A RESEARCH BRIEF

2025

Nature and Health Researcher Needs Assessment

Investigating the state of evidence among researchers to better inform practitioners

A report by the Collective for Nature Immersion Science and Practice at CSU

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HUMAN DIMENSIONS OF NATURAL RESOURCES
COLORADO STATE UNIVERSITY

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rei cooperative action fund

Executive Summary

In this report, we outline the findings of a needs assessment conducted with researchers studying the connection between nature and human health and well-being. The goal was to better understand the scientific efforts of nature and health researchers and identify opportunities to leverage current research to support practitioners. To do this, we 1) assessed the current landscape of research and what researchers are focused on, 2) asked researchers to assess the state of scientific evidence in the field and 3) explored researchers' perspectives on collaboration with practitioners.

Our results indicate that the field of nature, health, and well-being is largely interdisciplinary, with psychology playing a dominant role. Researchers are answering a wide variety of research questions utilizing a diversity of methods, which creates opportunities and challenges for sharing findings. Clarity in how benefits are being measured is important due to the overlap and diversity of ways to talk about and operationalize health and well-being. We also found that current research is focused primarily on the benefits individuals receive from nature and the application of nature-based interventions and programming. Future research priorities should focus more on how, when, and why nature benefits health and well-being as well as how to leverage nature's benefits to support society. In the following pages, we discuss this data in greater detail, synthesize our results, and identify next steps for our needs assessment and the field of nature and health more broadly.

This work is supported by the REI Cooperative Action Fund.

Introduction

The Collective for Nature Immersion Science and Practice (cNISP) exists to **increase the capacity of nature-based programming to support happier, healthier, and more sustainable communities.** We do this by facilitating collaboration and co-learning between practitioners and researchers working at the intersection of nature and human health and well-being. We are an interdisciplinary research group at Colorado State University.

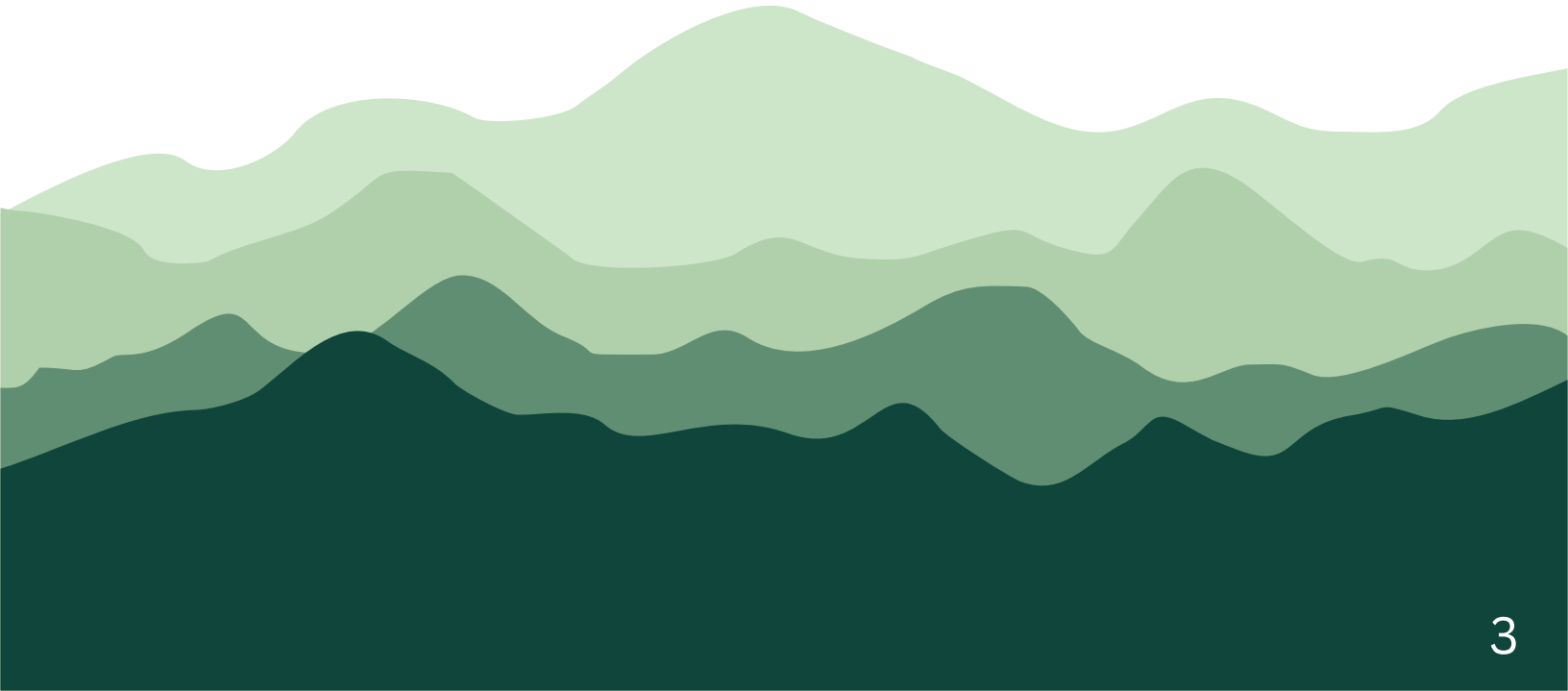
To ensure our work meets the needs of researchers and practitioners across the country, we are conducting an extensive needs assessment. This report outlines the results from phase 2, a survey of 88 researchers who study nature health, and well-being. (Find a report of phase 1 here: Practitioner Needs Assessment Report). Interviews with practitioners have been completed and are in the process of being analyzed. Follow-up interviews with researchers are also in progress and will inform a future version of this report.

In sum, this needs assessment process will guide curricula for practitioners to better leverage scientific evidence in their work. Additionally, an open-source research database is being developed that will enable practitioners to input their program evaluation data into a single database to enable more diverse and applied research. We are launching both the training program and database in Summer of 2025.

Methods

To conduct this phase of the needs assessment, we administered a survey to researchers studying the effects of nature on human health and well-being. Recruitment utilized directed emails to researchers publishing academic articles in the nature, health and well-being field. To create this list of researchers, we conducted a literature review and collected emails of corresponding authors from each of the articles. Further, we sent the survey to researchers who attended the SHIFT Nature and Health Conference in 2023 in Bend, Oregon and utilized snowball sampling to gather contacts from survey respondents. Lastly, we used an additional list of nature and health researchers compiled by Drs. Jay Maddock and Matthew Browning's research groups based on a comprehensive search of authors who had published on nature and health in the last 20 years. In total, 127 researchers participated in the survey. Out of the 127 researchers, 88 completed the full survey.

Researchers were asked about their professional identity and institution, their discipline, their perspective on the current state of scientific evidence in the field, their current research questions and the most pressing priorities for future research. They were also asked about their perspective on collaboration with nature and health practitioners. We analyzed the data using a combination of descriptive statistics and qualitative thematic analysis.



Results

Researcher Information

Researchers who participated in our survey came from a variety of backgrounds and disciplines. In this section, we present information on respondents' professional titles, primary academic discipline, type of institution, geographic location.

Professional Titles

Most respondents were tenured faculty (35%), followed by research scientist/scholar (27%), then tenure-track faculty (14%). The next two largest categories were graduate students (10%) and "other" (10%) with respondents writing in roles such as emeritus professor, technology provider, consultant, industry professional, and independent researcher. Non-tenure track faculty included 9% of respondents, mental health practitioners were 7%, healthcare practitioners 3%, and research staff and postdoctoral scholar were both 2%. Note that researchers were able to select multiple options. Additionally, 24% of respondents reported that they are licensed healthcare professionals (Figure 2). A variety of health care professions were listed including psychotherapist, social worker, physician, nurse, and psychologist.

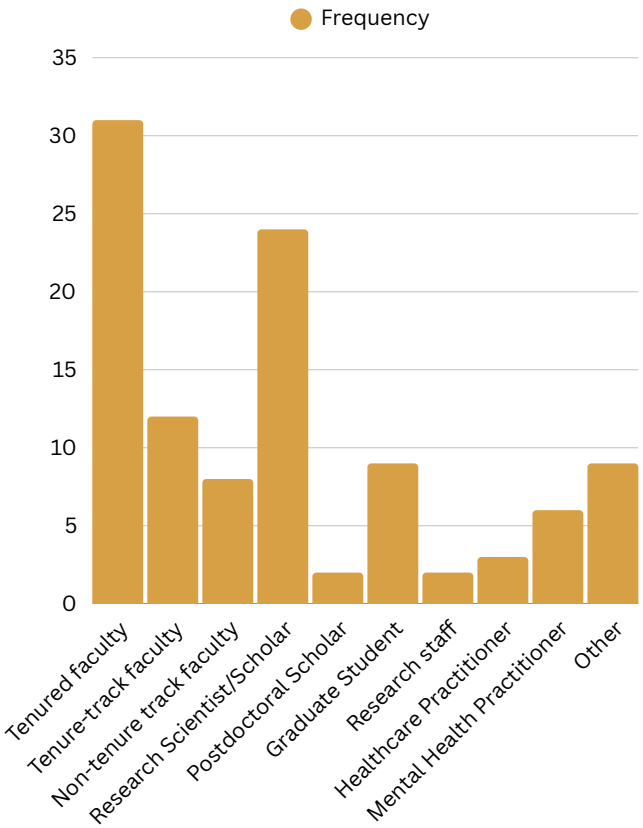


Figure 1. *Researchers were asked what their role was at their institution. n = 88*

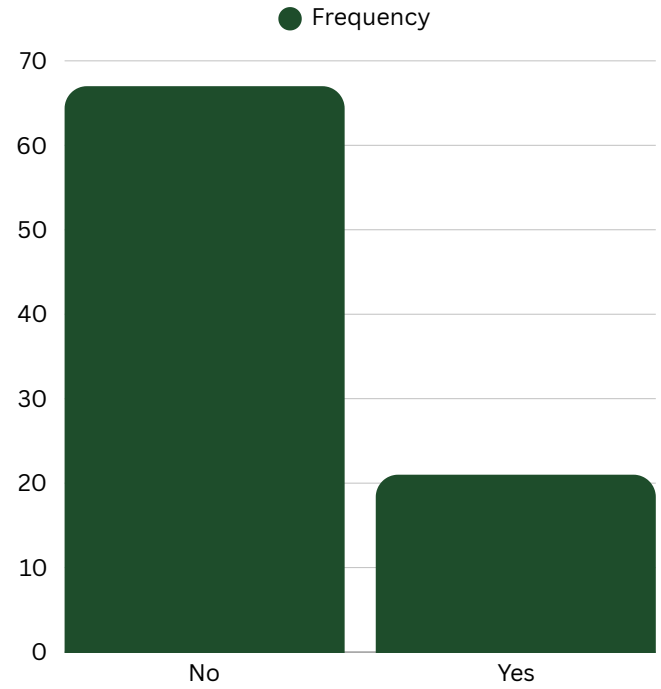
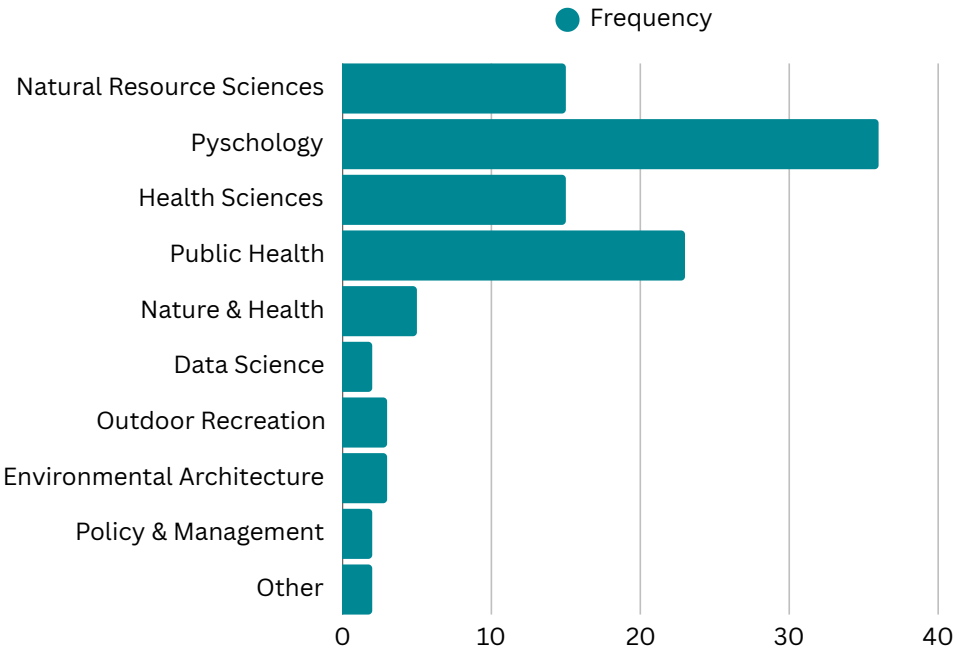


Figure 2. *Researchers were asked if they are licensed health care professionals. n = 88*

Research Discipline



Researchers were asked to name their discipline, and we organized their answers into key disciplinary themes. Psychology was the most prevalent discipline with public health, natural resource sciences, and health sciences following by a significant gap. Some researchers identified ‘nature & health’ as its own research discipline.

Figure 3. Researchers were asked to name their research discipline (e.g., psychology, public health, ecology). The data was analyzed to identify common themes and the number of researchers identifying each theme.

Type of Institution

An overwhelming majority of respondents listed their current institution as a university (78%). The second largest category was “other” (12%) where researchers wrote in responses such as private practice, health system, and consulting. The remaining categories, which all had under 10 respondents, included non-profits, private industry, government research institutes, independent research institutes, and colleges. Researchers were able to select multiple answers.

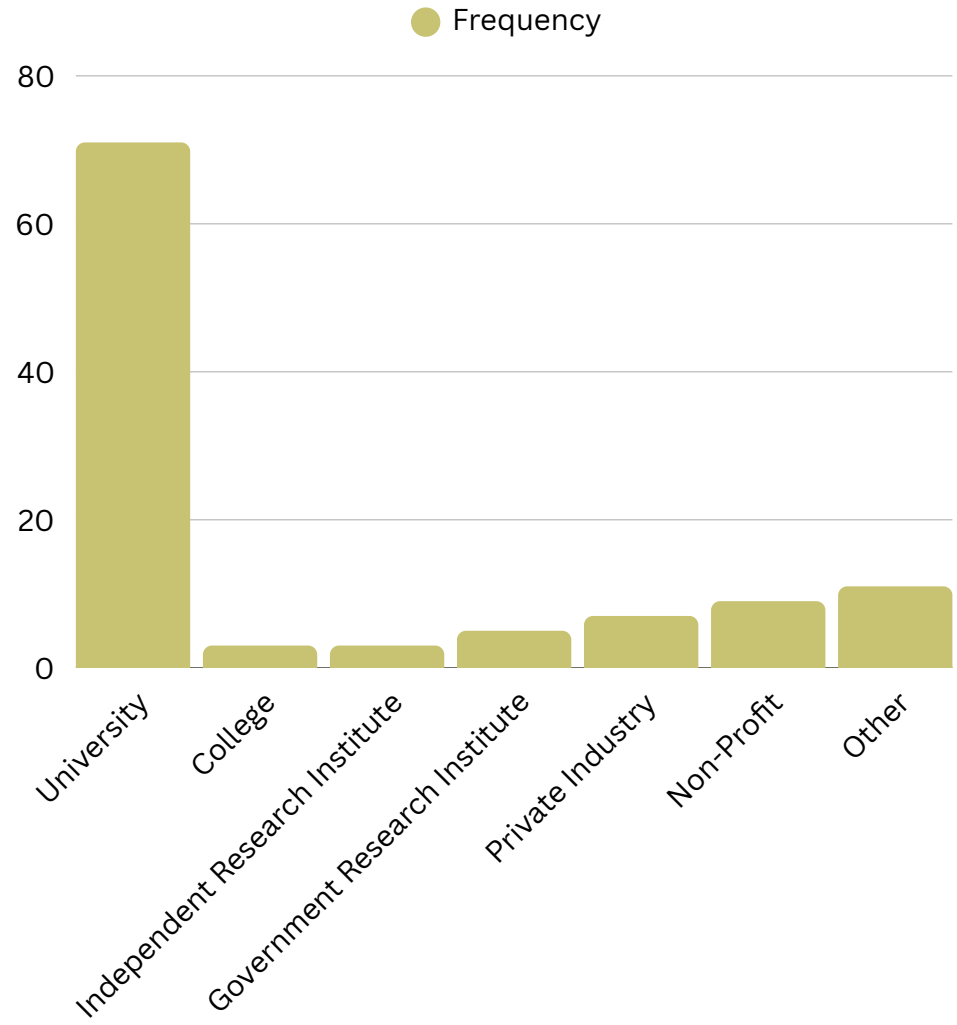


Figure 4. *Researchers were asked what type of institution they work wihtin. n = 88*

Geographic Location

A majority of researchers that responded are located in the US with the United Kingdom and Canada were the countries with the second and third most responses, respectively. Forty-two percent of respondents were located outside the United States. See Figure 6 for a complete visual of all participants' countries.

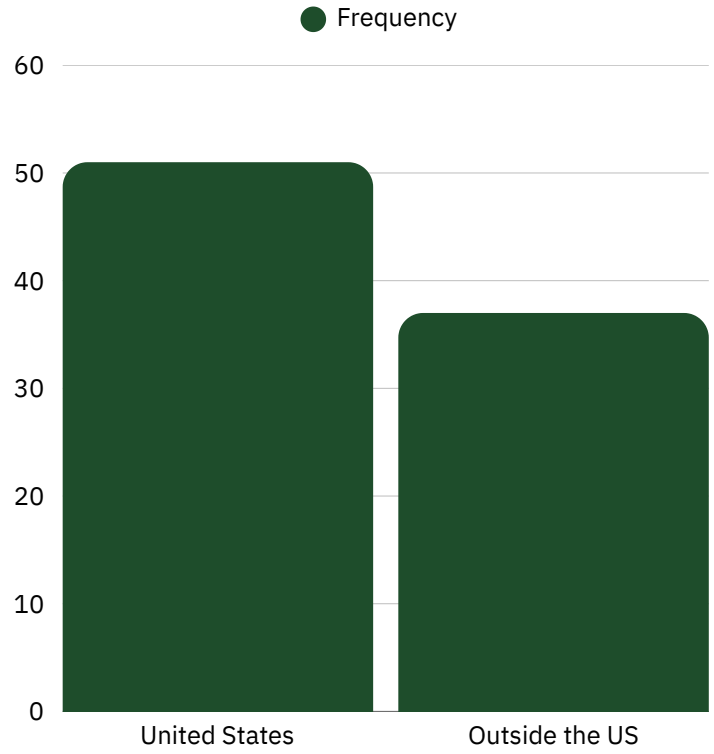


Figure 5. *Researchers were asked if they are located in the United States. n = 88*

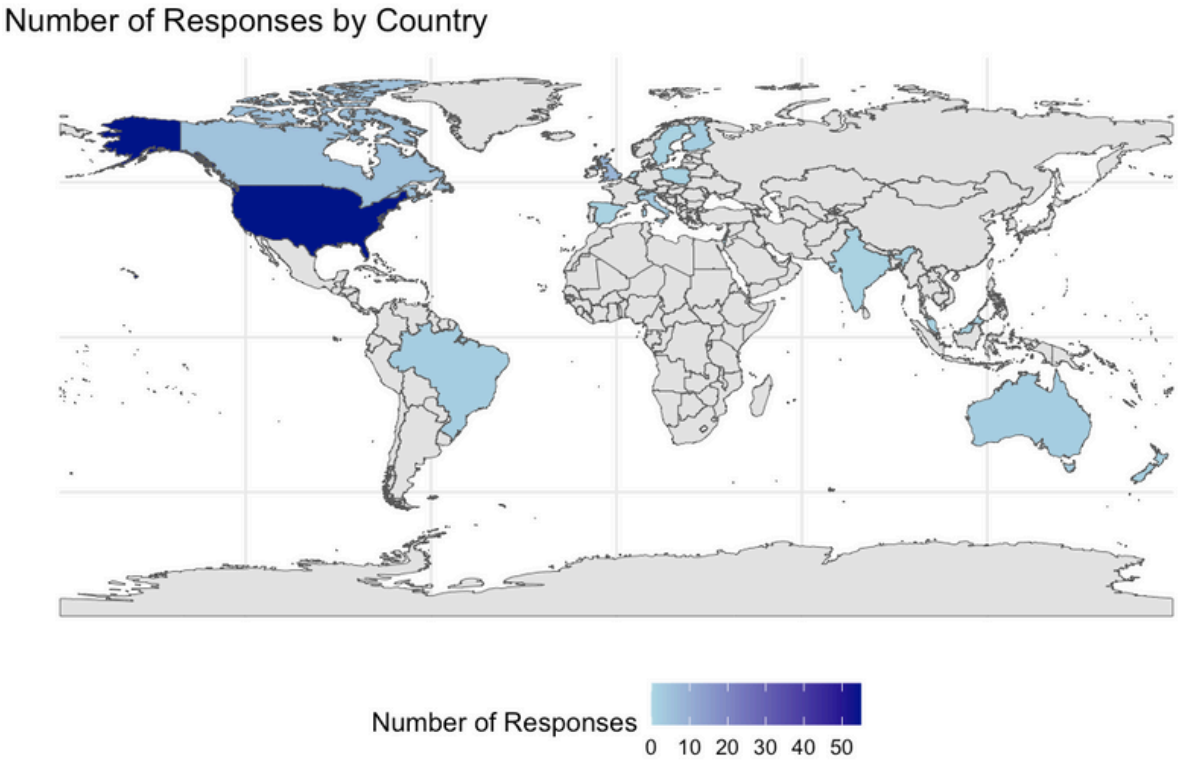


Figure 6. *Researchers that were not located in the US were asked where they are located geographically. This data, along with those who answered 'yes' to being in the US, are representated by this world map. n = 88*

Table:

Australia: 2
Brazil: 2
Canada: 5
Denmark: 1
Finland: 2
India: 1
Israel: 1
Italy: 3
Malaysia: 1
Netherlands: 1
New Zealand: 1
Poland: 1
Portugal: 1
Singapore: 1
Spain: 1
Sweden: 1
Switzerland: 1
United Kingdom: 8

Amount of Nature & Health Research

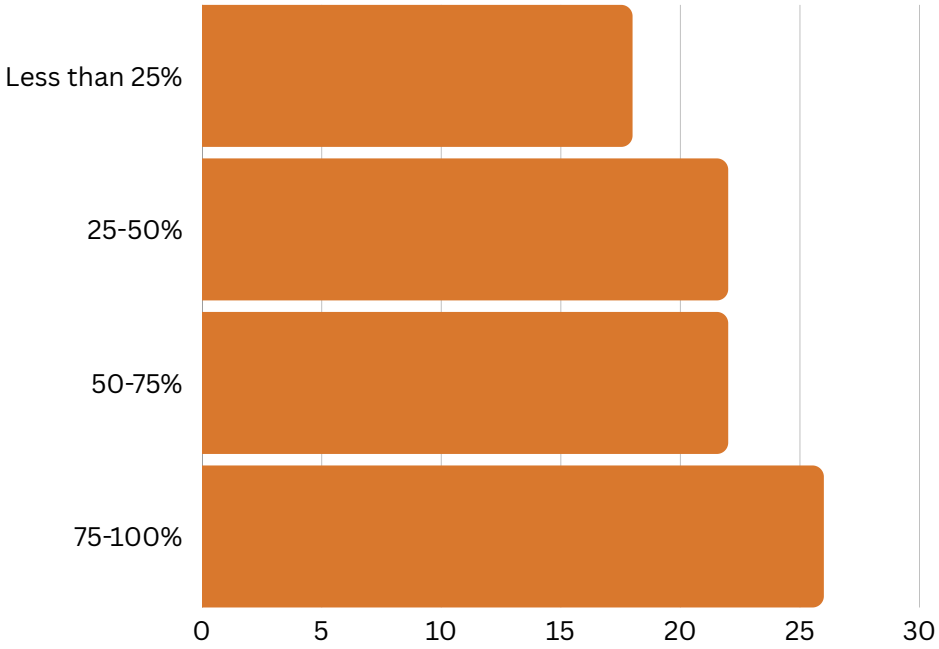


Figure 7. *Researchers were asked the percentage of their research program that is focused on nature and health & well-being. n = 88*

We surveyed respondents about the proportion of their research programs focused on nature and health and well-being. Nearly a third of researchers stated that over 75% of their research focused on nature and health and well-being. Half of respondents shared that nature and health made up of 25-75% of their research programming with another 20% stating that it made up less than 25% of their research.

Number of Publications

To further understand the scope and extent of respondents' work dedicated to nature and health, we inquired how many peer-reviewed publications they have written on this topic. The red dotted line represents the mean of 12.8 peer-reviewed journal articles. There was a large range in responses with a minimum of 0 and the maximum of 200.

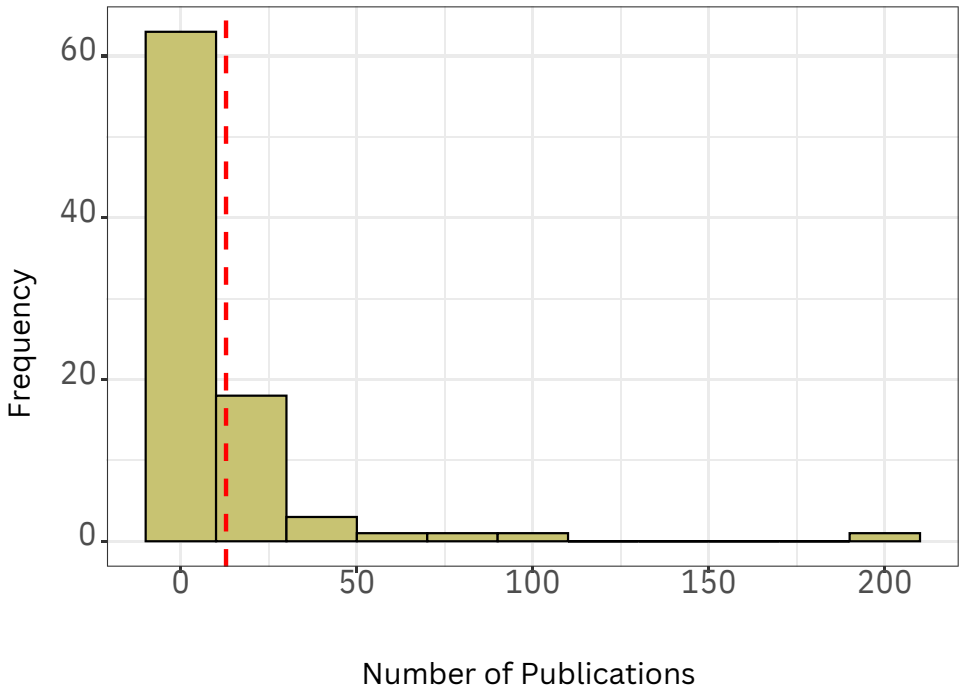


Figure 8. *Researchers were asked how many peer-reviewed publications they have authored or co-authored on the topic of nature and health. n = 87*

Current Research Foci

We also collected information about the types of research questions researchers are currently asking and the methodological approaches they are using to answer them. This included the types of nature and participant population commonly utilized, methods most often used, the health and well-being outcomes being investigated, and where their results are being published and shared.

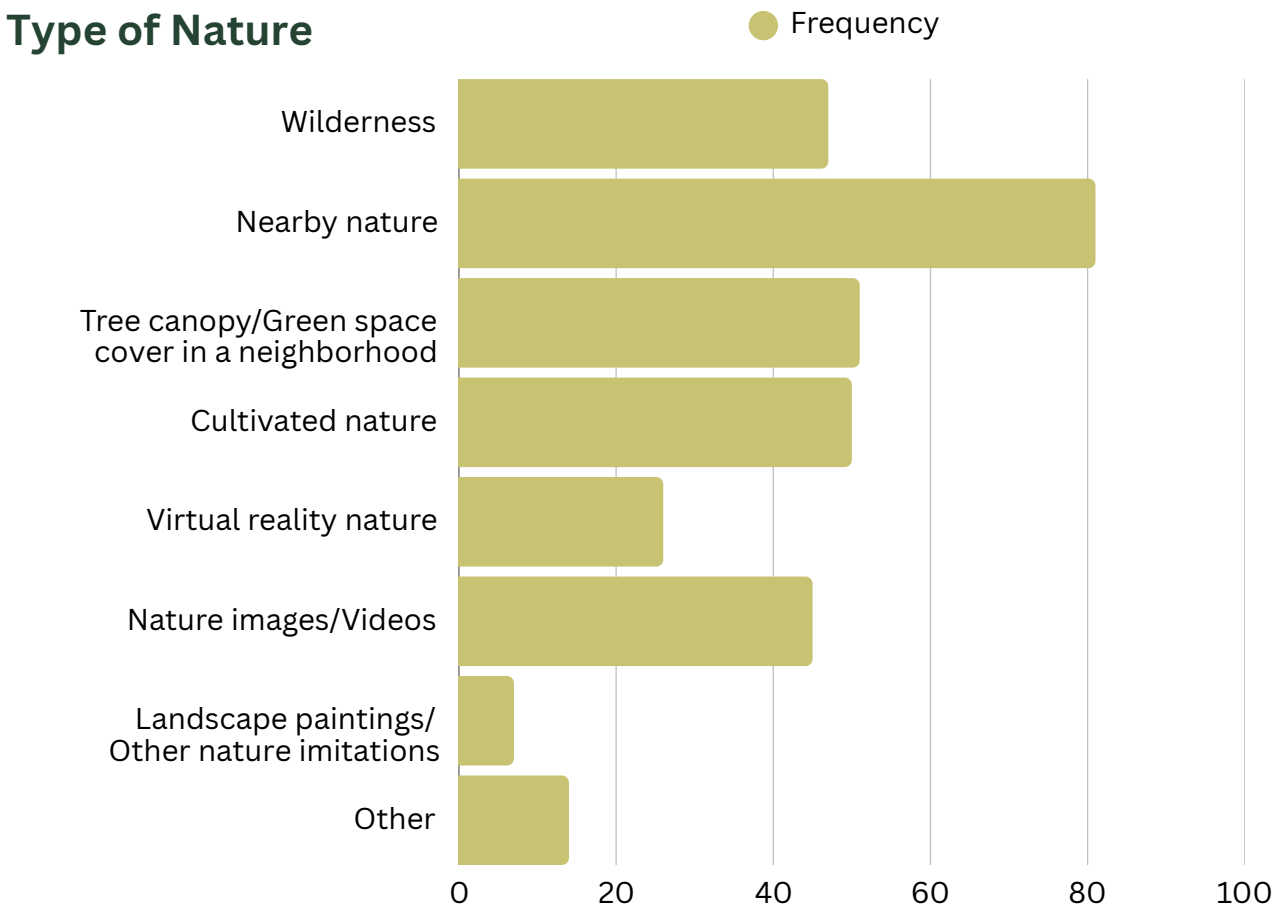


Figure 9. *Researchers were asked the type of nature they utilize in their research. n = 88*

Researchers are most frequently focused on 'nearby nature', with 92% of respondents indicating that their research is focused on this 'type' of nature. This was followed by tree canopy/greenspace cover (58%), cultivated nature (57%), wilderness (53%), and nature images/videos (51%). Thirty percent of respondents reported working with virtual reality nature and 8% with landscape paintings/other nature imitations. Sixteen percent selected the option "other" with responses such as blue space, nature sounds, weather, seasons, memories of nature, indoor nature such as potted plants, aquariums, or nature-based schools.

Participant Popluations

We asked respondents to describe the types of participants included in their research. Adults were overwhelmingly the largest theme, which included college students (31) and older adults (13) as sub-themes. Other prevalent themes include 'youth; ages 5-18' and 'patients with a clinical focus (e.g. cancer patients/survivors, residents of care facilities, substance abuse patients)'. Eighteen researchers identified minoritized communities as the focus of their research which included BIPOC, people of low SES, etc., and 10 researchers mentioned community members in the local area as their target group. The 'other' theme mostly included codes that were too broad to be organized into a specific theme, such as 'general public.'

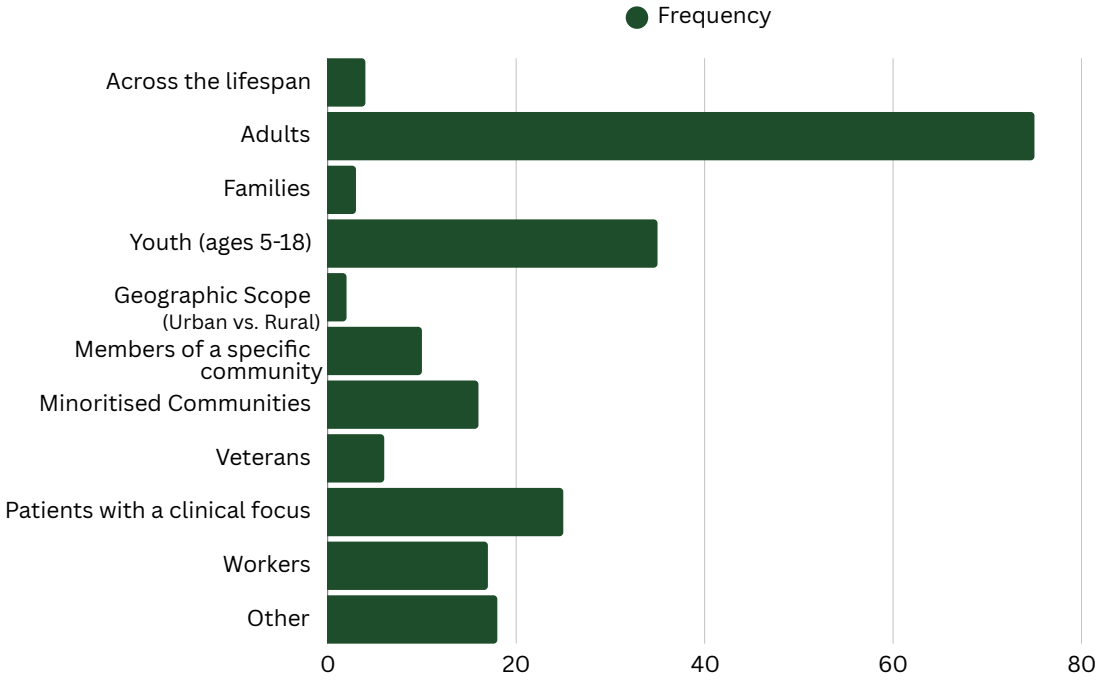


Figure 10. *Researchers were asked participant populations they study (e.g., college students, older adults, veterans, etc.). The data was analyzed to identify common themes and the number of researchers identifying each theme.*

Research Approaches

When researchers were asked what types of methodological approaches they most commonly utilized, 72% responded mixed methods, representing the largest group. This was followed by quantitative (64%), and meta-analyses or scoping reviews and qualitative both being reported at approximately 40%. Researchers were able to select multiple options.

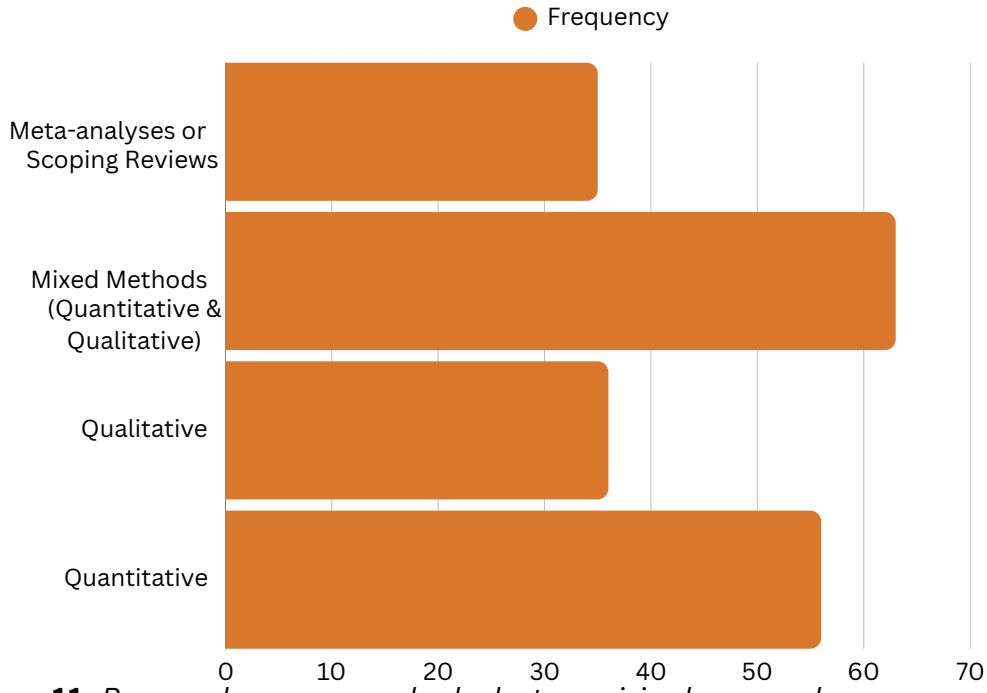


Figure 11. *Researchers were asked what empirical research approaches they commonly use for nature and health research. n = 88*

Quantitative Designs

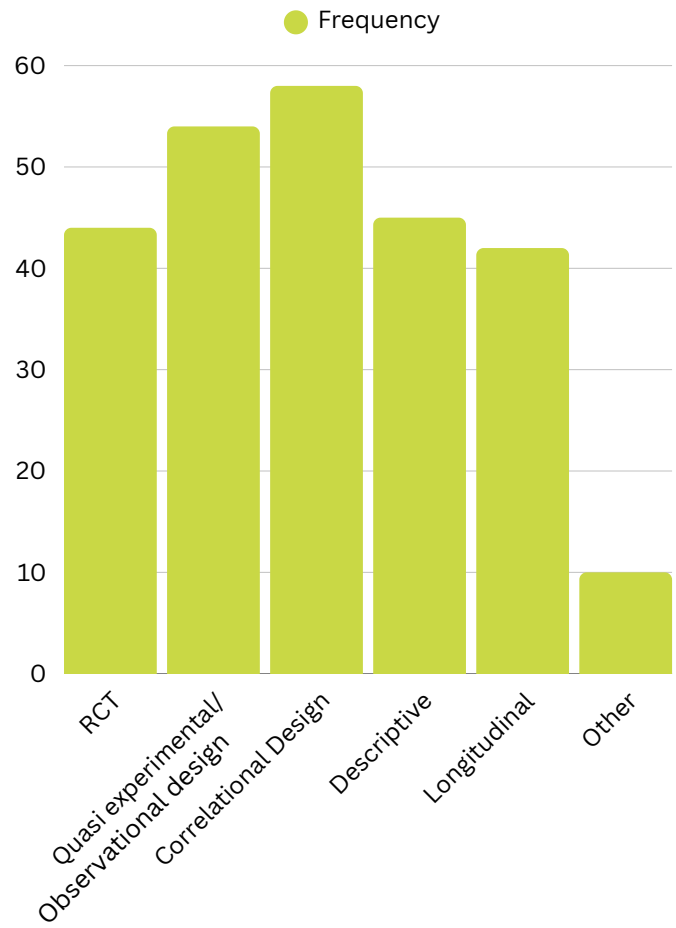


Figure 12. *Researchers were asked what kinds of quantitative study designs are employed in their research. n = 85*

With respect to quantitative study designs, correlational design was the most popular (with 68% of respondents choosing that option), followed closely by quasi experimental/observational design (with 64% of respondents). RCTs, or randomized control trials, received 52% of respondents, and descriptive and longitudinal studies had around 53% and 49% of respondents, respectively. Researchers had the option to select multiple study designs.

Qualitative Designs

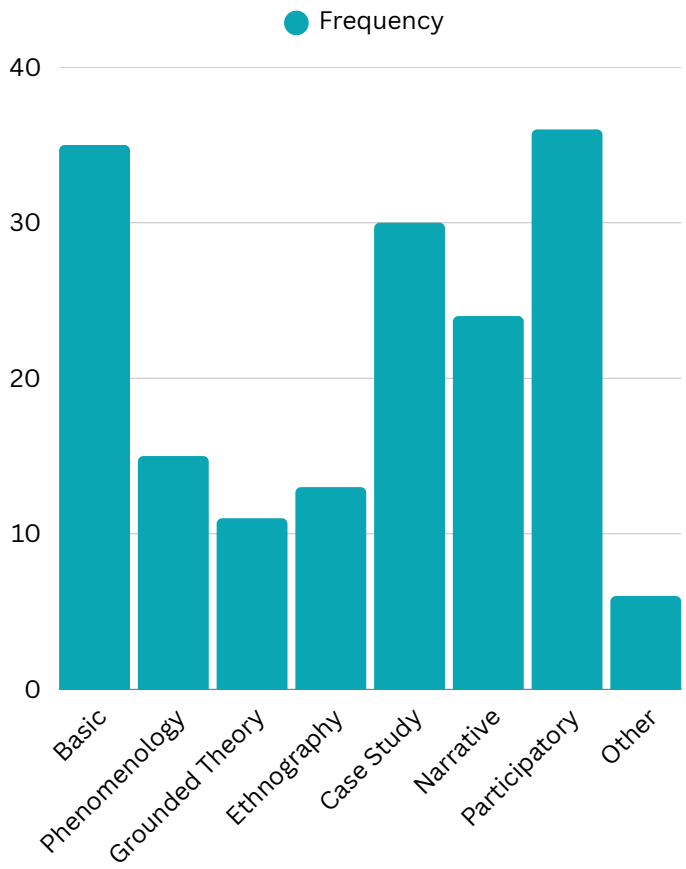


Figure 13. *Researchers were asked what kinds of qualitative study designs are employed in their research. n = 67*

As for qualitative study designs, basic and participatory were the most popular with 52% and 54% of respondents them, respectively. Case study and narrative followed with 45% and 36%, respectively.

Phenomenology, ethnography, and grounded theory were the least popular ranging from 16-22% of respondents. Again, researchers had the option to select multiple study designs.

Outcome Categories

Researchers were asked to identify the health and well-being outcomes on which their research focused. The survey provided a list of 54 outcomes, broken into 6 categories. Respondents could choose as many outcomes as necessary to reflect their research. The overarching categories are shown below (Figure 14), and the specific outcomes of each of the most popular categories are shown on the next 2 pages (Figures 15-18).

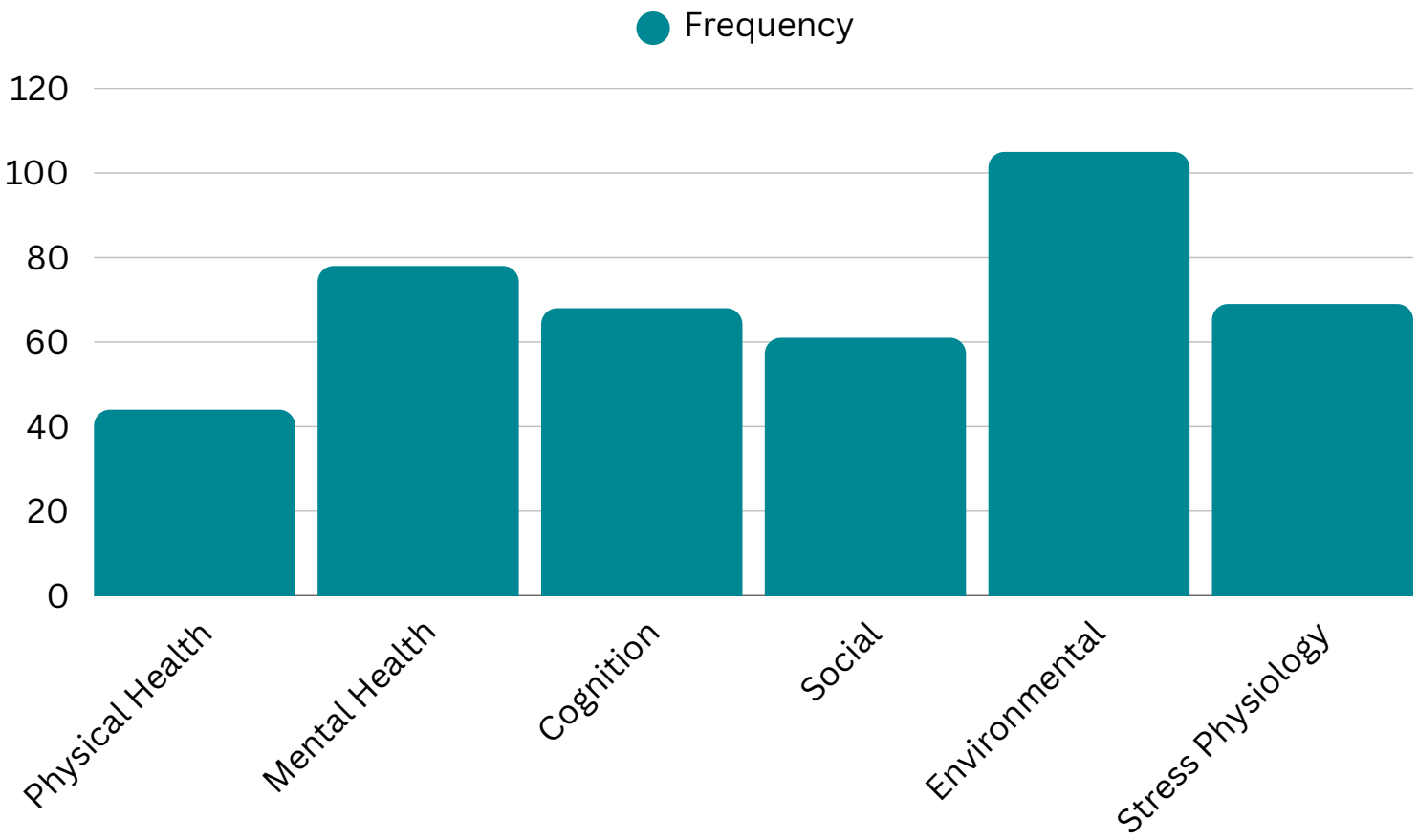


Figure 14. *Researchers were asked what outcomes they focus on in their research. n = 87*

Environmental outcomes, including pro-environmental behavior as well as nature connectedness, were the most frequent outcome category investigated by researchers. Mental health and stress physiology were the next popular with cognition and social outcomes following close behind. The specific outcomes being studied within the four most popular categories are displayed in the following pages (Figures 15-18).

Environmental Outcomes

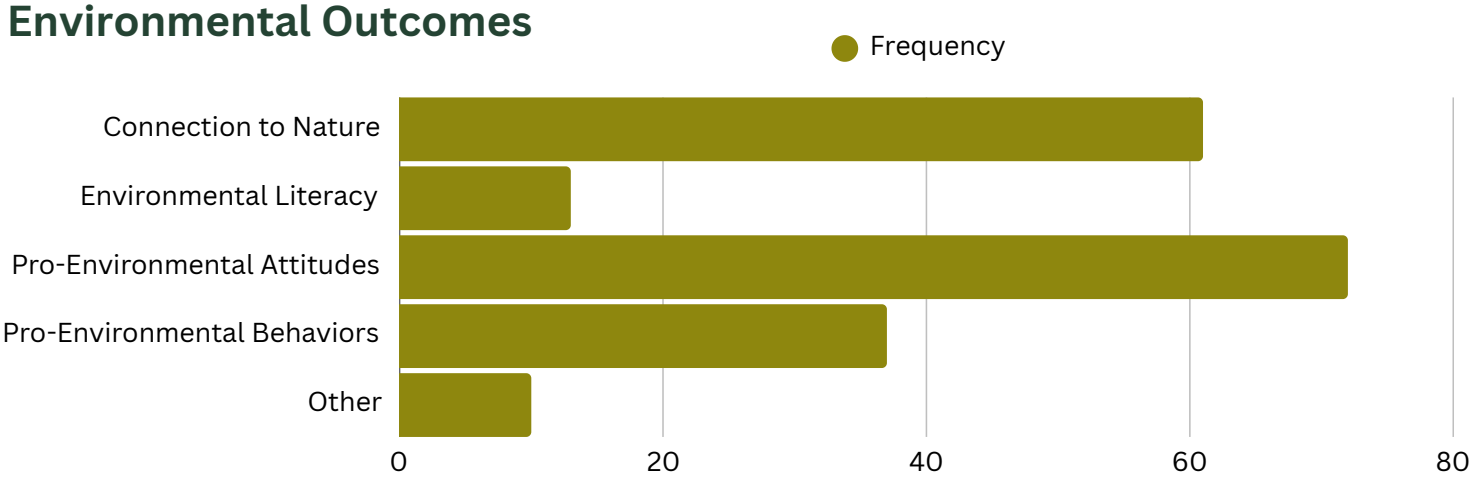


Figure 15. *List of outcomes shown to researchers that fell within the pro-environmental category and the associated frequency. Respondents were able to choose multiple outcomes.*

Pro-environmental attitudes (PEA) and connection to nature were by far the most chosen outcomes by researchers. Pro-environmental behavior (PEB), (e.g. donating to an environmental organization), was less prevalent than pro-environmental attitudes (e.g. expressing concern about climate change).

Mental Health Outcomes

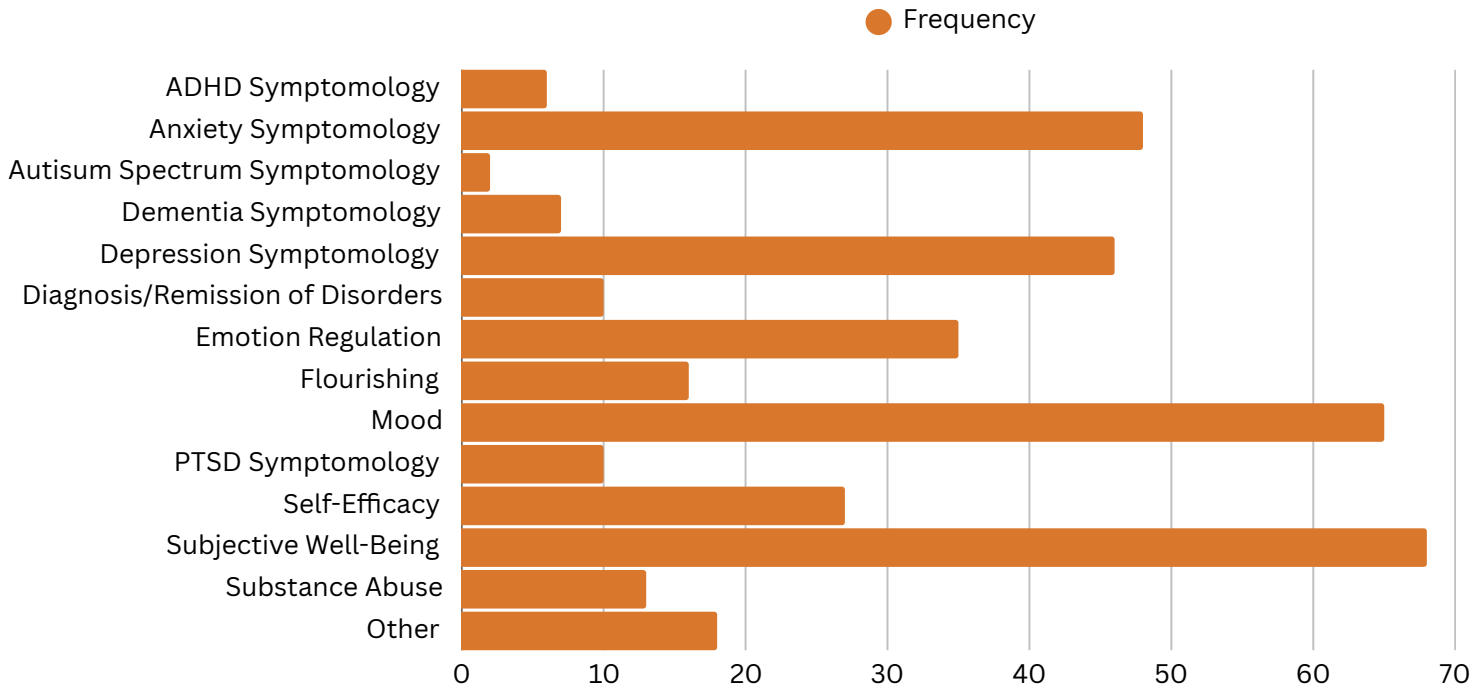


Figure 16. *List of outcomes shown to researchers that fell within the emotional/mental health category and the associated frequency. Respondents were able to choose multiple outcomes.*

In the emotional/mental health section, subjective well-being and mood are the most popular outcomes measured by researchers. Anxiety and depression symptoms were the third and fourth most popular outcomes, respectively. Other mental health related symptoms, emotion regulation and flourishing were options that were chosen less frequently, but still reflect multiple research programs.

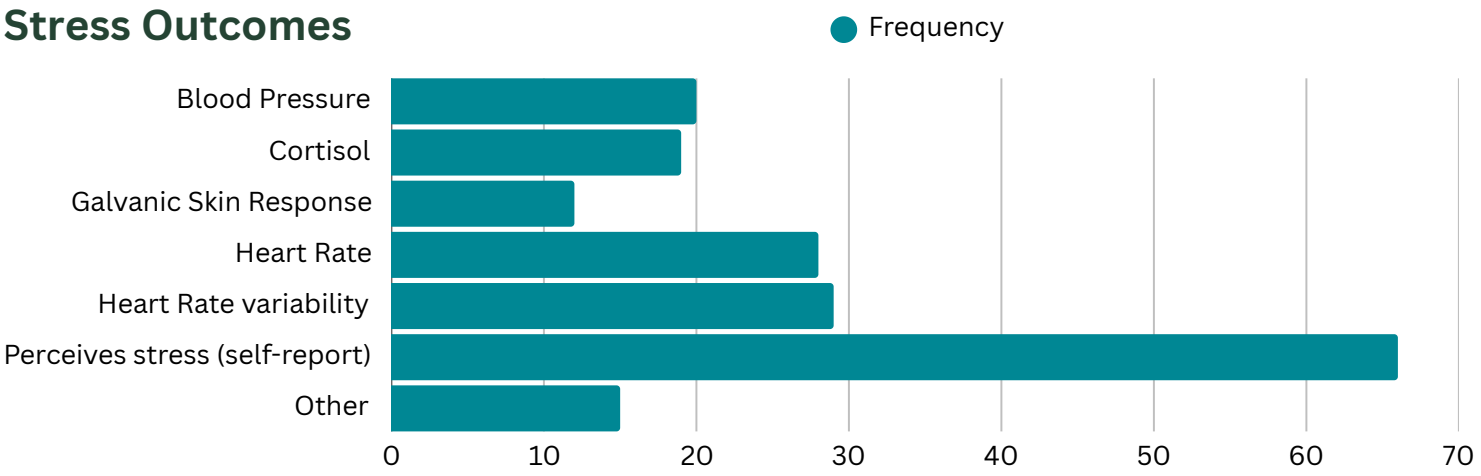


Figure 17. *List of outcomes shown to researchers that fell within the stress/stress physiology category and the associated frequency. Respondents were able to choose multiple outcomes.*

Self-reported perceived stress was the most common stress physiology outcome being measured by researchers. Heart rate variability and heart rate were the second and third most popular, respectively. Blood pressure , cortisol, and galvanic skin response were also options that were chosen by researchers.

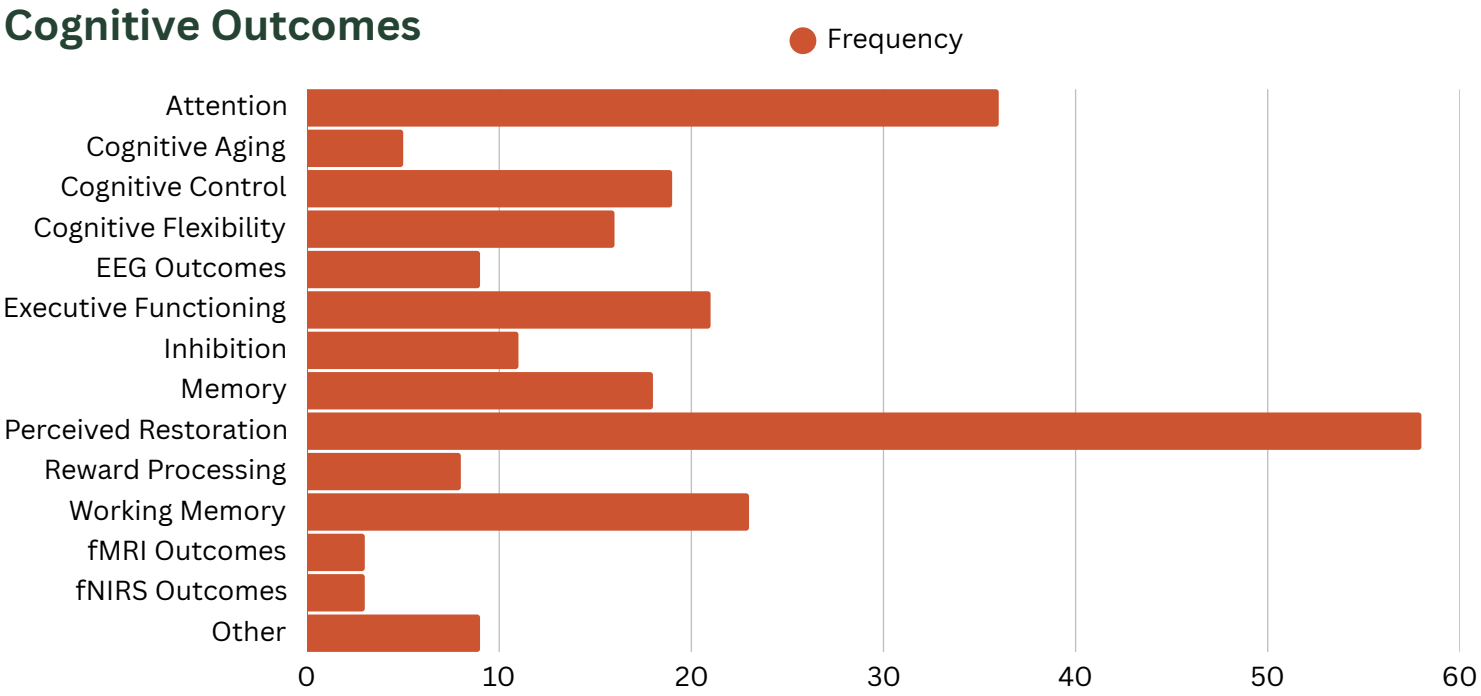


Figure 18. *List of outcomes shown to researchers that fell within the cognitive/cognitive neuroscience category and the associated frequency. Respondents were able to choose multiple outcomes.*

Perceived restoration (the feeling of being mentally and physically refreshed) was overwhelmingly the most common cognitive outcome studied by researchers. Attention and working memory are the second and third most studied outcomes, respectively. It is important to note that perceived restoration is an indirect measurement of cognition, while the other measurements in this grouping are more performance and physiologically based.

Current Research Questions

We collected respondents' descriptions of the research questions they are trying to answer within their research. Different types of questions/foci in the same researcher response were counted as distinct. Single responses that were able to fit into multiple themes were counted more than once. Themes with a large amount of responses were further organized into sub-themes.

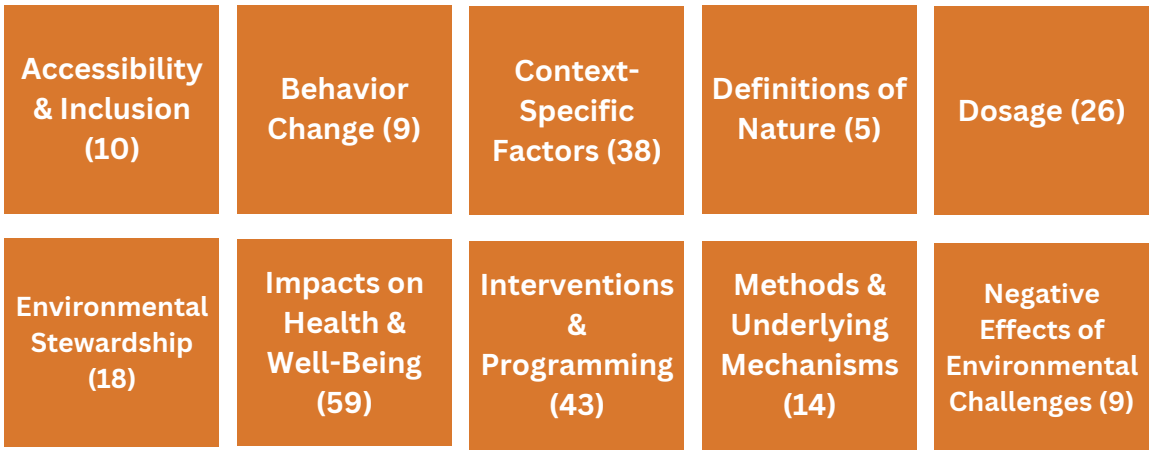


Figure 19. *Researchers were asked what types of research questions they are trying to answer through their research. The data was analyzed to identify common themes and the number of researchers identifying each theme.*

The most common research questions focused on understanding impact of nature on health and well-being outcomes. Within the theme of health and well-being outcomes, common sub-themes included mental health outcomes (20) and cognitive and executive function (11) outcomes. Researchers also mentioned general health and well-being, attention, mother and child development, physical health, public health outcomes, social connections and belonging, and stress as specific health and well-being outcomes.

Researchers also identified investigating the efficacy of nature-based interventions as a common focus of research. Examples of such interventions included nature-based interventions, policies and built environments, education, family and children nature programing, integration into health care, outdoor therapy, and specific types of nature contact and engagement (e.g., differences induced by different modalities).

A significant number of researchers described research questions focused on nuances and individual differences, that were grouped together as 'context-specific factors.' Examples of sub-themes include social identity-based (e.g., focused on patients, LGBTQ+, teachers, etc.), place-based factors (e.g., urban dwellers) , across populations (e.g., increasing diversity, focus on vulnerable/sensitive groups), and across age groups (e.g., college students, children, older adults). The dosage theme refers to research questions focused on how different types of nature and different amounts time and frequency influence the benefits one receives from spending time in nature.

Environmental stewardship research questions focused how time spent in nature influences people's behavior, attitudes and connection with nature. A handful of researchers were also studying the negative effects of environmental challenges on health and well-being (e.g., ecoanxiety, effects of air quality, heat, natural disasters, etc.).

Data Sharing

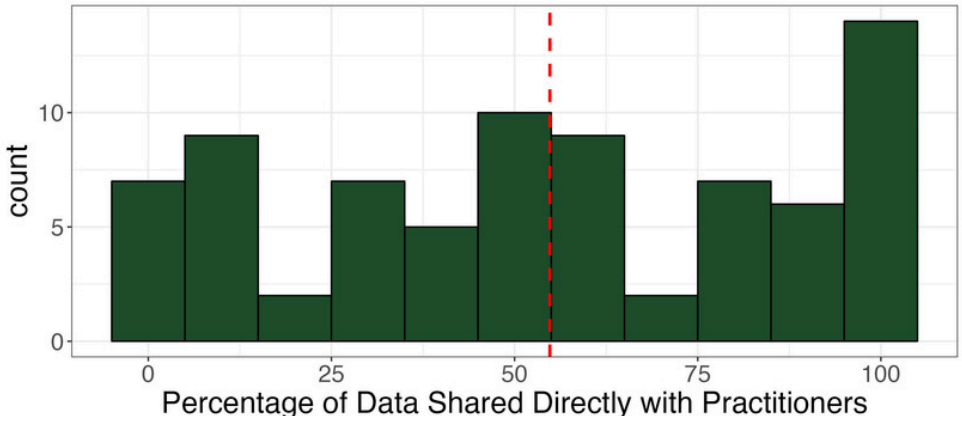


Figure 20. *Researchers were asked what percentage of their peer-reviewed research has been shared via direct communication with practitioners. n = 78*

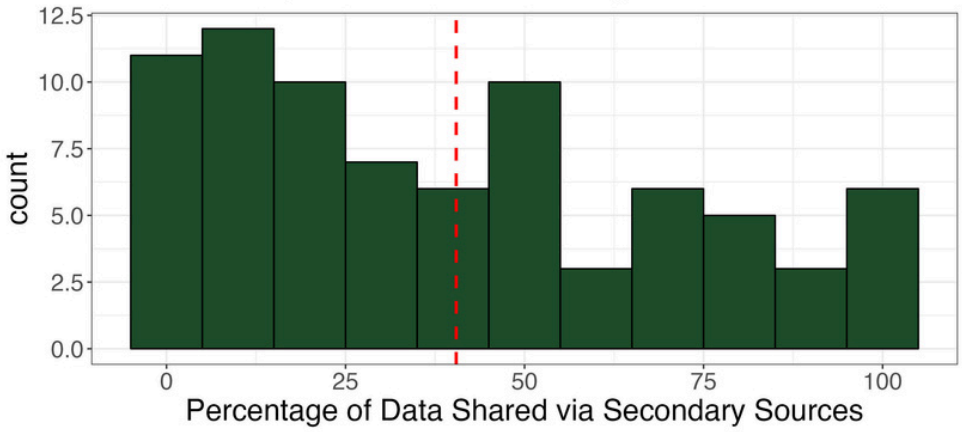


Figure 21. *Researchers were asked what percentage of their peer-reviewed research has been shared via secondary sources. n= 79*

The data suggests that more researchers share their research directly with practitioners than with secondary sources, meaning non-primary or non-academic sources. Figure 20 shows a mean of 55% of their work is shared directly with practitioners while Figure 21 shows a mean of 40% of work shared with secondary sources. Some researchers did not know how/where their work is being shared with practitioners (n=5). Figure 22 outlines the examples of secondary sources that researchers rely on to share their data with practitioners.

Examples

Academic articles (4)	**Communication to donors & funders (3)**	**Community Outreach - speaking & presentations (14)**	**Distributed to personal networks (7)**	**Governing bodies & policymakers (13)**
Newsletters (8)	**Press & news coverage (26)**	**Professional & academic conferences (22)**	**Public science communication platforms (26)**	**Unsure how their data is being shared (5)**

Figure 22. *Researchers were asked to share examples of where their data has been shared via secondary sources and direct communication. Numbers in brackets represent the number of times a theme was mentioned by respondants*

State of the Science

We asked researchers to assess the state of current scientific knowledge in the field of nature and human health and well-being. More specifically, we asked researchers to rate their level of agreement with broad statements about the benefits of nature, and whether sufficient evidence existed to support these statements. The most consensus came from agreement that nature promotes effective stress recovery and improves mental health, cognitive outcomes, and public health outcomes. Many researchers disagreed with the statement that research on nature and health is representative in terms of the diversity of the participants included in the research. There was less consensus around whether nature promotes pro-social behavior and improves pro-environmental outcomes as many researchers indicated it was outside of their area of expertise.

We also asked researchers to explain their level of agreement. Below we show responses to each consensus statement as well as key themes in their qualitative explanation of their consensus ratings (Figures 23-30).

Nature can promote effective stress recovery

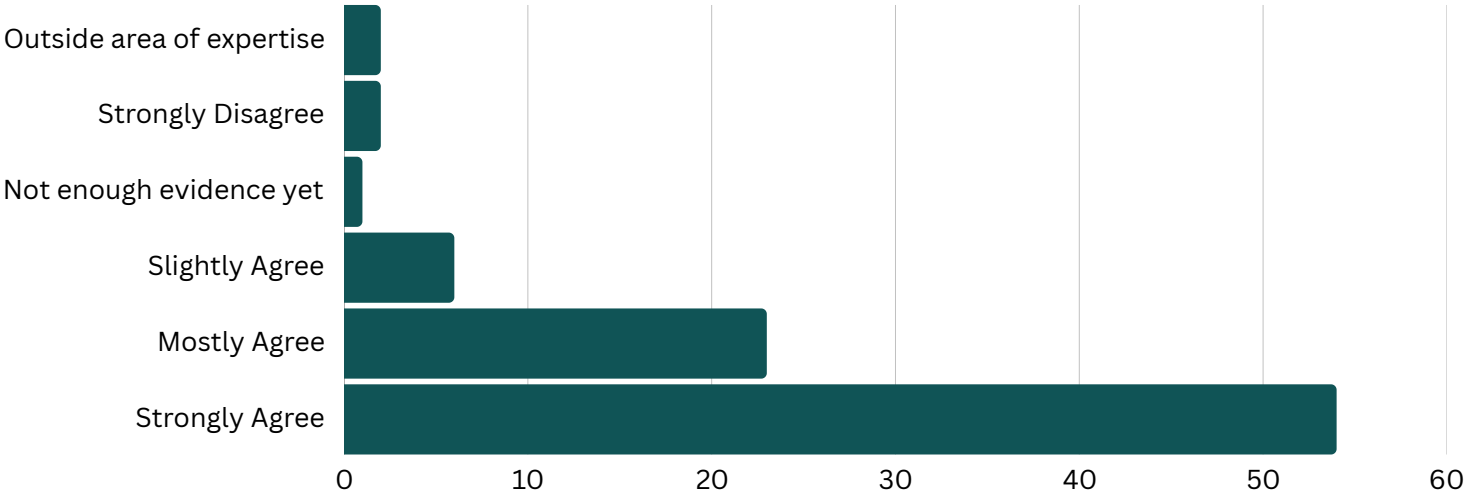


Figure 23. *Researchers were asked to rate their agreement with the following statement: 'Spending time in nature can promote effective recovery from stress.' n = 88*

<u>Key Themes from Explanations:</u>

- There are prominent and well-known theories that support this
- Physiological and psychological data as well as anecdotal evidence to support this
- Variability in nature types used and inconsistencies in experimental design - need better understanding of conditions and measures that show this
- Environmental conditions and personal comfort are very important factors, otherwise nature can induce stress

Nature improves cognitive outcomes

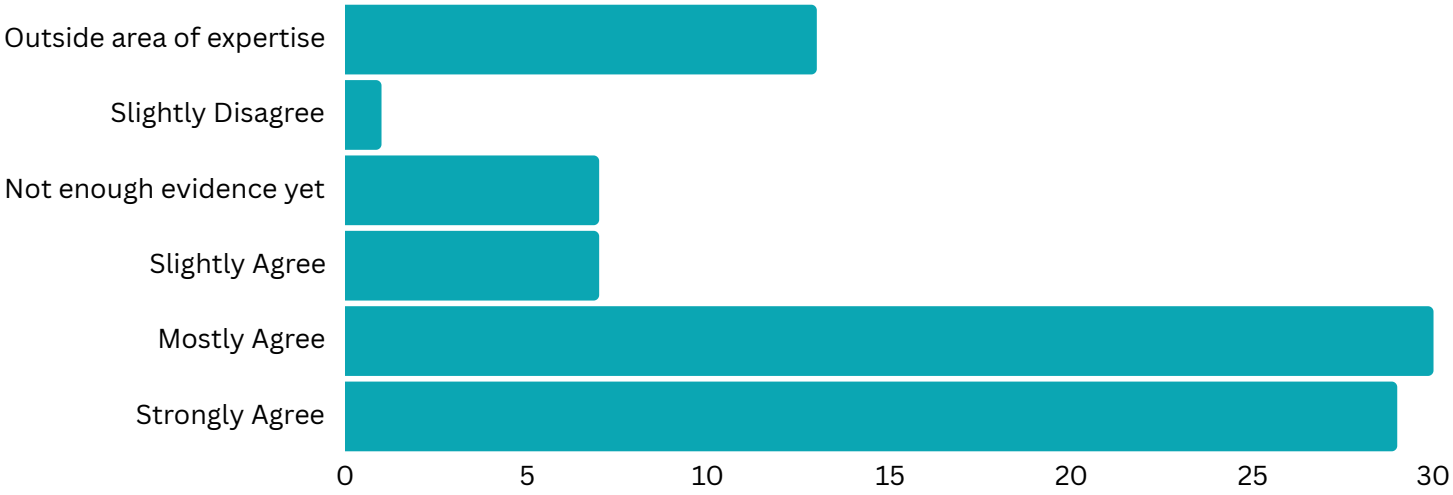


Figure 24. *Researchers were asked to rate their agreement with the following statement: 'Spending time in nature can improve executive functioning/attentional abilities.' n = 87*

Key Themes from Explanations:

- Attention Restoration Theory is widely accepted and has supporting evidence to back it up
- There is variability in outcome measures and methods, so there is a need for consistency in research design and replication of data
- Again, this is individualized and context-specific and depends on the type of nature, comfortability, and state of the person before nature contact
- There is strong evidence for immediate effects, but there are questions around the length and durability of the effect
- Also questions around ability to translate to different populations and types of nature

Nature improves mental health outcomes

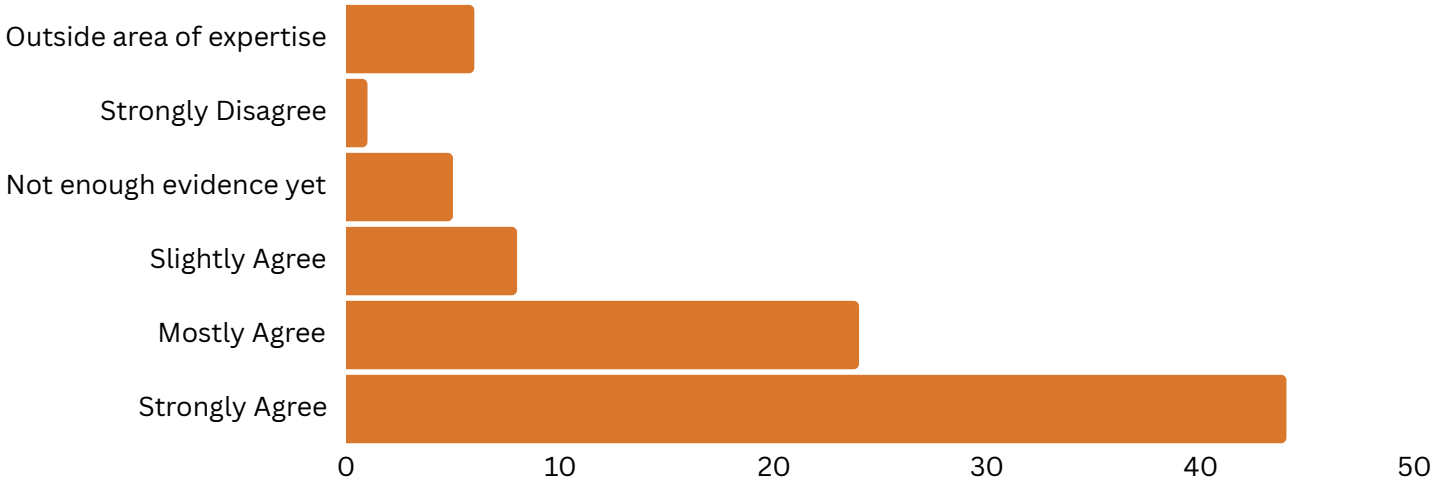


Figure 25. *Researchers were asked to rate their agreement with the following statement: 'Spending time in nature can improve mental health symptomologies in mood disorders (i.e., anxiety, depression).' n = 88*

Key Themes from Explanations:

- Both physiological data and self-report studies support this; strong association in epidemiological literature
- Strong correlation, but more research is needed to investigate causality and the underlying processes
- Also need additional research on individual differences with more diverse/representative research subjects
- Emphasis that nature is a form of symptom management, not a cure, that compliments traditional mental health treatment

Nature promotes pro-social behavior

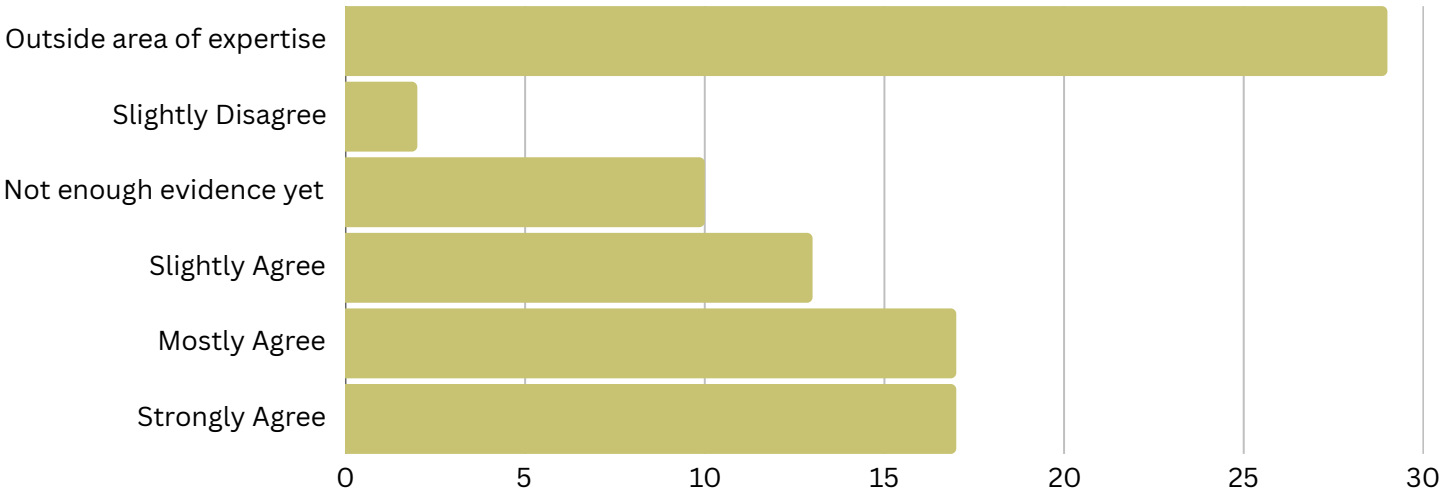


Figure 26. *Researchers were asked to rate their agreement with the following statement: 'Spending time in nature can increase pro-social behavior (e.g., charitable giving, kindness towards others).' n = 88*

Key Themes from Explanations:

- Both empirical and theoretical evidence for this benefit, especially in youth and sense of community outcomes
- But limited understanding of diverse populations, different types of nature and engagement, problems operationalizing, and conducting non-lab studies
- Explanations via other benefits - nature connectedness, stress recovery, affect, cognition

Nature improves pro-environmental outcomes

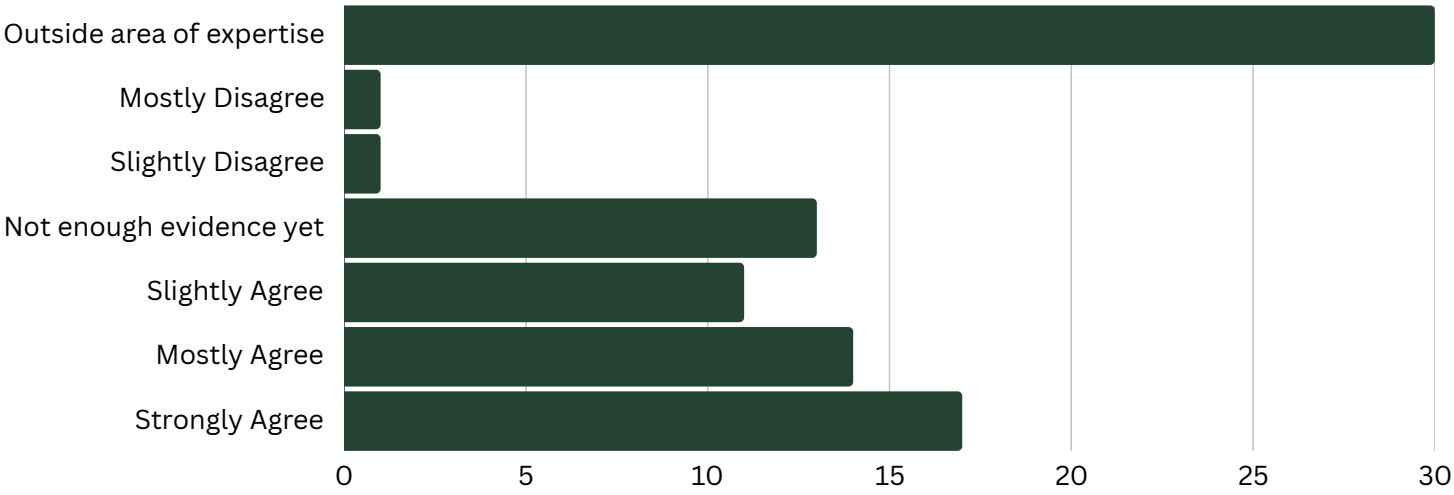


Figure 27. *Researchers were asked to rate their agreement with the following statement: 'Spending time in nature, even without receiving explicit environmental education, can increase pro-environmental behavior.' n = 87*

Key Themes from Explanations:

- Evidence supports this BUT lack of generalizability in study designs and measurements
- Nature connectedness mediates this (is necessary)
- Caveats that were mentioned:
  - Wears off after separation from nature
  - Importance of exposure at young age
  - Contradiction in whether environmental education is needed as well

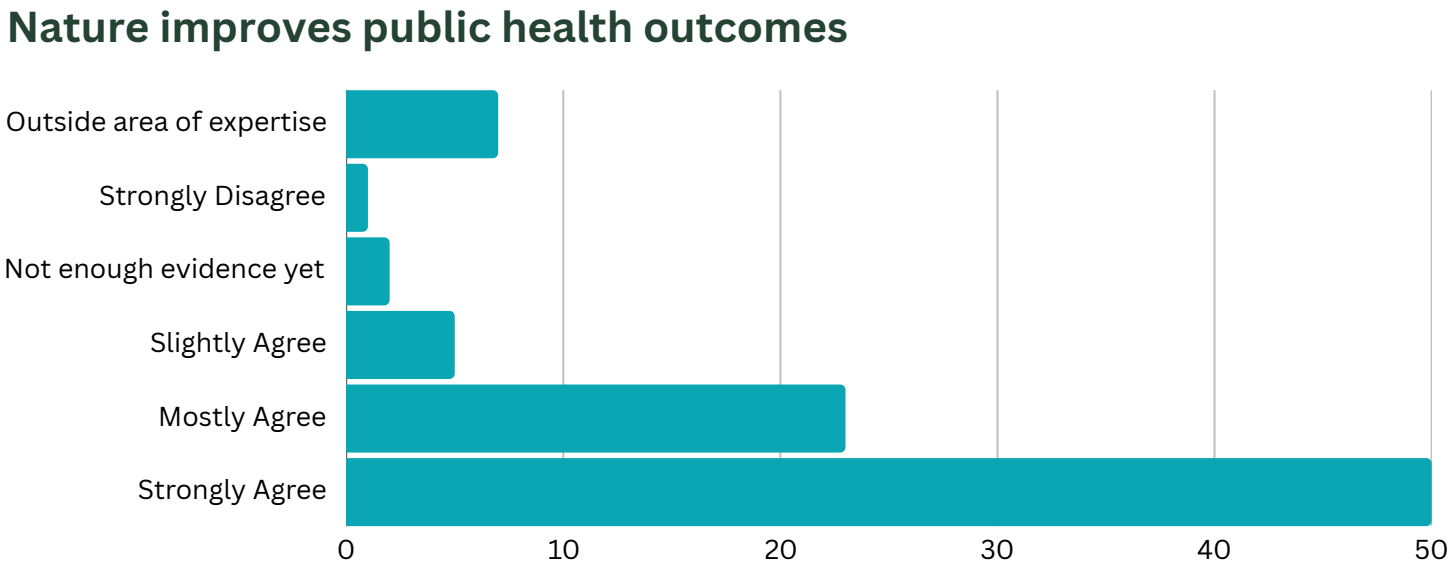


Figure 28. *Researchers were asked to rate their agreement with the following statement: 'Greater green space can lead to better public health outcomes.' n = 88*

Key Themes from Explanations:

- Lots of peer-reviewed studies that support public health benefits, but meta-analyses aren't always conclusive & causal relationship is unclear
- Provided explanations of how access to nature and green space influences people at the individual level which translates to broader public health trends
- Also connected health benefits to ecosystem services (air quality, heat mitigation, etc.)
- BUT there are caveats: depends on place and culture, quality and 'type' of nature, and accessibility of nature/green space
- Priority areas: causal explanations and interactions with other environmental issues (e.g., climate change), types of nature, excluded research populations

Populations studied are representative in terms of participant diversity

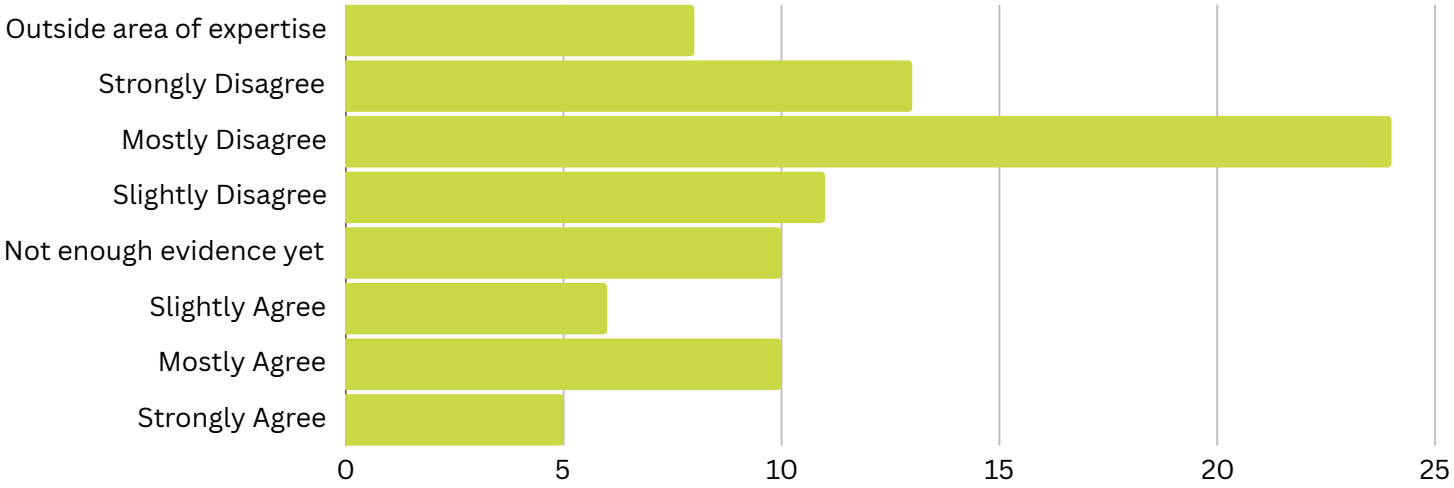


Figure 29. *Researchers were asked to rate their agreement with the following statement: 'Nature and health research includes representative samples (i.e., race, gender, ethnicity, SES, age).' n = 87*

Key Themes from Explanations:

- Lack of representation is a major weakness of the field
- Strong consensus that nature and health research has overrepresented WEIRD populations (white, educated, industrialized, rich, democratic countries)
- Acknowledgement that population-level, or public health studies, have done a better job including diverse populations
- Would like to see an increased focus on racial/ethnic and SES diversity
- Inequities in representation need to be addressed in conjunction with inequities in access to nature, but with legacies of violence and extractive research practices in mind

The most effective nature interventions in terms of 'dosage' has been accurately identified

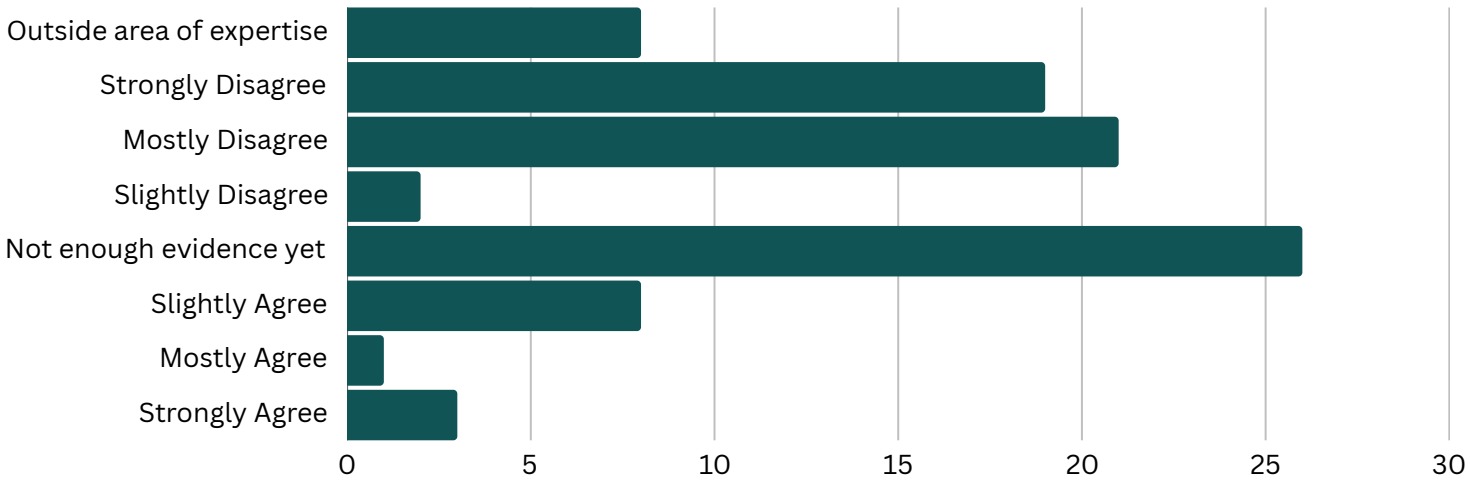


Figure 30. *Researchers were asked to rate their agreement with the following statement: 'The literature has accurately identified the most effective nature interventions in terms of "dosage" (e.g., time, frequency, locations).' n = 88*

Key Themes from Explanations:

- Quite a bit of reference to the White et al. (2019) paper that concludes we need 120 minutes per week of nature contact, but other than that there is little to no evidence identifying dosage
- Depends on the type of outcome you are looking at
- Research is difficult because there is so much variability - type of benefit/outcome, type of nature , different stimuli, different methods and measurements,
- A lot of discourse on whether dosage is a topic that should even be studied, some advocate against it
    - Benefits from nature are highly context-specific and individualized
    - Could be problematic to see time in nature as a transaction
    - Need to consider that benefits come from more than just spending time in nature

Research Now and Going Forward

We asked researchers to reflect on the types of research questions they aim to answer in their research and what questions need to be prioritized in the future. Figure 31 shows the focus of current research (also shown in figure 19, pg 14). Figure 32, shows the future priorities on which respondents think research should focus.

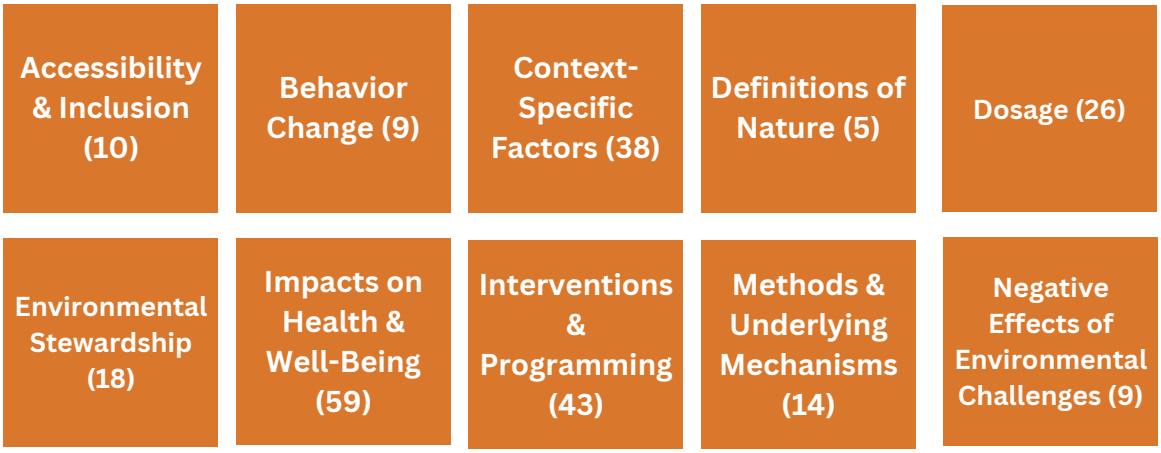


Figure 31. *Researchers were asked what types of research questions they are trying to answer through their research. The data was analyzed to identify common themes and the number of researchers identifying each theme.*

When asked about research priorities for the future, respondents tended to focus on the consolidation of past research, improving methodological rigor, better understanding causal pathways, and how to leverage our research to support real world applications. The 'critiques to current research narrative' theme highlights concerns about current research reducing nature experience to a transaction - namely the concept of dosage - and not placing the importance of nature and health in a broader societal context of the relationship between human and nature.

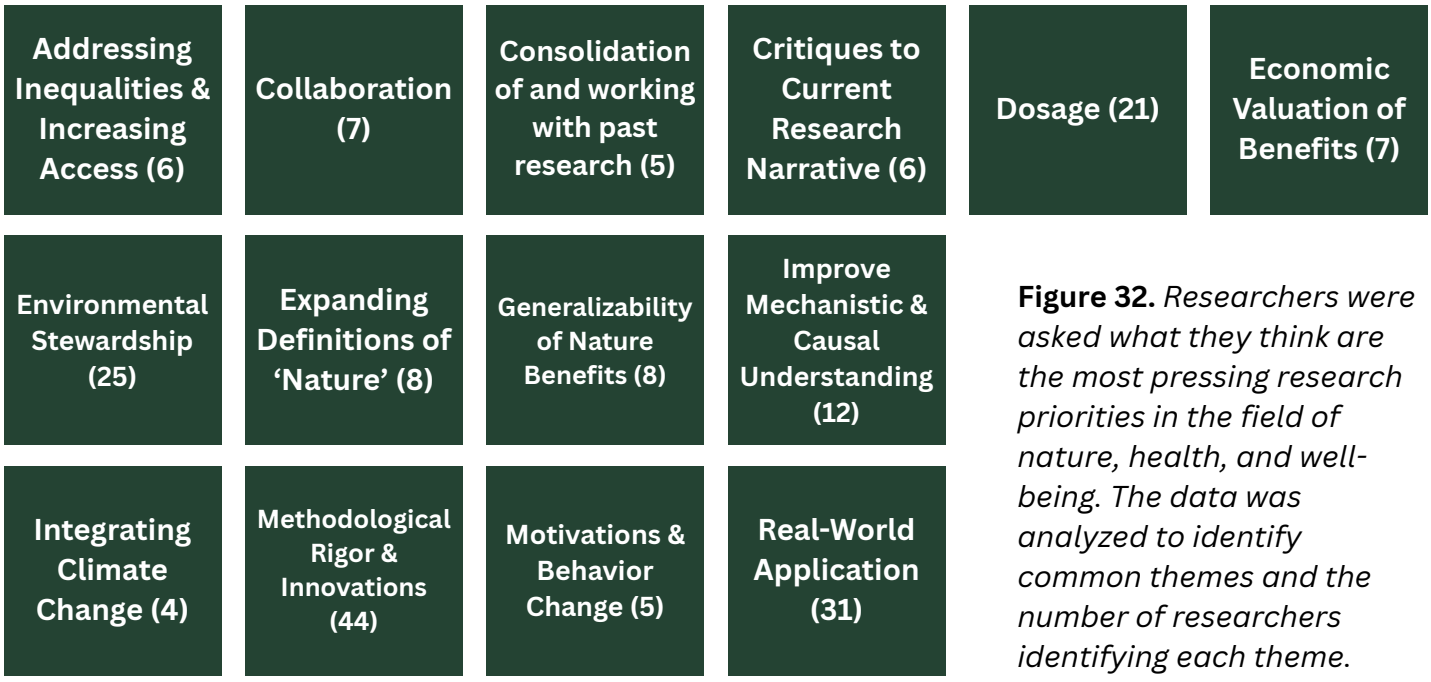


Figure 32. *Researchers were asked what they think are the most pressing research priorities in the field of nature, health, and well-being. The data was analyzed to identify common themes and the number of researchers identifying each theme.*

Collaboration

One of our main goals is to facilitate collaboration between researchers and practitioners. As a result, we asked researchers to reflect on their experiences and perspectives on collaboration with practitioners in their research. The questions aimed at understanding past collaborations, views around opportunities and benefits, as well as challenges and constraints. Most notably, **every respondent indicated they view collaboration with practitioners as beneficial (**e.g., for themselves, for practitioners, for society) and expressed interested in collaborating with practitioners to conduct research about the health and well-being benefits of spending time in nature.

Types of past collaborators

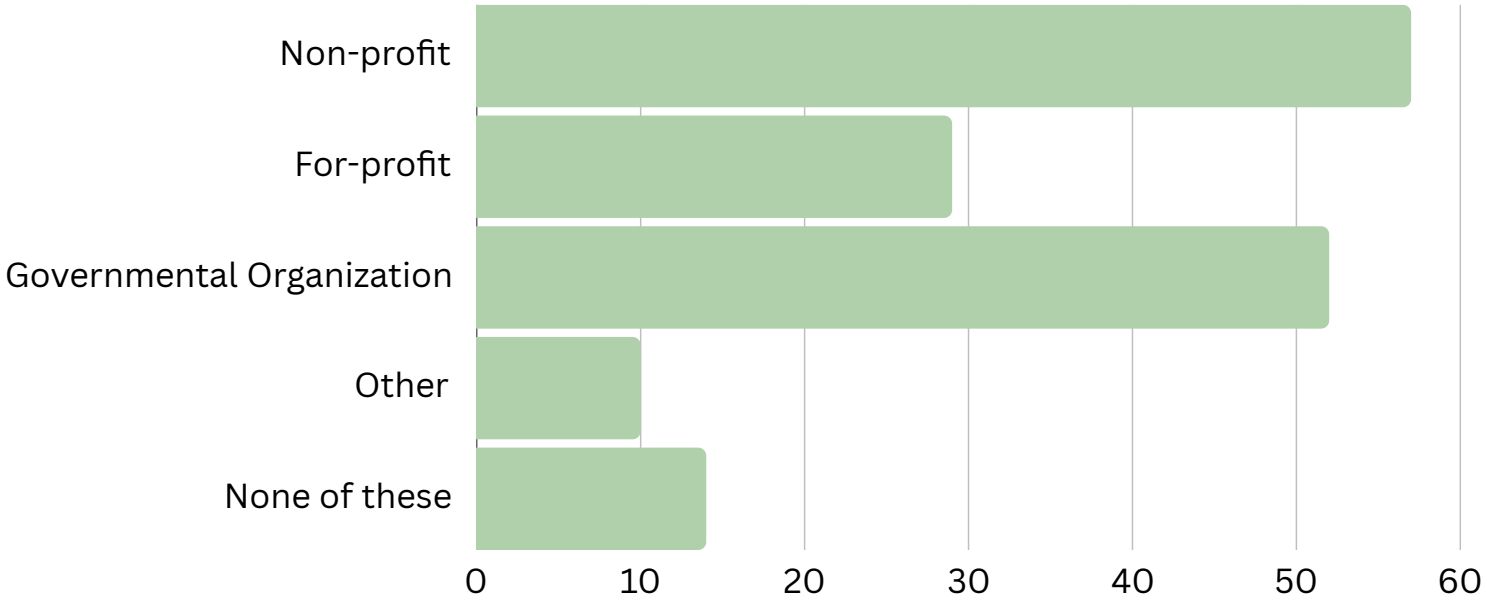


Figure 33. Researchers were asked which groups they have collaborated with in the past. n=87

Practitioners most commonly collaborated with non profits (66%) and governmental organizations was close behind (60%). For-profit gathered 33% of respondents' choices, while 16% indicated they haven't collaborated with any of these groups. The 'other' category (11%) included informal community groups, academic/educational organizations, and health care systems. Respondents were able to select multiple options.

Sectors of past collaborators

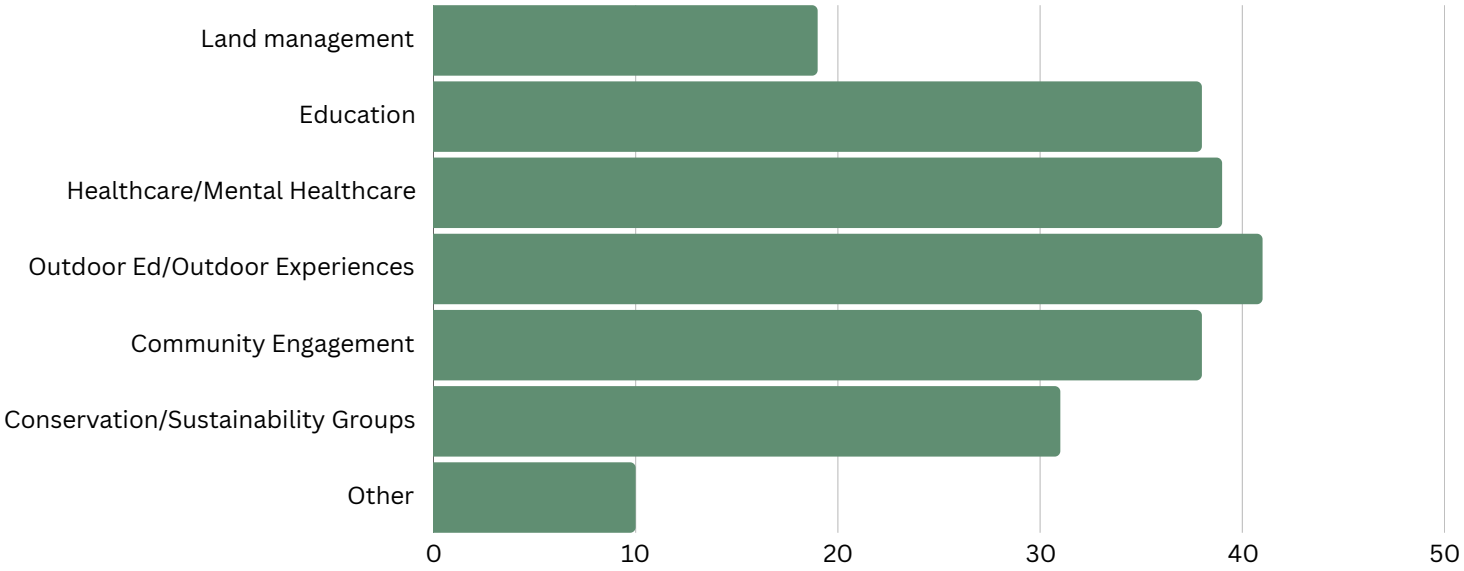


Figure 34. Researchers were asked within what sectors did they collaborate with these groups. n=71

Researchers identified outdoor ed/outdoor experiences as the sector they collaborate with the most (58%). Health care/mental health (55%), community engagement (54%), and education organizations (54%) were also common types of collaborators. Forty-four percent of researchers collaborated with conservation/sustainability group while 27% also identified management organizations as collaborators. Some examples of sectors mentioned in the 'other' category include the private sector, government policymakers, parks and recreation, public health, and urban planning.

How collaboration happens

Figure 35. Researchers were asked in what ways have they collaborated. Respondents were able to select multiple options. n=73

We also asked researched to qualify their collaboration, in other words, what were they doing with a practitioner in these collaborations. The most common type of collaboration involved giving a talk, with 81% of respondents choosing this option. Other answers included providing resources (52%), conducting a study with practitioner programming and participants (55%), supporting program development (56%), providing a training (42%), co-creating a study (42%), and supporting program evaluation (44%). Some examples from the 'other' category include government or institutional briefings, attended the practitioner's training, written grants, commented on policy proposals, and more.

Implications & Next Steps

The synthesis of the data from our survey with nature and health researchers points to important strengths and gaps in the current state of science in the nature and human health and well-being field as well as collaboration between researchers and practitioners. Furthermore, there are some important implications for both practice and research in the field of nature, health, and well-being. Key insights are listed below.

- **The field of nature, health, and well-being is largely interdisciplinary, with psychology playing a dominant role.** It should be noted that our participants were skewed towards respondents from academic institutions and US-based researchers.

- **Researchers are answering a wide variety of research questions utilizing a diversity of methods.** This speaks to the interdisciplinary nature of the work in this field. It also creates opportunities and challenges for sharing work in peer reviewed journals and conferences that have a thematic focus.

- While we found that **researchers are focused on a variety of benefits,** it is also apparent that **we need to be clear about how we're measuring these benefits** due to the overlap and diversity of ways to talk about and operationalize them. This was most notable in the cognitive and mental health outcome categories, which contain many different ways to measure those benefits.

- Similarly, **much of the current research is focused on what benefits individuals are receiving and the application of nature-based interventions and programming**. However, the diversity and number of types of nature-based interventions means that **the amount of research supporting the use of one particular intervention or another is unclear**.

- Overall, the researchers surveyed **recommend moving away from finding evidence to support the benefits of nature on health and well-being more generally and move toward the understanding of why**. In other words, shifting from 'do we know that nature benefits us' to 'how, when, and why does nature benefit us' and 'how do we leverage these benefits to support society.'

In addition to these key insights, we found indicators of consensus on some important benefits to human health and well-being.

- There appears to be a **general consensus that there is enough evidence to claim that nature leads to benefits in stress, cognition, mental health, and public health.** It should be noted that nature should not replace traditional mental health care, but rather act as supplementary care.

- Across our sample **there was less consensus about pro-social benefits and pro-environmental behavior, with higher percentages of respondents choosing "outside of my expertise" for those questions**. However, there was a trend towards agreement of nature's positive effect on these outcomes as well. This raises important questions around if there is a need for recruitment of more researchers with relevant backgrounds conducting studies on those outcomes or if they are bad options for outcomes that could be improved upon as a field.

Our findings also identify some priority areas for future research

- Researchers surveyed **recommend studying diverse populations and types of nature engagement while keeping a focus on real-world application**. There is a lack of representation of diverse communities in participant samples and as a focus of research. This gap presents a limitation in the ability to generalize data and a crucial component in the work to support underserved communities.

- Respondents also highlighted **the importance of how we define nature and "what counts" as nature**, but without much consistency on raising that topic or context in how they discussed it.

- While **some argue that the concept of 'dosage' is important, others feel that there is too much variability**, making the ability to identify the 'right' or 'proper' dosage to be a doubtful prospect. **Other respondents argued that the idea of dosage is an inherently problematic concept** that leads to reductions of nature experience, and therefore, shouldn't be a priority for future research.

There is an overwhelming consensus from researchers that collaborating with practitioners is important, that they want to do it, and that they see the benefits that could be gained. However, they were less clear about what collaboration looks like. Many respondents reported that they are sharing data with practitioner and other non-researcher audiences which is crucial, but low on the scale of collaborative behavior. Quite a few researchers also reported that they are co-developing studies and supporting program development and evaluation for practitioners, which could be seen as higher on the ladder of collaboration. Our findings demonstrate that we need to learn more about the barriers and constraints of these researcher-practitioner collaborations.

Next steps in our needs assessment include:

- Interviews with researchers, where we'll ask for their reaction to the findings of the researcher survey and their perspective on and experiences with collaboration with practitioners
- Piloting a curriculum for practitioners aimed at increasing the capacity for their organizations to evaluate and assess their programming
- Piloting a research database that will contain resources for practitioners to gather data on benefits and input that data back into the database for nature and health researchers to utilize
- Create a report that outlines best practices for collaboration based on the interview data from researchers and practitioners

Interested in learning about the next phases of our assessment and resource development? Visit our website!