

SUPPLEMENTARY INFORMATION

CATEGORIZING PERSPECTIVES ON ENVIRONMENTAL COMMUNICATION

SI Table 1. Codebook for statement categorization, Krippendorff's alpha (α) = 0.8035

Information provision	Information provision (one-way; also, education, raising awareness, understanding, accessibility and usability)
Connections & information exchange	Building connections between people and/or communities (relationships, networks, coalitions); information exchange (two-way; also, conversations, dialogue)
Decision-making	Decision-making (public decision-making or policymaking); *decision is a key word, unless the focus of the action is not on the decision or decision-maker, but some other aspect of the communication process
Knowledge production	Production or creation of science and scientific knowledge, including improving the practice of science
Emotion	Emotional engagement; must specifically use the word emotion
Behavior & cultural change	Individual behavior change at either the individual or societal level; cultural or other societal change
Advocacy	Political or issue advocacy, including policy change; e.g., promoting specific political or scientific issues with the public; subjectivity is implied
Training	Training scientists to communicate with lay audiences *note, the objective must be better communication, not some other goal that would potentially fall into a different category
Strategic approach	Strategic approach (audience information, evaluation, lack of strategic approach)
Ethics & rules	Rules, either ethical or otherwise, that are internalized as to what the person can or cannot do, or that are institutionally mandated (no rules on allowed communication, some general institutional guidelines, some advocacy, stick to the science, honest broker)

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SI Box 1. In the first sorting step, conducted online, respondents were asked to move each of the 48 statements of research needs into one of three categories based on their level of interest in learning the information.

The following list consists of 48 statements derived from the interviews that we conducted with you over the last two months.

Thinking of your role and the context in which you work, which statements seem most similar to or different from your own views? Please categorize the statements as those that are "most different from my view," "neither different nor similar," and "most similar to my view."

1) Drag each statement on the left into one of the boxes on the right.

2) When you have moved all the statements into one of the three boxes, please click on the arrow to take you to the next page.

Note: Please move all the statements into one of the boxes on the right. The next questions build on this rating. You will not be able to move forward until the rating is complete. If you wish to end the survey, simply exit the webpage. You will be able to comment on the process after completing the rating.

Statements

I create spaces for the academic community and the decision making community to come together for effective dialogue.

Most different from my view

Neither different nor similar

Most similar to my view

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SI Box 2. In the second sorting step, respondents were given instructions on how to place the research needs statements into one of nine categories, ranging from “most different from my view” to “most similar to my view.”

Thank you for telling us which statements are most similar to your own views. **Please further divide the statements from your first sort into each of the nine boxes below.** The categories range from "most different from my view" to "most similar to my view."

Please move all the statements into one of the boxes on the right, making sure that the correct number of statements is in each box (4, 5, 6, or 8). You can easily see which statements are in each box by clicking on “expand all.” As you move the statements, the total count will be reflected on the label above the box (e.g., “1 of 4 statements”). You may move statements between boxes on the right as you make your final choices. If you need to move a statement to a location that is not visible on the screen, pull it into the box closest to your desired location, then scroll the screen to make the statement and new box visible, and finally pull the statement into position.

Note: We understand that it may be hard to make distinctions between some of the statements. You also may wish you could place more statements into some of the boxes than allowed. Please rate the statements to the best of your ability. You will be able to comment on the process at the end. You will not be able to move forward until the rating is complete. If you wish to end the survey, simply exit the webpage.

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SI Box 3. In the second sorting step, respondents completed the ranking by moving the previously categorized statements into nine groups with more specific labels.

Most different from my view
(0 of 4 statements)

Most different from my view

It is my job to interface with the public.

Very different
(0 of 5 statements)

Moderately different
(0 of 5 statements)

Snipping Tool

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SI Table 2. Additional questions asked during the ranking exercise about the respondent

Before ranking the statements, please help us in characterizing your work and your organizational role.

Which of the following environmental issues do you address in your work? [CHECK ONE OR MORE]

Climate change

Land use

Oceans

Energy

Chemicals, toxics and/or heavy metals

Fisheries

Water

Air pollution

Deforestation

Biodiversity

Waste management

None of the above (Please comment below)

How would you describe yourself? [CHECK ONE OR MORE]

Academic

Journalist

Practitioner

Policymaker

Educator

Manager

Researcher

Trainer

Organizer

Scientist

Capacity builder

Other (Please write)

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SI Table 3. Additional questions asked during the ranking exercise about respondent preferences for terms

The terms below are those that we heard from you and your colleagues in the interviews.

How likely—or unlikely—would you be to use these terms in describing the communication-related dimensions of your own work?

	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely
Education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Persuasion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advocacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mobilization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engagement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

And these?

	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely
Communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informing decision-making	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Behavior change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dialogue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Outreach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Again, how likely—or unlikely—would you be to use these terms in describing the communication-related dimensions of your own work?

	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely
Public participation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collaboration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consensus building	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Journalism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Deliberation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

And these?

	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely
Boundary spanning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Co-production of knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advisory services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Extension	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="text"/>				

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SI Table 4. Workshop questions, Day 1

- Does each perspective make sense to you? Why/why not?
- Is there anything you would change about the way it is written?
- Are there perspectives that are missing? What are they?

- What are the dilemmas that you face in communicating on environmental issues?
- What specific examples would you like to share?
- How are these dilemmas perhaps unique to this perspective?

- What types of graduate programs educate students on the types of dilemmas--and necessary skill sets--just described?
- What courses should be included?
- What research or practicums should students engage in?

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SI Table 5. Shifts in perspectives in re-analysis

	REVISED ANALYSIS	ORIGINAL	
CIG007	0	3	*Closest factor remains the same
CIG026	0	2	*Closest factor remains the same
CIG032	0	2	*Closest factor remains the same
CIG036	0	0	
CIG037	0	3	*Closest factor remains the same
CIG005	1	1	
CIG018	1	1	
CIG023	1	0	*Not assigned to a factor originally
CIG028	1	1	
CIG031	1	1	
CIG041	1	1	
CIG016	2	2	
CIG017	2	2	
CIG027	2	0	*Not assigned to a factor originally
CIG033	2	2	
CIG035	2	2	
CIG008	3	0	*Not assigned to a factor originally
CIG019	3	3	
CIG040	3	3	
CIG010	4	4	
CIG012	4	4	
CIG013	4	4	
CIG034	4	4	
CIG038	4	4	

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SI Table 6. Factor solution characteristics

	F1	F2	F3	F4
Average reliability coefficient	0.8	0.8	0.8	0.8
Number of loading Q-sorts	6	5	3	5
Eigenvalues	3.74	2.82	2.59	2.58
Percentage of explained variance	15.57	11.75	10.8	10.74
Composite reliability	0.96	0.95	0.92	0.95
Standard error of factor scores	0.2	0.22	0.28	0.22
Negatively loading Qsorts	1			
Non-significant Qsorts	5			

Table 7. Respondent self-described roles in each of the perspectives

	Did not load (<i>n</i> =5)		F1 (<i>n</i> =6)		F2 (<i>n</i> =5)		F3 (<i>n</i> =3)		F4 (<i>n</i> =5)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Scientist	1	20.0%	1	16.7%	1	20.0%	3	100.0%	0	0.0%
Researcher	2	40.0%	1	16.7%	2	40.0%	2	66.7%	2	40.0%
Academic	2	40.0%	2	33.3%	3	60.0%	2	66.7%	3	60.0%
Educator	1	20.0%	2	33.3%	3	60.0%	1	33.3%	2	40.0%
Journalist	0	0.0%	0	0.0%	1	20.0%	0	0.0%	0	0.0%
Capacity builder	1	20.0%	3	50.0%	2	40.0%	1	33.3%	2	40.0%
Manager	2	40.0%	0	0.0%	2	40.0%	2	66.7%	1	20.0%
Trainer	0	0.0%	2	33.3%	1	20.0%	0	0.0%	0	0.0%
Organizer	0	0.0%	1	16.7%	0	0.0%	0	0.0%	2	40.0%
Policymaker	1	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Practitioner	2	40.0%	2	33.3%	2	40.0%	1	33.3%	3	60.0%
Other	1	20.0%	1	16.7%	1	20.0%	1	33.3%	1	20.0%

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SI Table 8. Terms that perspective members say they would be likely to use to describe the communication-related dimensions of their work.

	Did not load (n=5)		F1 (n=6)		F2 (n=5)		F3 (n=3)		F4 (n=5)	
	n	%	n	%	n	%	n	%	n	%
Communication	5	100.0%	6	100.0%	5	100.0%	3	100.0%	5	100.0%
Engagement	5	100.0%	6	100.0%	4	80.0%	3	100.0%	5	100.0%
Collaboration	5	100.0%	6	100.0%	3	60.0%	3	100.0%	5	100.0%
Public participation	4	80.0%	2	33.3%	3	60.0%	3	100.0%	5	100.0%
Outreach	4	80.0%	5	83.3%	3	60.0%	3	100.0%	5	100.0%
Dialogue	5	100.0%	3	50.0%	3	60.0%	2	66.7%	4	80.0%
Mobilization	2	40.0%	3	50.0%	0	0.0%	2	66.7%	4	80.0%
Advocacy	1	20.0%	3	50.0%	0	0.0%	3	100.0%	4	80.0%
Co-production of knowledge	2	40.0%	5	83.3%	3	60.0%	2	66.7%	4	80.0%
Informing decision-making	5	100.0%	5	83.3%	3	60.0%	3	100.0%	3	60.0%
Behavior change	3	60.0%	4	66.7%	2	40.0%	3	100.0%	3	60.0%
Education	5	100.0%	6	100.0%	5	100.0%	2	66.7%	3	60.0%
Boundary spanning	3	60.0%	5	83.3%	2	40.0%	0	0.0%	3	60.0%
Persuasion	2	40.0%	2	33.3%	0	0.0%	2	66.7%	2	40.0%
Deliberation	1	20.0%	1	16.7%	1	20.0%	1	33.3%	2	40.0%
Consensus building	3	60.0%	2	33.3%	1	20.0%	2	66.7%	1	20.0%
Advisory services	3	60.0%	2	33.3%	3	60.0%	2	66.7%	0	0.0%
Extension	1	20.0%	2	33.3%	3	60.0%	2	66.7%	0	0.0%
Journalism	0	0.0%	1	16.7%	3	60.0%	0	0.0%	0	0.0%
Other	1	20.0%	0	0.0%	0	0.0%	1	33.3%	1	20.0%

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SI Table 9. Factor loading matrices

	F1	F2	F3	F4
CIG027	-0.2679	0.4239*	-0.0495	0.2288
CIG038	0.0984	0.1227	0.0914	0.5951*
CIG034	-0.0798	0.0093	0.1137	0.6619*
CIG032	0.1825	0.1267	0.3179	0.2763
CIG041	0.7997*	0.2545	0.1871	-0.1228
CIG008	-0.1835	0.1959	0.4935*	0.0437
CIG016	0.1179	0.5427*	0.0765	0.1048
CIG031	0.7115*	-0.121	0.0473	0.1365
CIG018	0.6749*	0.0080	0.3211	0.3747
CIG012	-0.0579	0.3002	0.0058	0.5552*
CIG033	-0.0496	0.7692*	0.1819	0.0371
CIG023	0.603*	0.1622	0.3211	0.2993
CIG017	0.3887	0.7506*	-0.0475	0.1209
CIG035	0.1702	0.5447*	0.4371	-0.1538
CIG019	0.1288	-0.0946	0.5115*	0.0886
CIG013	0.3430	-0.1743	-0.0766	0.5560*
CIG007	-0.2037	-0.1519	-0.2111	0.1797
CIG005	0.6411*	0.4159	-0.3017	-0.0289
CIG040	0.0031	0.0346	0.7476*	-0.0357
CIG037	0.4097	0.2921	0.492	-0.1295
CIG026	0.1391	0.4494	0.3942	0.2177
CIG010	-0.0064	0.0810	-0.0564	0.7198*
CIG036	0.5745	0.3081	0.5157	0.0828
CIG028	-0.5602*	0.0527	0.3445	0.3014

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SI Table 10. This factor array represents the four perspectives of respondents.

#	Category	Statement	F1	F2	F3	F4
1	Advocacy	I generate public interest about urgent issues.	-4	0	-2	0
2	Advocacy	I help get public support for policy solutions.	-3	-4	-2	0
3	Behavior & cultural change	Behavior change is a key outcome rather than attitudes.	-1	-3	2	-1
4	Behavior & cultural change	I help people learn to live more sustainably.	-3	-3	-1	-2
5	Connections & information exchange	I view the goal as creating longer term relationships.	4	2	-2	4
6	Connections & information exchange	It is my job to interface with the public.	-2	2	-4	2
7	Connections & information exchange	I seek to engage participation from the public.	-1	-1	1	1
8	Connections & information exchange	I facilitate consensus building—getting everyone into the same frame with respect to a problem.	-1	-3	-3	-2
9	Connections & information exchange	I grow networks.	3	0	-4	4
10	Connections & information exchange	Through communication, I help build credibility.	2	2	0	3
11	Behavior & cultural change	My big goal is changing culture.	0	-3	1	4
12	Behavior & cultural change	I create experiences that support cultural change.	-1	-3	0	3
13	Decision-making	My work supports sound policymaking.	2	0	4	1
14	Decision-making	I engage decision-makers.	1	3	3	0
15	Decision-making	I provide information and tools that will empower people to make decisions.	0	1	3	2
16	Decision-making	I improve the scientific basis of decision-making.	2	-2	4	-3
17	Emotion	I don't produce content; I elicit an emotion.	-1	-2	-4	-4
18	Emotion	I try to touch an emotional chord.	-2	-1	-3	1
19	Ethics & rules	I am supposed to be neutral. I do not advocate.	1	4	-3	-3

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20	Ethics & rules	Everything I do has to be evidence-based.	1	0	3	-1
21	Ethics & rules	I have tremendous freedom in terms of how I engage with the public and how I communicate on issues.	-2	4	-2	3
22	Ethics & rules	There are communication guidelines that I have to follow.	1	-1	3	-2
23	Ethics & rules	I can engage in advocacy, up to some limits.	-3	-4	-1	1
24	Ethics & rules	I stick to the science. I don't interject my own personal feelings.	-2	1	2	-4
25	Ethics & rules	I serve in the role of an honest broker. The information I provide needs to be balanced and representative.	2	2	-1	0
26	Connections & information exchange	I help my organization engage in public conversations.	0	1	0	0
27	Connections & information exchange	I create spaces for the academic community and the decision-making community to come together for effective dialogue.	3	-1	0	0
28	Information provision	I educate students and teach them about science.	-4	0	3	-3
29	Strategic approach	The most important thing is to generate exposure and attention.	-4	0	-1	-2
30	Information provision	The purpose is to get public buy-in for the information that I'm putting out.	-3	-4	1	-2
31	Information provision	I translate knowledge and technical information into terms that the general public can understand.	0	4	2	1
32	Information provision	I ensure that information is accessible and usable by a broad audience.	0	3	2	2
33	Information provision	Jargon makes the communication process more difficult, so I focus on plain language.	1	3	4	3
34	Information provision	I personally try to do an effective job in communicating science.	-2	4	4	-1
35	Information provision	I help people understand these issues.	-1	3	0	2
36	Information provision	I look to provide learning opportunities.	0	1	2	2
37	Knowledge production	I help diverse disciplines to work together more effectively with stakeholders to produce knowledge.	4	1	1	0

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38	Knowledge production	I support communities' rights to benefit from and participate in the creation of scientific knowledge.	0	-2	0	4
39	Knowledge production	I improve the practice of science through building communication and collaboration skills.	3	0	1	-1
40	Strategic approach	A very important step to take is to do a very solid and thorough analysis of the audience.	3	2	0	1
41	Strategic approach	I focus on public opinion.	-3	-4	-1	-4
42	Strategic approach	I contribute an understanding of how people think and act.	0	-1	-3	3
43	Strategic approach	I do anything that works; it just depends on the context.	-4	-2	-1	-1
44	Strategic approach	The goal is to improve program efficacy.	1	-2	-3	-4
45	Strategic approach	What you create should come out of an identified need.	2	0	1	0
46	Strategic approach	I try to connect information generation to better program outcomes.	3	-1	-2	-3
47	Training	I work with scientists to help them communicate to other audiences.	4	3	0	-1
48	Training	I help give scientists the resources and the skill sets needed to communicate.	4	1	-4	-3

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SI Table 11. Perspective 1 highest and lowest statements, and higher and lower rankings

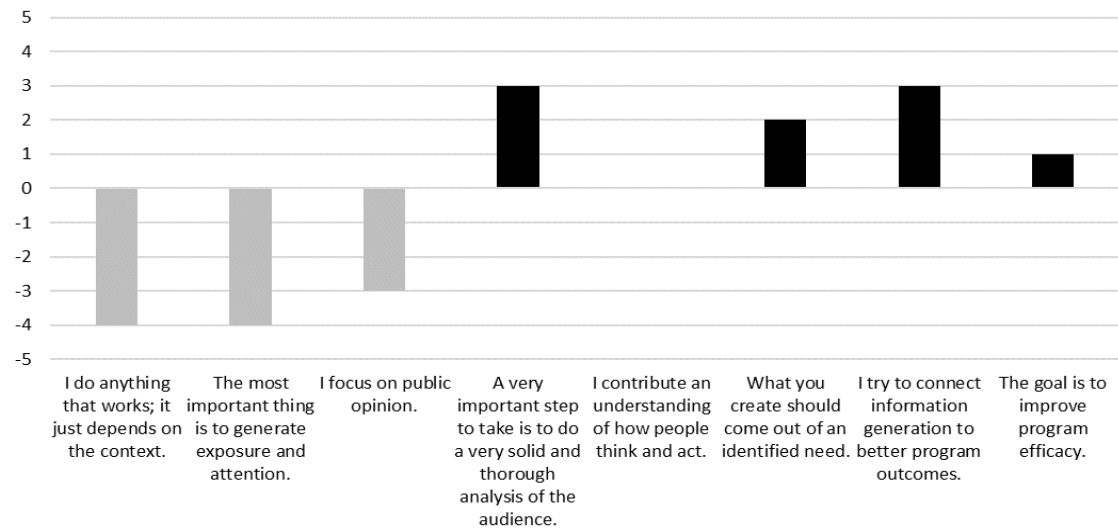
Highest ranked statements			
4	5	Connections & information exchange	I view the goal as creating longer term relationships.
4	37	Knowledge production	I help diverse disciplines to work together more effectively with stakeholders to produce knowledge.
4	47	Training	I work with scientists to help them communicate to other audiences.
4	48	Training	I help give scientists the resources and the skill sets needed to communicate.
Lowest ranked statements			
-4	1	Advocacy	I generate public interest about urgent issues.
-4	28	Information provision	I educate students and teach them about science.
-4	29	Strategic approach	The most important thing is to generate exposure and attention.
-4	43	Strategic approach	I do anything that works; it just depends on the context.
Ranked higher than other perspectives			
-1	8	Connections & information exchange	I facilitate consensus building—getting everyone into the same frame with respect to a problem.
-1	17	Emotion	I don't produce content; I elicit an emotion.
3	27	Connections & information exchange	I create spaces for the academic community and the decision-making community to come together for effective dialogue.
4	37	Knowledge production	I help diverse disciplines to work together more effectively with stakeholders to produce knowledge.
3	39	Knowledge production	I improve the practice of science through building communication and collaboration skills.
3	40	Strategic approach	A very important step to take is to do a very solid and thorough analysis of the audience.
1	44	Strategic approach	The goal is to improve program efficacy.
2	45	Strategic approach	What you create should come out of an identified need.
3	46	Strategic approach	I try to connect information generation to better program outcomes.
4	47	Training	I work with scientists to help them communicate to other audiences.
4	48	Training	I help give scientists the resources and the skill sets needed to communicate.
Ranked lower than other perspectives			
-4	1	Advocacy	I generate public interest about urgent issues.
0	15	Decision-making	I provide information and tools that will empower people to make decisions.
-4	28	Information provision	I educate students and teach them about science.

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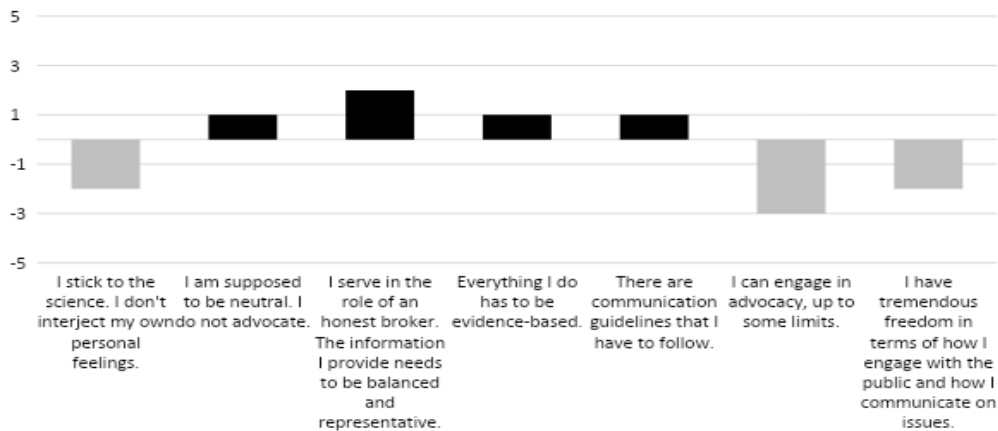
-4	29	Strategic approach	The most important thing is to generate exposure and attention.
0	31	Information provision	I translate knowledge and technical information into terms that the general public can understand.
0	32	Information provision	I ensure that information is accessible and usable by a broad audience.
1	33	Information provision	Jargon makes the communication process more difficult, so I focus on plain language.
-2	34	Information provision	I personally try to do an effective job in communicating science.
-1	35	Information provision	I help people understand these issues.
0	36	Information provision	I look to provide learning opportunities.
-4	43	Strategic approach	I do anything that works; it just depends on the context.

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SI Figure 1. Perspective 1 strategy



SI Figure 2. Perspective 1 ethics



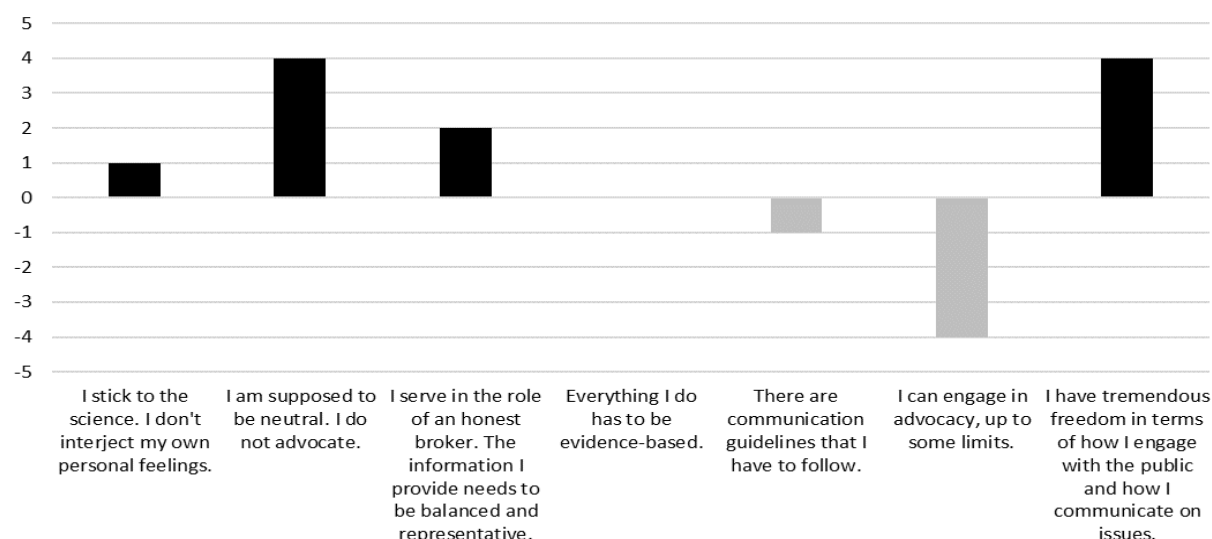
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SI Table 12. Perspective 2 highest and lowest statements, and higher and lower rankings

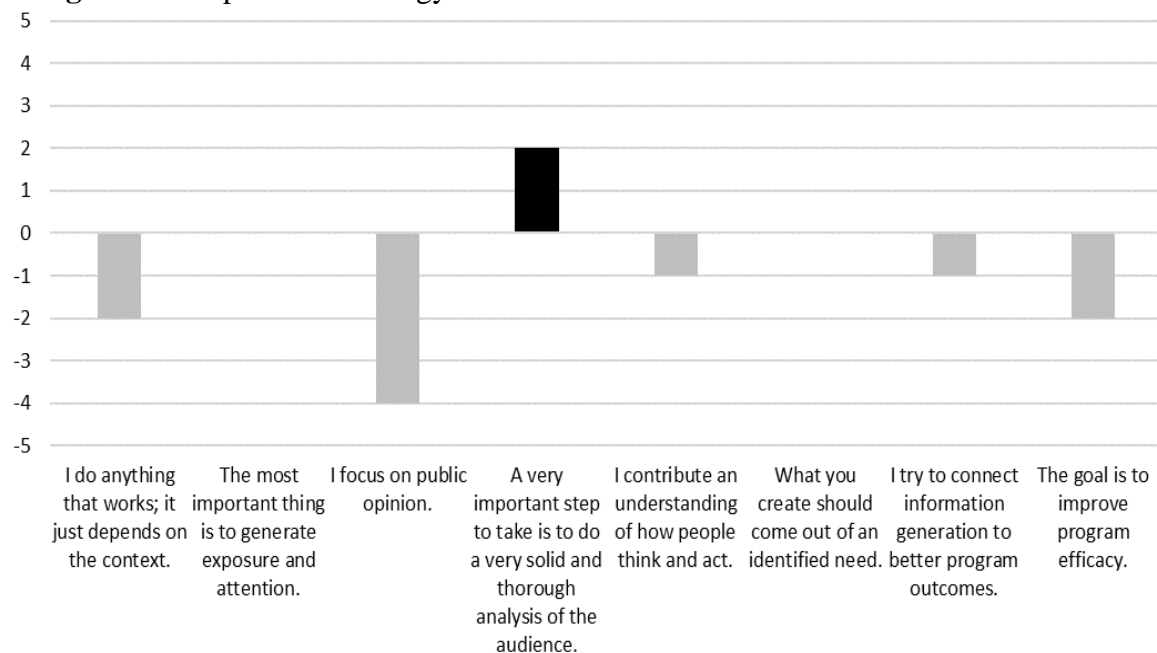
Highest ranked statements			
4	34	Information provision	I personally try to do an effective job in communicating science.
4	19	Ethics & rules	I am supposed to be neutral. I do not advocate.
4	21	Ethics & rules	I have tremendous freedom in terms of how I engage with the public and how I communicate on issues.
4	31	Information provision	I translate knowledge and technical information into terms that the general public can understand.
Lowest ranked statements			
-4	2	Advocacy	I help get public support for policy solutions.
-4	23	Ethics & rules	I can engage in advocacy, up to some limits.
-4	30	Information provision	The purpose is to get public buy-in for the information that I'm putting out.
-4	41	Strategic approach	I focus on public opinion.
Ranked higher than other perspectives			
4	19	Ethics & rules	I am supposed to be neutral. I do not advocate.
4	21	Ethics & rules	I have tremendous freedom in terms of how I engage with the public and how I communicate on issues.
1	26	Connections & information exchange	I help my organization engage in public conversations.
0	29	Strategic approach	The most important thing is to generate exposure and attention.
4	31	Information provision	I translate knowledge and technical information into terms that the general public can understand.
3	32	Information provision	I ensure that information is accessible and usable by a broad audience.
3	35	Information provision	I help people understand these issues.
Ranked lower than other perspectives			
-4	2	Advocacy	I help get public support for policy solutions.
-3	3	Behavior & cultural change	Behavior change is a key outcome rather than attitudes.
-3	11	Behavior & cultural change	My big goal is changing culture.
-3	12	Behavior & cultural change	I create experiences that support cultural change.
0	13	Decision-making	My work supports sound policymaking.
-4	23	Ethics & rules	I can engage in advocacy, up to some limits.
-1	27	Connections & information exchange	I create spaces for the academic community and the decision-making community to come together for effective dialogue.
-4	30	Information provision	The purpose is to get public buy-in for the information that I'm putting out.
-2	38	Knowledge production	I support communities' rights to benefit from and participate in the creation of scientific knowledge.

CATEGORIZING PERSPECTIVES ON ENVIRONMENTAL COMMUNICATION

SI Figure 3. Perspective 2 ethics



SI Figure 4. Perspective 2 strategy



CATEGORIZING PERSPECTIVES ON ENVIRONMENTAL COMMUNICATION

SI Table 13. Perspective 3 highest and lowest statements, and higher and lower rankings

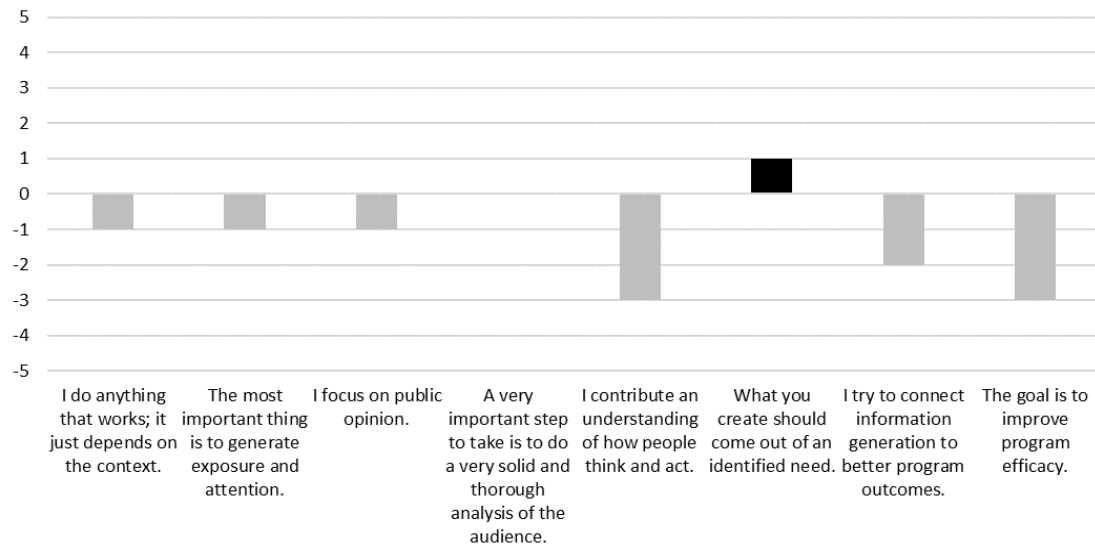
Highest ranked statements			
4	34	Information provision	I personally try to do an effective job in communicating science.
4	13	Decision-making	My work supports sound policymaking.
4	16	Decision-making	I improve the scientific basis of decision-making.
4	33	Information provision	Jargon makes the communication process more difficult, so I focus on plain language.
Lowest ranked statements			
-4	6	Connections & information exchange	It is my job to interface with the public.
-4	9	Connections & information exchange	I grow networks.
-4	48	Training	I help give scientists the resources and the skill sets needed to communicate.
-4	17	Emotion	I don't produce content; I elicit an emotion.
Ranked higher than other perspectives			
2	3	Behavior & cultural change	Behavior change is a key outcome rather than attitudes.
-1	4	Behavior & cultural change	I help people learn to live more sustainably.
4	13	Decision-making	My work supports sound policymaking.
3	15	Decision-making	I provide information and tools that will empower people to make decisions.
4	16	Decision-making	I improve the scientific basis of decision-making.
3	20	Ethics & rules	Everything I do has to be evidence-based.
3	22	Ethics & rules	There are communication guidelines that I have to follow.
2	24	Ethics & rules	I stick to the science. I don't interject my own personal feelings.
3	28	Information provision	I educate students and teach them about science.
1	30	Information provision	The purpose is to get public buy-in for the information that I'm putting out.
4	33	Information provision	Jargon makes the communication process more difficult, so I focus on plain language.
-1	41	Strategic approach	I focus on public opinion.
Ranked lower than other perspectives			
-2	5	Connections & information exchange	I view the goal as creating longer term relationships.
-4	6	Connections & information exchange	It is my job to interface with the public.
-4	9	Connections & information exchange	I grow networks.
0	10	Connections & information exchange	Through communication, I help build credibility.

CATEGORIZING PERSPECTIVES ON ENVIRONMENTAL COMMUNICATION

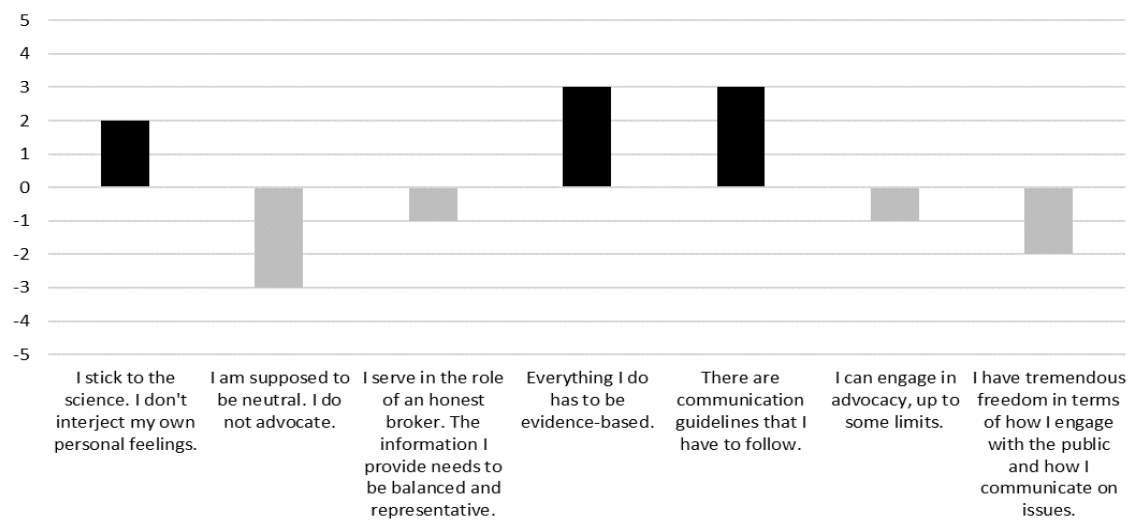
-3	18	Emotion	I try to touch an emotional chord.
-1	25	Ethics & rules	I serve in the role of an honest broker. The information I provide needs to be balanced and representative.
0	40	Strategic approach	A very important step to take is to do a very solid and thorough analysis of the audience.
-3	42	Strategic approach	I contribute an understanding of how people think and act.
-4	48	Training	I help give scientists the resources and the skill sets needed to communicate.

CATEGORIZING PERSPECTIVES ON ENVIRONMENTAL COMMUNICATION

SI Figure 5. Perspective 3 strategy



SI Figure 6. Perspective 3 ethics



CATEGORIZING PERSPECTIVES ON ENVIRONMENTAL COMMUNICATION

SI Table 14. Perspective 4 highest and lowest statements, and higher and lower rankings

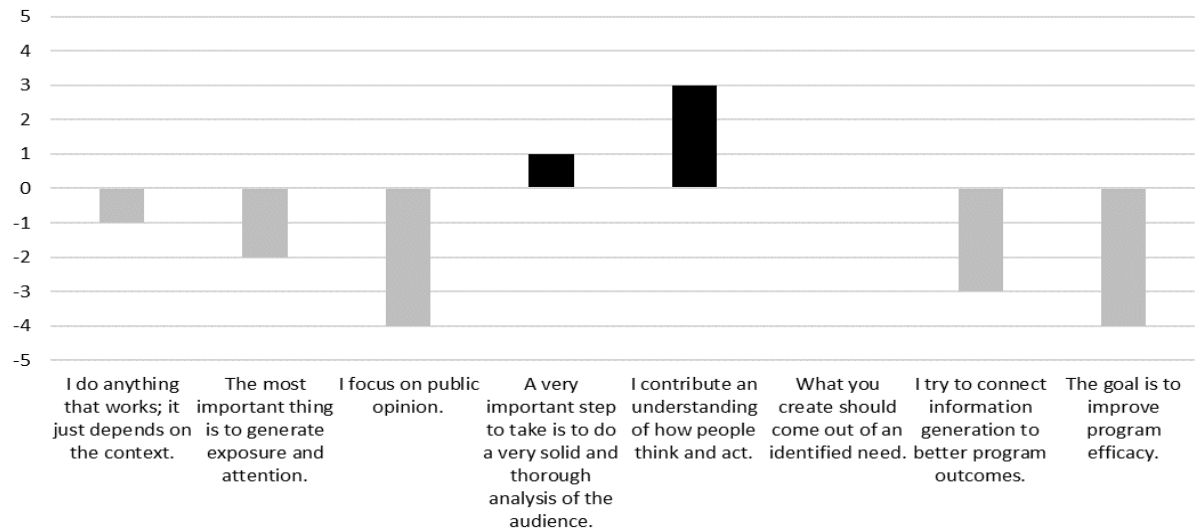
Highest ranked statements			
4	5	Connections & information exchange	I view the goal as creating longer term relationships.
4	9	Connections & information exchange	I grow networks.
4	11	Behavior & cultural change	My big goal is changing culture.
4	38	Knowledge production	I support communities' rights to benefit from and participate in the creation of scientific knowledge.
Lowest ranked statements			
-4	24	Ethics & rules	I stick to the science. I don't interject my own personal feelings.
-4	44	Strategic approach	The goal is to improve program efficacy.
-4	17	Emotion	I don't produce content; I elicit an emotion.
-4	41	Strategic approach	I focus on public opinion.
Ranked higher than other perspectives			
0	2	Advocacy	I help get public support for policy solutions.
4	9	Connections & information exchange	I grow networks.
3	10	Connections & information exchange	Through communication, I help build credibility.
4	11	Behavior & cultural change	My big goal is changing culture.
3	12	Behavior & cultural change	I create experiences that support cultural change.
1	18	Emotion	I try to touch an emotional chord.
1	23	Ethics & rules	I can engage in advocacy, up to some limits.
4	38	Knowledge production	I support communities' rights to benefit from and participate in the creation of scientific knowledge.
3	42	Strategic approach	I contribute an understanding of how people think and act.
Ranked lower than other perspectives			
0	14	Decision-making	I engage decision-makers.
-3	16	Decision-making	I improve the scientific basis of decision-making.
-1	20	Ethics & rules	Everything I do has to be evidence-based.
-2	22	Ethics & rules	There are communication guidelines that I have to follow.
-4	24	Ethics & rules	I stick to the science. I don't interject my own personal feelings.
0	37	Knowledge production	I help diverse disciplines to work together more effectively with stakeholders to produce knowledge.

CATEGORIZING PERSPECTIVES ON ENVIRONMENTAL COMMUNICATION

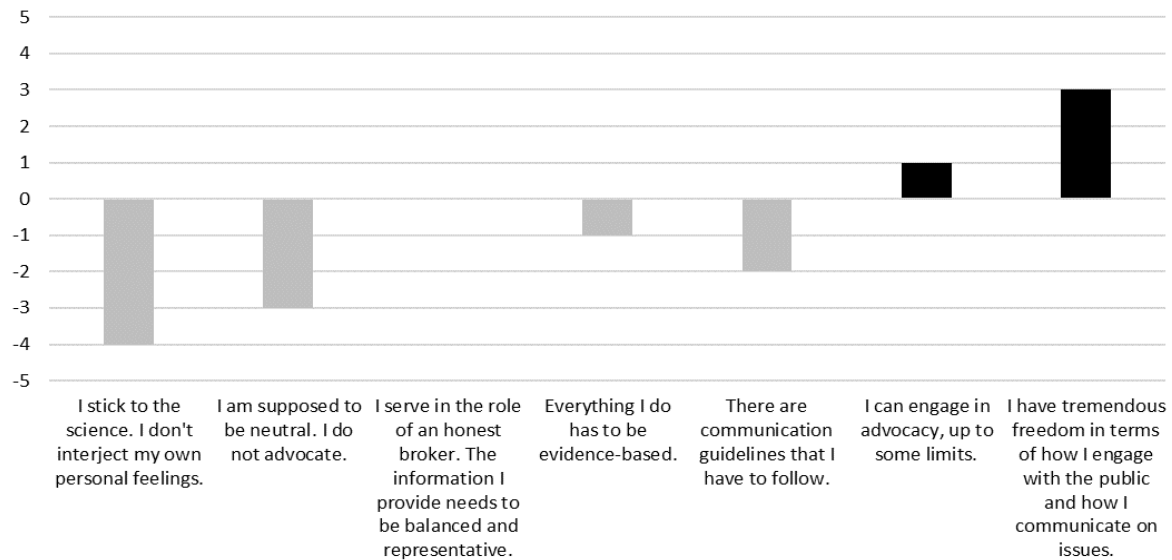
-1	39	Knowledge production	I improve the practice of science through building communication and collaboration skills.
-4	44	Strategic approach	The goal is to improve program efficacy.
-3	46	Strategic approach	I try to connect information generation to better program outcomes.
-1	47	Training	I work with scientists to help them communicate to other audiences.

CATEGORIZING PERSPECTIVES ON ENVIRONMENTAL COMMUNICATION

SI Figure 7. Perspective 4 strategy



SI Figure 8. Perspective 4 ethics



Appendix A

INTERVIEW PROTOCOL | CIG RESEARCH STAGE I

Section I: Interview Information

Modality: Phone interview • In-person interview •
Interviewer name:
Respondent name:
Title:
Organization:
*Highest academic degree (circle one): BS/BA, MS/MA, PhD, JD, MD, Other
*Highest academic degree title:
Demographic information (circle one): Female, Male, Other
Phone:
Email address:
Address to send gift card:

Interview start time: _____

Section II: Interview Introduction

- Thank you for your participation in this project. Would it be helpful if I first provide you with some background on the workshop and study?
 - George Mason University has provided our team with funding to explore the range of communication dilemmas that environmental researchers and practitioners experience. This information will inform the development of a rapidly emerging field in this area and help us improve graduate curricula.
 - To this end, we will be conducting interviews and a brief survey in advance of the January 14-15th workshop to which you have been invited.
 - The information from these studies will feed into an academic paper that we will write as a group during the January workshop, on which you will be invited to serve as a co-author. The purpose of the paper is to delineate current problems in communication for environmental researchers and practitioners and their implications for the development of the field and associated graduate curricula.
- Did you receive the study information I sent to you, labeled “interview consent form”?
 - [If no] May I read the form to you over the phone?
 - Do you have any questions about the study?
 - Do you mind if I audiotape this conversation to be sure that we capture your comments correctly?
 - Is [ADDRESS] the correct address to send you the [Amazon/Starbucks] gift card?
 - [If consent given] Thank you!

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3. [Education] I am interested in a few specific issues, but before we get to those I wanted to confirm that I have the correct information for your educational background.
 - Confirm highest academic degree and degree title from search of LinkedIn or CV
4. [Position] How would you describe your current position?

Section III: Role

1. [Discipline] Do you identify as either an academic or practitioner ?
 - No •
 - Yes-Academic •
 - Yes-Practitioner •
 - Other_____•
 - [Discipline_Open] Which [academic/professional] discipline(s) do you identify with?
2. [Sci_Info] In your [academic/professional] role, do you produce, provide, or use scientific information? By scientific information, we broadly mean research produced by any individual or organization in a rigorous, systematic way. Research on technology would also fall within this broad definition.
 - No •
 - Yes-Produce •
 - Yes-Provide •
 - Yes-Use •

Section IV: Naming the Field

1. [Terms] People and organizations use different terms to describe the variety of communication, engagement, and outreach activities they use in their conservation or environmental work.
 - a. [Terms_Individ] Which terms do you typically use to describe these kinds of activities and why?

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- b. [Terms_Org] Which terms are used within your [organization/institution]? Why?

2. Would you say that in your role as [TITLE], you “do” ...

- a. [SCI_COMM] “Science communication”? No • Yes •

- Why or why not?
- What does the term mean to you?

- b. [ENVIRO_COMM] “Environmental communication”? No • Yes •

- Why or why not?
- What does the term mean to you?

Section V: Range of Communication Contexts

1. [Activity] I am interested in the range of communication-related activities that you engage in, or to which you provide advice, and then we will discuss one in particular. In your opinion, what are *the types of environmental- or conservation-related activities for which communication is critical* that you engage with—or advise on—in your role as [TITLE]? Please name up to five activities. [FILL IN CHART]

- If the respondent does not engage in, or advise on, environmental- or conservation-related activities for which communication is critical, check “No activities” •
- *Ask instead:* “How would you describe the ways in which your work relates to environmental- and conservation-related activities on which communication is critical?”

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Activities	Importance ranking (1 st , 2 nd)	Sci info (Y/N)	Most challenging (X)
1.			
2.			
3.			
4.			
5.			

2. [Activity_Import] Have you listed the activities roughly *in order of importance for your work*? [Interviewer: List the activities in their current order for the respondent.]
 - What are the first and second most important for your work that you engage in in your role as [TITLE]? [FILL IN CHART]
3. [Activity_SciInfo] For which—if any— of the activities you just listed does *scientific information* come up in either materials or discussions? By scientific information, we broadly mean research produced by any individual or organization in a rigorous, systematic way. Research on technology would also fall within this broad definition. [FILL IN CHART]
4. In your opinion, which of the activities that you just described are the *most challenging*? [FILL IN CHART]

Section VI: Specific Communication Context

Now let's talk about one of these activities in more detail. Would you be willing to tell me more about... ?

[A_SELECT] Activity selected [WRITE] _____

[INTERVIEWER: Select the most important communication activity listed in which scientific information is relevant, and—ideally—that is challenging. If none of the activities include scientific information, select the most important and challenging.]

1. [A_PURPOSE] What do you see as the purpose of the [ACTIVITY]?

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2. [A_PURPOSE_Other] Are there any purposes for the [ACTIVITY] aside from those that are officially stated? No • Yes •

a. If so, can you think of any occasion that gives evidence of that?

3. [A_RULES] Does your organization have any formal or informal rules that guide the [ACTIVITY]?

4. [A_GOOD] What are the features of a good, or successful, [ACTIVITY NAME]?

5. [A_BAD] What are the features of a bad, or unsuccessful, [ACTIVITY NAME]?

6. [A_CONCERNS] Do you have any concerns about your role in [ACTIVITY NAME]?

7. You said that this activity [was/was not] one of the most challenging communication-related activities.

- [A_DIFFICULT] Do you have anything to [additionally]say about what makes it challenging?

- [A_STRATEGIES] What strategies do you use to address these challenges?

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8. **[THINK]** Has any training, guidance, or research—written, in-person, experiential, or otherwise—informed your thinking about how to communicate in this situation?

[Question asks about same activity as above]

No • *[See follow-up question]*

Yes •

- **[If no; otherwise SKIP] [THINK_NO]** You said that research, training, or guidance, have not informed your thinking on how to communicate in this situation. ***Why not?***

9. **[TRAIN]** Could you describe 1 or 2 specific trainings, guidance, or research that has generally influenced your communication in your [academic/professional] role? What were the key lessons you received from them?

Guidance 1:

Key lessons:

Guidance 2:

Key lessons:

Section VIII: Conclusion

1. Is there anything I haven't asked you that you would like to share with me about this topic?
2. Do you have any questions for me?

Thank them again for their participation and reiterate benefits. Let them know how to follow-up if they have any further questions. Immediately following interview, make notes of any information not captured by the verbal transcription/recording (such as questions that did not land well, or those that did, any concerns or questions that were unanticipated, etc.).

Finish time:_____

----End of interview----