.

Some participants felt that they would have learned more if there had been more context or clearer introductions to the videos. One graduate student did not understand what was being discussed in one of the videos, and mentioned that, "It wasn't until about three-quarters of the way through that it became apparent exactly what they were talking about." Other Alaska-based graduate students recognized the challenge of fitting a lot of information into a short video, but felt that the videos should focus more on the "purpose of the research and how it can impact everyday individuals."

Evidence was mixed about whether watching the videos contributed to changes in viewer attitudes.

"I was interested, but if [the video] had elaborated more, it would have increased my interest in general."  
- Video Viewer, Student

"I am pretty much a passionate Alaskan, and I find all of [the videos] really interesting, but I don't know if I am typical."  
- Video Viewer, Alaskan Tourist

"The videos were lovely to see, but it didn't really change how I felt."  
- Video Viewer, Alaskan Tourist

Approximately half of participants in focus groups conducted with tourists and residents in Alaska felt that watching the videos did not change their attitudes about Alaska or Arctic science, primarily because they already had very high levels of interest. The other half found themselves intrigued to learn more about the video content. One participant said that the videos were useful for, "prodding people into thinking more about Arctic science.... [The video] called it to people's attention."

For many high school and graduate student viewers, partial comprehension was an obstacle to increasing appreciation of the topic being covered. Teachers, however, who had more educational and science background, expressed both interest and engagement with the topics. When asked about whether the videos were interesting, one teacher said, "I would definitely say, 'Yes.' I was interested in finding out more about every one of those topics." However, most potential tourists to Alaska did not feel that watching these videos increased their interest in visiting Alaska or their connection to Alaska.

Most viewers expressed an interest in viewing more Frontier Scientists videos.

"I am not really inspired to do anything different, but I might watch more videos before going to new places."  
- Video Viewer, Alaskan Tourist

Across the focus groups, most viewers indicated interest in pursuing additional information about specific topics and content areas (e.g. arctic ground squirrels, volcanoes, polar bears, etc.). These viewers mentioned that they would be interested in watching more videos about these topics, or that they felt stimulated to look up more information online.

However, few viewers felt motivated enough by the videos to change their conservation behaviors. Many participants perceived themselves to be "pretty environmentally conscious" already. No viewer in any of the focus groups was interested in asking a question of the scientists or in commenting online.

## Website Use (Years 1 and 2)

Frontier Scientists website use was relatively consistent in 2014, and then lower overall in 2015.

In 2014, website *users* and *page views* metrics were fairly consistent except for a substantial dip in February (cause unknown) and a peak in September and October, followed by a return to the level of users and page views before the peak. From June until the end of the year, there was a general upward trend. Although the cause of this peak is unknown, it is noted that starting in September, more videos were on the website, and there were corresponding press releases at that time as well. (See tables and figures in Appendix 5a for more detail on Frontier Scientists' Google analytics.)

In 2015, website users and page views metrics trended upward in the first four months of the year (January-April) and then downward for the remainder of the year. Page views showed a spike in May but users did not. This spike could possibly be attributed to the start of broadcast on KAKM Science Wednesdays (May, June, July) and accompanying station promotion. Lower users and page views in June, July, August could be a seasonal artifact, although the YouTube metrics did not reflect this same trend. Web metrics were not available for September while the site was being redesigned. Overall total users and page views were lower than the preceding year.

In 2014, website *pages per session*, *average session duration*, and *bounce rate* metrics were relatively consistent over the year. Since the primary activity of website users is video watching, YouTube metrics are likely to be a better measure of time spent interacting with website content. Once viewers clicked on a video, they were sent to the Frontier Scientists' YouTube page and their user/viewing behavior was, therefore, not recorded in the available Google metrics.

In 2015, pages per session, bounce rate, and average session duration, were also consistent through the year, except for increases in May. Average session duration dipped in March and April before the May spike.

There was no clear upward or downward trend in the viewing of videos during 2014 and 2015.

In 2014, YouTube video *views* and *minutes watched* metrics were higher from January to April, lower from May through August, and then gradually trended upwards starting in September (see Appendix 5b for YouTube analytics). In 2015, video views and minutes watched trended downward from January through May, and then flattened out or increased slightly from June through August with July and August showing more activity than September and with a dramatic spike in views in August.

In project years 1 and 2, YouTube *average view duration* for videos ranged from 2.0 to 2.6 minutes and *average percent viewed* ranged from 40-52 percent. In 2014, these metrics were low in January and then increased and remained relatively consistent throughout the year. In 2015, they were relatively consistent over the year and similar to metrics in the previous year.

Website and YouTube metrics were not tracked by the evaluators in 2016 (year 3) so that more resources could be devoted to other evaluation activities.

## What Does It Mean?

**Program Implementation** - Frontier Scientists is providing a useful service, and improvements might help further the organization and its mission. The primary activity of Frontier Scientists, and the most effective practice, has been the actual production of the videos. Current collaborators cited many positives about this process, and enjoyed their involvement with Frontier Scientists. Challenges related primarily to developing stronger partnerships and building a community of collaborators. Each collaborator in the video-making process is a potential future collaborator, and even a potential promoter of Frontier Scientists and its mission. Word of mouth is a powerful force, and the scientific community within the state is relatively small and likely well-connected. An important contextual condition to consider is the intended audience of Frontier Scientists, as collaborators suggested that different storytelling and outreach tactics may be more effective for different audiences.

**Scientists Workshops.** Scientist workshops were enjoyed and perceived as valuable by participants, and even improved some scientists' ability to communicate about their research to non-scientists using video. Although participants found the workshops to be useful and some were even interested in participating in additional workshops, Frontier Scientists determined that workshops were no longer viable. However, depending on which audience segments are targeted for future endeavors, that decision may be worth reconsidering.

**Video Viewers.** Focus group participants reported absorbing new and interesting information about animals in the Arctic (e.g. arctic squirrel, polar bears). Changes in attitudes about the range of science being conducted in Alaska and the Arctic were not widespread. A few participants did describe an increased appreciation of the importance of arctic science and the efforts of scientists working in the Arctic, and most were willing to watch more Frontier Scientists videos. This may represent the *entry-level* of environmentally significant behaviors, as defined by some conservation researchers<sup>6</sup>. There could be room to deepen attitude change, and to amplify this outcome to a wider audience with the addition of new strategies for promoting the videos or telling the story within the video.

**Website and Video Use.** Overall, website usage and video viewing did not show significant increases over the course of the first two years of the project (2014 and 2015) when it was tracked.



<sup>6</sup> Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *The Journal of environmental education*, 18(2), 1-8.; Stern, P. C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. *Journal of social issues*, 56(3), 407-424.

## Recommendations

1. **Program Implementation** - *Nurture collaborator relationships to increase commitment and community.*
  - a. Increase communication at all stages of the process, including maintaining contact with collaborators over time. Communication could focus on the big picture goals of Frontier Scientists, as well as uses for videos. Potential strategies for this include: 1) occasional but regular personalized contact; and 2) an annual public event that recognizes and promotes their work.
  - b. Provide a clear road map of the video-making process so that collaborators know what to expect. A short guide (two pages perhaps) could be used to provide details about the interviewing, shooting, and editing components of the video-making process. Such a guide could also provide some summary information about outreach and potential co-promotion, and about audiences on both the web and Public Television.
  
2. **Scientists Workshops** - *Consider a venue for a longer and possibly more in-depth workshop.*
  - a. Consider providing more time for teaching and applying skills so that scientists may be able to go further in their skill development.
  - b. Provide follow-up support for scientists in creating videos about their research. Implementation and professional development research indicates that in order for participants to fully integrate new skills, they need additional support once they've returned to their workplace.
  
3. **Video Viewers** - *Determine target audiences and focus content on those audiences.*
  - a. Frontier Scientists may want to reexamine prioritization of potential audiences for the videos, including (but not limited to): 1) Potential scientists; 2) General public, Alaskan residents; 3) General public, tourists; 4) High school/college students; 5) High-school/college teachers/faculty.
  - b. Once the audiences have been prioritized, staff can then work with collaborators to brainstorm what outcomes they hope for, and how best to achieve those outcomes. For instance, if high school students were a focus, then it may make sense to team up with an organization that could create curricula based on the videos.
  
4. **Website and Video Use** - *Increase distribution of the newsletter and consider other promotional activities.*
  - a. Since the Frontier Scientists' audience is not growing, as indicated by static website metrics in the first two project years, new tactics for promotion of videos should be explored and tested. One suggestion is to reexamine the formatting of the newsletter to determine if the use of subheadings, graphic highlights, more images, and other techniques, which clearly delineate and emphasize each new video, might help increase click-throughs and website users and video views.
  - b. Continue to develop relationships with visitor centers, museums, and tourist bureaus in Alaska in an attempt to find more high-visibility venues for Frontier Scientists.

# Appendix 1a - Collaborator Interview Guide

## Frontier Scientists Collaborators Interview Guide PEER Associates

### Intro:

- *I am an external evaluator with PEER working with Frontier Scientists as part of their NSF grant.*
- *Main purpose of interview: provide an opportunity for critical feedback about Frontier Scientists.*
- *Participation is voluntary. Please be as open and honest as possible.*
- *Everything you say is confidential (only eval team will see raw data).*
- *Request permission to record, take notes. Questions or concerns?*

### Questions

1. **Relationship:** Tell me about your relationship and involvement with Frontier Scientists (video, website, dissemination, TV broadcast, etc.).
2. **Successes:** In what ways has your collaboration with Frontier Scientists been successful, and why?
3. **Challenges:** Please describe any challenges you have noticed in you or your organization's collaboration with Frontier Scientists?
4. **Increasing Success:** What could make Frontier Scientists more successful? What factors might inhibit the success of Frontier Scientists?
5. **For Scientists:**
  - a. Did making a video with FS in any way change how you communicate about science?
  - b. How has collaborating with FS impacted your work in other ways?
  - c. Describe any feedback you have received about the videos you collaborated on.
6. **Anything Else:** Is there anything else you would like to tell me about Frontier Scientists?

***Thank you for your time!***

# Appendix 1b: Scientists Workshop Survey

## Frontier Scientists - Scientists Workshop Survey

### Demographics

Please take a few minutes to answer a BRIEF set of questions about the process and content of the Frontier Scientists video workshop you participated in. Workshops like this will be held again, so your feedback will help us think about any changes we may want to make. Your responses are confidential, so please be candid. Thanks!

#### \* 1. Some information about you:

Name:

Email Address:

#### \* 2. Which video workshop did you take?

- AGU - San Francisco, December 2013
- University of Alaska Fairbanks, Fairbanks, AK, May 2014
- AGU - San Francisco, December 2014

Other (please specify)

#### \* 3. What type of work do you do?

- Practicing scientist
- Scientist in an administrative position
- Post-doc scientist
- Graduate student scientist
- Communications/marketing
- Other (please specify)



# Frontier Scientists - Scientists Workshop Survey

## Workshop Content

### 4. Rate your agreement with the following statements about the workshop.

	Strongly Disagree	Tend to Disagree	Tend to Agree	Strongly Agree	Don't know or N/A
The activities were well planned and organized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Goals and objectives were clearly specified at the outset.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New practices were effectively modeled and well explained.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The materials provided enhanced my learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sufficient time was provided for the activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### \*5. Rate your ability to write an engaging video story about your scientific research (or the research of scientists you work with):

	Not very proficient yet	Fairly proficient	Moderately proficient	Proficient	N/A or not sure
BEFORE taking this workshop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AFTER taking this workshop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### \*6. Rate your ability to use a camera to shoot a video about your scientific research (or the research of scientists you work with):

	Not very proficient yet	Fairly proficient	Moderately proficient	Proficient	N/A or not sure
BEFORE taking this workshop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AFTER taking this workshop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### \*7. Rate your ability to use editing software to edit a video about your scientific research (or the research of scientists you work with):

	Not very proficient yet	Fairly proficient	Moderately proficient	Proficient	N/A or not sure
BEFORE taking this workshop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AFTER taking this workshop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### \*8. Rate your ability to effectively communicate with non-scientists about your scientific research (or the research of scientists you work with):

	Not very proficient yet	Fairly proficient	Moderately proficient	Proficient	N/A or not sure
BEFORE taking this workshop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AFTER taking this workshop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

# Frontier Scientists - Scientists Workshop Survey

## Tell Us More

**\*9. How likely are you to use what you learned in the workshop in your professional life?**

- Not at all likely     Fairly likely     Moderately likely     Very Likely     N/A or Not Sure

Can you be more specific about what you would use and how?

**\*10. Would you be interested in working with Frontier Scientists to complete a video using your field footage (or another scientist's footage and/or draft video edit) for possible inclusion on the Frontier Scientists website?**

- Yes  
 No  
 Maybe

**11. What new knowledge, skills, inspirations, or motivations did you get from this workshop?**

**12. Which workshop experiences were particularly valuable or effective for you, and **WHY?****

**13. Which workshop experiences were most challenging or least effective for you, and **WHY?****

## Frontier Scientists - Scientists Workshop Survey

**14. Please add any additional thoughts about your survey responses or the Frontier Scientists workshop and program.**

**Thank you for your feedback!**

# Appendix 1c: Scientists Workshop Interview Guide

## Frontier Scientists - Scientist Interview Guide Summer/Fall 2014 prepared by PEER Associates

### Intro:

- I am with PEER Associates, an external evaluation firm hired to evaluate the Frontier Scientists program.
  - We would like to ask you some questions to get your perspective on the video workshops and the impact they have had on you, as well as how to improve them.
  - Request permission to record.
  - Questions? Concerns? (e.g. voluntary, confidential, purpose, use)
1. In what ways has the Frontier Scientists workshop **challenged or reinforced your approach to communicating science** to non-scientists? *(Additional prompt(s): Are you taking home any new ideas about storytelling and communicating visually?)*
  2. How **comfortable and confident** do you feel about using the skills and methods you learned in the Frontier Scientists workshop? *(Additional prompt(s): How about scriptwriting, shooting videos, editing videos, etc.?)*
  3. Which components of the Frontier Scientists workshop were **most effective or valuable** to you? *(Additional prompt: Describe any "aha" moments you had during the workshop.)*
  4. In what ways, if at all, do you **think you might use** the video production and communication skills you learned in the workshop? *(Additional prompt(s): If you won't use, please explain your reasons.)*
  5. How much and what kind of additional **training or support** could the Frontier Scientists program offer that would help you more successfully communicate your research? *(Additional prompt(s): What would be the best forum/venue for that training? What is the one topic you'd especially like to know more about?)*
  6. If you were in charge of redesigning the Frontier Scientists workshop for next year, what **changes** would you make?
  7. Is there anything else you would like to tell me?

# THANK YOU!

## Appendix 2: Video Viewer Focus Group/Interview Guide

### Frontier Scientists - Video Viewer Interview Guide prepared by PEER Associates

#### Intro:

- I am with PEER Associates, an external evaluation firm hired to evaluate the Frontier Scientists program.
- We would like to ask you some questions about the Frontier Scientists web video(s) that you watched.
- Request permission to record.
- Questions? Concerns? (e.g. voluntary, confidential, purpose, use)

1. **What program:** What web video(s) have you watched? (reference web video list, [website video page](#), or [YouTube page](#)) *(Additional prompt(s): How many videos have you watched? Have you watched any of the Frontier Scientists TV programs on KTOO? How did you hear about Frontier Scientists?)*
2. **Outcomes - Learning:** What were the most important things you learned about Alaska and Arctic science from watching the web video(s)? *(Additional prompt(s): Methods? Tools and technology? Computer modeling? Why do you think it's important to have an understanding of Arctic science?)*
3. **Outcomes - Attitudes:** How has the video(s) changed your appreciation and interest in the Arctic and Arctic science, if at all? *(Additional prompt(s): After watching, what is your connection to the Arctic and Arctic science?)*
4. **Director-for-a-Day:** Think about one or two videos that you've watched. If you were the director, what would you change about it/them? *(Additional prompt(s):*
  - a. *Program interest - What about the video was interesting or uninteresting and why?*
  - b. *Program length - How did you find the length of the web video in terms of communicating the topic and holding your interest - too long/short/just right?*
  - c. *Role of Scientist - In what ways did you find the scientist(s) in the video engaging or uninteresting? Which type of bio would you be more likely to watch: written or video?)*
5. **Engagement/Action:** What would motivate you to take action to find out more info about AK/the arctic, such as: asking a question of the featured scientist online, commenting about the program online, or doing additional research on the topic of interest? *(Additional prompt(s): Do you comment online about any other topics?)*
6. **Last thoughts:** Is there anything else you would like to tell me?

**THANK YOU!**

# Appendix 3: Website Google Analytics Sample Report



## FS custom dashboard

May 1, 2014 - May 31, 2014

All Sessions  
100.00%

+ Add Segment

### Pageviews and Unique Pageviews by Page path level 1

Page path level 1	Pageviews	Unique Pageviews
/2013/	957	834
/tag/	928	781
/2014/	666	592
/	364	298
/projects/	296	238
/scientists/	203	163
/2012/	128	116
/2011/	68	58
/videos/	59	52
/about/	58	47

### Users

**2,303**  
% of Total: 100.00% (2,303)



### Sessions by Browser

Browser	Sessions
Chrome	931
Safari	601
Internet Explorer	516
Firefox	466
Android Browser	64
Safari (in-app)	46

### Pages / Session

**1.47**  
Site Avg: 1.47 (0.60%)



### Pageviews

**3,952**  
% of Total: 100.00% (3,952)



### Bounce Rate

**77.71%**  
Site Avg: 77.71% (0.60%)



### New Users

**2,205**  
% of Total: 100.00% (2,205)



### Bounce Rate

**77.71%**  
Site Avg: 77.71% (0.60%)



### Avg. Session Duration

**00:01:05**  
Site Avg: 00:01:05 (0.00%)



### Sessions and % New Sessions by User Type

User Type	Sessions	% New Sessions
New Visitor	2,206	100.00%
Returning Visitor	486	0.00%

## Appendix 4: Scientist Workshop Analysis

**Table 3. Rate your agreement with the following statements about the workshop:**

Question	AGU 13 (n=21)	UAF 14 (n=15)	AGU 14 (n=15)	Difference (F-test)
Activities well planned and organized	3.3	3.3	3.5	0.4
New practices effectively modeled	3.0	2.9	3.6	1.4
Goals/objectives clearly specified at outset	3.2	3.1	3.8	4.7*
Materials provided enhanced learning	2.7	2.6	3.7	3.7*
Sufficient time provided for activities	2.6	2.6	3.1	1.4

F-test = Measure of difference in means, <sup>†</sup> =  $p < .10$ , \* =  $p < .05$

1=Strongly Disagree; 2=Tend to Disagree; 3=Tend to Agree; 4=Strongly Agree

**Table 4. Rate your ability to do the following:**

Question	AGU 13 (n=21)	UAF 14 (n=15)	AGU 14 (n=15)	Difference in means (F- test)
Write an engaging video story BEFORE	2.0	1.8	1.9	0.2
Write an engaging video story AFTER	2.8	2.7	2.7	0.1
Use a camera to shoot a video BEFORE	2.1	1.9	1.7	0.8
Use a camera to shoot a video AFTER	2.6	2.9	2.6	0.7
Use editing software to edit video BEFORE	2.1	1.5	1.3	2.9 <sup>†</sup>
Use editing software to edit video AFTER	2.3	2.1	1.6	1.9
Effectively communicate with non-scientists BEFORE	3.2	2.9	2.5	1.9
Effectively communicate with non-scientists AFTER	3.3	3.1	2.9	0.7

F-test = Measure of difference in means; <sup>†</sup> =  $p < .10$ , \* =  $p < .05$

1=Not very proficient yet; 2=Fairly proficient; 3=Moderately proficient; 4=Proficient

**Rate your ability to do the following:**

**Table 5. For all respondents, all workshops (n=51)**

Question	Before	After	Difference in means (t-test)
Write an engaging video story	1.9	2.7	7.9**
Use a camera to shoot a video	1.9	2.7	6.3**
Use editing software to edit video	1.7	2.1	4.8**
Effectively communicate with non-scientists	2.9	3.1	2.7*

t-test = Measure of difference in means, \*  $p < .05$ ; \*\* =  $p < .01$

1=Not very proficient yet; 2=Fairly proficient; 3=Moderately proficient; 4=Proficient

**Table 6. For AGU 14 Scientist Workshop (n=15)**

Question	Before	After	Difference in means (t-test)
Write an engaging video story	1.9	2.7	4.0**
Use a camera to shoot a video	1.7	2.6	3.8**
Use editing software to edit video	1.3	1.6	2.3*
Effectively communicate with non-scientists	2.5	2.9	2.6*

t-test = Measure of difference in means, \*  $p < .05$ ; \*\* =  $p < .01$

1=Not very proficient yet; 2=Fairly proficient; 3=Moderately proficient; 4=Proficient

**Table 7. How likely are you to use what you learned in the workshop in your professional life:**

Question	AGU 13 (n=21)	UAF 14 (n=15)	AGU 14 (n=15)	Difference in means (F-test)
How likely are you to use what you learned in the workshop in your professional life?	3.4	3.1	3.3	0.3

F-test = Measure of difference in means

1=Not very likely yet; 2=Fairly likely; 3=Moderately likely; 4=Likely



## Appendix 5a: Website Google Analytics

**Table 8. Frontier Scientists Website Google Analytics for 2014**

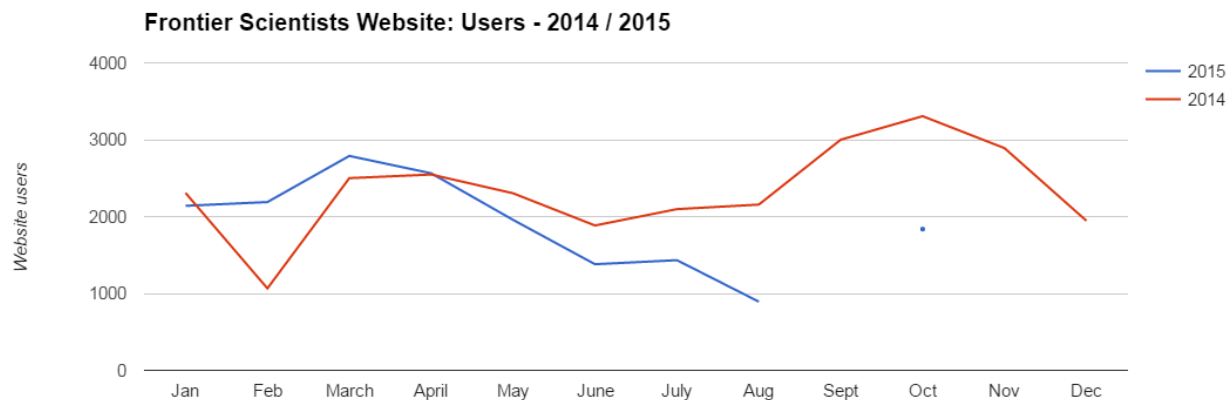
Google Analytics	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Users	2308	1066	2500	2547	2303	1884	2097	2156	3000	3306	2890	1945
Page Views	4345	2036	4428	4784	3952	3273	3778	3533	5134	6294	4807	3143
Pages/Session	1.65	1.68	1.5	1.57	1.47	1.46	1.61	1.51	1.54	1.68	1.48	1.65
Bounce Rate	80%	74%	79%	78%	78%	72%	79%	82%	80%	77%	79%	84%
Avg Session Duration (min)	1.11	1.2	1.17	1.26	1.05	1.09	1.09	1	1.04	1.22	1.04	0.46

**Table 9. Frontier Scientists Website Google Analytics for 2015**

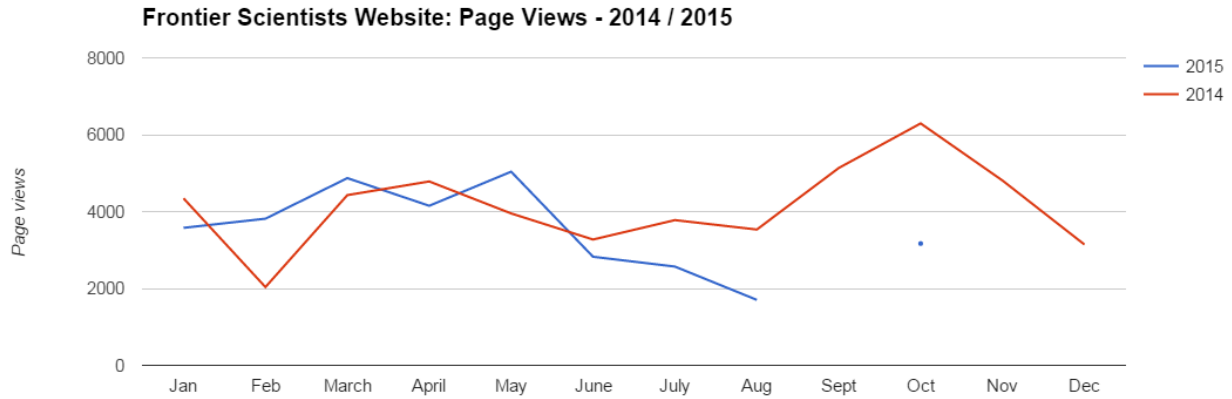
Google Analytics	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Users	2140	2189	2789	2563	1957	1380	1433	893	NA	1837	1993	1425
Page Views	3577	3815	4871	4151	5038	2825	2569	1703	NA	3169	2929	2885
Pages/Session	1.49	1.55	1.55	1.45	2.27	1.76	1.59	1.66	NA	1.54	1.36	1.8
Bounce Rate	80%	80%	82%	84%	77%	79%	79%	77%	NA	82%	88%	75%
Avg Session Duration (min)	1.09	1.12	0.58	0.52	1.53	1.4	1.14	1.08	NA	1.01	0.45	1.36

**NOTE:** September analytics report was not available because site was undergoing a redesign.

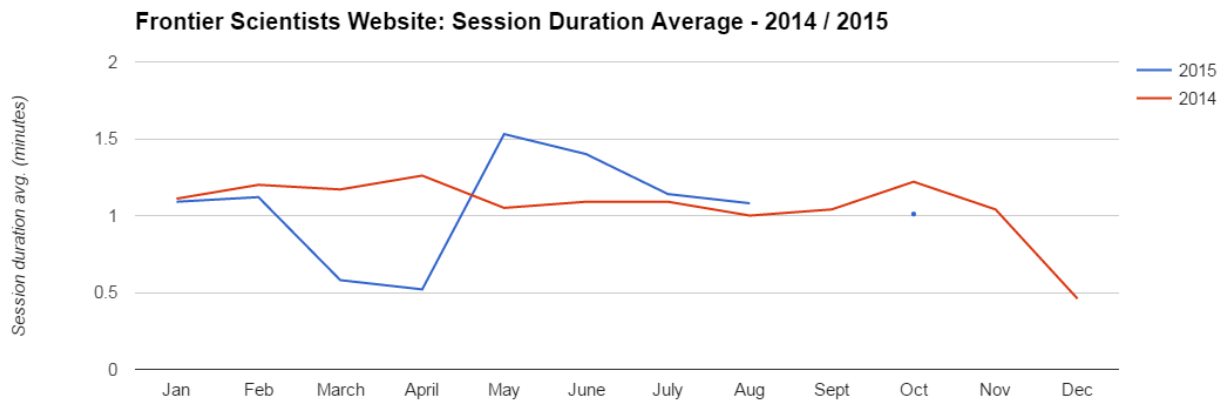
**Figure 1. Frontier Scientists Website: Users - 2014 / 2015**



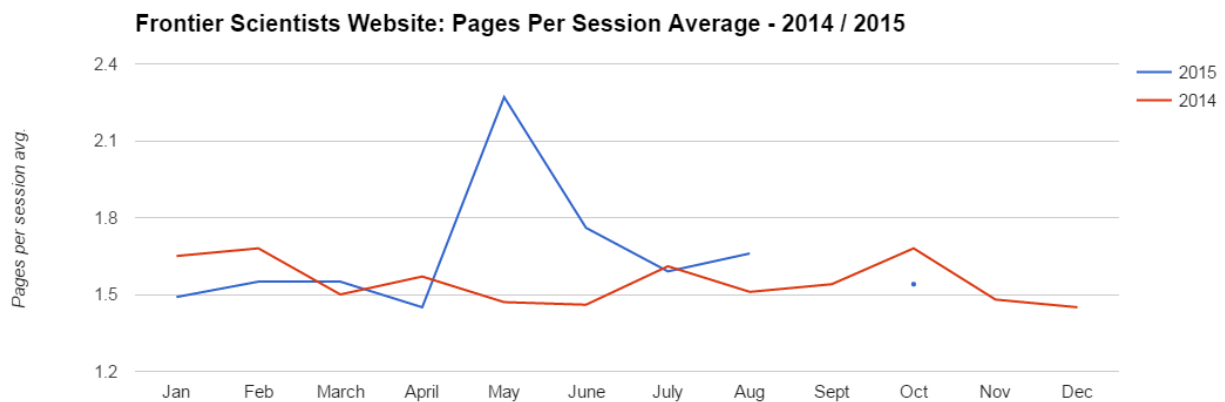
**Figure 2. Frontier Scientists Website: PageViews - 2014 / 2015**



**Figure 3. Frontier Scientists Website: Session Duration Average - 2014 / 2015**



**Figure 4. Frontier Scientists Website: Pages Per Session Average - 2014 / 2015**



## Appendix 5b: Website YouTube Analytics

**Table 10. YouTube Analytics for Frontier Scientists Videos for 2014**

YouTube Metrics	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Videos listed	87	82	87	99	93	109	112	109	127	134	144	130
Video Length (min)	530	516	514	584	505	586	615	623	689	766	793	789
Views	2,828	2,687	2,571	3,008	1,874	2,065	1,959	1,717	2,216	2,529	2,722	2453
Est. Min. Watched	7,307	8,034	9,419	7,205	4,888	5,070	4,692	4,074	5,391	7,140	7,419	5967
Avg View Duration (min)	1.15	2.25	2.5	2.5	2.4	2.33	2.16	2.24	2.22	2.56	2.5	2.4
Avg Percentage Viewed	31%	40%	45%	43%	50%	49%	45%	43%	50%	52%	54%	49%

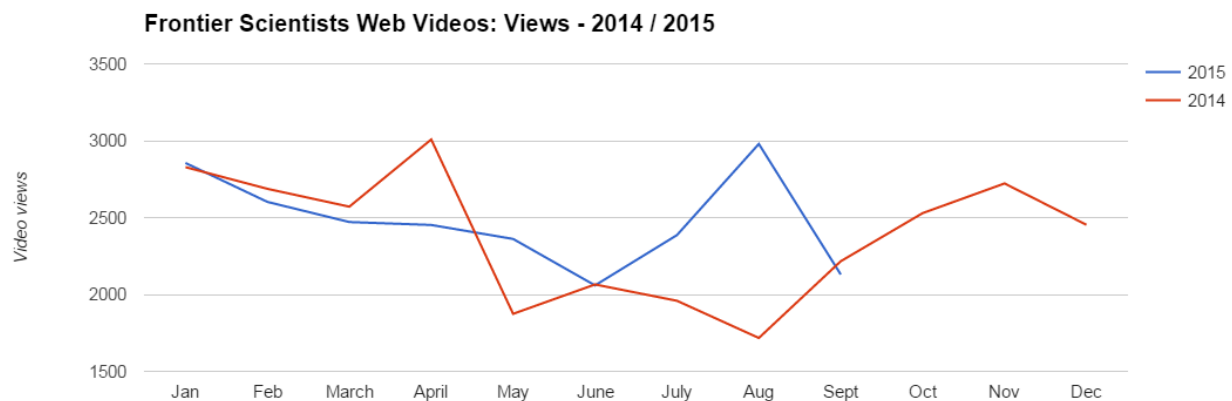
**NOTE:** Avg. View Duration and Avg. Percentage Viewed are complementary metrics, the former indicating how many minutes were watched, and the latter showing the average percentage of a video that was viewed; 30% is the YouTube national benchmark for Avg. Percentage viewed.

**Table 11. YouTube Analytics for Frontier Scientists Videos for 2015**

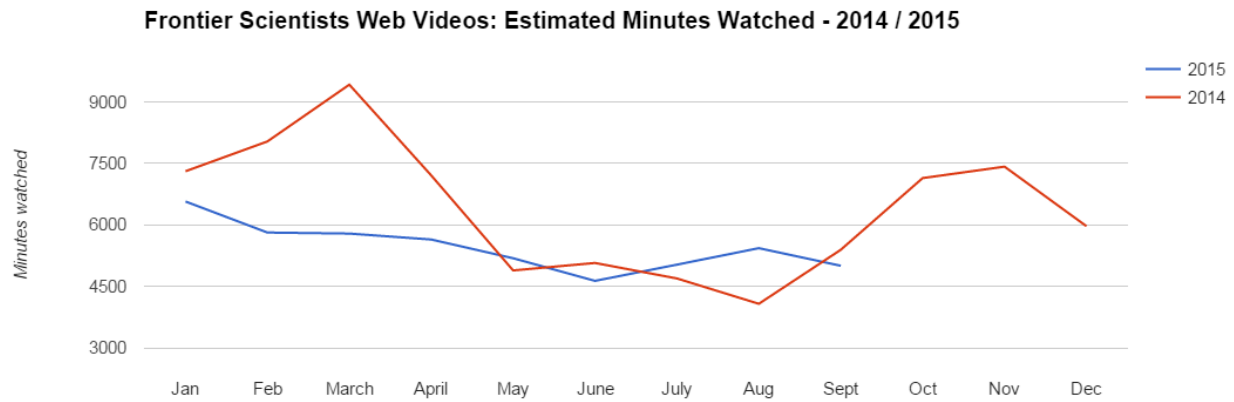
YouTube Metrics	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Videos listed	119	127	121	133	118	136	118	132	130	NA	NA	NA
Video Length (min)	689	696	703	787	677	686	646	681	670	NA	NA	NA
Views	2855	2602	2,471	2,452	2,361	2,059	2,386	2,979	2,130	NA	NA	NA
Est. Min. Watched	6569	5812	5,787	5,642	5,185	4,633	5,029	5,431	5,002	NA	NA	NA
Avg View Duration (min)	2.2	2.2	2.6	2.5	2.2	2.1	2.3	2.0	2.3	NA	NA	NA
Avg Percentage Viewed	46.9	45.8	51.9	49.7	44.3	51.1	47.8	48.0	50.0	NA	NA	NA

**NOTE:** Avg. View Duration and Avg. Percentage Viewed are complementary metrics, the former indicating how many minutes were watched, and the latter showing the average percentage of a video that was viewed; 30% is the YouTube national benchmark for Avg. Percentage viewed.

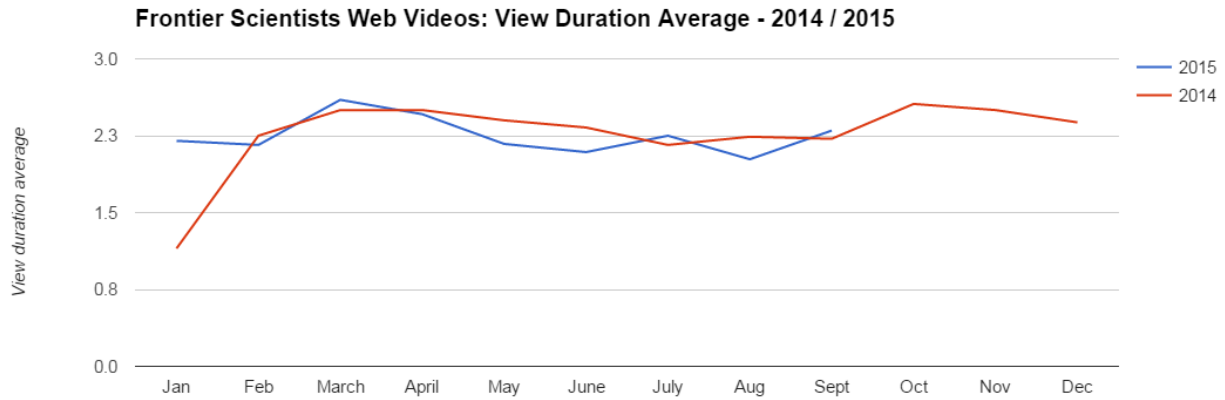
**Figure 5. Frontier Scientists Web Videos: Views - 2014 / 2015**



**Figure 6. Frontier Scientists Web Videos: Estimated Minutes Watched - 2014 / 2105**



**Figure 7. Frontier Scientists Web Videos: View Duration Average - 2014 / 2015**



**Figure 8. Frontier Scientists Web Videos: Percentage Viewed Average - 2014 / 2015**

