

Analysis of a Nitrogen Wiki:

The David and Lucile Packard Foundation's Experiment with Online Collaboration

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1. Why a Wiki?

In the fall of 2006, the Packard Foundation's Conservation and Science Program began exploring a grantmaking strategy to address a rapidly growing global issue: nitrogen pollution. Tackling this complex issue required the Foundation to investigate all aspects of the problem, including scientific understanding, technology developments, and environmental impacts particularly related to reducing pollution from crop and livestock production. The Foundation needed to find a way to access input from experts it had not tapped in the past and to effectively engage them to help create informed strategies for grantmaking decisions. The Foundation regularly undertakes strategy development in complicated issue areas, but this time it delved into new territory by entering the world of online collaborative forums. The centerpiece of this engagement was a wiki—a tool that allows multiple users to easily edit Web pages.

Through experimenting with a wiki, the Foundation hoped to gather more than just information from individuals. A wiki, in theory, would allow people from different perspectives to collectively generate new and better ideas than they would have been able to generate on their own. Instead of relying solely on experts it already knew, the Packard Foundation hoped to expand its network by using the power of the Internet to include a broader range of stakeholders, academic institutions, the private sector and interested individuals. Much like the popular online encyclopedia, Wikipedia, the Foundation's wiki would be designed to allow for the simultaneous editing of subject matter from multiple online participants. It would be transparent so all participants could view and edit the work of others. By giving participants the freedom to “wiki” whenever they wished—day or night—the Foundation hoped it would be easier for people to participate than in other traditional foundation practices such as holding in-person meetings.

The wiki project ran from March 30 to May 10, 2007 and in broad terms, the idea worked. (The archived wiki can be visited at <http://nitrogen.packard.org>.) The process produced new insights generated by a network of individuals from multiple disciplines and geographies. Such an open approach to strategy development had the added value of bringing broader representation into the process, rather than the usual approach of relying on individuals who were already part of the Foundation's network. Foundation staff later determined that the quality of the strategy product rivaled that which could have been generated by a multiple day in-person convening. Input from this part of the nitrogen pollution strategy development process directly impacted the focus and emphasis of the ultimate strategy recommended to the Foundation's Board of Trustees in June 2007.

However, while online collaboration proved useful to the Foundation's nitrogen pollution strategy development, the wiki did not emerge as a panacea. Other methods commonly used by the Foundation remain important, such as drawing on the expertise and contacts of Foundation staff and consultants, and conducting workshops and conferences to enable more in-depth exploration of strategy points. To see why, it is helpful to take a closer look at the Packard Foundation's expectations for the online collaboration, how it met or did not meet those expectations, and the lessons the Foundation learned from the effort.

2. Setting up the Wiki

Having made the decision to use an open online forum to seek strategies for addressing nitrogen pollution, the next major question was who to invite and how to entice them to come.

Packard Foundation Conservation and Science Program staff hoped that the chance to influence the flow of Foundation funding would drive enthusiasm for the wiki. At the very least, the staff anticipated being able to test and strengthen their initial strategies without having to gather participants—and incur costly travel expenses—to conduct workshops.

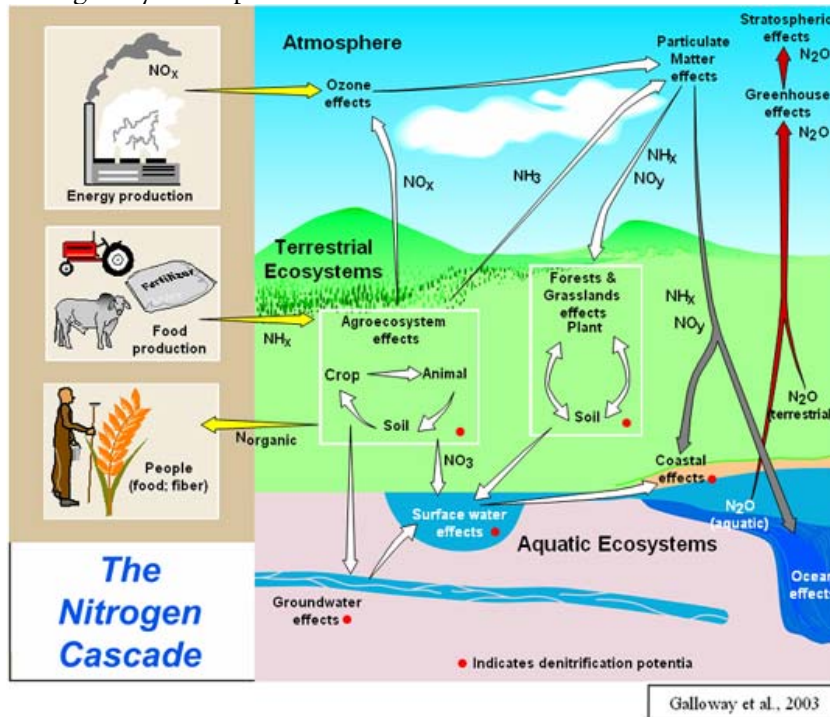
Although expectations were high, the staff had concerns. Would the content the Foundation used to ‘seed’ the wiki be seen as too complete, therefore limiting participation and discussion in the proposed strategies section? Would participants use the site only to lobby the Packard Foundation on their own proposals and disregard the seed content? Would participants see the value of having multiple institutions and individuals with a wide range of expertise collaboratively develop nitrogen reduction strategies? Would there be trust and technology barriers to this method of strategy development? There was only one way to find out: launch the wiki and see what happens.

The first task was to assemble a team. Conservation and Science Program Director Walt Reid turned to Diana Scarce at the Monitor Institute for help, naming her project manager. Scarce recruited staff to design and set up the online forum; technology experts to ensure the site would run efficiently; a wiki expert who could serve as the site’s moderator; a researcher to help find the right mix of participants; and someone to chronicle the process, so that the Packard Foundation could share learnings. (See Attachment A: Description of Players Involved)

Next, Reid and his team needed to find the right mix of participants, drive them to the site, and entice them to engage. To ensure participants would continue to contribute, technical errors and other glitches needed to be minimal. Although Foundation staff were aware of the typical barriers to participation (e.g., people being too busy or otherwise unable to access the site during the allotted time period), the team remained hopeful that the majority of the participants would place enough importance on the issue—and the Foundation’s involvement—to contribute.

Denise Caruso of The Hybrid Vigor Institute, a consultancy that specializes in collaborative problem-solving, was brought in to help build the list of stakeholders and target participants. Denise subsidized the Foundation’s existing network to identify approximately 180 potential participants. The final list of targets represented individuals with a variety of backgrounds and professional experience—ecologists, environmentalists, climatologists, horticulturalists, academics, scientists, agriculturalists, state and federal government regulatory agency personnel, and private sector industry professionals. To create this balanced list, Caruso relied on the nitrogen cycle map that appears on the wiki. The cycle map is widely accepted by the scientific community as accurate, so it seemed like the most reasonable and credible way to bind the group. Caruso cross-referenced the map with the draft strategy in order to extrapolate which categories of institutions and organizations might have a stake in addressing the pollution problem.

Nitrogen Cycle Map



In developing the participant list, Caruso assumed that the subject experts would likely be the most active participants. Many of these experts have already been published and would want people to comment on their content contributions. Caruso also believed that the subject experts would log on to the wiki out of curiosity to see the information added by other experts and would perhaps learn something new.

Caruso suspected that industry invitees and the NGO community would be more leery about putting their ideas and strategies into a public forum without knowing who would see them or what might be done with the information. She questioned whether NGOs would be willing to use a public forum to discuss ideas that had not yet been funded. Private sector participants might be hesitant to participate, since many are considered to be at least partially responsible for current high levels of nitrogen pollution and might be vilified by other participants. Caruso's concerns gave the team potential trends to watch once the site launched and they monitored its progress.

3. Gathering Participants

[Attachment B: Process Timeline]

Of the 180 various experts asked to participate, more than 85 indicated that they would.

On March 30, 2007, the Packard Foundation's nitrogen wiki officially launched. Initial activity on the site was sluggish.

Traffic to Wiki March 30 to April 2, 2007



By April 2, three days after the launch, less than half of the 85 who had indicated they would participate had signed on, and most were simply taking a look. Six people had formally introduced themselves to the community, and ten people were using the discussion section. According to Reid, the postings, though useful, were too few to generate a discussion. Furthermore, "It appears that no one has begun actually working directly on the wiki itself," wrote Reid in an email to all participants, noting his surprise that no one was editing the seed content or offering new strategies.

The Packard Foundation team discussed possible reasons for the relative lack of activity on the site and pointed to a number of potential factors, both technical and practical. On the technical side, the site suffered because it was launched using Microsoft's collaborative Web software, Sharepoint. Sharepoint runs only on Microsoft's Web browser, Internet Explorer, unless support files for other Web browsers (such as Mozilla Firefox or Apple's Camino and Safari) are downloaded. This introduced problems for some participants who were using Apple computers or other web browsers. Downloading the correct support files addressed these compatibility problems. Several participants had trouble registering and reported difficulties with navigation. Packard I.T. staff determined that registration problems were due to participants using spaces in their user names, which causes problems in many online systems. Some participants offered suggestions for improving the usability of the site, such as having a more detailed and easy-to-access instruction guide so that participants know where and how to contribute and providing contact information for the moderator and tech support personnel on the homepage.

Site moderator and wiki expert Jamais Cascio attributed initial sluggish activity on the site to the slow uptake common to many online collaborations, coupled with a general lack of familiarity and practical experience among the participants with using a wiki for this kind of project. Many may have heard of wikis or Wikipedia, but they had never actually used one and were unfamiliar with how it worked. "They need to know that it's okay to edit the content and know this not just from instructions, but from experience," said Cascio. To address these concerns, the team redesigned the homepage for easier navigation and sent an email to the participants to encourage involvement and prod them to focus more on editing the wiki, and less on the discussion boards.

For the most part, the strategy worked. By the second week, the number of participants had increased along with the level of activity on the site. However, participants still seemed reluctant to move from the discussion section to the wiki strategy pages. An analysis of participants also revealed that those participating came fairly equally from the two lists, but those from the Hybrid

Vigor list were more active on the site. Twenty-six participants from the Hybrid Vigor list had posted to the wiki a total of 148 times, while 18 of the Foundation's initial targets posted comments 50 times. This seemed to show that a pre-existing relationship with Packard Foundation staff was not necessarily a factor in whether certain individuals participated, or their degree of activity. But no definitive conclusion can be drawn since more than 20 participants could not be identified as coming from either list and could have found the site through word-of-mouth or other means.

By day 12, approximately 50 participants had registered, but the amount of activity, especially on the wiki strategy pages, was still restrained. In Cascio's view, the high level of activity on the discussion pages was normal and a result of the lack of wiki experience among the first wave of participants. He noted that many of the participants in the first wave could be viewing the site content as complete and did not see a need to improve it. To rectify the problem, the team opted to make direct contact with participants on a few of the discussion threads and invite them to enter the strategy sections that corresponded with those threads. To rally more activity on the site, the team alerted participants that the Foundation would be conducting broader outreach through blogs and listservs in the coming weeks, but was anxious to get the views and proposals of the experts and stakeholders currently registered on the site before going public.

The wiki had been up for 15 days when the team expanded its outreach to include about 40 blogs, listservs, and Web sites in an effort to create a buzz about the wiki, making it part of a larger discussion among those interested in nitrogen pollution. Within the first week of outreach, 20 blogs had posted information about the site; each of these blogs linked to between 250 and 1,000 other blogs. By mid-April, according to Google Analytics, 57 visits to the nitrogen wiki came from primarily environmentally focused blogs and links from other environmental and climate change-focused Web sites. Comment sections within those blogs indicated that the Foundation's efforts were being well received. No negative comments appeared, and many bloggers indicated that they were impressed that the Packard Foundation was addressing nitrogen pollution—and doing so using a process open to the public.

4. Ongoing and Increasing Activity

By April 19, it was time for the team to take stock of efforts to date and assess whether key objectives were being met. On the content front, the Packard Foundation wiki team noted that much of the activity was still happening on the discussion pages. For example in one discussion thread, there was an interesting debate brewing over whether nitrogen use efficiency could be improved sufficiently without fundamental changes in what crops were being grown (for example, increasing the amount of perennials vs. annual plants), but participants had not incorporated ideas from this discussion into the wiki. The Foundation was beginning to get the input it needed to bolster the initial strategy. However, the majority of input was not being generated through the wiki, as expected.

The site now had 122 registrants with more than 30 participants formally introducing themselves to the community. Cascio noted that he still saw no real surprises in the pattern of participation. The first wave of participants started slowly, and the second wave was bringing an increase in

registrants, but most participants were still not truly engaging. Cascio suspected that these new registrants, many from the blog outreach, were simply watching and learning, and that there was still a general reluctance to actively edit and add to the wiki pages. Reid noted his surprise that many of the NGOs targeted through the initial outreach were still not engaged, despite the opportunity to strengthen their relationship to the Foundation by making their voices heard on the site. His hope was that by May 10, when the site was due to close, he would see a linear increase in use and engagement on the site. Cascio noted that an announcement that the site would soon close would likely draw participants who were interested in joining but putting it off, but he also predicted that the level of activity would begin to level off once conclusions to the wiki strategy sections were reached. The site was adding value in terms of informing the Foundation's strategy development, but the team maintained that the level of participation and engagement could be better.

In the final days of the site, the wiki team gathered the necessary conclusions from each of the discussion threads and elicited final comments from the participants. In preparation for closing down the forum, the moderator sent an email to participants emphasizing that all postings would be archived and made available for consideration by Foundation staff as they developed a proposed grantmaking strategy. Walt Reid made a personal appeal reminding participants of the closing date and encouraging them to review and add to the discussion as soon as possible. The team also thought it would be useful if Reid entered the discussion threads and posted the Foundation's take-home message, such as how he viewed a particular thread contributing to a more effective strategy to reduce nitrogen pollution. This way, the Foundation could get reactions from participants on whether they agreed or disagreed with the preliminary synthesis before the site closed.

With these final tasks complete, it was again time to assess the wiki to determine whether the additional activities to increase participation worked. In Cascio's view, the efforts seemed to be paying off. More of the regular participants were now actively engaged on the strategy sections, and there appeared to be a steady increase in new registrants. A review of Google Analytics statistics on the site reflected this trend as well. Overall, during the time the site was live, from March 30 to May 10, there were no obvious spikes in participation. People entered the site on a consistent basis, and each participant visited at least twice.

Traffic March 30 to May 10, 2007



In all, there were a total of 2,751 visits to the site by 1,343 unique visitors. Of those visits, 60 percent came directly to the site, 23 percent came from referring sites and 16 percent came from search engines.

The number of page views was quite high throughout the period (22,367), with an average of more than 545 page views per day. There are two possible reasons for the high traffic: people visiting the site were interested in the content, or they were having difficulty finding what they came to the site to find. Aside from the home page (3,690 page views) and wiki table of contents page (2,340 page views), the most popular pages on the site were the Stakeholder Map (773 page views), the Farm Bill strategy page (344 page views) and the Nitrogen Use Efficiency strategy page (326 page views). As suspected, the most used page, aside from the home page and table of contents, was the discussion page (2,047 page views).

The vast majority of participants came from the United States (2,354 visits). Next came Europe (178 visits), Asia (103 visits) and Africa (43 visits). Within the United States, visitors mostly came from California (817 visits), New York (225 visits), Massachusetts (166 visits), the District of Columbia (109 visits) and Wisconsin (78 visits).

In Cascio's opinion, the heavy activity on pages such as the Nitrogen Use Efficiency page, as opposed to the pages addressing nitrogen pollution in developing countries, was not surprising. He pointed out that "Technical questions are apt to get more activity than uncertain political questions, as a rule, even in political discussions." Moreover, he said that discussions about developing world policies involving only Western participants are rarely insightful or particularly successful. "Use efficiency, conversely, appeared to be a more 'solvable' problem, and one that the various participants had clearly been thinking about for some time," Cascio said. Other reasons some areas of the site received less attention were more obvious, according to Cascio. For example, certain strategy topics were not germane to the background or expertise of the participants. Among the least trafficked pages, according to Google Analytics, were the coastal effects page, the ocean effects page, and the visibility effects page.

5. Lessons Learned

As the site closed on May 10, 2007, the wiki team reconvened via conference call to reflect on lessons learned during the wiki experiment.

From a broad perspective, the team acknowledged the importance of identifying a robust invitation list of potential participants from diverse backgrounds and expertise. When initiating such a project for the first time, the team saw value in assembling a heavily resourced team and investing in regularly scheduled team meetings—the combination of a well-resourced team and strong communication gave the team the capacity to adapt and respond to unforeseen issues. In retrospect, the team wished there had been more involvement from Foundation program staff, so the learning could have been shared more widely in the Foundation.

With regard to the set-up of the site, the team considered good, insightful content a key factor in encouraging interaction on the wiki, but too much content can be seen by participants as already complete and without need for additional input. Some participants said they were overwhelmed by the information presented and reluctant to add their own ideas. However, both the wiki team and the participants said that having Reid and the moderator actively guiding the discussions helped to alleviate this problem. Also paramount from the team's perspective is paying close attention to user interface issues and to building a site that is easy to navigate and easy to understand how and where to contribute.

Phone interviews and a survey of registered participants conducted after the wiki closed gave credence to these insights. Participants noted that there were so many different ways they could engage that it was not immediately clear how best to contribute. A consensus indicated that the site needed to be simpler and more focused. Participants also recommended making it easier to navigate and post to the site. Several survey respondents indicated that more instructions would have been helpful. There needed to be a narrower focus, with specific guidelines on what to contribute.

The mix of invitees was good, but the mix of participants suffered as many chose to observe rather than contribute. Packard Foundation wiki team members were surprised that many of the scientists they thought would provide input did not, while other scientists not known by the Foundation did engage.

Participants from NGOs, the private sector and the general public also did not contribute as much as the team expected. Reasons for their lack of activity were difficult to pin down, but the team suspected that competition for funding among NGOs could have made those groups reluctant to share even their top level, non-confidential ideas. Interviews with two participants from the NGO community confirmed this possibility. A question and answer document provided to participants also might have had a dampening effect on NGO participation, as it stated that the site "was not a forum for soliciting or securing grants from Packard." One NGO representative interviewed after the wiki closed noted this document, saying that most NGOs would have participated more if they had seen this as an opportunity to pitch to the Packard Foundation.

As for site moderation, the team learned that clear expectation setting and regular and active participation in the discussions by the host of the site is critical to a successful final product. Participants, they found, need to be reminded regularly of the host's intentions for the input provided and the need for timely responses to the host's calls for active participation and editing. For technical subjects, the team also learned that the site moderator needs to have considerable knowledge of the subject matter in addition to experience facilitating online dialogues.

Regarding overall participation, Reid said that it was important not to assume that "if you build it, they will come." Building a robust network of experts and stakeholders from all sides of the issue before and during the process is critical to success. The team felt that additional outreach during the time the wiki was live and as gaps in participation were identified would have improved the

amount of participation from some segments, such as the NGO community. In addition, the team felt that soliciting more wiki-savvy participants the next time an effort like this is undertaken would improve the level of participation and the quality and quantity of the content.

The importance of having more wiki-savvy participants and an experienced site moderator steeped in subject matter knowledge was most evident on May 2 when, with just eight days to go, things came to an abrupt boil on one of the wiki pages. Although participants had made edits up to this point, edits were largely additive and not transformative (new content was added but did not replace existing content). One semi-regular participant, who had mostly been an observer to this point, suddenly made a major transformative change to the Nitrogen Use Efficiency page. The change itself was not a problem, according to site moderator Cascio, but the fact that the participant made this major change without any initial warning about what he was planning to do upset other participants. Another participant saw the major edit and expressed his displeasure, asking the site moderator to “do something.”

Cascio chose to revert the page, but posted the major changes to the discussion board to prompt discussion. The participant who made the major change disagreed with this approach.

“In retrospect, reverting the change was the wrong course,” Cascio said afterward. “I should have left it but emphasized in the discussion group that the other participants had a responsibility to determine whether user edits should remain.”

Cascio suspects this type of edit war would probably not have occurred in the manner it did had there been more wiki-experienced participants from the outset. “The participants of this wiki largely come from a ‘measure twice, cut once’ mental model,” Cascio explained, noting that the participants seemed to spend a lot of time crafting their wiki entries before posting them, while the content of wikis with more experienced wiki users changes rapidly as people test and question various theories.

According to Cascio, edit wars are more common on other wikis in which he has participated because they are a side effect of rapid iteration versus planning in discussion. In this online forum, we saw disagreement in the discussion sections. In forums with participants with more wiki editing experience, that disagreement would have manifested itself in the wiki content.

Finally, from the participants’ perspective, many recommended that future online collaborative projects include experts and stakeholders from around the world, not just the United States. They noted that this might have improved the content of this wiki.

Other recommendations from the Packard Foundation team for improving the experience in the future include:

Continuously work to drive registered participants to the site, reminding and encouraging them to return to the site.

- Provide clear and regular updates on site changes, and provide frequent requests for specific input.
- Encourage participants to sign up for alerts on site changes or provide participants with daily summaries of updates with the option to opt out.
- Remind participants that all of their comments and ideas are being saved in the site archive for later revision (even after the site has been closed).
- Set a definitive timeframe for participation in the forum, as means of maintaining momentum and driving participation.
- Provide participants with a way to continue their discussions through a listserv, thus further strengthening relationships between those who have a stake in the issue.
- The team also found value in chronicling the process of developing the wiki as a method for tracking progress and ensuring that the lessons learned are used to make future wiki experiments as effective as possible.

6. Conclusions

The Packard Foundation wiki team drew several conclusions from the experimental effort that hopefully will inform future wiki-driven efforts.

Foremost was the overall consensus of the team that the site fostered a good level of participation and engagement, and that the quality and quantity of content had improved over time.

Overall, Reid concluded that the wiki was useful and achieved the primary objective of creating a broader, more transparent network of experts and stakeholders.

“A new community of individuals was created, and all can now see so many different angles to the problem of nitrogen pollution,” Reid said, adding that the wiki needed to be supplemented by more in-depth discussion of certain strategy points that could only be addressed via face-to-face interaction. When participants were asked if they preferred the online forum over live meetings, 67 percent of the 48 respondents indicated that they preferred face-to-face collaboration. At the same time, however, the majority of the respondents said that the online forum is an excellent way to build and maintain relationships, as well as bolster their own knowledge and reading lists, and many noted they would be interested in contributing to specific project issues.

The majority of the registered participants who responded to the survey (60 percent) described the exercise as a useful, interesting, and overall great idea. Of those responding positively, a majority expressed that the interactive discussions were useful, and the exchanges were a good way to collect diverse points of view from a wide group of contributors. They also said that they learned a great deal of information from the wiki discussions, which prompted them to think more about the issues and research evidence.

Although Reid determined that crafting an initial strategy for the wiki and assisting in guiding discussion on the site was worthwhile, a review of the total estimated time spent by team members on the project revealed that the online collaboration was a resource-intensive endeavor, with wiki team members spending an aggregate of approximately 500 to 600 hours over twelve to fifteen weeks working on the wiki. Of course, the Foundation was managing a steep learning curve running such a process for the first time. Hopefully, future wiki-based collaborations will benefit from the nitrogen wiki experience and require fewer resources. Reid concluded that he would recommend using a wiki as a way for foundations to inform their grantmaking strategies, as long as the issue being addressed is complex, far-reaching, and requires a large pool of potential contributors.

The online collaboration had a significant impact on the final strategy product by providing more clarity about where the opportunities for philanthropic investment may be. For instance, the discussion around Nitrogen Use Efficiency (NUE) provided a reality check about where Foundation dollars could make a difference and led to the observation that some sort of synthesis of the state of knowledge on nitrogen pollution could be valuable. It put the need to think about shifts in cropping systems (rather than just increased NUE for existing crops) on the table and led to less emphasis on nutrient trading. It strongly reinforced the Farm Bill emphasis, helped clarify the potential opportunity provided by nutrient trading and helped to raise the profile of California-focused opportunities through emphasis on the scale of the nitrogen problem in California.

There were big takeaways related to framing and new opportunities. The Foundation's draft strategy was mostly "inside the box" when it came to the role of agriculture, and the online dialogue revealed the need to look at farming systems and the need to shift more crops to perennials. The wiki also brought to the Foundation's attention specific new opportunities, such as the potential for better field measurement techniques to give farmers real-time information on nutrient inputs.

Finally, the nitrogen site generated a lot of buzz among the philanthropic community, and the Foundation has since been contacted by a number of foundations and funder collaboratives interested in learning from and replicating the model. Blog activity and anecdotal evidence suggests that others in the field are intrigued as well. Whether this is a trend toward greater openness and transparency or if wikis are just another tool that established foundations like the Packard Foundation will try but won't integrate into significant culture change remains an open question.

Attachment A: The Nitrogen Wiki Team

Project Sponsor: Walt Reid, Packard Foundation
Project Manager: Diana Scarce, Monitor Institute
Forum Moderator: Jamais Cascio
Stakeholder Research: Denise Caruso, Hybrid Vigor Institute
Communications: Nick Branden, Gwyn Hicks, Spitfire Strategies
Technology Development & Support: Matt Sharp, Marcus Krawinkler, Packard Foundation
Project Associate: Aron Kirschner, Monitor Institute
Wiki Gardener: Chris Coldewey

Attachment B: Process Timeline

March 8–22 Stakeholder research
March 23–29 Targeted participant outreach
March 30 Site launches
April 13 General public invited to participate
May 10 Site closes