

Results from the SMILE Camera Survey Project

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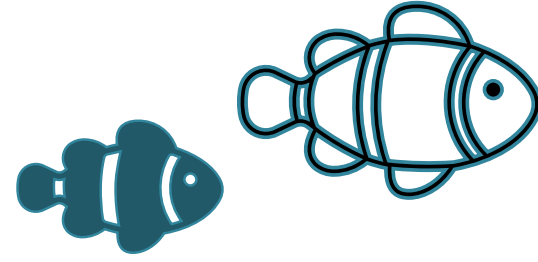
Photo courtesy of REEF

What is the SMILE Project?

The SMILE Project utilizes citizen scientists to collect fish length data using a low-cost, laser-mounted camera. This initiative plays a vital role in supporting reef fish management and conservation efforts by supplementing end users with crucial size data



Research Questions



Who is most likely to participate in the SMILE project?

What motivates divers and snorkelers to participate in the SMILE project?

What challenges did participants experience with the SMILE camera?

What types of trainings are preferred for engagement with the SMILE Project?

Methods

Structured surveys

Main survey:

22 items:

- Socio-demographics
- Dive experience
- Camera experience
- Preferred training methods
- Motivations for participation

Post survey:

27 items:

- Experience using SMILE camera
- Barriers and challenges to use
- Motivations for using SMILE camera
- Interest in continued participation

Distribution:

- Survey link sent via REEF listserv
- Advertised on social media and at REEF events

Main Survey

(before participating in SMILE Project)

N= 459

Post Survey

(after participating in SMILE Project)

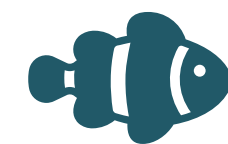
N = 55



Photo: Driveresearch.com

*IRB CSU Protocol #6182; deemed exempt

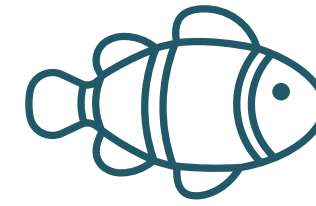
Demographics



	Nonusers	Users
Diver certification level	n=459	n=55
Non-diver/ snorkeler	15 (3.3%)	-
Snorkeler	27 (5.9%)	-
Open water	61 (13.3%)	5 (9.1%)
Advanced open water	113 (24.6%)	11 (20%)
Rescue diver	53 (11.5%)	13 (23.6%)
Master scuba diver	37 (8.1%)	4 (7.3%)
Dive master	68 (14.8%)	10 (18.2%)
Professional (above dive master)	85 (18.5%)	12 (21.8%)



Demographics

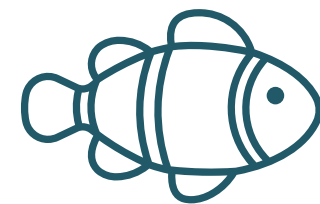
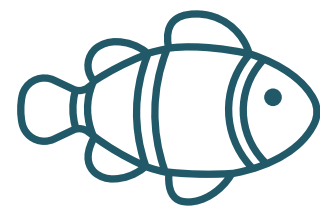


	Nonusers	Users
Number of dives	n=456	n=55
0-10	50 (11%)	1 (1.8%)
11-25	24 (5.3%)	-
26-50	41 (9%)	9 (16.4%)
51-100	33 (7.2%)	3 (5.5%)
101-500	122 (26.8%)	23 (41.8%)
501-1000	74 (16.2%)	5 (9.1%)
More than 1000 dives	112 (25.6%)	14 (25.5%)

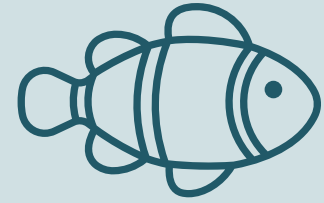


Demographics

	Nonusers	Users
Underwater camera experience	n=458	n=55
Never	50 (10.9%)	1 (1.8%)
Rarely	67 (14.6%)	9 (16.4%)
Sometimes	95 (20.7%)	10 (18.2%)
Frequently	127 (27.7%)	18 (32.7%)
Always	119 (26%)	17 (30.9%)



Research Questions



Who is most likely to participate in the SMILE project?

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83% of respondents said they would be likely to participate in the SMILE Project if given the opportunity.

Age

“Likely to Participate”

Median age: 56

(n=350, IQR = 28, mean = 52, s.d. = 17)

“Unlikely to Participate”

Median age: 64

(n=66, IQR = 19.5, mean = 61, s.d. = 15)

W = 7741, p-value <0.001* (Wilcoxon Rank Sum Test)



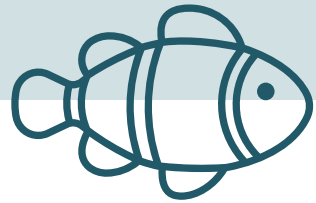


Who is most likely to participate in the SMILE Project?

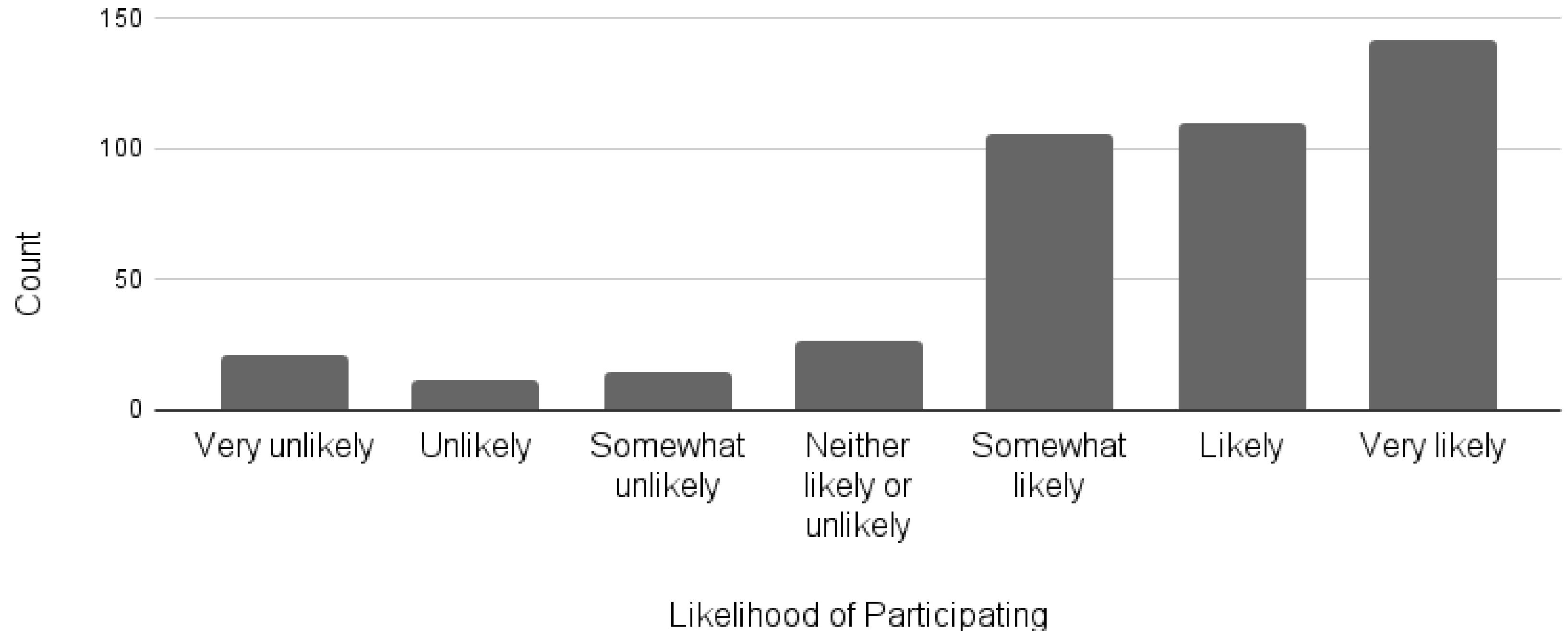
Nonusers who were likely to participate differed from those who were unlikely on:

- **Diver certification** ($p=0.013$)
- Belief about **impact** on fisheries science ($p=0.006$)
- **Comfort** with SMILE technology with ($p<0.001$) and without training ($p<0.001$)
- **Interest** in the SMILE camera ($p<0.001$)
- **Experience** with underwater cameras ($p=0.007$; Wilcoxon Rank-Sum tests)

Who is most likely to participate in the SMILE Project?

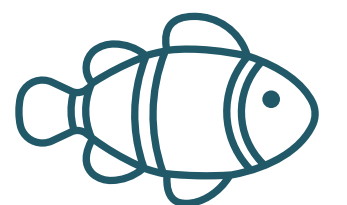
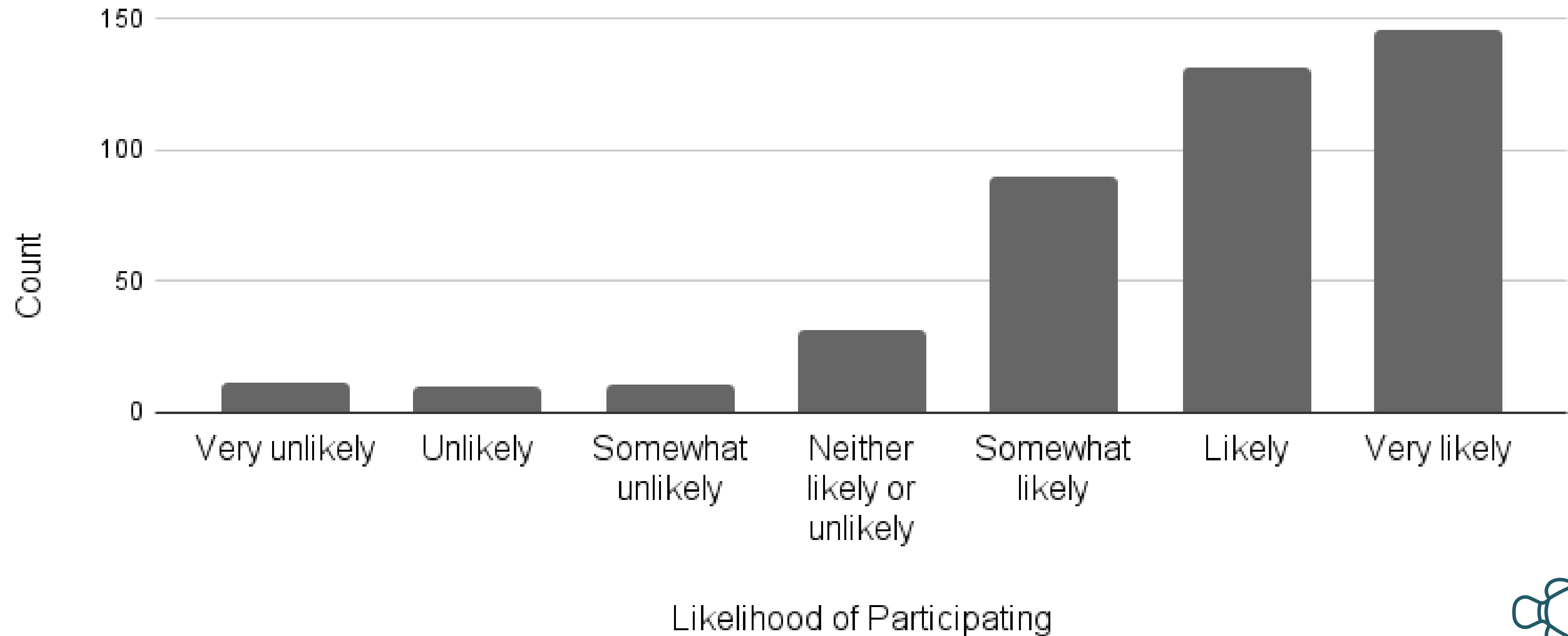


Distribution of Likelihood of Participating in SMILE



Who is most likely to participate in the SMILE Project?

Distribution of Likelihood of Participating in SMILE (if it contributes to fisheries management)



Why are some respondents unlikely to participate?

- External constraints (e.g., access to dive sites, money, and time) (n=16)
- Confusion about the project:
 - What's required? What's the intent with data? (n=4)
 - What's "fisheries management"?* Some not interested in fisheries or averse to contributing information to commercial fisheries. (n=11)
- Dive experience and skills (n=7)
- Interest (e.g., don't like underwater cameras or involved in other projects) (n=7)
- Physical ability (e.g., age, disability and health concerns) (n=6)





Who participated in the SMILE Project?

REEF Membership	n=55
No	9 (16.4%)
Yes	46 (83.6%)

REEF Surveys (Have Participated Before)	n=55
No	9 (16.4%)
Yes	46 (83.6%)

Number of REEF Surveys	n=46
0-10	18 (39.1%)
11-50	15 (32.6%)
51-250	5 (10.9%)
251-500	3 (6.5%)
501-1000	2 (4.3%)
More than 1000	3 (6.5%)



Who participated in the SMILE Project?

Diver Certification Level

n=55

Non-diver/ snorkeler

-

Snorkeler

-

Open water

5 (9.1%)

Advanced open water

11 (20%)

Rescue

13 (23.6%)

Master scuba diver

4 (7.3%)

Dive master

10 (18.2%)

Professional (above diver master)

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Number of Dives

n=55

0-10

1 (1.8%)

11-25

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26-50

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3 (5.5%)

101-500

23 (41.8%)

501-1000

5 (9.1%)

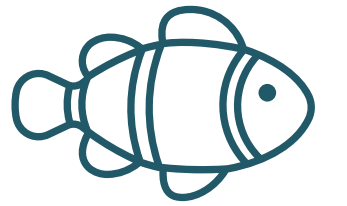
More than 1000 dives

14 (25.5%)

Research Questions

Who is most likely to participate in the SMILE project?

➔ What motivates divers and snorkelers to participate in the SMILE project?

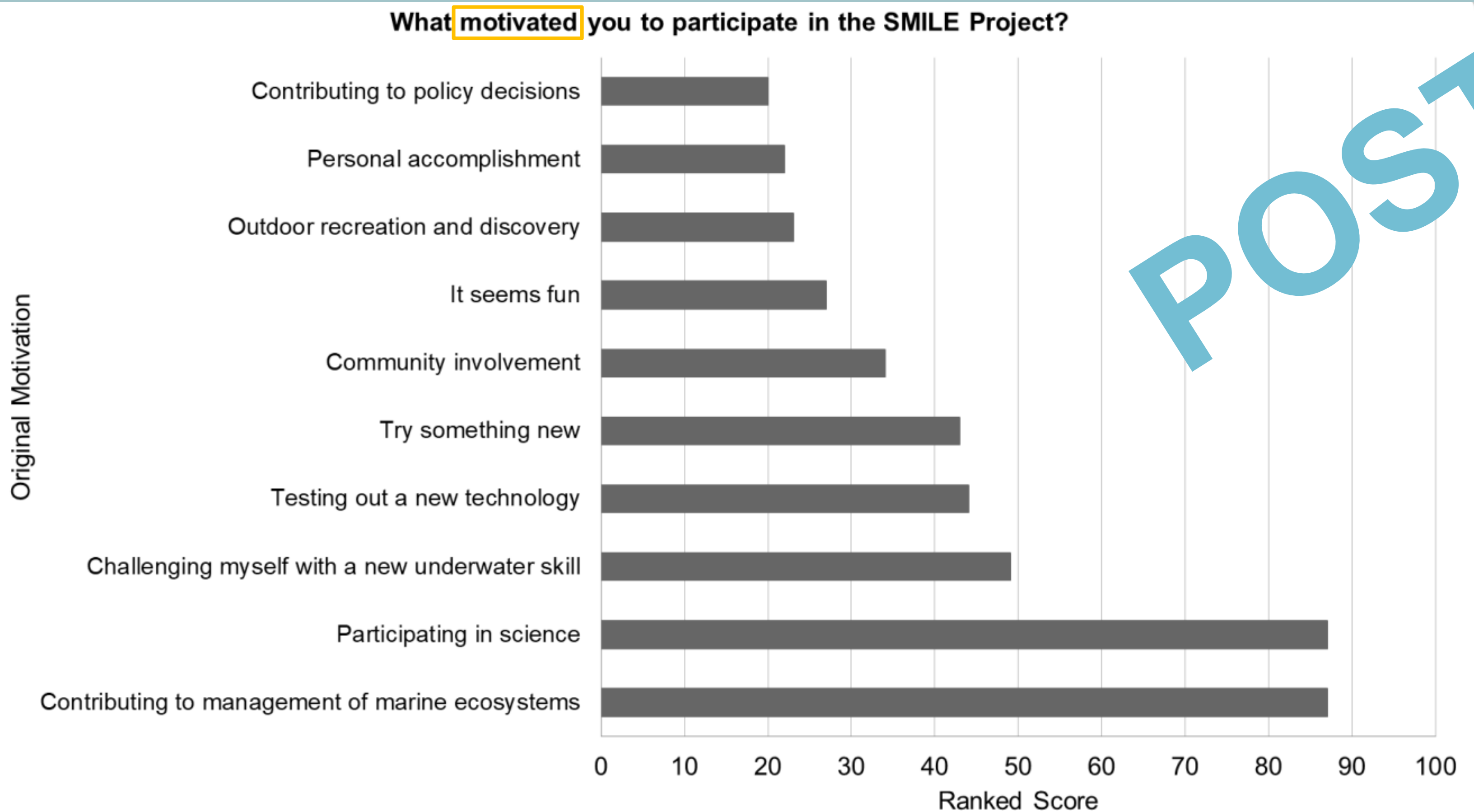


What motivates divers and snorkelers to participate?

What **might motivate** you to participate in the SMILE project?

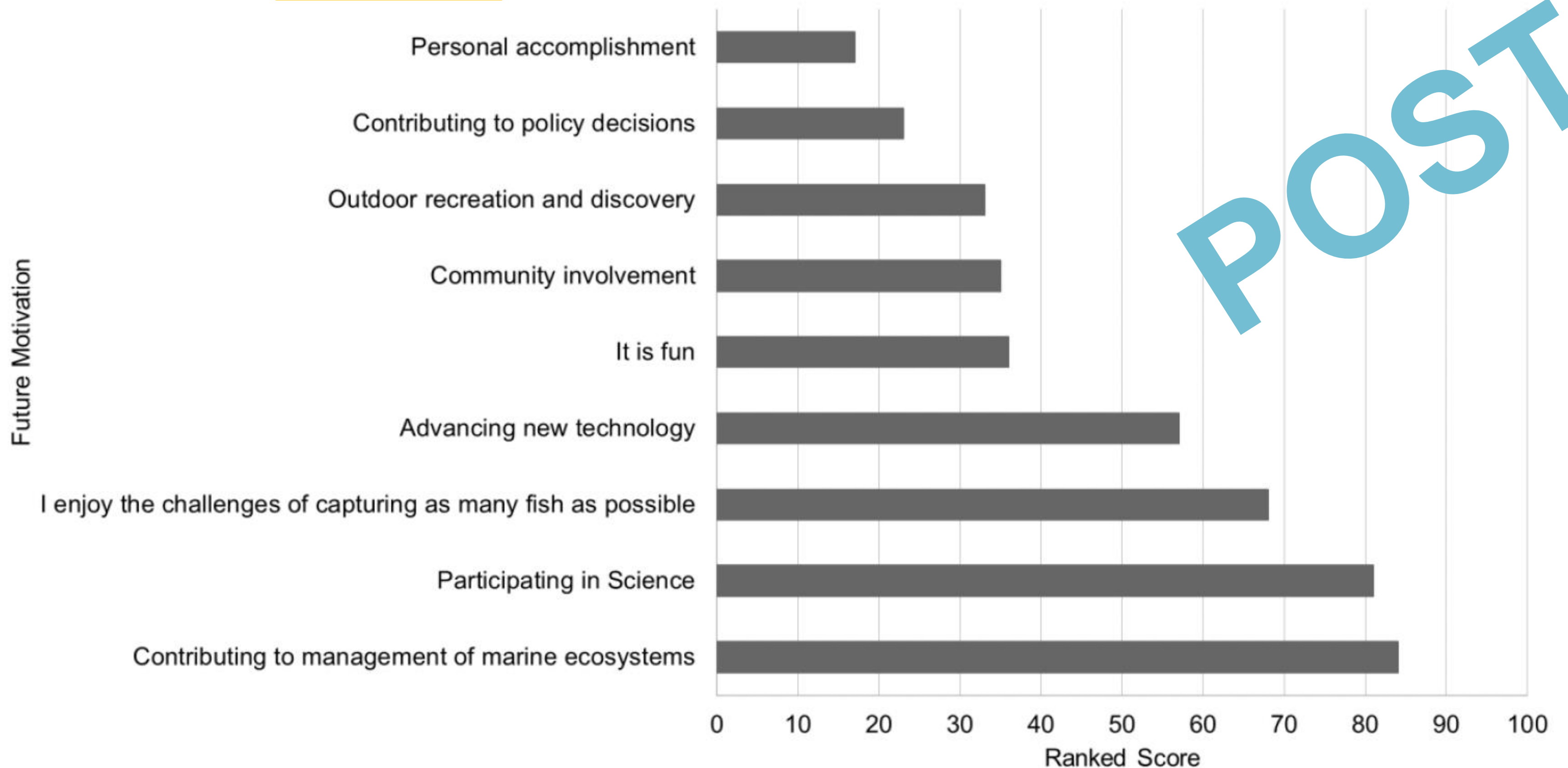


What motivates divers and snorkelers to participate?



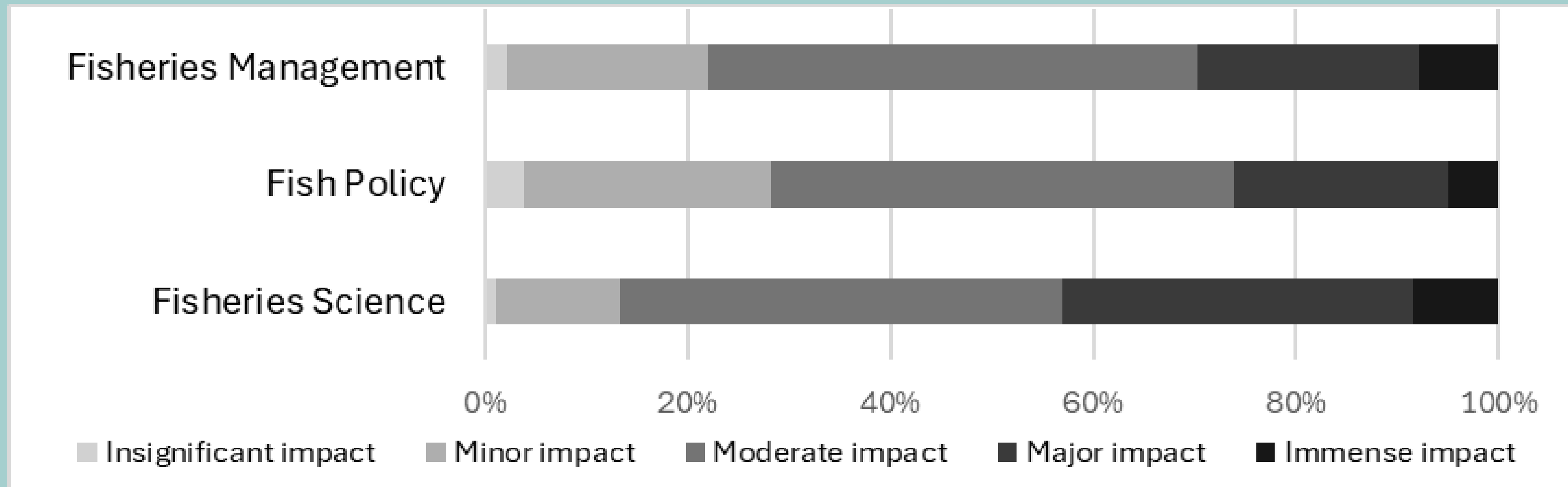
What motivates divers and snorkelers to participate?

What would motivate you to participate in the SMILE Project, again, in the future?

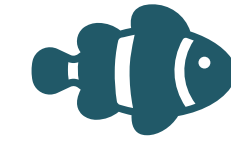


What is the perceived impact of participation?

If you were to participate in marine species monitoring with the SMILE project, how much of an impact do you believe your contribution would have on the following:



Note: We found a positive, though weak, correlation between perceived impact and interest in participation ($\rho = 0.24$, $p < .001$, $n = 413$)



Research Questions

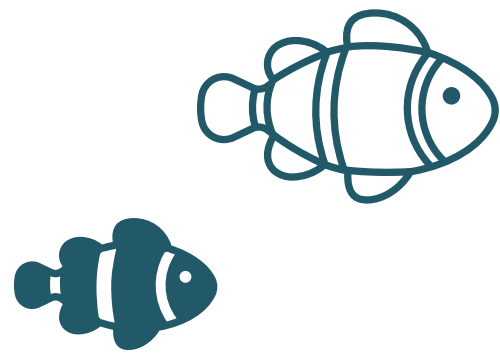
Who is most likely to participate in the SMILE project?

What motivates divers and snorkelers to participate in the SMILE project?

➔ What challenges did participants experience with the SMILE camera?

What challenges, if any, did participants experience when using the SMILE camera?

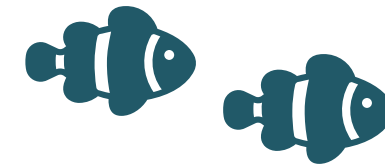
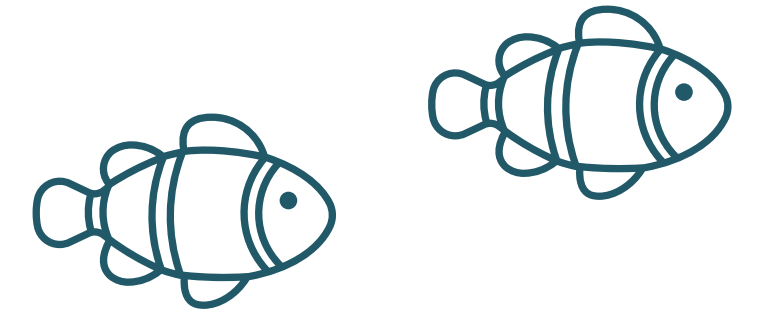
Most
Challenging



Least
Challenging

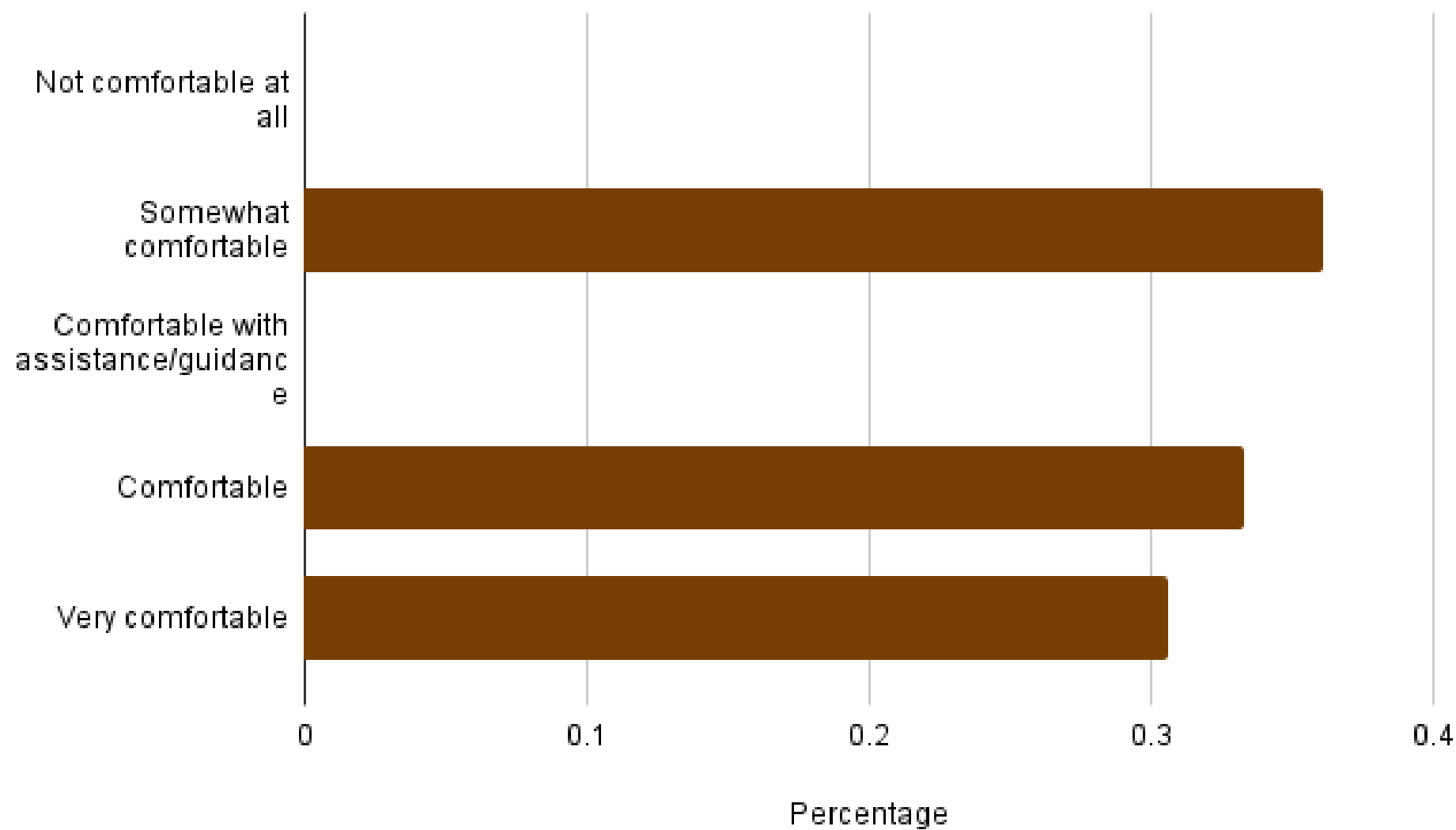


1. Target species were skittish
2. Target species were scared of the laser
3. Encountering few target species
4. Low visibility
5. Camera battery dying
6. The habitat made it challenging to capture photos of target species
7. High fish abundance made it difficult to capture target species
8. Current and using the camera
9. Laser battery dying, observed habitat condition, using the laser, and the camera was a burden to carry
10. Too many target species were present and quality of instruction

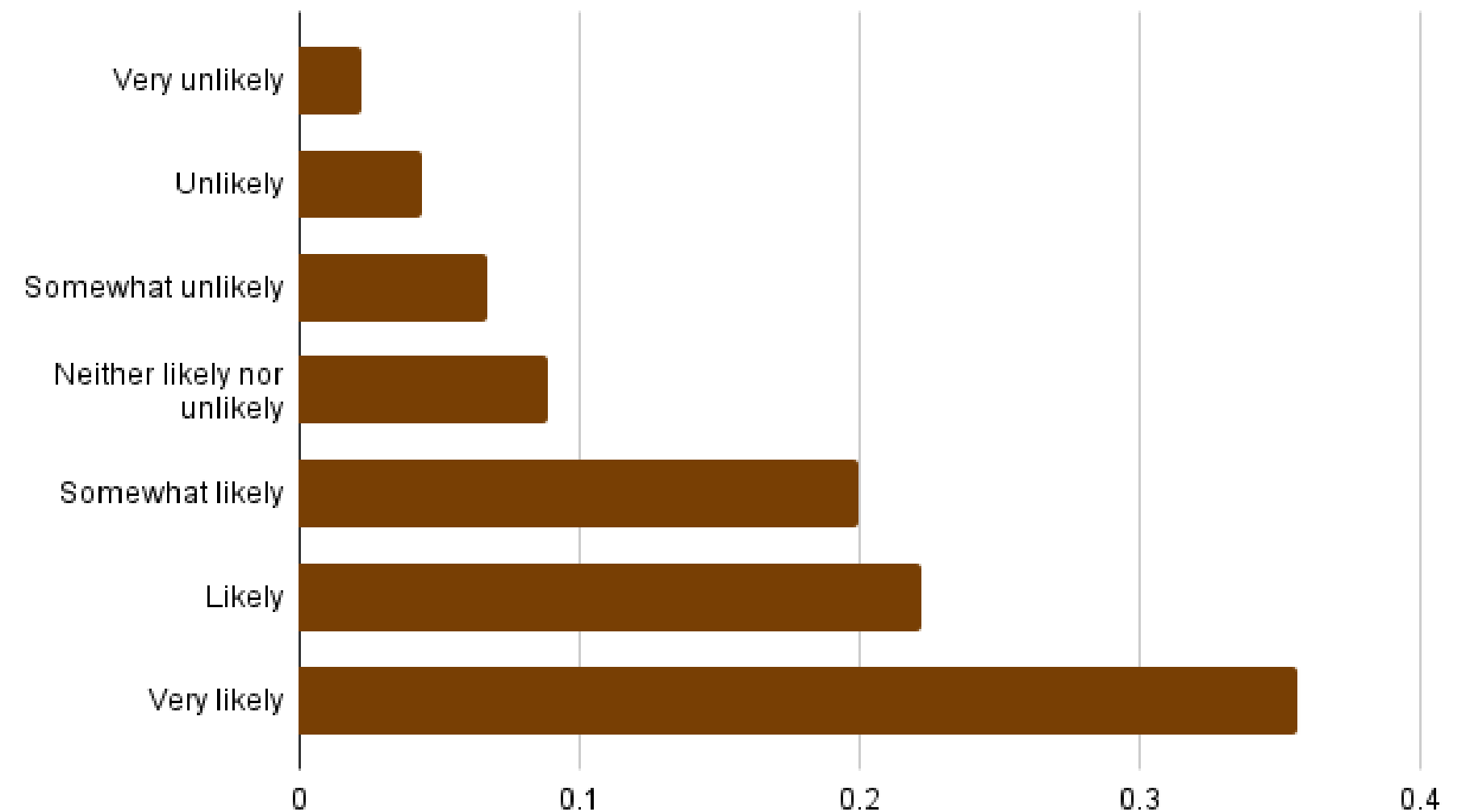


What challenges, if any, did participants experience when using the SMILE camera?

Comfort with setting up camera (n=36)



Likelihood to upload data (n=45)



Research Questions

Who is most likely to participate in the SMILE project?

What motivates divers and snorkelers to participate in the SMILE project?

What challenges did participants experience with the SMILE camera?



What types of trainings are preferred for engagement with the SMILE Project?

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Preferred Training Topics* of Respondents *Before* Participating:

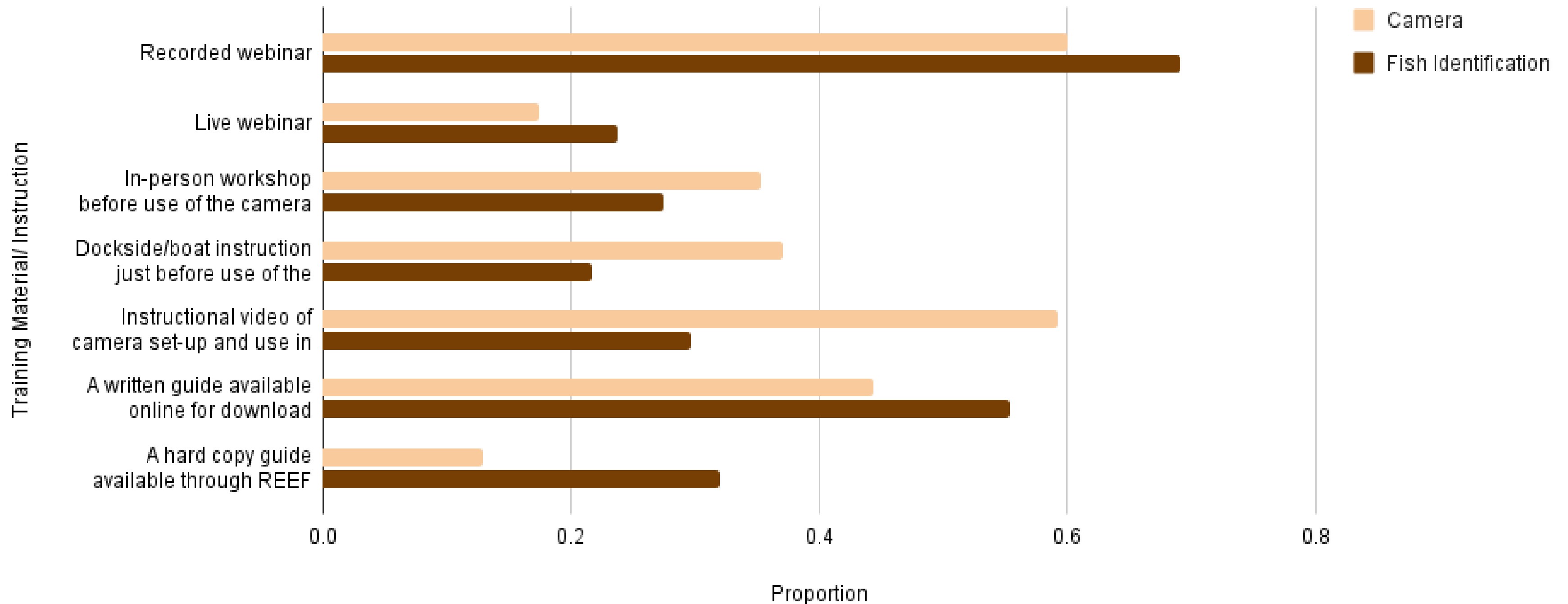
Camera Use	(354) 78%
Data management and upload	(314) 69%
Fish identification	(313) 69%
Fish survey methodology	(313) 69%
n =	453



Photo: REEF

What types of trainings are preferred for engagement with the SMILE Project? 🐠

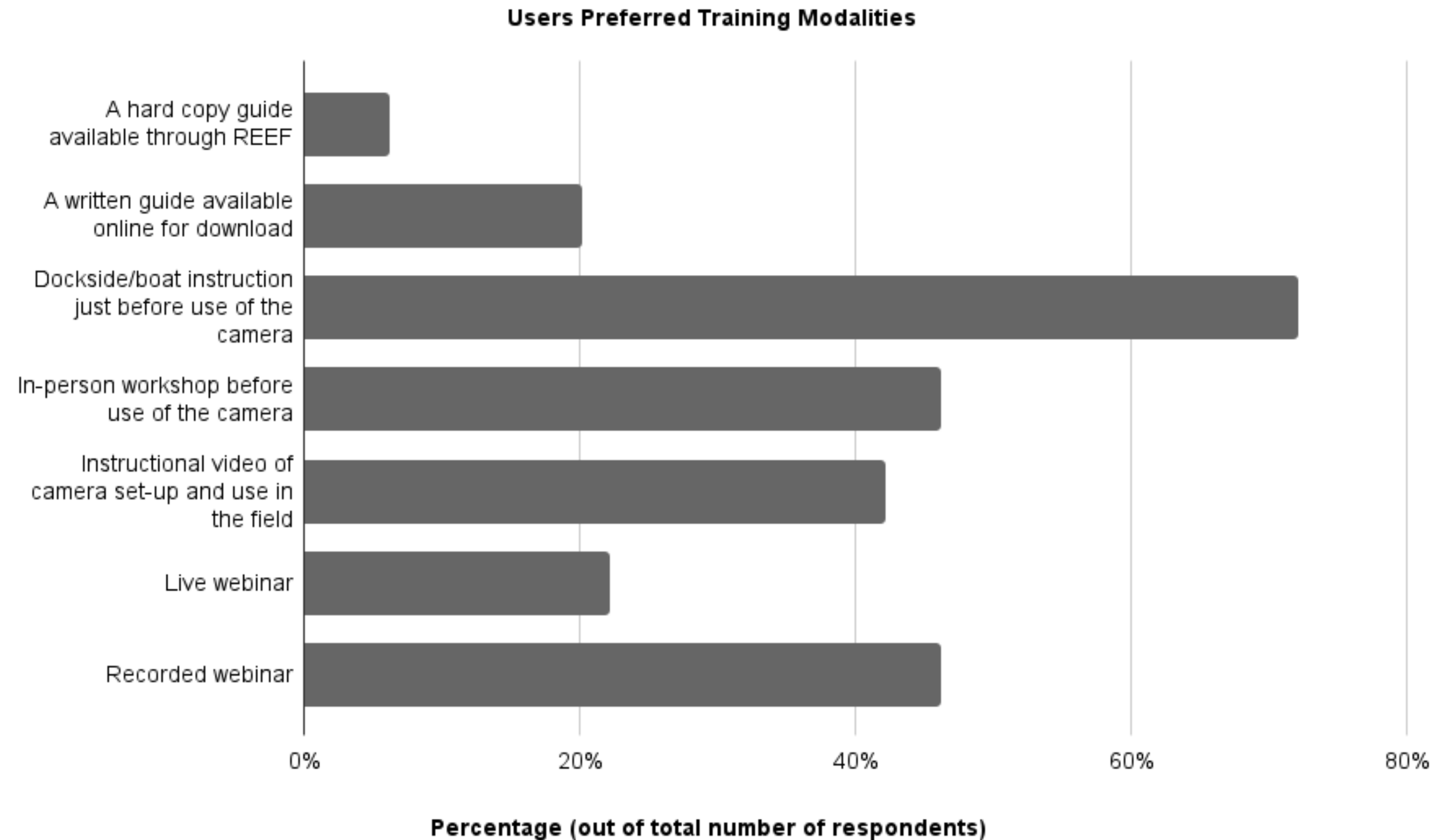
Preferred Training Modality* of Respondents *Before* participating:



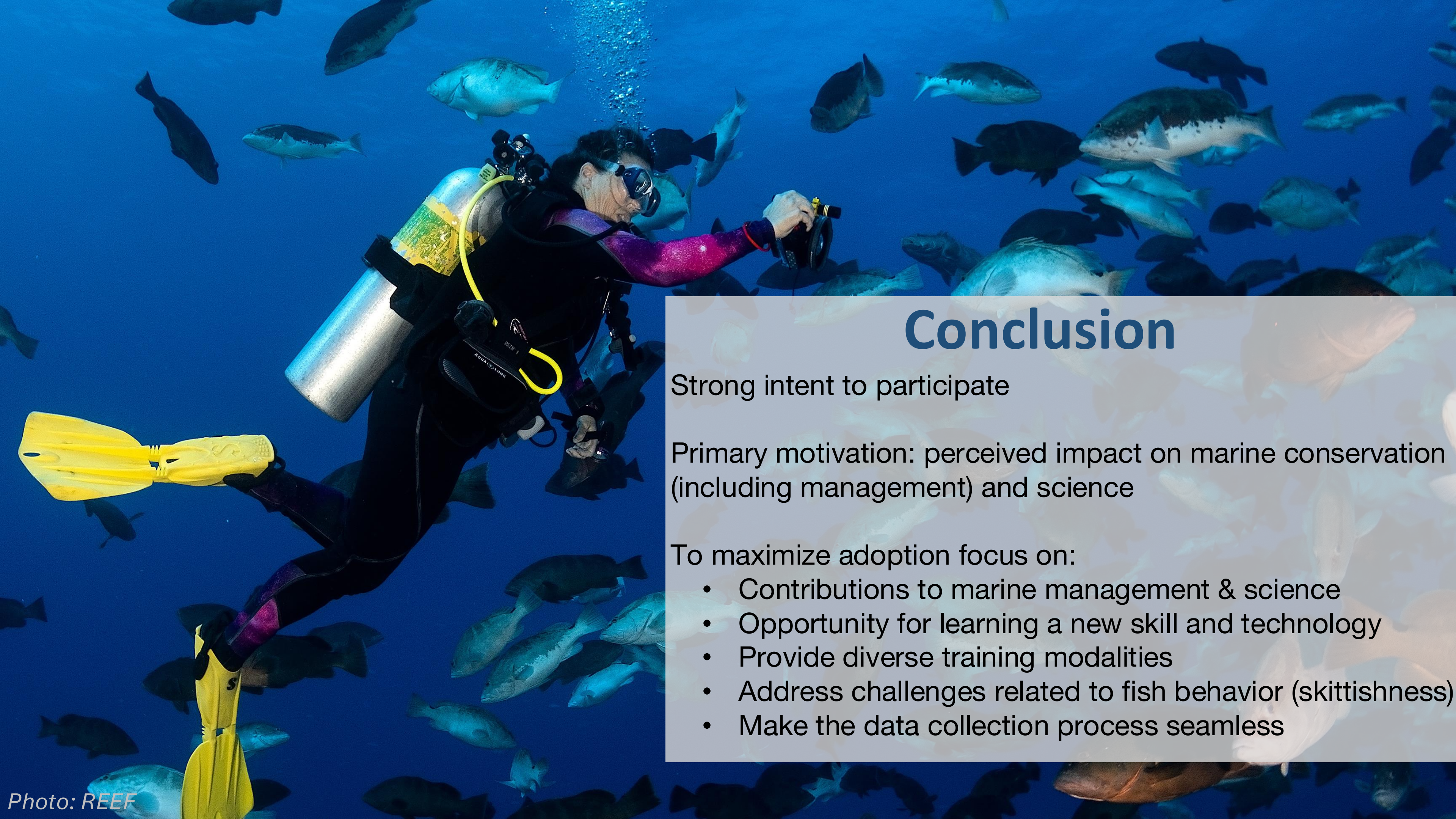
*participants could choose up to three options, %s represent the total number of respondents that chose that training type

What types of trainings are preferred for engagement with the SMILE Project?

Preferred Training Modality* of Respondents *After* participating (for camera use):



*participants could choose up to three options, %s represent the total number of respondents that chose that training type



Conclusion

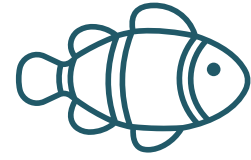
Strong intent to participate

Primary motivation: perceived impact on marine conservation (including management) and science

To maximize adoption focus on:

- Contributions to marine management & science
- Opportunity for learning a new skill and technology
- Provide diverse training modalities
- Address challenges related to fish behavior (skittishness)
- Make the data collection process seamless

Future Directions



- Currently working on creating a model to predict likelihood to use SMILE camera
- High level of comfortability, expertise, and interest among the survey respondents to participate in the SMILE Project
 - To what extent do participants in the SMILE Project demonstrate changes in their comfort, expertise, and interest levels following participation? How do we best maintain interest and motivation to participate?
- Top motivating factor for respondents to participate in the SMILE Project is contributing to fisheries management and perceived impact is positively correlated with participating in the SMILE Project
 - In what ways does participation in the SMILE Project affect participants' understanding and evaluation of citizen science as a mechanism for influencing marine management outcomes?
- Potential to scale SMILE camera adoption. What are the most effective strategies for distribution and increased use of SMILE camera?



Photo: REEF

Acknowledgements

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- Chelsey Crandall, PhD
- May Lehmensiek, PhD

Thanks to REEF staff and colleagues who piloted the survey extensively



Thank you





Questions.?