Assessing Rationale for Community Engagement in San Francisco Bay Area Conservation Groups

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ABSTRACT

It's agreed among scientists that there are many benefits from community engagement in local projects, although it's only been in recent decades that the scientific world has begun to look towards the community for input on their work. Community engagement is extremely beneficial to conservation in particular, and is known to lead to higher success in a project. Even so, there are many barriers for researchers to effectively engage the community in local projects. In the San Francisco Bay Area, there are many local conservation groups that have varying degrees of community engagement within their projects. This study seeks to understand how these conservation groups prioritize community engagement in their projects. To do so, I interviewed eight leaders of different organizations regarding their experiences with community engagement. The most common barriers to community engagement could be summarized in three points: education, resources, and volunteer makeup. The organizations' current practices have been effective in engaging the public, although they have room to improve through education, community relations, and capacity. However, these improvements are dependent on funding and overall public interest for the environment and conservation.

KEY WORDS

Public engagement with science (PES), preservation, environmental education, local stewardship, environmental accessibility

INTRODUCTION

It's agreed among scientists that there are many benefits from community engagement in local projects, although it's only been in recent decades that the scientific world has begun to look towards the community for input on their work. There has historically been a "deficit model" of communication that involves a one-way flow of information that scientists release without expecting information coming back (Hopfensperger et al. 2021). It assumes that there is a large gap in public knowledge about a topic that scientists must fill in on their own (The American Association for the Advancement of Science).This creates little room for community discussion, and does not effectively engage and educate this broader element of society. Alternatively, science is moving towards a "public engagement with science (PES) model" that prioritizes active communication and deliberation with the community so that both scientists and community members can learn from each other (Hopfensperger et al. 2021). This opens a line of communication between the two groups and makes science more accessible and locally relevant to the general population. PES helps inform scientists of local factors in their projects and allows for larger projects with the addition of public help. PES has also been shown to improve community understanding and support of a project (AAAS (American Academy of Arts & Sciences) 2018). This local engagement with science can provide mental and physical health benefits, and lower age and cultural barriers (Townsend et al. 2004). PES is clearly effective for both scientists and the public, but it's not always easy to carry out.

There are many barriers for researchers to effectively engage the community in local projects. The level of public participation can depend on how the people value conservation in their region (Taylor et al. 2022). Sociodemographic factors can also impact whether community members support a project, and how involved they will be (Cross and Chappell 2022). They may feel it's important, but may not always see the value of their time and input to the project. For scientists, time is consistently a large barrier to prioritizing PES. Projects already require an abundance of time to be spent on research, funding, and planning, and it's often hard to allocate an additional large block of time towards public engagement (Hopfensperger et al. 2021). In a study on scientists' motivations around PES, Cerrato et al. found that a lack of volunteers, communication skills, insufficient institutional commitment, and skepticism were common barriers that researchers faced in getting the community involved (Cerrato et al. 2018).

Ultimately for both scientists and the public, effective PES depends on values and resources, although this differs between locations.

There are many local conservation groups in the San Francisco Bay Area with varying degrees of community engagement within their projects. They all work to conserve and restore land within the SF Bay Area, but have different approaches. Groups such as Save Mount Diablo, Save The Bay, and East Bay Regional Parks advertise their volunteer work to the public to invite community members to help with their restoration projects. This mainly includes activities such as planting native seeds, removing invasive species, or maintaining trails. Other groups like the San Francisco Estuary Institute (SFEI) and the Peninsula Open Space Trust (POST) put more emphasis on working with partner organizations from the community and a bit less on working with individual members of the public. It is unclear how different conservation groups choose to prioritize community engagement versus other realms, like funding, research, partner organizations, etc. However, it's important to understand their rationale, or to look for ways to improve it, so that local conservation can be as effective and accessible as possible.

This study seeks to understand how local conservation groups in the SF Bay Area prioritize community engagement in their projects. I dove into the ways that the community has been reached out to in the past regarding these projects, what barriers to community engagement have been seen by these conservation groups, and how these conservation plans can be improved to effectively engage the public. I collected interview data from leaders on local conservation projects to learn from their experience. I expected to find that these local conservation groups mainly use volunteer work as their community engagement, but face barriers regarding time, resources, and education. I predicted that the best way to improve these plans to engage the public is by educating the researchers, organizations, and sponsors on the importance of PES and how to make it as effective and efficient as possible.

RESEARCH FRAMEWORK

The predecessor of PES: the deficit model

The traditional style of science is centered on the deficit model of communication.

(Hopfensperger 2021). This model makes science overall less effective and accessible to the public. In this model, scientific knowledge is delivered to the public in a one-way stream of information given by experts. There is little to no room for the general populace to provide their knowledge or experience so that scientists can apply it to their work. Research has continuously shown this model to be ineffective, although many members of the scientific community continue to use it in their work (AAAS (American Academy of Arts & Sciences) 2018). However, in more recent years, science has started to shift towards the "public engagement with science" (PES) model (Burdett et al. 2021). PES opposes the deficit model. Whereas the deficit model typically is in the form of formal lectures, publications, etc, the PES model can range from volunteer work and conversations with experts, to exhibits or social media (Burdett et al. 2021). As research shifts to include two-way communication, both science and the public will benefit.

Strengths and weaknesses of PES

PES has many strengths and weaknesses for scientists and the public. When done correctly, it can provide science with insight, local context, and both physical and financial support that they may not have had otherwise. Studies have shown that members of the public who participate in land management or conservation groups see mental and physical benefits, increased sense of community, and increased social capital in their local area (Moore et al. 2006). However, there are negative factors to consider as well. One study outlined common barriers that scientists face to be time, funding, professional stability, number of volunteers, and skepticism (Cerrato et al. 2018). These are non-negligible hurdles that even the most community-oriented scientist cannot always easily get past. On the community side, many individuals' involvement in conservation can depend on a variety of factors. This may be time, resources, accessibility, or their perceived worth of conservation in the region (Taylor et al. 2022). Overall, PES is highly beneficial, but would be most effective if it was more accessible to both scientists and the public.

PES in conservation

Community engagement is extremely beneficial to conservation in particular, and is known to lead to higher success in a project. It's been found that PES leads to "more legitimate" conservation work that better serves the local people affected (Rodríguez-Izquierdo et al. 2010). This means that projects with higher public engagement are generally more equitable in addressing not just the needs of conservationists and ecosystems, but community members as well. Because these types of projects are more likely to have just outcomes, they typically are met with increased compliance and reduced conflict over resources from the public. This makes conservation projects more cost-effective and longer-lasting than if they weren't focused on PES (Rodríguez-Izquierdo et al. 2010). Additionally, increased community buy-in on conservation work provides a sense of empowerment and stewardship among locals (Pakiding et al. 2020). This passionate involvement also reduces conflict with conservationists as they now have a common goal. These benefits of PES are applicable to nearly every conservation project, both broadly and locally.

PES and conservation groups in the San Francisco Bay Area

The San Francisco Bay Area has many local conservation groups that approach community engagement in different ways. Many of them offer volunteer work in which all community members can take part in activities such as trail maintenance, invasive species removal, tree planting, etc. This includes organizations such as Save Mount Diablo. Others, such as Audubon Canyon Ranch, offer similar volunteer opportunities but targeted more directly at community members on their email lists or social media. A third category of conservation groups largely focuses on land acquisition with the intent of preservation. Organizations such as Peninsula Open Space Trust are typical land trusts like this.

The Bay Area is an extremely densely populated area, home to over 7.7 million people As the need for housing and urban expansion grows, it's critical that these conservation groups preserve as much natural land as possible so that all residents of the Bay Area have access to the beauty and benefits of nearby open space. In order to achieve this goal, they need widespread support for preserving natural spaces. This starts with engaging the public on conservation issues so that they feel opted-in to the process, and are ready to defend it. By understanding how Bay

Area conservation groups think about PES, we can better understand how this will affect local communities and ecosystems.

METHODS

Data collection and management

To understand current PES practices in the San Francisco Bay Area, I reached out to eighteen local conservation groups and requested interviews with their project leads. Leaders from eight of these groups were able to schedule interviews to discuss community engagement in their work. I talked specifically with leaders in these groups so that I could discern how scientists in management positions viewed PES, as this likely trickles down to new hires and influences the organization's overall attitude towards PES. I chose groups that appear to have varying approaches and priorities so that the study would more accurately encompass conservation efforts within the Bay Area. For example, groups such as Save Mount Diablo have a significant amount of volunteer opportunities that people can take part in. Other organizations, like The Conservation Lands Network, have little to no volunteer postings, and focus more on other conservation tools. To properly understand the entire geographic region, I chose groups from the North, South, and East Bay areas. Each region has different needs, communities, and open spaces. As such, they all needed to be equally examined.

To keep the content relevant, the interviews were semi-structured, with twenty-one pre-written questions. I decided to make the interviews semi-structured so that the participants had the space to add comments they felt were relevant, but not being directly asked. It also allowed the conversation to flow more naturally. I used this structure to dive deeper into participants' comments and ask off-script follow-up questions as needed.

The interview questions aimed to understand how these group leaders think about PES, how they carry it out, what barriers they've experienced, and how their PES efforts could be improved moving forward. There were three main sections of questions. The largest section was about current community engagement practices. I focused more interview time on these questions because my priority was to determine how these local conservation groups currently think about PES, and this gave me a solid foundation on each organization. A complete list of the

pre-written questions is provided, although the conversation was not limited to these explicitly and did not always touch on every question (Appendix).

Interviews took place on Zoom at a time that was convenient to the participants and lasted between twenty-five to sixty minutes. Each interview was recorded using Zoom and uploaded to Fireflies.ai to be digitally transcribed. I recorded and transcribed meetings to capture direct quotes from interview participants to precisely communicate their thoughts and experiences. I edited some quotes only for grammatical clarity.

Data analysis: interview coding

I used thematic content analysis (Taylor et al. 2022) to break down the interview responses into main themes based on commonalities among interviewee statements. I used the same category names across interviews for simplicity. Some categories had sub-themes within them to further divide the content for easier analysis. This allowed my analysis to be as specific as possible to accurately preserve the participants' messages. For example, multiple participants noted age diversity as a barrier to PES that the public faces. However, some described barriers that older age brackets dealt with and others described problems for young age groups. To properly encompass all of these comments, I coded the theme "age diversity" with two subgroups, for young and old community members.

RESULTS

The groups I talked with had varying needs for, and abilities to conduct, community engagement. Based on my interviews, I found that current practices, barriers, and aspirations of effective community engagement across all conservation groups could be consolidated into three overarching themes. These themes are education, resources, and volunteer makeup.

Education

The most common topic broached by all participants was education. Every interviewee noted education as both a pitfall and an advantage within conservation. Some argued that early

education is critical in building the love for nature that is fundamental in garnering community support and engagement down the line. For example, Ted Clement at Save Mount Diablo said that "programs [need to be] set up to get people connected to nature, educated about nature, and then getting service opportunities" (personal communication, Ted Clement/April 2, 2024). Nicholas Jensen at The California Native Plant Society (CNPS) added to this argument by saying that "part of that [environmental education] is making sure that people at an early age become engaged and fall in love with plants" (personal communication, Nicholas Jenson/April 4, 2024).

Many interviewees gave examples of successful education programs that fostered conservation-minded young people that then became active volunteers in their organizations. This included the program at Save Mount Diablo that brings students out in nature to reflect on their connection with the environment around them. Ted Clement was baffled by their revelations, saying that "we desperately need new ideas [that] the community can offer". Other organizations, such as Save the Redwoods League, had similar programs to bring students and young people into nature.

Some participants spoke on how the community is able to educate scientists themselves. For instance, Deborah Zierten from Save the Redwoods League noted that, "sometimes these are the people that are local, that are directly impacted by whatever the situation is or they have direct experience with it. And so they come in with very fresh eyes as opposed to someone from the outside [of the local area]" (personal communication, Deborah Zierten/April 26, 2024).

I found that a common barrier to community engagement was a lack of public education about nature and the importance of conservation. When I asked what they needed to get over this barrier, multiple participants said that some level of government should provide education programs in public schools. Others stated that early education was a key component in fostering a love of nature early on. One interviewee said that conservation organizations, specifically land trusts, should be doing their part to educate the community as well.

Resources

All interviewees cited different resource needs for their organizations as important factors in their PES work. For many, funding was at the forefront of their resource needs. Some organizations, like Audubon Canyon Ranch, relied on donations from their community and

volunteer bases. Others, like Save Mount Diablo, depended on their volunteers to help host big events to attract larger donors. Deborah Zierten commented that funding is critical "to be able to compensate, to help pay for transportation, to get community members to different projects, or to pay for programming if we want to bring families out to an area" (personal communication, Deborah Zierten/April 26, 2024). Multiple participants noted that funding is important to compensate volunteers and community members for their time and work.

I found that local connections were instrumental in conservation projects for multiple organizations. For example, Nicholas Jensen at CNPS explained that his organization does political advocacy to help advance their projects. However, he learned that many elected officials are unwilling to meet with his group unless they are with a community member in that official's district. Jensen described how many of their projects wouldn't have been as successful if they hadn't had connections to local government through the community members that they worked with. Additionally, multiple interviewees discussed the importance of building strong relationships with the local community. Kelli McCune at San Francisco Bay Joint Venture said, "I strongly believe trust is built through connecting with people directly and building that relationship as a way to build trust. And in conservation work, that is critical" (personal communication, Kelli McCune/April 26, 2024). Deborah Zierten also emphasized the importance of local relationships, saying that "the most valuable thing is building those relationships and making sure to maintain those relationships" (personal communication, Deborah Zierten/April 26, 2024).

I discovered that a major community resource valued by these conservation groups was the public's physical work. Every organization described various projects that community members physically helped with. This included removing invasive species, planting trees, collecting data, and more. On this topic, Nils Warncok at Audubon Canyon Ranch stated that "we couldn't do some of the work that we do without that public participation" (personal communication, Nlis Warnock/April 5, 2024). Almost all of these organizations mentioned that staff capacity can be challenging. For example, Ted Clement said "we don't have enough staff, so we just need all those volunteers helping us with advocacy campaigns or stewardship projects, etcetera" (personal communication, Ted Clement/April 2, 2024).

Volunteer makeup

Every interviewee described how their volunteer demographics impacted their PES work. For example, Nicholas Jensen stated that "our active members, and the people who engage on issues that we're concerned with, don't often accurately reflect the demographics and the makeup of our communities" (personal communication, Nicholas Jenson/April 4, 2024). Ted Clement also said that "we have to do a better job becoming more diverse because people often will look at who's involved with organizational leadership, and if they don't see anyone that looks like them, they may not feel as welcome" (personal communication, Ted Clement/April 2, 2024). The two had similar concerns over ensuring that everyone felt included in conservation. Many participants cited age and ethnicity as demographics that they wanted to be representative of the local community, but are not currently reflected in their volunteer base. Nils Warncok, for instance, had age-related concerns around activities they had available to the public. He noted that "there's barriers for older people because some of the work we do requires more physical activities that they just can't do" (personal communication, Nlis Warnock/April 5, 2024).

DISCUSSION

Conservation groups in the San Francisco Bay Area work hard to engage the community through a variety of tactics despite the barriers they face. Their current practices have been effective in public outreach, although they have room to improve through education, community relations, and capacity. However, these improvements are dependent on funding and overall public interest for the environment and conservation. My results clearly fill the gap in knowledge regarding Bay Area PES, as is outlined below.

Summary of current PES practices and their implications

Public engagement practices in these conservation groups suggest a variety of tactics that community members can participate in, consistent with the missions and goals of each organization. Opportunities include activities such as political advocacy, data collection, joining conversations about project planning, attending events and outings, and helping with manual labor such as trail management, tree planting, or invasive species removal. As a result,

communities throughout the Bay Area experience a multitude of benefits. Based on their own experience, some interviewees thought this volunteer work increased people's sense of belonging, connectedness and understanding of nature. This testimony aligns with current studies in the field that argue the benefits of feeling connected to nature, especially in urban locations (Halpenny and Caissie 2003), (Moore et al. 2006), (O'Brien et al. 2010). There were also PES tactics brought up by conservation leaders that are not commonly discussed in scientific literature. For example, a few of the interviewees emphasized the importance of relationship building in the community. They described how it takes trust and solid foundations to connect with community members, encourage them to share their experiences, and effectively conserve natural land within their local space. This is especially important because it allows conservation to move past the idea that scientists know what's best for an ecosystem or landscape. In many ways, the community has insight into local factors that conservation scientists may not.

The Bay Area is a rapidly growing and fairly dense urban landscape. It's critical to analyze how conservation groups here are involving community members in their work, so that an understanding of nature's importance is maintained in landscape planning as the area continues to develop. Hopefully, with this knowledge and engagement with local conservation, the Bay Area community will prioritize environmental conservation in quickly urbanizing spaces.

Summary of barriers to PES and their implications

My findings revealed many shared barriers faced by conservationists, although each organization had its own challenges that were specific to their exact work. Every interviewee cited funding as a prohibiting factor to prioritizing community engagement. This suggests a serious need for investors and all levels of government to fully understand the importance of conservation, and be willing to funnel more capital into the field. Funding is a prevalent issue outside of the Bay Area, as explained by an overwhelming abundance of research that matches interviewees' comments (Cerrato et al. 2018), (Rodríguez-Izquierdo et al. 2010), and (Taylor et al. 2022). Another common barrier that interviewees listed was a general lack of support and resources. This went beyond funding to encompass factors such as time, government restrictions, lack of pre-existing community relationships, and staff capacity.

The interviews also displayed common barriers to engagement that many participants postulated were experienced by community members. Although they cannot testify to these barriers directly, as they did not experience them as the public would, their comments are based on observing community participation in their work. One of the most common answers by interview participants was the importance of diversity and equity. Often, the population of people in conservation is not truly representative of the community it serves. As such, community members might be less likely to volunteer or feel less welcome. This is detrimental, as it effectively determines who gets to reap the rewards of community involvement in conservation. This is similarly described in much of the current research (Gerolemou et al. 2022), (Cerrato et al. 2018). The Bay Area is a diverse urban area in terms of age, income, ethnicity, and race. It's critical to consider all of these factors when determining who has access and ability to partake in community engagement. Additionally, accessibility was a commonly described barrier faced by the public. Problems related to this typically included: events that are during the work day, opportunities that require specific transportation, unpaid work/volunteering, or age limitations. Some interviewees expressed the necessity for conservation groups to consider community needs such as childcare, transportation, food, or compensation.

Future steps to improve community engagement

In my interviews, I found that community engagement can be improved through accessibility, community relations, increased government support, funding, and education programs. While the latter three of these strategies are strongly supported by available literature (Pakiding et al. 2020), (Hopfensperger et al. 2021), (Burdett et al. 2021), and (Taylor et al. 2022), the former two were not as commonly cited in research. This suggests a higher priority for accessibility and community relations in the Bay Area than in other locations. However, this could also suggest a priority shift in more recent years, that hasn't had the chance to be as well documented in scientific papers. Moving forward, local conservation groups need to continue with their work to improve diversity among their staff and their volunteers. In turn, this will help conservation become more accessible to more communities, as they see themselves represented and are being actively included in these spaces. Additionally, I found that increased government

support for conservation groups would go a long way in improving community engagement. Multiple organizations pointed to staff capacity as a limiting factor in prioritizing public engagement. Many interviewees said they would prefer having at least one staff member solely dedicated to community outreach. However, there is typically little available funding to hire staff just for that purpose. If local, state, or federal government agencies provided incentives or funding for community outreach and conservation programs, these monetary constraints would be alleviated.

Limitations and future directions

This study is limited mainly by geographic relevance. I focus solely on conservation efforts within the San Francisco Bay Area. As such, not all my findings and inferences cannot be applied to other locations. The Bay Area has unique community, scientific, and ecological needs that likely are not found exactly anywhere else. Furthermore, my findings are not applicable to rural regions, as my study focused on conservation and engagement efforts in one of the largest urban areas in the United States.

In the future, studies should be conducted to learn how to quantify the effectiveness of community engagement strategies. Right now, researchers can give qualitative answers as to how many people engage in conservation through volunteer work or direct advocacy. However, it's challenging to quantify long term effectiveness of engagement strategies compared to each other. Furthermore, research should look into what the ideal conservation expenditures are to balance land acquisition, stewardship, paid volunteers, or staff size in the most desirable and cost-effective way,

Broader implications

This study is important for PES research overall, as it provides valuable insight into the San Francisco Bay Area conservation scene. The Bay Area is one of the largest metropolitan areas in the country, in the state that has the fifth largest economy in the world (California 2024). Research conducted here helps set a precedent for science in the rest of the country. As the climate crisis worsens and the need to preserve biodiversity becomes more desperate, it's critical

that we have the tools we need to conserve natural spaces. Community engagement is an extremely powerful tool to create environmental advocates that love and understand the need for conservation. Therefore, this study can be used as a stepping stone to build community passion for the environment in the wake of climate change.

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APPENDIX

Table 1: Semi-Structured Interview Questions

Broad/Introductory Questions
What made you want to get into conservation work?
How did you get your start with this organization?
What are some of the typical projects that your organization takes on?
Current Community Engagement
What are your thoughts on community outreach and input on conservation projects?
What do you think the public has to offer to help with local conservation?
At what point(s) in your projects do you want the community involved, if at all?
How does the public usually engage with your projects?
How often do community members take part in your work?
In your opinion, how does community engagement benefit both conservation work and the public?
Barriers to Community Engagement
As a scientist, do you think there are any barriers to effectively working with the community?

What challenges have you or your peers faced that directly impacted the community input they had in their projects?
What do you think is a barrier for the public getting involved in local conservation work?
How to Maximize Community Engagement
In an ideal world, what role would community members have within your organization and your work?
What kind of support or resources are needed to make that happen, both for scientists and for the community?