

# A Survey of Listeners' Perceptions of an Extension-Produced Invasive Plant Podcast

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## Abstract

Science communication and university Extension initiatives are evolving in response to society's needs and an ever-changing digital landscape. The UF/IFAS Center for Aquatic and Invasive Plants (CAIP) has recently launched a podcast called Working in the Weeds (WITW). We surveyed podcast listeners to find out their motivations for listening and asked for their feedback on current episodes and future content. The survey revealed that a majority of respondents were individuals who work in the world of invasive plants. Many respondents were introduced to the podcast through work and listen to learn more about relevant research and information, to feel connected to the Center, and to be entertained. Overall, the respondents were satisfied with the podcast production elements and the variety of episode styles. Based on open-ended responses, listeners described that the podcast shares science in a meaningful way and the Center should continue producing episodes that highlight invasive plant research. Some respondents suggested future episodes should cover specific invasive plants, environmental impacts, herbicide use and safety, management techniques, and social issues surrounding invasive plant management.

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## Introduction and Problem Statement

Invasive plants are an environmental issue entangled with the natural and social world (Head, 2017; Rajan et al., 2023). The effects of invasive plants, like hydrilla (*Hydrilla verticillata*), can impact a variety of stakeholders such as anglers, recreational boaters, waterfront property owners, and ecotourism businesses particularly in the Southeastern United States (Fouts et al., 2017). Discussions about invasion science, policy, and management are complicated and controversial due to differing values among varied stakeholder groups (Fouts et al., 2017; Rajan et al., 2023). Extension services include scientists, specialists, agents, and staff who educate and promote research-based information about agricultural, community, and natural resource science (Warner et al., 2022). Extension's science education and outreach efforts can be enhanced using digital media like podcasts (Loizzo et al., 2023; Strickland et al., 2021). Podcasts are downloadable audio files streamed online for individuals to subscribe and listen to new episodes typically related to a specific theme (Cambridge University Press, 2023).

The UF/IFAS Center for Aquatic and Invasive Plants (CAIP) launched a podcast in January 2022 titled *Working in the Weeds*. WITW aims to regularly connect stakeholders with the Center's research and inform them about invasive plant issues and programs. Podcast episodes range from science storytelling to invasive plant descriptions to discussions about plant management research to trivia games that review previous content. While podcasts can be ideal for sharing information, listener engagement is often difficult to measure beyond downloads and demographics. The purpose of this study was to examine WITW listeners' perceptions of the podcast and gain insight into how different episodes enhance Extension's educational and engagement efforts.

## Theoretical and Conceptual Framework

The dialogic model of public relations served as the theoretical lens for this study (Kent & Taylor, 1998). Kent and Taylor (1998; 2021) described how technology can foster relationships through the strategic use of these tools for engagement between organizations and their stakeholders. Dialogic science communication can involve communication between and within specialized groups, or through a mass communication medium with a large, diverse audience. Moving from the traditional deficit model, the dialogic approach to science communication emphasizes a dyadic relationship between the expert and their audience (van der Sanden & Meijman, 2008). This relationship allows scientists and non-experts to create meaning from scientific information together (Yuan et al., 2017). "Dialogue is not about winning or convincing, but about informing the other or oneself about facts, concepts, notions, feelings, emotions and fears" (van der Sanden & Meijman, 2008, p. 91). Besley et al. (2018) discussed that in addition to knowledge gain and appreciation for science, communication objectives should also relate to trust and relationship building between scientists and the public.

Podcasting can serve as an accessible, credible, and relevant method for communicating science in Extension (Chivers et al., 2022). Yuan et al. (2022) found that science podcasters prioritize several goals related to valuing science, personal decision-making, policymaking, and

highlighting careers in science. They also found that science podcasters utilized a combination of interviews, storytelling, statistics, emotion, and audience interactions as communication tactics for their episodes. This survey served as a form of listening to audience members' feedback to shape future conversations for the WITW podcast and to be a model for how other Extension podcast productions could leverage similar assessment approaches to effectively engage in listener-centered dialogue.

## Purpose

The purpose of this study was to gain a better understanding of the WITW listening audience after its initial launch. We aimed to identify the characteristics of the WITW audience, determine their overall satisfaction and motivation for listening, and capture listeners' recommendations for future episodes. The following research questions (RQs) guided the study:

1. How did listeners discover WITW?
2. Why do they listen to WITW?
3. What is their level of satisfaction with the WITW production?
4. What content should the podcast consider covering next?

## Methods

### Survey Design and Distribution

The survey included a combination of multiple-choice and open-ended questions. We developed a listener survey that included modified items from the Edison Research Podcast Listener Survey (Edison Research & Triton Digital, 2021) as well as additional items specific to the content of the WITW podcast. Our survey incorporated modified Edison Research items about the WITW audience members' gender, age, and education level. We added an additional item about respondents' careers in relation to the podcast's invasive and aquatic plants context. For RQs 1 and 2, we used multiple choice survey questions with response items related to the Center's communication channels and the podcast's content. For RQ 3, we used eight items to assess listeners' satisfaction in podcast production elements such as the length of episodes, hosting style, storytelling, scientific information, and more. For RQ 4, the survey included multiple-choice questions that asked respondents about their episode content preferences and an open-ended question. The respondents could select all that apply from five content format options that the podcast offers. Through the follow-up open-ended question, respondents could also share their ideas for future episode content and formats that the podcast producers and experts may not have otherwise considered. The survey was delivered through Qualtrics, an online survey tool. The data was analyzed in Microsoft Excel.

We had three approaches to participant recruitment. First, we highlighted the podcast and discussed the relevant content at the Florida Aquatic Plant Management Society (FAPMS) Conference (a stakeholder training conference) on October 4, 2022. At the end of the presentation, we projected a QR code and link to the listener survey projected on a screen in

front of the room, and attendees who had listened to at least one episode were encouraged to participate. The second recruitment method involved social media posts on the UF/IFAS CAIP social media platforms (Facebook, Instagram, LinkedIn, and Facebook). These posts appeared on November 4 and December 1, 2022. Then, to reach listeners who did not attend the conference or follow CAIP on social media, two emails (October 10 and November 30, 2022) were sent among their existing listservs ( $n=2,467$  emails). We acknowledge that through these recruitment methods, many of the recipients may not have listened to WITW. To weed out non-listeners from listeners, the survey asked participants if they had ever listened to the podcast. This resulted in a total of 24 podcast listeners completing surveys.

### Survey Respondents

Based survey results, most respondents were male ( $f=14$ , 58.3%), 25% ( $f=6$ ) were female, and 17% ( $f=4$ ) preferred not to answer. Respondents' ages ranged from 18 to 59+, and 25% ( $f=6$ ) preferred not to answer. Education levels varied among respondents. Approximately 33% ( $f=8$ ) had obtained a graduate degree, 25% ( $f=6$ ) had a high school degree or GED, 25% ( $f=6$ ) had a bachelor's degree, about 13% ( $f=3$ ) had completed some college or an associate degree, and 4% ( $f=1$ ) preferred not to answer. Most survey respondents (88%,  $f=21$ ) identified as *someone who works in the weeds* defined as being "involved in the field of aquatic and invasive plant management" in the survey.

The study had two major limitations. First, the generalizability of the results is limited in that they reflect a sample of listeners from one science-based podcast. Also, all respondents were either professionals, researchers, or students. The survey was distributed through a professional conference and existing CAIP communication channels. Therefore, there is little known about the perceptions of listeners who are not involved in the field of aquatic and invasive plant management.

### Subjectivity Statement

As a collaborative group of researchers, we acknowledge our direct involvement and interest in the success of this podcast. Our in-depth understanding of the podcast's planning, production, and promotion process may have influenced our interpretation of the findings. The entire research team has an appreciation for Florida's natural resources and interest in the impact of invasive plants. We are committed to sharing and interpreting the findings with integrity.

## Findings

### How did listeners discover WITW?

Respondents were asked to share how they first discovered the podcast (see Table 1). Almost half ( $f=11$ , 45.8%) of the respondents discovered WITW through a work or school recommendation. Followed by the CAIP e-newsletter announcement ( $f=6$ , 25%) and other means ( $f=4$ , 16.7%) including: the FAPMS conference, Twitter (now X), and direct communication with the Center.

**Table 1***How the respondents first discovered the podcast (N = 24)*

Variable	<i>f</i>	%
Recommended at work or school	11	45.8
CAIP e-newsletter announcement	6	25
Recommended by a family member	1	4.2
Through a Facebook post	1	4.2
Through Instagram	1	4.2
Other	4	16.7

**Why do they listen to WITW?**

Next, respondents were asked to select all options that related to their motivation for listening to the podcast (see Table 2). Most listen to WITW for a variety of reasons, whether it's *to learn about new research* ( $f = 21, 87.5\%$ ), *to keep up with invasive plant terminology and information* ( $f = 18, 75\%$ ), *to learn new core material for my job* ( $f = 16, 66.7\%$ ), *to feel connected to CAIP* ( $f = 15, 62.5\%$ ), or *to be entertained and listen to stories* ( $f = 14, 58.3\%$ ). Four respondents also ( $f = 4, 16.7\%$ ) listen *to learn about careers in science and natural resources* ( $f = 4, 16.7\%$ ).

In addition to the provided motivations, three ( $f = 3, 12.5\%$ ) respondents also selected "Other" and provided explanations. Two of them were private applicators that listen to WITW so that they can inform others. Their statements were: *Knowledge to pass to curious persons and/or stakeholders* and *to keep myself aware of the information covered so I may refer others to it. When I receive questions, I can refer the questioner to any of the episodes that may [expand] on the subject.* The other respondent, an academic peer, shared their motivation for listening is because they are: *Just curious on your format.*

**Table 2***Survey Respondents' Motivations for Listening to WITW (N = 24)*

Variable	<i>f</i>	%
To learn about new research	21	87.5
To learn new core material for my job	16	66.7
To feel connected to the CAIP	15	62.5
To keep up with invasive plant terminology and information	18	75
To be entertained and listen to stories	14	58.3
To learn about careers in science and natural resources	4	16.7
Other	3	12.5

**What is their satisfaction with WITW production?**

Overall, respondents were satisfied with the WITW production elements (see Table 3). A majority of the respondents indicated that they were either "Very Satisfied" ( $f = 20, 83.3\%$ ) or "Satisfied" ( $f = 3, 12.5\%$ ) with *the podcast hosts*; yielding one "neutral" ( $f = 1, 4.2\%$ ) response. Respondents were mostly "Very Satisfied" ( $f = 20, 83.3\%$ ) or "Satisfied" ( $f = 3, 12.5\%$ ) with the

*interaction and flow between the hosts and guests.* However, one respondent ( $f = 1, 4.2\%$ ) shared that they were “Dissatisfied.” Getting feedback on the amount of storytelling and scientific information in the episodes was important. About 75% of respondents were either “Very Satisfied” ( $f = 14, 58.3\%$ ) or “Satisfied” ( $f = 4, 16.7\%$ ) with *the amount of storytelling*. Some respondents felt “Neutral” ( $f = 2, 8.3\%$ ) or “Dissatisfied” ( $f = 1, 4.2\%$ ). One respondent ( $f = 1, 4.2\%$ ) did not select their satisfaction level. About 95% of respondents were “Very Satisfied” ( $f = 18, 75\%$ ) or “Satisfied” ( $f = 5, 20.8\%$ ) with *the amount of scientific information in the episodes* and one respondent ( $f = 1, 4.2\%$ ) felt “Neutral” on the matter.

**Table 3**

*Listeners’ level of satisfaction with various podcast production elements (N = 24)*

Variable	<i>f</i>	%
The podcast hosts		
Very Satisfied	20	83.3
Satisfied	3	12.5
Neutral	14	4.2
The interaction and flow between the hosts and guests		
Very Satisfied	20	83.3
Satisfied	3	12.5
Dissatisfied	1	4.2
The amount of storytelling in the episodes <sup>a</sup>		
Very Satisfied	14	58.3
Satisfied	4	16.7
Neutral	2	8.3
Dissatisfied	1	4.2
The amount of scientific information in the episodes		
Very Satisfied	18	75
Satisfied	5	20.8
Neutral	1	4.2
The episode lengths		
Very Satisfied	13	54.2
Satisfied	9	37.5
Neutral	1	4.2
Dissatisfied	1	4.2
Audio/sound quality		
Very Satisfied	19	79.1
Satisfied	4	16.7
Neutral	1	4.2
The music/theme song <sup>b</sup>		
Very Satisfied	12	50
Satisfied	4	16.7
Neutral	6	25
How frequently episodes are released <sup>c</sup>		
Very Satisfied	13	54.1
Satisfied	7	29.2
Neutral	3	12.5

*Note.* a Response missing from 1 participant.; b Responses missing from 2 participants.; c Response missing from 1 participant.

In addition to the content, the researchers were interested in knowing how satisfied listeners are with the construction of the podcast. First, their satisfaction with the episode length and frequency was gauged. Most respondents were either “Very Satisfied” ( $f = 13$ , 54.2%) or “Satisfied” ( $f = 9$ , 37.5%) with *the episode lengths* (about 30 minutes). One respondent felt neutrally about it, and another ( $f = 1$ , 4.2%) was “Dissatisfied”. About 83% are either “Very Satisfied” ( $f = 13$ , 54.1%) or “Satisfied” ( $f = 7$ , 29.2%) with *how frequently episodes are released*. Three ( $f = 3$ , 12.5%) felt “Neutral” about the frequency and one respondent ( $f = 1$ , 4.2%) left it blank.

Then, respondents were asked about the audio/sound quality and the music/theme song. Over 90% of respondents were either “Very Satisfied” ( $f = 19$ , 79.1%) or “Satisfied” ( $f = 4$ , 16.7%) with *the audio/sound quality* of the podcast; one respondent ( $f = 1$ , 4.2%) felt “Neutral” about it. Over 60% of respondents were either “Very Satisfied” ( $f = 12$ , 50%) or “Satisfied” ( $f = 4$ , 16.7%) with *the music/theme song*. Twenty-five percent ( $f = 6$ , 25%) felt neutrally about the music selection and others ( $f = 2$ , 8.3%) chose not to respond.

#### What content should the podcast continue or consider next?

Currently, the podcast releases episodes in a variety of styles including science storytelling, interviews with researchers, and educational episodes that review scientific concepts related to plant management. Respondents were asked to select from a list of episode styles that they would be interested in hearing more of (see Table 4). Respondents ( $f = 21$ , 87.5%) were interested in hearing more “interviews with plant management researchers and other related sciences” and “science storytelling (history, research failures and successes, etc.” The other episode style options were also of interest to the respondents with 83% ( $f = 20$ ) interested in “interviews with people who work in invasive plant management,” 79% ( $f = 19$ ) interested in “educational episodes that review important topics about plant management,” and 71% ( $f = 17$ ) wanted to hear “information about programs and resources related to plant management.”

**Table 4**

*Episode styles listeners are interested in hearing more of (selected all that apply) (N = 24)*

Variable	<i>f</i>	%
Interviews with plant management researchers and other related sciences	21	87.5
Interviews with people who work in invasive plant management	20	83.3
Educational episodes that review important topics about plant management	19	79.2
Information about programs and resources related to plant management	17	70.8
Science storytelling (history, research failures and successes, etc.)	21	87.5

After the episode-style question in the survey, there was an open-ended question that asked respondents to share feedback or suggestions that they have for the podcast. Eight of the twenty-four respondents completed the question. All eight responses were open and axial coded to identify two themes: (a) Science is shared in a meaningful way, and (b) listeners recommended to carry on the conversation.

**Theme 1: Science is shared in a meaningful way.**

The first theme related to the podcast was that science is shared in a meaningful way. Listener responses described the quality of the podcast and how it made them feel. One respondent said, "I love the quality of this podcast. It is the only science-based podcast I listen to." A couple of respondents provided positive feedback on the content. One wrote, "I like how the podcast is never boring." They explained, "I usually have a hard time staying focused while listening to eBooks or podcasts. That says a lot for my ADHD brain!" They recommended to alternate "between historical and current research" and wished "Good luck!" Another respondent shared their impression of specific episodes:

I think that "Florida's Lakes and Landscapes" is the BEST explanation I've heard about our unique FL lakes and the invasive aquatic species issues they have. I also particularly liked the water hyacinth series you did, and the recent "How Are Invasive Plants Managed/Pros and Cons of Management Techniques." I think the combination of historical accounts and information about the current state of specific invasive species issues is invaluable. I think the greatest value of this podcast is your ability to share important, real information and data in a way that is exciting and understandable to the public.

One respondent expressed their appreciation for the podcast from an educational and personal perspective:

I would suggest however to not lose sight of the educational potential here. I understand how difficult it may be to put this program together. I also understand that it should be expected to be more difficult to maintain the effort. When the effort becomes burdensome, when the excitement that comes with freshness begins to wane remember that somewhere out there in the listening audience is an applicator that has been treating mats of hyacinth in the elements for decades. What you do and have done here brightens the day and helps to remind those often-weary soldiers that what they are doing is important, that it matters, and some part of society gets it. It is not necessarily cheerleading, but it certainly is legitimizing.

These responses highlight the accessibility and relationship building capacity of science-based podcasts.

**Theme 2: Listeners recommended to carry on the conversation.**

The second theme, carry on the conversation, related to the responses that suggested content for future episodes. Listeners' suggestions included WITW future topics should focus on invasive species and how they impact popular environmental issues. One respondent requested that future episodes should focus on specific invasive plant species: "How about a deep dive into other major plant species such as hydrilla (and other submersed) and the wonderful world of algae?" Another respondent listed ideas like: "short interviews with applicators...", "summarized research," and "success stories in invasive plant management." A third respondent suggested tackling topics that address concepts related to invasive plant management. He referenced a specific study focused on low-level maintenance control, or proactive management, and herbicide fate in the environment. They said the podcast should:



...maybe expand on more of the science i.e. Dr Joyce's study and how it relates to maintenance control...breakdown of herbicides (half-life) in the environment ...bioaccumulation etc. Though I (and y'all) understand those topics...the general listener may be enlightened.

Another respondent suggested conversations on the “value in novel ecosystems, herbicide resistance, [and] how to minimize non target effects.” It was also recommended that episodes could involve discussions about:

Perception issues for the control of invasive plants. Novel herbicide or other non-herbicide approaches for invasive plant control. Discussions on climate change and what it means more specifically to invasive plant control. New research on the control of invasive plants.

These suggestions can help the podcast producers and scientists involved gain a better understanding of the educational needs of their listeners.

## Conclusions, Discussion, and Recommendations

Most of the WITW listeners identified as professionals whose work related to invasive plant management. Motivations for listening were related to the podcast’s mission of sharing content related to the research and management of invasive plants. Respondents shared that they felt the podcast served as a source of information and entertainment. The podcast is a personal learning tool and a resource to pass along to others. Future content should continue to blend storytelling and science-based content. Respondents shared that they would like future episodes about research summaries, interviews with invasive plant professionals, discussions on techniques, herbicide science and safety, and plant-specific episodes. Other respondents encouraged future episodes to have topics related to the bigger picture like other environmental issues, public perception, herbicide science and safety, and success stories.

Since the survey was conducted and analyzed, the podcast hosts have used the feedback and suggestions to inform the creation of future episodes. For example, some respondents proposed episodes with specific information on invasive plants. The following season’s episodes were all ‘plant deep dives’ where the podcast hosts and guests talked about specific plant species and how their physiology makes them invasive.

Based on our experiences producing a science-based podcast, we believe it is important for Extension professionals who are also producing podcasts or considering adding podcasts to their outreach and engagement efforts to strategically balance messaging with science information and storytelling. They should also encourage listener feedback at the end of every episode and promote the podcast through communication channels that will reach their intended audience. Podcasting can serve as a way for expert scientists at land grant universities and other organizations to regularly cultivate relationships with key stakeholders and enhance communication efforts (Yuan et al., 2017). This format of communication can connect primary stakeholders, colleagues, and general audiences with the science and story behind the work

that they do. This communication medium provides accessible and digestible learning opportunities. We encourage using this technology to communicate scientific topics to primary stakeholder groups or broader audiences. Also, as Extension professionals look for ways to dialogue with their podcast audiences and assess the impact of their podcast (Loizzo et al., 2023), the survey method and items used in this study could be adapted to other Extension podcast contexts and topics. Future research methods could include cognitive evaluation of what listeners have learned from podcast episodes as well as how they applied the content to their daily lives which could help Extension measure behavior change.

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