

THEMED SECTION COMMENTARIES

Community Change Interview with Dr. Bill Hopkins

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Garland Mason: Thank you, Dr. Hopkins, for joining us today. I am Garland Mason. I am on the editorial board of the journal *Community Change*. *Community Change* is an online peer-reviewed graduate student journal that seeks to explore multiple approaches to democratic community development and change.

Patrick Salmons: I am Patrick Salmons. I am on the editorial board of *Community Change*. For our third volume, our themed section is environmental issues, climate change, and sustainability.

Garland Mason: I would like to start by asking Dr. Hopkins to briefly describe your teaching and research interests.

Dr. Hopkins: Thanks for having me. My interests primarily revolve around wildlife and how they interact with the environment. My background is primarily in physiology and I tend to focus on physiological adaptations, things like how animals maintain their water balance, how they feed, and how they reproduce out in the wild.

Garland Mason: Can you tell us a little about how you chose this field? How you were led to do this research, and how you ended up researching the species that you focus on now?

Dr. Hopkins: That is a bit of a convoluted path, but I was actually pre-med. I thought throughout my entire childhood and teen years that I was going to be a medical doctor one day, and that is why I still have this emphasis on physiology when I'm studying wild animals. But when I was in my late high school years and early college years, I became really concerned about the environment. Many of the things that I was seeing happening, even at a local level, were quite alarming and I had a big pivot, and there was a big shift in my thinking. I started to use the things that I had learned in my pre-medicine [days] to pursue wildlife conservation and I have made a career out of that.

Garland Mason: Can you talk a little bit about the research that you are doing in this area and what species you are doing research with now?

Dr. Hopkins: Yes. My research is divided, at least currently, into two big thematic areas. One of those is really focused on parents and their babies. I am fascinated by this intimate relationship between wildlife. I examine moms and dads and how they care for their young, how they feed them, how they nurture them, and how they care for them. Importantly, even before they hatch or before they're born. There are many things that happen prenatally that can be important. Therefore, I am very interested in that, and how environmental

disturbance can disrupt that fragile balance, and how that can lead to conservation problems. I study that primarily locally here in Virginia, but also around the Mid-Atlantic and in the southeastern United States, down in South Carolina and Georgia.

Then the other area of research is really focused on pollution. I collaborate a lot with agencies, industries, and local stakeholders, to try to solve problems related to environmental pollution and how that affects wildlife. In terms of species, I tend to focus on amphibians, reptiles, and birds. I dabble in other areas; in fact, my early dissertation work was actually on fish. It tends to be more oriented around whatever the problem is. If it is a certain type of pollutant, for example, we may know that some species are more sensitive than others are, and I would target studying those sorts of animals. Right now, most of my work is focused on birds. In terms of the parental care work that I mentioned, it is focused on birds, and how they take care of their eggs in different sorts of environmental settings, and how disturbance can disrupt that incubation of the eggs, and the implications of that for early development. I also work with this magnificent salamander here in Virginia. It is a national treasure. It is one of the largest amphibians in the world. It is this huge two-foot-long salamander that lives right here in Virginia in some of our streams.

Garland Mason: What is the name of that salamander?

Dr. Hopkins: It is called the “hellbender.” It has many other nicknames, but hellbender is the one that is used most commonly. It is a fascinating animal. It is one of these interesting animals that really occurs nowhere else on the planet. It is something to be proud of here in Appalachia. Unfortunately, it is declining; it is in a lot of trouble. The populations have been declining since the 1980s. We have been trying to figure out why.

Garland Mason: Wow! Well, that sounds really interesting and part of the goal of our interview today is to understand how the research that you’re doing with natural environments is relating to the human—the human communities, and the human experience that we’re all living every day in this region.

Dr. Hopkins: Sure.

Patrick Salmons: I think that is very interesting, especially with the hellbender salamander from Appalachia, I never heard of it, and I am from the region. What can human communities learn from animal communities and ecosystems like these?

Dr. Hopkins: The first thing I would say, is that I think there is value in recognizing that we are part of the ecosystems that we inhabit. We affect these ecosystems and these ecosystems affect us. And, I think that we’ve known for a long time that by studying wildlife, fish and wildlife, and in particular, species that tend to be a little bit more sensitive than others, we can glean information about the unintended consequences of our actions. We have made many mistakes in society that were not intentional byproducts of normal human activity. Over time, by studying wild systems, by studying fish and wildlife and how they respond to those disturbances, we oftentimes make adjustments to our behavior that have had broad benefits. A classic example would be something that we are all familiar with, pesticides: D.D.T. back in the 1970s for example. We knew in the 1950s, 60s, 70s, the damage that it was doing to bird populations. Science showed us what was going on, and we made changes at the policy level to change our habits in terms of what sorts of pesticides we were using. Those birds that were susceptible to that made a comeback. It turns out the same pesticides affect human health, and we can glean many insights like that from wild animals in these ecosystems.

Patrick Salmons: Furthering those ecological issues, how do you understand humans’ ethical responsibility to these ecosystems in terms of pollution and the ecological destruction that occurs because of them?

Dr. Hopkins: I think that is a good philosophical question that conservation biologists struggle with and debate. There are many different opinions on that. My opinion is that we do have an ethical responsibility. Not just to those ecosystems but also to future generations of people. Humans, unlike other species on the planet, have this incredible capacity to actually understand the implications of our interactions and forecast the future what those actions could actually do to the environment. As we learn from science more and more, we learn that there are sometimes alternatives to our current practices. We have the amazing capacity to understand the implications of our actions, to forecast the future, and to make changes so that the planet is uninhabitable. I think the ethics of that are complicated, because is it our duty to preserve ecosystems

for ecosystems' sake? Should we be doing that for future generations? In my opinion, it is both. You really cannot disentangle those. I just worry about what society will look like one day. What will it look like in 50–60 years? What it will look like if we do not take actions to actually curtail some of our current pollution?

Patrick Salmons: Within this realm of discussion, what are the appropriate levels, within ethics and within preventing extinction, of human intervention to prevent this extinction?

Dr. Hopkins: That is another tough one. Conservation biologists debate that as well. We sink billions of dollars into trying to stop extinction of species. I should back up, and just say that we are currently witnessing the sixth mass extinction of life on this planet. It is happening right now. Science tells us that, and science makes it very clear that humans are causing that. It is a very timely question; I think sometimes we focus too much on the species and not the root problem. What I mean by that is there is an enormous amount of money spent, for example, in zoos, captive propagation, and hanging on to the last individuals of a species. I think that is great. However, it does not solve the problem. It does not solve the root cause. It is almost like, just to use a human analogy, smoking causes lung cancer. If we sunk all of our time and money into just treating lung cancer and not treating the root problem of smoke inhalation, and that bad habit that we know that causes cancer. We are missing the boat in the end. You need to do both. The same is true for when we talk about species extinctions. In many cases, I think, we are better served focusing on the root problem, focusing on protecting functioning ecosystems. If you do that, then the preservation of many species will follow. There obviously will be exceptions to that, but we need to be focused on things like: how do we prevent habitat degradation around streams and rivers? How do we curb our appetite for carbon? If we do that, many of these things, in terms of individual species preservation, will fall into place.

Patrick Salmons: Thank you. Following along these lines where you are talking about our responsibility, our responsibility not just to ecosystems, but to humanity as a whole. One of the roots of the problem, many would say, would be corporate interest, or government restrictions. How do these government restrictions or corporate interests affect the kind of research that you do?

Dr. Hopkins: Well. A lot of the work that I do with pollution is directly tied to public policy and corporate interests. Just to give you an example: I do a lot of work with coal, and the combustion of coal in power plants to generate electricity. One of the things I have studied for a long time is how we manage the waste products associated with that process. One of the ways that we do that is we pump waste into these large ponds. There was a huge spill of this material, oftentimes called “fly ash” over in Tennessee, about 10 years ago. There was another one right here in Virginia, on the Virginia-North Carolina border and Dan River. These unfortunate episodes have taught us a lot in terms of just how toxic these materials are. Our studies of that play into the economics, and the policy decisions that are made surrounding how these waste products should be managed. As you can imagine, that is a hot topic. There are very different opinions on that, obviously. Industry has a lot at stake; there is a lot of money involved. You are talking about one of the most important energy sources in the United States. However, at the same time, there is an environmental side to this. Moreover, we get back to the heart of the ethics, in terms of balancing ethically responsible waste-management, with corporate needs, with society's energy needs. It gets a little complicated. The work that we do does inform policy, but that is only one of the components of these big decisions. Economics, and societal norms, and values, and everything else comes into play as well.

Garland Mason: You talked a little bit about ethical responsibility, the way that ethics plays into your motivations to engage in this work, and the way that you pursue your research. I am curious about ethical responsibility to what end? Are we ultimately responsible to humans that are on the planet at present? To humans that might be on the planet in the future? Alternatively, are we ultimately ethically responsible to the preservation of earth's ecosystems with or without the presence of humans? I was wondering how you balance those philosophical claims in your work. In light of what you were just mentioning with corporate interests, and the interests of political parties, all political parties, in meeting the needs of humans that are presently on the planet. Not only their needs, but also their continued prosperity and growth.

Dr. Hopkins: I think it is a great question, and a complicated one. I am not sure if this answer is going to be satisfying but I view those as inseparable. The reason why I say that is because, we have an abundance of data that demonstrates that we're not doing enough, right now, to protect ecosystems for ecosystems sake, for the biodiversity that inhabits those. We know that we are not doing enough now to protect humanity,

now. I will give an example of water in just a moment. It follows that we are not doing enough to plan for the future. All the science available points us towards the idea that we really are headed down a scary path. The species extinctions that I mentioned really play into that. That is a symptom of these larger problems; that we have to treat these larger problems, or we are headed down a very scary path. Not only for the future of ecosystems, but also for the future of humanity and the quality of life that we currently enjoy.

If you think about water, water pollution, water scarcity, many of the biodiversity crises that we see today occur in these freshwater systems. We know that that is driven by the changes in water flows and streams, it is driven by siltation, it is driven by pollution, it is driven by some of these streams changing in terms of how they are heating up, because trees have been cut down around them, and that changes the environment and affects many species. The same is true for humans. As we mistreat our water resources, we are having a huge effect on humanity today. Six thousand kids die every single day in the world due to water related health issues. That is a phenomenal number. Six thousand kids every day. If we are not doing enough now to preserve aquatic biodiversity. If that many children are dying due to water related health issues, then I think we definitely need to make changes to be thinking about the future, for my own kids and for their kids. Coming back, I think it is all of them. I think we have an ethical responsibility to do all of that. I think that responsibility falls on us to do now. We need to act sooner rather than later.

Patrick Salmons: Along those lines, a question comes to mind when I think about these issues. In the liberal arts especially, the hesitancy to deal with these issues, or talk about them. What I am concerned with about this kind of research is how do we provide, or make changes in the academic community, to provide awareness of these issues? Because many people within, say, a political science circle would not know about these issues, especially within a town or locale as well.

Dr. Hopkins: Yeah, I think that is an interesting question as well. I think that, at Virginia Tech, we are taking major steps in the right direction with some of our new programming that is cutting across majors; and new minors that are being developed right now as we speak, that would be more accessible to students not in the sciences that are going to deal with these sorts of conservation issues. I know that there are new minors being developed in sustainability and biological conservation that are specifically designed to reach these other audiences. That is a baby step. However, I think it is the kind of thing that we need to be thinking about to reach these audiences. The other thing is public engagement. I think one of the things that I have become more and more aware of over the last decade is that we have these technical lifestyles. In our careers to take that and share that information in a more palatable form to general audiences, no matter what their backgrounds are. We have been trying to do a lot here, locally, by having local, distinguished lectures where we bring in experts to talk about things like climate change and water shortage. Because, they are issues, that everyone, as you pointed out, needs to at least understand what the potential solutions are. That affects our ability as a society to respond.

Garland Mason: Thinking about informing in both academic communities that might not be fully within the realms that you work in and individuals in the public, how do you reconcile the need for these technical quick fixes with the larger need for kind of a complex and chaotic adaptive change? How do you educate for that? How do you educate in a holistic way so they do not turn into technical quick fixes that ultimately will not be sufficient to address some of the widespread issues that you have been talking about in this interview?

Dr. Hopkins: Yeah. I'm not sure I have a good answer for that, because the unsettling reality is that, many experts would argue that the changes that we need to make right now are radical. That there are massive changes, of course our energy systems are the ones that are front and center right now in the news all the time due to climate change. Nevertheless, that is only one of them. We need to have radical changes in terms of how we manage our water resources. We are going to have to face the reality of major changes to infrastructure and to water recycling. Our coastal zones are obviously very fragile and are vulnerable looking in the not too distant future; we can already see it happening now. Those are not the kind of things you can take baby steps to address. The problem is that, even though science tells us this, and in some cases, you can see it. You can see it day-to-day. People are slow to change. Policies are slow to change. The unsettling aspect of this, to me, is that, the longer we wait, and the more baby steps that we take, I think we are going to find ourselves even more pressed to make even more radical changes to address these challenges. The million-dollar question is, as a society, can we do that?

Garland Mason: Do you think it is possible to maintain the current quality of life that is available to middle-class, wealthy-middle-class, and wealthy citizens in the U.S.? Not only maintain that for those individuals, but to make that a global reality for everybody, while simultaneously preserving the integrity of ecosystems on earth?

Dr. Hopkins: Not without radical change. When I was born, there were four billion people on the planet. Now there are over seven billion, by the time I die there are going to be over nine billion. The answer is no. In my opinion you cannot keep going down this path without major shifts in how we use resources, how we live day-to-day as middle-class and upper-class citizens. You just cannot have that kind of individualized footprint on the planet and think that we can have billions more people able to do that. Right now, one out of around nine people are dying of hunger. How are we going to do that with a couple billion more people on the planet? How can we do this with arguably much larger sections of the planet just a couple decades from now not being suitable for agriculture, with more droughts, more fire? I do not think we can pull that off. I think we are going to have to make big shifts. That comes back to what I said a moment ago, are we capable of doing that as a society?

Garland Mason: Can you describe what you envision when you think of the future where those radical changes have happened?

Dr. Hopkins: I like to have a very optimistic view of that. I really do. When we have come to grips with a lower footprint, in terms of how we utilize water, how we obtain and utilize our food. A world where one third of the food that is produced is not wasted. That right there is something that would be fantastic. I do believe it's possible. I just worry about whether you can get enough people on board to pull it off as a society.

Patrick Salmons: This reminds me of a book entitled *Flight Ways*. It deals with bird species and extinction, and how that affects our everyday life. How big of an impact does a book like this make? How does this help bring attention to ecological problems? Again, getting into ethics, getting into these questions of, how do you reach the audience? Do you think that a publishable work that speaks to a community will help engage the community? How does talking to locals about the problem help?

Dr. Hopkins: I think that books like that make science accessible to the general public. Books that take complex processes and problems and make it palatable to an audience that is not versed necessarily in that field. That would be the same, for example, me reading a physics book that has been made palatable so that a biologist can understand it. The same is true for any scientist to make their work palatable to a general audience. I think that there is great value in these books. However, I would argue that that is only one of many tools that we need to be utilizing.

I think one of the biggest things we need to be doing is establishing better critical thinking skills and better science education in our K- through-12 system. One of the things that really concerns me is that, many of our kids are coming out of the system not being equipped to critically evaluate information. They are facing challenges that are much more significant than any information challenges any of us in this room ever faced when we were growing up. Because they are encountering false information at a rate that we did not encounter when we were growing up. How does one know how to trust their sources? How to disentangle false information from scientific facts? That is a completely new world that we are entering into, and it is scary.

To me, I think books like that are fantastic. Nonetheless, it is only one of a number of things that we need to be doing. The more scientists interacting with society, the better. Whether it is going into schools, or it is better training for teachers, or it is having online resources that debunk false information that is out there, or it is the public lecture kind of format that I mentioned earlier. I think there are many different ways to do that and we need to be utilizing every method possible.

Garland Mason: I have two questions that I am going to combine. I would like you to name the single finding relevant to human interventions, or human disturbance, that most concerns you. Conversely, name a single finding or a single sort of entity relevant to human intervention or human disturbance that gives you the most hope for the future.

Dr. Hopkins: Right. I am going to combine this into one thought, if that is okay. I think the thing that's most concerning is that if you look back 20, 30 years ago, with our climate projections, and what we understood about carbon in the atmosphere and how that was affecting current climate and the future climate. It seems that every couple of years, as we compile more and more information, and as we develop new, more sophisticated models, and as we validate our models, the thing that is most alarming to me is that, repeatedly, we have underestimated the impacts. That is scary. We're projecting a really scary future, in terms of what our climate was going to look like, and how that's going to affect the world around us. Many scientists warned of these, sort of unpredictable—at least we thought of as unpredictable—positive feedbacks, and other sorts of 'forcings' that we didn't fully understand. Every year that goes by, we seem to refine our models and it points towards an even more frightening potential future. To me, I think that is the scariest. That is not a single finding. That is a massive body of information, but I would say that is the scariest to me.

In terms of most hopeful, I think the most hopeful thing to me would always be related to a suite of evidence, or suite of examples. That's more in line with the fact that we have shown, historically, that we are capable of making big changes. Big policy changes. Big societal changes. We have seen the positive outcomes that can come from that. We passed things like the Clean Air Act. We banned big pesticides like D.D.T. that were decimating wildlife populations. We have confronted huge challenges, enormous challenges, in the past. We have done radical things to address those. We have shown that they can work. To me, that is hopeful. It is hopeful that we do have a record of accomplishment of stepping up to the plate when we really needed to. The problem that we face now is that carbon is not going to go away in the atmosphere. We are facing a greater challenge now than any of those in the past. Which means we are going to have to make bigger changes than we have ever had to make in the past. However, I am hopeful.

Garland Mason: Given that our journal is a graduate student run journal, and that our authors and readership are largely graduate students. I would like to ask a question that is relevant to graduate students. What piece of advice, or guidance, would you give graduate students just beginning, or scholars just entering your field? Conversely, what piece of advice, or guidance, would you give scholars that are engaging either in disciplinary work that are, say in political science or in English, or in fields that seem far away from the areas where you work and people who are doing interdisciplinary work? Can you give any piece of advice, or guidance, to them in light of the future that we have just discussed for the past 40 minutes?

Dr. Hopkins: Yeah, I think that I would give maybe two pieces of advice. The first is that, if you want to make a difference, I think that it is critical that you do something you are passionate about. Because, the sorts of problems that we are facing, you are going to constantly be running up against enormous challenges, enormous setbacks, enormous resistance from, perhaps, your peers, or governments, or whoever. If you are not passionate about that, you are not going to stay the course. I think that passion is an amazing attribute that is unique to every individual. I think when students figure out how to harness that, and focus it, it can take something that they care about, and turn it into a very fulfilling lifelong journey. The second would be simply do not give up. I cannot tell you how many projects I have worked on, where it would have been very easy, and some people around me probably would have said 'wise,' to step away and step back. If it was not for that inner fire, that stubbornness, to reconnect with the things that I care about and that I am passionate about, know that I could not stay the course. It is tapping that passion and being a little stubborn when people say we cannot pull that off.

Garland Mason: I am thinking about the feeling within academia of being trapped in this ivory tower, publishing in journals, having only academics read the work that you are publishing. If it is this closed loop of knowledge, then we may have a deep understanding of some of the issues that you have mentioned, but we are not putting that into action. Do you have any advice for early career scholars, on how to use their research and their knowledge to apply their knowledge to promote policies that would make the radical changes that you are indicating?

Dr. Hopkins: Yeah. I think that this comes back to an idea that we cannot live in a bubble anymore. As we talk about radical changes to society, I think that part of the radical change that needs to occur is in our academic institutions; how our academic institutions interact with people that are not associated with our universities and colleges; how we share that information; how we interact with the press. I think all that is important. I think that in the last 10 years we have seen a big shift, especially in the sciences, in terms of an emphasis on that. When I was in graduate school, it was "keep your head down, don't mess around with the

press, or any of it." You were actually encouraged to just focus on your research, publish in journals, and do not get bogged down in outreach. I would say it is the exact opposite now.

I think it is one of the things that we really need to change in our academic institutions. I think it is happening already. There is this emphasis not only on "we should be doing it," but also we are seeing a shift towards educating our graduate students on how to do it, and how to do it more effectively. Now, the problem is that not everybody is going to be naturally good at that. What I think is exciting about that problem is that, it creates a niche for people that really enjoy the communication aspects of science. I think we are already seeing it. We are going to see a lot more of it in the future. A lot more careers that are oriented around making that more palatable to broader audiences, be that through journalism; be it through public interactions; be it through our educational systems. There are all sorts of different mechanisms. However, I think it is a new niche. We now have an increased awareness now of how important it is.

Patrick Salmons: How can we promote more change within the community? Especially places where people are not in academia, where people don't write these things. People live every day and see the effects of them. How can we promote the gifts that other people have, say as a mechanic, or as someone outside of academia? How can we think about those people and their impact?

Dr. Hopkins: Well, I'm not sure if this gets at your question or not, but, the sort of massive, the broad-scale change that I've mentioned would need to occur to address these challenges. I would say that nobody, especially any middle-class to upper-class citizen would be exempt from that. Everybody has a role to play. No matter what your expertise. No matter what your profession. No matter what your hobby. Everyone has to be involved. And that's the challenge, right? That really gets down to society-wide change, society-wide awareness. At the end of the day, we all have a responsibility to understand some of the basics of these issues, and some of the things that we're all going to have to do in order to institute broad-scale change. And I think that is where our educational system, and where our academic institutions need to do a better job of equipping people to understand that information, but also of communicating that information outside of the ivory towers of our universities.

Garland Mason: In the answer you just gave, you mentioned the role of wealthy and middle-class Americans to make the changes that we are talking about. I am wondering, how you see the role of poor countries in leading this work, poor citizens of the U.S., and poor people globally leading these radical changes? I think the assumption is that they are not the creators of these issues as much as the high consuming wealthy and middle-class Americans and Europeans and so they don't need to be troubled in considering how they should be solved. However, as a result, I think that they are left out as thought-leaders within these discussions. I just wanted to get your take, given the answer you just gave, of what you think of their role in moving these changes forward.

Dr. Hopkins: I think they are critical. I think that it is the groups that you are mentioning in developing nations, for example, that are oftentimes the most vulnerable to some of the changes we are talking about. They oftentimes live in some of the more arid regions. They oftentimes live in coastal zones. It really does get to my point about the middle- and upper-class. It is that we have a larger per capita footprint on the planet. Unfortunately, many of these other sectors of our global society are the ones that really feel those impacts. I agree with you that they may be perhaps marginalized in terms of their role as thought-leaders. That should not be the case, because they are oftentimes the ones that can actually really attest to the changes that there are already observing and the changes that they are concerned about in the future. There are good examples of that. Impoverished island-nations that will be underwater, in a matter of decades, would be one example. I think that we have an obligation to have all of those different voices at the table in these discussions. In some cases, they do have loud voices, in terms of, for example our climate change discussions. Some of these smaller developing nations have been the ones that have been very, very vocal. Unfortunately, our wealthier nations have not been stepping up to the plate in doing their part. I agree with you. They are integral to this discussion, especially because they are going to be the ones most impacted in many cases.

Garland Mason: The last question now: Where do you see your research taking you, moving forward?

Dr. Hopkins: Broadly, I want to keep doing what I am doing. But I am getting pickier. I am getting meticulous because I am becoming more aware of the limited amount of time I have left. In terms of trying to have

impact and influence. I am getting meticulous with the projects that I choose to work on, because I want to make sure that they are going to have an impact, a lasting impact, on things like policy. One of the big projects I am working on right now is focused on aquatic biodiversity. One of the species that I mentioned earlier, that massive hellbender salamander, turns out it is sensitive to changes in land use, particularly deforestation. Yet it is an aquatic animal. What we are doing on the landscape is influencing what is happening in these streams. Where I see a major focus in the next five to ten years at least, is trying to gain more insight. With this, we can inform, at the local level at least, decisions, policy, land use change, working with local landowners. We have just started a lot of work working with farmers, for example. Because it is at that local level where we can have faster impact. It takes a lot longer to change federal regulations. But if we can convince people at the local level that we can co-exist in these ecosystems, and have less of a long-term impact, that the natural resources in our backyard will be there for their grandkids. That is where I want to put my time and effort right now.

Garland Mason: Thank you.

Dr. Hopkins: Thank you. I appreciate it.

Competing Interests

The authors have no competing interests to declare.

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