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### Webinar Transcript

## An Introduction to CRAVe: A Climate Registry for the Assessment of Vulnerability Management in the Northern Mariana Islands

### Speaker:

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National Climate Change and Wildlife Science Center

### Recording Date:

Tuesday, June 23, 2015

### Webinar Video and Project Information:

<https://nccwsc.usgs.gov/webinar/472>

**Ashley Isham:** Good afternoon, or good morning from the US Fish and Wildlife Service's National Conservation Training Center in Shepherdstown, West Virginia. My name is Ashley Fortune Isham. I would like to welcome to our webinar series, that's held in partnership with the US Geological Survey's National Climate Change and Wildlife Science Center, otherwise known as NCCWSC.

They're located in Reston, Virginia. The "NCCWSC climate change, science, and management webinar series" highlights their sponsored science projects related to climate change impacts and adaptation. It aims to increase awareness, and inform participants like you about potential and predicted climate change impacts on fish and on wildlife.

I would like to introduce a senior scientist at the NCCWSC, and that's Dr. Shawn Carter. Shawn, welcome.

**Dr Shawn Carter:** Thanks, Ashley. Thank you to everyone joining us today. It's my privilege to introduce a couple of my esteemed colleagues here at the NCCWSC.

Robin O'Malley's our policy and partnership coordinator here at our center, and he, which manages the Department of Interior climate science centers. Prior to joining our team here, Robin was the Director of Program Development and Environmental Reporting at the Heinz Center.

He's also worked at the Department of Interior at different levels, both on policy staff and also Chief of Staff when the National Biological Survey was around. Also, a special assistant to Interior Secretary Bruce Babbitt.

He's also been Deputy Science Advisor within Interior, Associate Director of Natural Resources at the White House CEQ, and has also been Senior Environmental advisor to Governor Thomas Kean of New Jersey. He holds a Master's from Harvard's Kennedy School of Government and a Bachelor's from SUNY New York.



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Also, with us today, is Laura Thompson. She's a biologist here at our center. Her work includes gathering information on climate change vulnerability assessments for natural systems and understand progress towards climate change adaptation planning.

Her research interests are to help understand impacts of climate variables on genetic variation of wild populations and the potential to adapt evolutionarily to future climate change.

Laura just recently finished her PhD at Trent University in Petersborough, Ontario, and that was focusing on landscape and climate factors contributing to genetic structure of woodland caribou. She also holds a B.S and M.S from the University of Tennessee Knoxville in Wildlife.

We're going to be starting today with Laura, so it's my privilege to introduce Laura and you have it.

**Laura Thompson:** Thank you, Shawn. Thank you, everyone, for joining.

I'm going to start out this presentation by giving you a little bit of an overview of what to expect during the next hour. First, we're going to provide a brief introduction on vulnerability assessments and why they are important, and then provide an understanding on the need for this particular tool that we call "CRAVe." Then provide an overview of the CRAVe features and how you can help you and your partners, then end up with some highlights on CRAVe.

To start to give you a little bit of background on vulnerability assessments, so there's a number of resources that are of particular interest to many of us, whether it be fish and wildlife CCs or habitat, ecosystems, or for some may be more interested in infrastructure or crop resources or cultural resources.

However, climate change has the potential to affect those different resources in a variety of ways. It's important to assess vulnerability, which is defined as the likelihood that a particular resource of interest will have adverse effects to particular climate changes, whether it be changes of precipitation or temperature.

This graph shows, this was actually taken from the National Wildlife Federation's publication Scanning the Conservation Horizon that explains the components of vulnerability, and how to go about assessing vulnerability. This is also a similar framework that was provided in the 2007 IPCC report.

Some of the key components are exposure, which is the likelihood that, or the potential climate change the particular resource of interest might be exposed to, whether it be changes in temperature or even associated climate changes, such as altered fire regimes. Then also, sensitivity, which is how particular climate changes might affect your particular resource of interest.

Then those two components can be assessed to understand the overall impacts of climate change on your resource. But it's also important to assess whether your resource might be able to ameliorate those impacts through adaptive capacity. By following those steps, you can get an understanding of vulnerability.



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Vulnerability assessments are really important for prioritizing resources of concern as a result of climate change. But they also help us to understand why particular resources might be vulnerable, which is really important in adaptation planning. This framework, also taken from Scanning the Conservation Horizon, shows how vulnerability assessments fit into the adaptation planning framework.

In the upper left hand corner, you start with a framework by identifying a conservation target, whether it be a species, ecosystem or some type of infrastructure resource. Then you assess vulnerability to climate change by assessing sensitivity, exposure and adaptive capacity. Then you can identify management options to reduce sensitivity exposure and increase adaptive capacity and then implement those management options on the ground through changes in policy, practice or institutional changes.

A more recent publication, also by the National Wildlife Federation, went into more detail about the adaptation process. I just put this in because it shows multiple steps of adaptation planning. But I wanted to point out that one of the first and critical steps is assessing vulnerability to climate change. It's really an important step for identifying meaningful adaptation strategies.

However, there's a lot of issues for somewhat of a daunting task for many resource managers just being able to collect the necessary information, and using the relevant science that may be needed.

I'm going to pass it over to Robin, who will describe some of the issues that came about because of some, developing this tool.

Robin O'Malley's: Thank you. Again, thanks, everybody, for being on the phone.

As people, as we've been moving along through the past few years, these are the kinds of questions that we get it from folks who are faced with the challenge of adapting or planning for adaptation to climate change. "What are the impacts? How do I do this? Where do I get the data?" Those kinds of questions. That's some of the motivation for what we've been thinking about and what we're going to talk to you about.

We have worried about some things in terms of the "Thousand flowers blooming strategy," which is good for coming up with interesting ideas. But we can almost guarantee that, certainly within the federal government and probably within any other large body of folks that we're duplicating some work or we're duplicating similar work being redundant and we simply don't have enough money to be able to afford that.

Maybe more importantly, we're all at the forefront of a really new and evolving area of science and conservation practice and we have to have mechanisms to learn from each other. We've got to be able to move the information around quickly, we've got to be able to learn lessons from other similar studies about similar resources. We've got to aggregate over broader areas. We've got to learn about different methods of doing things.

The notion that we needed a place to look for information about methods and outcomes and resources for vulnerability assessment became clear over the past few years. That's what drove us to where we are now.



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This is the simple goal of the CRAVe project. I want to unpack this statement a little bit to give you a sense of a little bit more granularity for what we're talking about. This is a project that provides descriptions and contact information, it's not a full database of all the monitoring data and the graphic material and maps, et cetera. It's really a phone book, a metadata record, essentially, for vulnerability assessments.

It's about studies that attempt to answer the question, "What is the impact of climate change on X?" It's not a database of downscaling methods or a database of monitoring data sets, even though those may be really important components and are often really important components of vulnerability assessments. This is about things that draw on that kind of information and move it towards answering a question about impacts.

Resources of interest, our organization, the National Climate Change and Wildlife Science Center and eight climate science centers, focus essentially on natural and cultural resources. There's some spill over and overlap with the built environment and maybe less, although a growing amount, with social and economic and health kinds of studies.

We've designed this, and you'll see some examples, where other communities that are knowledgeable about some of these end points have helped us build the capacity to incorporate vulnerability assessments of those kinds of end points into this. It's essentially -- and I'll make this point later -- a community effort. If it's not capable of handling studies about the points of interest you have, then we should talk.

I said it's a registry. These are not deep files of lots of data and graphs, et cetera. We've divided it into some pretty basic core project information and then some additional details. I'll say a little bit more, there's even a smaller list of things that you have to fill out for a basic registry entry. But you see, where is it, who's doing it. I'll say more about the target and cost and status. "How do I get in touch? What scale is it at? Why is it being done?" These kinds of things.

We have worked with a number of partners and partner organizations, both who are doing studies and who are interested in studying the outcome of this process to identify these minimum components that allow you to find the kinds of work you want to find.

The fewest items that you have to put in is this list. Our philosophy is we'd rather have more entries with less information but enough basic information for people to find their way around rather than requiring an answer to every one of the questions.

We've managed to narrow it down to where is it, who's doing it, what's the target, how big is this project, some sense of scale, and how do I get in touch with the folks. This is the bare minimum for an element. If that's all you have, it's worth putting the entry in to allow people to track, follow that down.

Want to talk a little bit about the types of assessment targets, and this is both a sense of what we've captured as the kinds of targets we think are relevant, and a little bit about how we've tried to make it easy for people to do the entry and capture the right information.



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These are the types of assessment targets that it's currently possible to easily enter into the system. I'm going to go through and give you some examples of where the data comes from and how it's linked, and, again, a little bit about how you manage the system.

For individual species, we're tied into the federal Integrated Taxonomic Information System. If you start to type a species name in the box, it will fill out with species that are live directly from the ITIS system. That is the federal standard for taxonomic names, and so we figured we'd just draw directly from that.

But there's also studies that do, that focus on larger numbers of species and you probably didn't want to add the individual species' names for all the salamanders and newts individually, so we put together a list of species groups at a larger level.

This is, obviously, the beginning of the list, but this is a drop down list that you can pick from that enables you to say, "OK, we're going to do all the water birds," or what have you and pick from that kind of a drop down list, so you can capture larger groups. There's both plants and animals on this list.

For habitat types, again, we've provided a list. There's always an "Other" option that you can fill in, but we've provided a moderately detailed list. There's obviously much more finely divided lists of ecosystem or habitat types. But we've gotten one that's got a moderate level. This, again, is a screenshot of the first part of it. But it scrolls down past the Ms for a few more different types.

The last one, I'll show an example of is a case where we worked with a partner to develop the taxonomy here. This is a National Park Service Taxonomy. We at USGS are not the cultural resource experts, but we were happy to work with the Park Service to find a taxonomy of types of cultural resources that were the standards around which the community could...people would understand those.

We did the same with the built environments. I don't have a slide here, but we worked with the Environmental Protection Agency and the Bureau of Reclamation to capture the kinds of built environment categories that would be relevant and understandable to folks working in those arenas.

This is the other category that I want to highlight right now is this sort of project status and time frame. We were encouraged to do this, and this was the benefit of working with a fairly large group of advisors. We were particularly encouraged by some folks outside the federal circle who may not have the kind of budgets that federal agencies often have and wanted to be able to find the ones that were a little bit more within their reach.

We provide some information on what does this project cost, how long did it take, is it done or not. We're just trying to, again, enable people to find the kinds of studies that are relevant for their uses.

I really want to make a point about this project that this is not a done and ready to use, nobody needs to use it, just sign on and begin to work with it. This is a partnership that we need to build and a community resource we need to build. I'm going to go through some of the tasks that are relevant for this and show who's had their hand in the process so far and where you all fit in.



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We at NCCWSC, and USGS Fort Collins Center have done the coding and design work. Mostly the funding has come from USGS with contributions from both the Fish and Wildlife Service and the Forest Service, and we are certainly open to additional ones.

The ideas and the design for this were really shaped by this...arose out of the Interagency Land Management Adaptation Group, which has both federal agencies and folks from outside the federal circle. We created a steering committee with folks from that. We've had input from people on the USGCRP Adaptation Science Working group, so a pretty broad set of both management practitioners and science practitioners giving us some sense about what we needed to cover.

Quality assurance is a legal mandate for federal agencies, and so any entry that is attributed to being managed by a federal agency will be reviewed by someone who's designated by that agency to make sure that the information is appropriate to be published about them and about a project that they are ostensibly funding.

We're partnering with EcoAdapt to provide a similar level, although obviously some slightly different criteria for non-federal vulnerability assessments, that we make sure that it's a real project, that it's reasonably informative, that we're not getting spammed, and those kind of things.

Again, a partnership between USGS and a number of federal agencies and the non-governmental sector.

We're going to maintain this infrastructure over time and think about designing it. We've already got a short list of things, since we did the release a few weeks ago, of changes we'll want to make to the basic coding and choices and things like that. Again, I encourage people to think about helping us out on that.

Most importantly though, is that we've entered into the registry, vulnerability assessments that have been funded by the National Climate Change and Wildlife Science Center. We're moving to add content for all of the vulnerability assessments conducted by USGS.

We can't enter vulnerability assessments done by your organization unless we know about them and you know most about them. Everyone's on this call. Your partners, collaborators, and staff, know about where these vulnerability assessments are. As I hoped you started to see and you'll see some more, we've made it as easy possible to make an entry into this registry, so we encourage you to take the time to do that, again, knowing that there's some quality assurance that gets done on the back end.

Another feature of the system is that we're working with EcoAdapt, both on the QA that I mentioned. But also where we started was that they published the climate adaptation knowledge exchange, which has a different audience, reaches a different set of folks, than a federal government website would.

So the information will be mirrored on EcoAdapt and USGS sites, so that you'll be able to find it either way and we'll reach some different audiences that way. We'll also be linking up, not clear exactly how, with the Federal Climate Resilience Toolkit, which, again, will reach a different kind of audience and bring different people to the table.



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What I want to do now is go through some of the features, both of the CRAVe system as a user, if you will, a searcher, who wants to find information, and then a couple more examples about what it's like to enter a registry entry onto the system.

First thing, this is a landing page. On this page and on some subsequent pages, a basic search bar with full text entry, a state or large marine ecosystem, managing entity, et cetera. The basic kinds of things, "I want to find out all of the vulnerability assessments in Colorado." You can go straight there and enter that.

But let me give you a little bit of an example. I entered trout in the "Full text search." A couple things to note is that as soon as you enter something and get some results back, you get a choice of filters. Right now there's only five results, so it's not really a problem to filter, but when we get a lot of content and you get 300 results back, you may want to filter it by some finer criteria. So we've built in some filters that enable you to find a little bit more about what you want.

Each one of these entries that you see two of, you'll see, has a little bit of information, a couple bits of data, and each one of these titles is a clickable link. If you click that link, you get a full registry entry.

Each one of these points on this list, these are the things that we ask information about for the registry. A full registry entry would have a response to every one of these. You'll see, in several cases, there's a "Not-supplied." That's, again, perfectly all right. Anything past the minimum is good. But again, at least there's a few minimums.

You'll see that in addition to this being a trout oriented project, it's also focused on freshwater streams. There's an opportunity to provide a web link for a project. If the project has its own website or a page on your website that provides information about it, you can make that link. Again, giving people the window to find what they want.

Because entries are coming from lots of different folks and we're concerned about people getting spammed, we don't actually publish the email address of the contact person. But in this case if you click on Jason Dunham's name here, it'll open up an email window and you can send him an email. He'll get your email address and can respond. But we haven't published his information there.

Finally, there's an opportunity for a full abstract summary kind of document that can give a pretty full description of what the study's about. Again, full range of question, but this is the full set of information about any particular vulnerability assessment. You can go further than this either through the contact or through the URL or reading the summary, but again, this is a metadata registry, not a data set kind of system.

If you log on and wish to enter a vulnerability assessment, so here I've created an account with my Gmail address, you'll get into a page that looks like this. Again, you still have the search access, but it'll allow you to add the vulnerability assessment and once you have assessments, so you can save them in draft or submit them, you can go back and manage them, see where they are.



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If you click on the "Add new vulnerability assessment," you start to get in -- and I'll just step back -- to the full questionnaire. It's a two page questionnaire, again, that goes back and asks you something about each one of these data elements.

In as many cases as we could, we made that as quick and painless and consistent as possible. In the list of states -- in most cases, if you start to type something, it will pick up the items that have that string of characters in it. I started typing A-L-A and I got Alabama, Alaska, and the Republic of Palau, this happens to be the state list, but the territories in with the states.

Again, making it as easy as possible. In many cases we have drop down lists. So for large marine ecosystems, we have a pretty pure drop down list. If your item isn't in any of the drop down lists, we, in almost all cases, have an other information box that you can add some additional information in.

We've enabled consistency and ease of entry, but we've also added flexibility if what we have doesn't fit what you need.

Again, another example of where we've tried to provide as much facility in entering and, again, for consistency, there's a question about managing entity, who actually does this project. There's a selection for tribal, federal, state, NGO, academic institution, et cetera.

In this case I picked the tribal one and immediately below it appeared a drop down box that has the entire list of federally recognized tribes. You can go down and select one or more tribes for managing entity select one tribe that's conducting the project.

But for example, if you're working with a tribe that's a state recognized tribe or a self-recognized tribe, you can always add in an other. We haven't limited you to the selections that we've got.

Want to call attention to...again, both the other, as I've mentioned, and the not sure. We've provided a lot of these opt outs so that you can get through the questionnaire and not answer. Again, we would rather have an entry that gives the basic information, and a where to go for more information than have people forced to answer things they might not have information about or not able to provide the entry.

That's the basic outline. Again, a metadata registry that we need to build together to help and enable the learning that we need to do across the community as we figure out how to assess vulnerability and figure out how to link that information to adaptation actions. Encourage you to go to take a look at it and am happy to open the floor for questions.

**Ashley:** Thank you Robin and thank you Laura. Our first question comes in through the chat box. It's from Sara and it says, "Vulnerability assessments that were collaborative among numerous federal agencies and NGOs, how would those be reviewed for quality?"

We have a second part of that question afterward.

**Robin:** We are thinking very hard about how to make sure...Well, you're raising an interesting aspect, but we know there will be projects that are funded by and supported by and conducted by



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multiple agencies. We have a challenge in making sure we don't have duplicate entries and we have the challenge that you mentioned.

I would say that the primary federal agency, the lead federal agency, maybe in this case, the one that has the most dollars in the pot, would be the one that would be selected as the lead agency, the implementing agency.

We have options for the managing entity and partners and we'd certainly encourage all of those agencies to be listed as partners. But at this point we need to pick a primary agency.

**Ashley:** Also, another question coming in and it says does the USGS version worked better with Internet Explorer or Google Chrome or in some other browser?

**Robin:** We think that it will work best in Chrome or Firefox and higher versions of Internet Explorer.

**Ashley:** Thank you. Also, are you looking for assessments of a broad range of climate change impacts or also assessments of specific impacts such as sea level rise?

**Robin:** I think we're looking for both of those. If by broad range you mean multiple kinds of impacts, sea level rise and heat and other things together, yes. Then, very targeted ones, either way. Either of those are likely to be of interest to other people in the community.

**Ashley:** Thank you. Another question. They were just searching on the Internet and when they went to work for tribal agencies only one popped up. Is that correct?

**Robin:** I'm not sure where their search was. There may only be a few vulnerability assessments that deal with tribal agencies that have been listed so far. Some of the lists are only populated with things that have actually been entered.

The list I showed should come up, if you want to enter a new one. But if you're searching for existing vulnerability assessments, the list that will show up to you only includes those items for which there already is an assessment. There may only be that one that's been registered so far.

**Ashley:** Thank you. Robin or Laura, if you guys have questions from your group, please feel free to chime in.

**Robin:** We're good here.

**Ashley:** OK. We have some more coming in through the chat. This one says, "May have missed this in the presentation, but can you insert a link to the vulnerability assessment if they are on a publicly accessible site versus obtaining through a lead agency?" So that's just a create website, right Robin?

**Robin:** Yes, although I can also interpret the question, if someone knows about a vulnerability assessment that's posted on an accessible website they could enter that. They'll have to pick, at some point, who did that study. So that, again, there'll have to be some entity identified as a managing entity for it.



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**Ashley:** Thank you. You started touching on this, at least saying they're interconnected. But it says, "How are CRAVe and CAKE related?"

**Robin:** CAKE is an existing resource that is essentially also a metadata registry of projects, publications, people, many different resources that are relevant to climate change adaptation.

EcoAdapt and the CAKE staff are now building a mechanism to incorporate all of the vulnerability assessments that come in through CRAVe into their system. But also to enable you to search, essentially, as if you're searching CRAVe.

On CAKE, you'll be able to get anything on CRAVe plus anything that's already on the CAKE registry. That's the relationship, CAKE is a larger resource and we'll be integrated into that.

**Ashley:** Thank you. One more question. It says, "Is the CRAVe team going to systematically comb through the Climate Science Centers and the Landscape Conservation Cooperative projects and enter vulnerability assessments into CRAVe or should CSC and LCC staff enter their projects?"

**Robin:** That's a half and half answer. We have entered all of the projects through fiscal year '14 that we're aware of that are funded that are vulnerability assessments at Climate Science Centers. We have not done so at the LCCs. We have distributed this information to the LCC through the LCC network and we hope that they enter those projects.

We've, in fact, had some discussions, and when I mentioned there was one of the modifications, it's not currently possible to choose a type of entity right now that is an LCC as a managing entity. We realized that's a mistake, so we're going to work on doing that.

But we encourage the LCCs to enter the projects that they have as vulnerability assessments into the system. We have not done that. We've done it for the CSC side of the house.

**Ashley:** Thank you. A somewhat related question, it says, "The US Fish and Wildlife Service has comprehensive conservation plans associated with its refuges. Some of these have "mini" vulnerability assessments incorporated in the Pacific Northwest. Are you looking to include these types of assessments that are part of the broader planning effort?"

**Robin:** I would say yes and I believe we had that very same discussion with Kirk Johnson, who is the Fish and Wildlife Service lead reviewer. We agreed that if it asks the question or tries to probe the question as what is the effect of climate change on fill in the blank, it fits our definition of a vulnerability assessment.

We don't think we should be really strict about the definition having to have adaptive capacity and sensitivity in those particular elements that Laura talked about. But really, something that asks that question. From what I know of those planning documents, those, again, probe that question and try to provide some feedback for that. I would say yes to that.

**Ashley:** Thank you. Then just touching back on the LCC's Tom who had asked that question, said that he's going to bring it up with the LCC coordinators and some of the science coordinators and try to come up with a systematic approach to enter the ones that have been completed by the LCCs as well.



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**Robin:** Thank you. Again, I would just say, we've tried to make it be quick and easy to do. This a not a lot of free writing, there are a lot radio boxes and check boxes and selections and drop down menus that make this an easy form to fill out and to provide an entry.

Then knowing that there'll be a second set of eyes to make sure they're...it should be relatively easy. I appreciate you taking that time.

**Ashley:** Then we have another question. It says, "What about experimental research projects?" I'm sorry, it's popping all over the place, excuse me. "An example is Effects of Ocean Acidification and Plant Productivity Response to Carbon Dioxide Enrichment, are they of interest?"

**Robin:** I don't see why not. That fits into the category of what is the effect of a climate change component on a resource?

**Ashley:** Another question says that we have just started a two-year comprehensive region wide vulnerability assessment. Should we wait until we are complete with our assessment or should we enter it now?

**Robin:** Enter it now. If you'll recall, and I might be able to get back to it, but the system asks whether it's planned, in progress, or completed. We will do, for all of the entries that are in the system, a periodic, probably annual call out to everybody, email out to the contacts, saying, "Has this changed? Have you completed this? Or what have you?"

Put it in as an in progress project. You'll be able to say when it's expected to be completed. Then, at some point, we'll prompt you to go back and review the entry and turn it into a completed one. So do it now.

**Ashley:** Then, it just says one recommendation was that maybe you change your project timeframe choices. The way that it is currently set up seems to leave gaps in time. Their project's about two and a half years.

[laughter]

**Robin:** Yep, fair enough. I can't argue with that. There may be some logic that's missing in some of those numbers, don't disagree. Yep, that was good. As we're getting to the end, if you have more questions or you get in and have questions, first of all, there's a user help that you can always call on that's in the system.

But please let us know and if there are things that make it hard for you to enter your project, because it doesn't fit in the way we've done it, we'd like to hear that, rather than going away mad, as it were. Let us know that that doesn't work or it's unsatisfactory the way you have characterize it.

I'm actually listening to the discussions about multiple agencies and thinking about how we might make it clearer that...we all know that in some cases there really isn't a lead agency, everybody's got a bunch of money in the pot and it's moving forward.

At this point, we have to pick. We're going to think about how to handle that in the future. Let us know, this is a community resource. We got a lot of input on designing it, but as people use it we'll



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certainly find out more interesting things that you either want to characterize your project or search for things.

Keep the dialogue open, contact us. There's a contact form on the page, couple emails here. I encourage you to go ahead and test it out and see what works and doesn't work.

**Ashley:** Thank you.

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