

## CAN 90 SECONDS OF SCIENCE MAKE A DIFFERENCE?

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*Earth & Sky* is a short-format science radio series airing daily on more than 1,000 commercial and public radio stations in the U.S. as well as on satellite and Internet radio outlets. The series is also widely heard beyond U.S. borders. Produced by a small non-profit, Earth & Sky, Inc. of Austin, TX, the series is hosted by Deborah Byrd and Joel Block and consists of 90-second programs on a wide variety of topics mostly drawn from environmental sciences, earth sciences and astronomy but also including emerging technologies like nanotechnology. Recently, with support from the National Science Foundation,<sup>1</sup> Multimedia Research completed a summative evaluation on the impact of *Earth & Sky* on public radio listeners.

*Earth & Sky*'s goals are to make science accessible and interesting and to increase science literacy by providing daily doses of science to listeners with a range of science backgrounds, knowledge and interest. Subsequent to listening to *Earth & Sky*, the producers hope listeners may be motivated to turn to other sources of science information such as the Internet, books, museums, and television programs to learn more about covered topics.

The evaluation focuses on what demographic or background characteristics relate to whether or not one listens to *Earth & Sky* and to frequency of listening; what effects the series has on listeners and what kind of actions the series has prompted in listeners. Questionnaires were mailed to random names drawn from member subscriber lists of public radio stations serving the areas surrounding Missoula, MT, Columbia, MO, and Boston, MA.<sup>2</sup> Of the 2964 questionnaires that adult public radio members received, 2005 or 68% were returned for analysis. Given that 2.1 million listeners contribute to public radio according to CPB revenue report data and that there are about 21 million listeners according to Arbitron estimates, our contributor lists represent about 10% of the listening audience. Thus, we can generalize our results to all subscribers and to about 10% of the total public radio audience.

### **Almost 9 out of 10 public radio member respondents report listening to *Earth & Sky*.**

Since the show is only 90-seconds in length, listeners are not choosing to tune in but hear the show as an integral part of other programming. Our respondent sample is typical of a public radio member audience – more educated, better employed, older, with fewer minorities compared to the general U.S. adult population. Listeners of *Earth & Sky* are significantly younger and better educated than non-listeners. Listeners of *Earth & Sky* rate themselves as significantly more interested in science generally and significantly more knowledgeable about science than non-listeners. These differences have also been found for our studies of the NSF-sponsored public

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radio show *Talk of the Nation: Science Friday*.<sup>3</sup>

**Primary sources of science news are “magazines/journals” and “radio.”**

Choosing from a list of primary sources of science news, one-third (33%) of public radio members chose “magazines/journals” (see table), followed by “radio,” “newspaper,” “television,” “Internet” and “books.” As a comparison, in the 2001 NSF Science & Engineering Indicators survey, the general public was asked in an open-ended question where they get most of their information about science and technology. The general adult public mentioned television most frequently and radio least frequently (see table). Radio is clearly a more important source of science information for those who are committed listeners of public radio as compared with the general public.

	What is your primary source of science news? (N = 2005 public radio members)	Where do you get most of your information about science and technology? (N = 1574 general public) <sup>4</sup>
Magazines/journals	33%	16%
Radio	18%	3%
Newspaper	17%	16%
Television	12%	44%
Internet	8%	9%

Additionally, listeners of *Earth & Sky* chose “radio” as a primary source of science news significantly more frequently than non-listeners; whereas non-listeners chose “television” significantly more often than listeners as their primary source. If we had the wherewithal to delve deeper into media habits of this sample, it is likely that we would find that “listeners” are tuning into radio for their general news thereby hearing the 90-seconds of *Earth & Sky*, and “non-listeners” are tuning into television news programs thereby missing the brief radio series.

Listeners differ with respect to science attitudes in a few ways also. Listeners of *Earth & Sky* agree significantly more than non-listeners that they like learning how contemporary scientists carry out their research, that it is important to understand the process of science discovery, and that science can be understood and enjoyed on some level by everyone.

**Appeal and program engagement are high among listeners.**

Nine out of ten listeners enjoy listening to the series and like hearing scientists talk about their own work on the show. Eight out of ten listeners agree that they listen attentively to the show. More frequent listeners enjoy the series more, listen more attentively and like hearing from scientists more than less frequent listeners.

**The presentation of science is very understandable.**

Nine out of ten listeners feel that the information on *Earth & Sky* is not too technical and that the process of science is clear when discussed on the show. The series information is rated as “usually familiar” by less than a third of the listening audience, novel to more than a third, and

<sup>3</sup> Flagg, B. N. (2000). Impact of *Science Friday* on public radio member listeners. *The Informal Learning Review*. September/October issue.

<sup>4</sup> National Science Foundation (2002). *NSF survey of public attitudes toward and understanding of science and technology*. Appendix table 7-43: Leading source of information about science and technology. Retrieved December 14, 2005, from [http://www.nsf.gov/statistics/seind02/pdf\\_v2.htm#c7](http://www.nsf.gov/statistics/seind02/pdf_v2.htm#c7)

sometimes familiar and sometimes novel to the remaining third of listeners. Thus, the information on *Earth & Sky* is correctly targeted at an appropriate level to reach the mass adult radio audience effectively. However, those who listed television as a primary or secondary source of information are more likely to feel less comfortable with the show's technical level, perhaps missing the visual support of television.

### **Listeners feel they learn from the series.**

Nine out of ten listeners agree that the series teaches interesting discoveries about the natural world, and more than eight out of ten feel they have expanded their knowledge of science and increased their awareness of science news topics. Two-thirds of listeners agree that the series has affected the way they look at the night sky and that the series keeps them up to date with current environmental science.

### **Nine out of ten listeners wrote about a positive personal impact of *Earth & Sky*.**

An open-ended question regarding how respondents feel *Earth & Sky* has personally affected them elicited answers from 84% of the sample and yielded three major categories of impact. Almost half of listeners report a positive affective impact -- listeners find the show interesting, enjoyable, and think it increases their appreciation of the natural world. Two-fifths of listeners describe a positive cognitive impact-- listeners say they learn from the series, that it increases their knowledge or understanding of the natural world and that they learn information to which they would not normally be exposed. Additionally, 14% of listeners spontaneously reported that they took some action after listening to the series, mainly looking for celestial events or discussing topics with others.

The following quotes illustrate the range of responses that were coded for the above open-ended question about personal impact:

- I usually stop what I'm doing to listen; love the series; very clear explanation, understandable but not demeaning. keeps me connected to science learning.
- Love it! Calls my attention to natural events, which I enjoy. Provides tidbits of info--raises curiosity.
- I find the series very interesting. I enjoy when they answer listeners' questions. I often learn new things from listening to the show
- Over the years the program has increased my awareness of scientific issues. Made me believe I could approach and understand them despite my lack of background or former training.
- Even though I consider myself knowledgeable about science I'm often surprised by what's being talked about on the show. Very often it's prompted me and my family to go out and observe some phenomena or become the topic at the dinner table.
- I used information in my class, used scripts [from website] to teach literacy to children, bought a telescope. My children and I usually hear it together and talk about it. It has a positive impact on sharing ideas and information as a family.
- Provides interesting facts for discussing with friends!
- Sometimes it simply informs me better. Other times it stimulates me to look for more info in books, magazines, online, etc.
- Makes me aware of what's going on and when I see it in magazines/the paper, I realize I've heard about it before. I feel it gives me a short blast of info on scientific topics I generally don't read or hear that much about.
- The series has given me numerous "ah-ha" moments. I like the short format that doesn't overwhelm me ( a nonscientist) with too much info too absorb at once.
- It's raised my consciousness on environmental concerns.
- It helps me to know what areas might need my monetary help. It helps me to fill in gaps in my science knowledge because I don't read the newspaper. I just feel like a whole person when I listen.
- It's made me aware of some avenues of scientific study not commonly known of.
- Given me new info. Made me think about/understand issues differently. Made scientific research really interesting. Answered questions I had carried.

It's made me much more aware of the importance of science and the everyday work that the scientists do in addition to the really big news events.

It broadens my perspective of my place in the universe. I work in one corner of science. E&S reminds me of all the other corners.

It brings me back to a bit of reality that there's so much more in this universe than my mundane daily routines. Perhaps most meaningful, it's just a few minutes of information and entertaining science talk occasionally inserted into my day--which is a good thing.

### **Listeners like hearing from scientists themselves.**

Half of the listeners wrote of the positive impact of hearing scientists themselves speaking of their own research on the show. Listeners think that hearing from the scientists adds a personal dimension to scientists and science; increases their respect for scientists and science; increases the credibility of the information; and helps them acquire a better understanding of scientific inquiry.

### ***Earth & Sky* prompts listeners to act.**

Provided with a check-off list of 11 different actions, respondents determined whether listening to *Earth & Sky* had ever prompted them to take those actions related to the series. The most frequent activities are discussing topics with others (74% of listeners), viewing the night sky (71%), reading related information (49%), searching for more information about a topic (35%) and accessing a web site (32%). Other prompted activities include modifying personal habits or philosophies (20%), visiting a planetarium or science museum (18%), purchasing a book or other item (15%), making donations to a non-profit institution (14%), using content in teaching (12%), and writing to *Earth & Sky*, a politician or scientist (3%). As might be expected, those who heard the show more frequently were more likely to report that the show had prompted them to action.

In conclusion, 86% of public radio members listen to *Earth & Sky* and rate the series as highly appealing and understandable. The series has a positive impact on listeners' awareness and comprehension of science issues and scientists and a considerable influence on listeners' actions beyond the 90-seconds. More frequent listeners report stronger impact than less frequent listeners. Despite its brevity, the 90-second format clearly acts to encourage listeners to look at the night sky differently but also demonstrates an important multiplier effect by inspiring significant numbers of listeners to discuss science with their colleagues, friends, students, family members and by stimulating listeners to further their informal education by reading related information or searching for more information. Ninety seconds can make a difference in a daily dose.