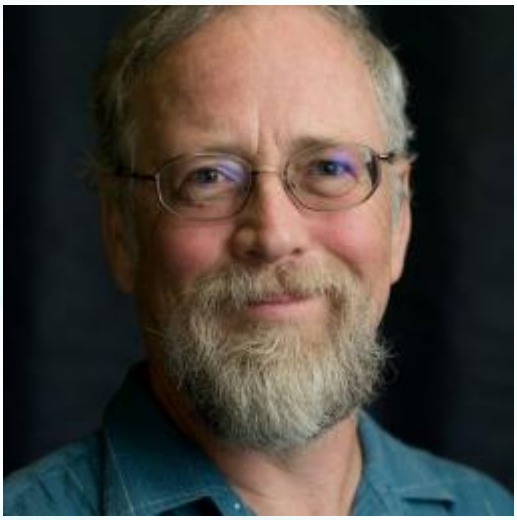
the weekly anthropocene

dispatches from the wild, weird world of humanity and its biosphere

By Sam Matey

Scientist Spotlight #4: An Exclusive Interview with Dr. Robert Sanford



Dr. Robert Sanford (pictured) is an environmental scientist and archaeologist working at the University of Southern Maine. He is the leader of USM's Department of Environmental Science and Policy and the author of an array of books on environmental law, landscape history, and archaeology. He is also a fellow and regional co-director of SENCER (Science Education for New Civic Engagements and Responsibilities) and his research interests include environmental planning, cultural resource management, and environmental education.

A lightly edited transcript of this exclusive interview follows. This writer's questions and remarks are in **bold**, Dr. Sanford's responses are in regular type. **Bold italics** are clarifications and extra information added after the interview. For more on Dr. Sanford and his work, please check out usm.maine.edu/environmental-science/robert-sanford!

Hi Dr. Sanford! There are so many things I want to talk to you about! Let's start chronologically, if you will-why did you become a scientist? And more specifically, why did you become an archaeologist and later an environmental scientist?

I think my first science experience was early. I may not even have been in school yet. It was looking at ants, and realizing that was an entire world down there. Years later, when I had kids, they would not be surprised when we'd all stop and look when a colony of ants were spread out on the sidewalk. I just started looking and realizing that that was a complete world down there. I grew up on a dairy farm with 400 acres of land and cows, horses, pigs, all of that stuff. When you get outside a lot-in fact, my father used to actually lock us out of the house to keep us out of trouble. He was an electrical engineer, and an expert on electrical fires, so he thought the outdoors was much safer. He would go, like "Go outside and play!" So that was a lot of fun. I didn't take a nice, easy path, which is probably why I ended up here. If you think about what environmental science is, it works on the macro level of looking at systems, but it also works on the micro

level of traditional, reductionist science. But that's really doing the same thing. As you know, from being in my classes, I like to talk about big systems functioning, large scale, even things like "this is what the wind is doing when it's cold." So big system, but also down to little small components of it. Environmental science lets you do things at multiple scales, and like engineering, it's like solving a problem, so it lets you draw from whatever fields apply to it. Be it biology, chemistry, geology, political science, economics, all of that. I started out in biochemistry-it was a pre-med program, I was going to go to med school. Back then, so much of it was memorization, and I'm not particularly good at that, I only memorize things when they're unimportant or amusing. But I took some environmental classes, I took biology at the college level, and my biology teacher was really interested in systems. I read Konrad Lorenz, and I got really interested in the logic of it, of how things were related. Then I did environmental engineering, because I liked the practical aspects of it. I took an archaeology field school, and thought it was wonderful. I ended up getting a degree in anthropology specializing in archaeology. It was the physical science part of it, how archaeology uses physical science to answer social science questions like how did people live. I liked the idea of analyzing soil, and what's in there. And when I went to go to grad school, I had done some work in archaeology as part of environmental assessment, and I got interested in the larger picture. I was accepted into a technical writing program for archaeology and environmental science. I had maybe sixty credits in biology and chemistry and geophysics. It was one of the first graduate-level environmental science degree programs in the country, so I'm of that first generation that had their Ph.D. and Masters say "environmental science" as opposed to conservation biology or something. It was fun to be in that first generation to study this as its own science, as a fairly applied field of systems thinking about natural processes.

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That's awesome! So, one of your major areas of expertise is the National Environmental Policy Act, or NEPA, permitting process, focused around the Environmental Impact Assessment. I believe you were in fact an environmental hearing officer for nine years in Vermont, evaluating the NEPA process. Could you give our readers a summary of that process and your experience working in environmental planning?

Sure, yes. If you think about what planning actually is, it's about reasoned thinking and doing in an organized manner. So plans that don't lead to any kind of action are purely abstract. NEPA, the National Environmental Policy Act, is a comprehensive, integrative accounting for people's decisions on what they want to do that could affect the landscape. Many states have a state version of this comprehensive law that looks at impacts from agriculture to archaeology to comprehensive planning for a town to energy to traffic to effect on schools to endangered species. So it's pretty comprehensive. Vermont has its own version of something like that, about accountability. It has a law that reviews large-scale residential subdivisions and commercial and industrial projects. It's a citizen review process, so you yourself could be a member of a citizen panel appointed by the Governor to make decisions on projects that are in your region of the state. The state of Vermont is divided up into nine regions, and each region has its own commission of citizens. They're not state employees, they're volunteer citizens. So the idea is that when we make land use decisions, they should be able to be understood by general members of the public. They needed a professional staff person who filled the role of organizing things for them. It's an integrationist role, but you could also delve into specifics. For example, I got to go out with the wildlife biologist when they were tagging black bear cubs and seeing how they were doing that. I couldn't believe I got to do that as part of my job. I also got to help with salmon stocking, different projects like that. Including being on the cusp of trying out new energy measures. The state was an early experimenter with wastewater treatment through wetlands. In fact, on the interstate of Vermont, there is one right now that treats waste from the rest stop with a small indoor wetland. And even that went through review, which drove the agency of transportation crazy. The organization that I worked for had no vested interest, it didn't own or manage land, it just administered these hearings. That made sense for me in my career, since I'd worked as an environmental consultant doing the reports that state and federal agencies reviewed. I wanted to have this level of experience. When I was in class, I liked to have professors that had the actual experience of working with this. I look at stuff in terms of "How can I use this, what can I do with it?" So I like theory, but I think theory lacks that tangibility of application. So having worked as a consultant then worked as a regulator, as a regulator I used to put on workshops for people on how to participate, and I realized that was my favorite part.

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I was also about to ask-you also have years of experience conducting impact assessments as an independent consultant. Could you tell me more about what that was like?

It's interesting, because I might write a 200-page assessment report that just dealt with the history of an area and who lived there, and in the final impact statement it might only be a couple pages. I started thinking "What is this bigger piece that I'm a part of?" I liked the idea of this philosophy of public accounting for what we do. Including policies and making decisions. For example, if we want to reintroduce a species, we have to think about how that's going to affect things, because the environment is not static. If somebody wants to reintroduce a species, environmental history has moved on, and we're ecologically, socially, and culturally different. We have much more of an urban-based economy. This is a system to evaluate that. Right now, people in Maine are really concerned about putting this new utility line in. People are always like "Are you in favor of it or are you against it?" And my approach is let's do the assessment and not make a decision before we assess it. That's the thing I like about science, it asks questions and tries to find things out. Then it's up to the policy people to use that and make decisions. I think that it's far more comforting that we make a decision based on knowledge rather than what people think or feel is right. If we start just thinking about what most people feel is right, it's scary to me, because I start thinking of a mob mentality. Like some particular species, nonhuman species, might be really important ecologically, but it might not look attractive. It's like this thing that E.O. Wilson calls biophilia. We tend to like things like baby seals, things that have big eyes and so on. That's hard wired into us, so that we don't kill our own long. Which is interesting, because humans have about the same violence rate as chimpanzees. We're not a friendly species. The bonobos are much nicer. Some ethologists and primatologists are looking at that, the relationship between how species behave and their environment. If you look at human violence, look at the areas where violence occurs-they're not benign habitats.

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This is fascinating, sir. Thank you so much. Well, it's sort of rambling, but environmental science covers so much. In this impact assessment area that I do, we put all of that in together because you can compare it. We do have to make tradeoffs, but I'm concerned with articulating what they are. And it's led to some interesting things. We take our students to evaluate this little acre-and-a-half pond here, it's not a big thing, but you realize when you look at it that it has its own little interesting biodiversity. The environment consists of lots of little areas that are near and around us, and if we treat the environment as an "other," as some exotic Amazonian rainforest, then it's easier for some people to say "Well, I guess I don't care what happens there, I don't relate to that." If we care about the environment, we have to get people to see that it's local, it's right outside their door. People need that local connection. The same way I like to think

on the macro and micro scale, I think we have to think on the local and global scale. We have to care about people, habitats, and environments no matter what and where they are.

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My idea of radical environmental change is to work in environmental education. The more people learn about what the truth is, and what the myths are, the more likely we'll make decent decisions about what we'll do. There are some myths, like the environment is separate from people somehow, or the environment is static and unchanging, or that it doesn't matter what we do. But we start looking at environments, and it does matter what we do, we can affect it globally. If you look at historical ozone depletion, we've already seen global effects as a result of human activity. That's why I'm surprised when people say we can't possibly be doing that, maybe for religious reasons or something, like that God gave us dominion. It's not a religious question, it's a cause and effect thing. I think we're in a scary anti-science time in the United States. If you look at the people who think the world is flat even...I mean Eratosthenes, thousands of years ago, found out the diameter of the Earth. The educated in medieval times knew the Earth was round. But in this age of the Internet, people can just look at whatever belief reinforces their own opinion. It's the opposite of finding truth, it's preselecting your truth and ignoring the other stuff. And in science, we have to start with questions, and trying to find things own. When you meet people and they say "I can't do science," what I hear is "I don't like asking questions and finding stuff out." If you think of science as a body of facts, that helps but that's not the be-all and end-all, it's really about understanding the processes. We like facts, and it's fun to share them, and we can geek out on things like that, but it's really a bigger way of gaining understanding.

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That's fascinating sir. Something else I wanted to ask you about-you also recently wrote a book called Reading Rural Landscapes: A Field Guide to New England's Past. I find this topic, reading the history of the land from its current appearance and ecology, absolutely fascinating. Can you tell me more about this process and how you've learned to read rural landscapes?

When I was doing archaeology-see the archaeology I'm interested in is part of environmental assessments. The books about how to do archaeology were written from a field school perspective, and I early on I realized there wasn't anything on how to do it from a professional perspective. So I wrote a book that said how to do archaeology from a professional perspective, rather than from an academic or a museum perspective. The first major publisher I sold it to said "Wow, there isn't something like this out there." I signed a contract with another archaeologist, and we did two books on it. When you're doing compliance archaeology, you've got to look at a lot of stuff in a hurry and make sense of it. We got used to making an assessment by driving along and looking at the landscape. This is the roots of that. And I thought, "Someday, I'm going to go back and go into this aspect of reading the landscape." There's some dangers in it, of course, because it implies a deterministic perspective, that this is a field that must go to shrub and then to forest. When there's something deterministic like that, it can oversimplify all the other variables. But there are certain basic tendencies. Fields do respond to edge forces, and they can be colonized by early pioneers. Landscape interpretation can work fine for a few hundred years. If I'm trying to figure out how Paleoindians were, maybe it's not that helpful. I'm really just focusing on fairly recent, what happened this century and the last. It arose out of doing these so-called "windshield surveys." Because I might have a project where I'm looking at 15 miles of highway, and I have to figure out "What happened to this land?" Where was there realignment and reconfiguration? If I'm going to have to dig to find out if there was a house somewhere, I want to know that. If I'm digging in 30 feet that someone filled it to improve the road grade, I'm wasting time. You get used to interpreting the history like that. That book was just written-it's not a textbook, I just wrote it because I liked doing those things, and it was fun for me to think about it. It's non-intrusive, so

> "There's lots of books that talk about profound, unusual, extreme landscapes. You can read about people climbing Mount Everest. I thought "Why not write about the ordinary stuff?" Because coming back to my discussion about little ponds and how they're important, I think that the common, ordinary landscape can get overlooked, and I'm really interested in what's there. About 80 % of the weeds you see around you were European. There's a fair amount of change that has occurred, and it's occurred in small, insidious ways that crept out over everything. And then you're realizing that this is really profoundly different to how it might have been five hundred years ago."

I'm interested in things that don't hurt the environment. Archaeology, it's like surgery in that the excavation is something you do after you've thought about what you're doing and where you're going. But just looking at it…people look at the world in terms of their field, and their discipline. If you're an entomologist like Joe, you look at insects and how they change everything. If you're a geologist, you might be looking out and thinking about what happened a million years ago. If you're a population biologist, you might be looking at everything in terms of how many of them there are. So I look at the landscape in terms of what happened to it, and how did it change. That landscape book is really sort of, like, putting together a lot of what we already know. There's lots of books that talk about profound, unusual, extreme landscapes. You can read about people climbing Mount Everest. I thought "Why not write about the ordinary stuff?" Because coming back to my discussion about little ponds and how they're important, I think that the common, ordinary landscape can get overlooked, and I'm really interested in what's there. About 80 % of the weeds you see around you were European. There's a fair amount of change that has occurred, and it's occurred in small, insidious ways that crept out over everything. And then you're realizing that this is really profoundly different to how it might have been five hundred years ago.

That's absolutely fascinating. Is there anything else you'd like to share that I haven't covered? Anything you think our readers should know?

Well, this is only one aspect, but I work in a small undergraduate interdisciplinary program and I get interested in everything. Part of the fun is having students come in and point things out and ask questions. I get really interested in water quality, or air quality. I wrote a small grant and got an aquaculture system, and I've got colleagues who are really bringing that along and making that something. I had a technician build this model ***(gestures to a model on the table)*** to my specifications to model groundwater, because I'm really interested in that. **That is so cool.** The world's a curious thing, and it's fun to ask questions. I think I'm in a time at which we're seeing slowly accumulating macro-type effects of the Industrial Revolution, and the Anthropocene. We're still finding out amazing things. I went to Columbia when they had the first exhibition there to report on finding those hydrothermal vents, the finding of an ecosystem not based on the sun as an energy source. We're at an exciting time, if we can keep from killing each other. **Well, Dr. Sanford, thank you so much for sharing your wisdom. Thank you so much for joining this interview. It's been a pleasure talking with you.**

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