

Summary

Uncommon Dialogue: Dynamic Conservation in a Changing World

April 17-18, 2017

Meeting the needs of species whose habitat is shifting or undergoing other alternations as a result of climate change, long-term drought, large-scale development or other factors has led to a concept called “dynamic conservation.” Unlike traditional conservation practices that are geo-spatially fixed, such as protected areas and conservation easements, dynamic conservation integrates the changing nature of ecosystems into conservation. It uses seasonal to long-term approaches, such as habitat enhancements and management restrictions, to adaptively meet conservation needs that are impermanent in space and time. Seasonal “pop-up” wetlands that adjust to the migration patterns of birds in California’s Sacramento Valley are one example of dynamic conservation.

Three dozen conservationists, biologists, academics, funders, and nongovernmental agency and government representatives met for one-and-a-half days in April 2017 at Stanford University to help define dynamic conservation, discuss its importance in achieving outcomes, identify obstacles and opportunities for its implementation, and develop a shared strategy to advance the concept.

Framing of Dynamic Conservation

After Professor Barton (“Buzz”) Thompson of Stanford Law School welcomed the participants, a conservationist explained why dynamic conservation is essential.

“The idea that when there’s an endangered species, that we can put a barrier around it and that species will be protected, is no longer true,” she said. She cited climate change and years of fire suppression in forests as two of the factors that are contributing to the need to build flexibility into efforts to protect the natural world.

For example, she said rising temperatures have permitted the mountain pine beetle to infest larger areas of the Western U.S., creating conditions that invite massive forest fires that have destroyed millions of trees. In addition, she noted, “We have limited evidence that climate change is increasing the frequency and magnitude of tornadoes, and we have strong evidence that it is creating more severe droughts, coastal flooding and heat waves.”

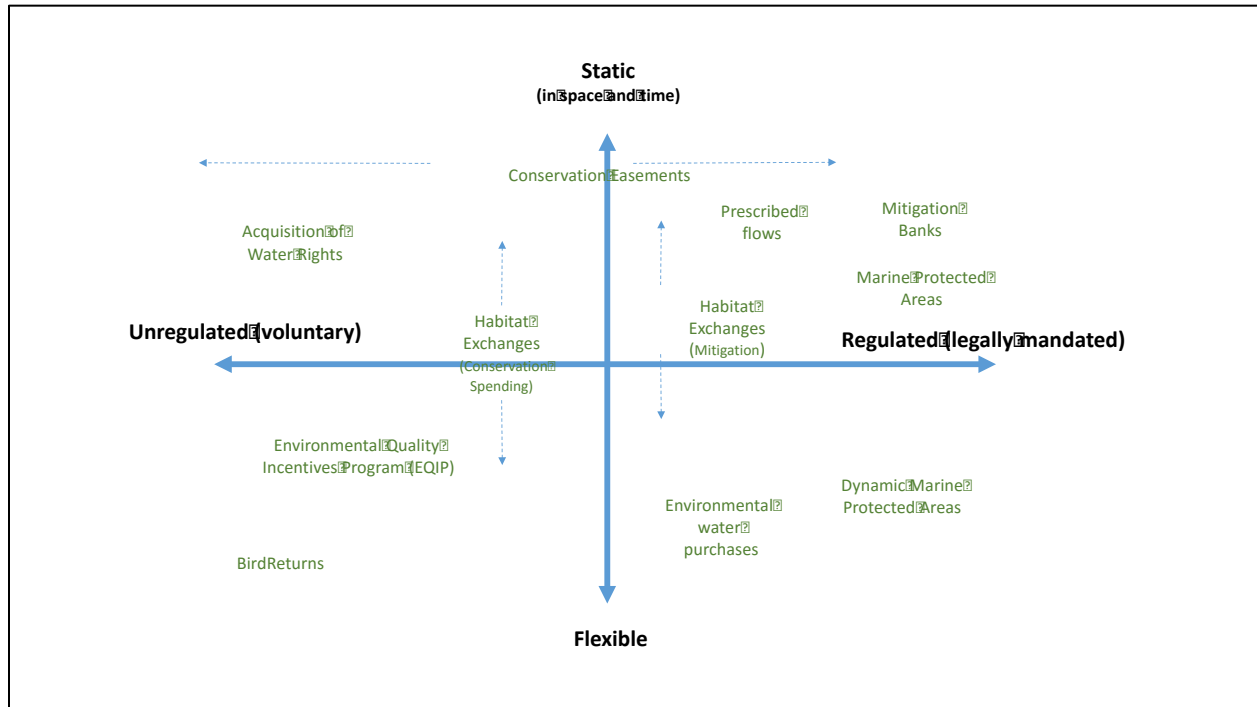
The social dynamics of climate change also are important – that is, how humans react to climate change.

Traditional conservation tools and a fixation on permanency do not address the needs of species driven from their habitats. “We need new strategies and tools that incorporate dynamics to achieve resilient conservation outcomes,” she said, noting conservation for the 21st century requires:

- Understanding of ecological and social dynamics in space and time
- Focus on terrestrial, aquatic and marine
- Data in real time
- New strategies and tools that incorporate dynamics to achieve resilient conservation outcomes
- Management for specified outcomes in the context of dynamics

- Optimization of resources for increased effectiveness and efficiency

One participant introduced a graph of tools for dynamic conservation that plots unregulated vs. regulated on the x (horizontal) axis and static vs. dynamic on the y (vertical) axis. (Static is at the top, dynamic is at the bottom, regulated is on the left and unregulated is on the right.) He explained that his graph is “a taxonomy that’s a way to think about different strategies.”



Case Studies on Dynamic Conservation

Presenters described examples of how dynamic conservation has been put into practice.

Bird Returns. The “Bird Returns” program in California’s Sacramento Valley compensates rice farmers to flood their fields during the winter instead of letting them dry out, thus creating wetlands that attract 200 bird species migrating along the Pacific Flyway. The program is an example of dynamic conservation because changes in migration patterns require flooding of different fields at different times, creating “pop-up” wetlands.

The effectiveness of the program was validated by an online platform created by Cornell University’s Lab of Ornithology and National Audubon, where bird watchers are invited to enter information about bird sightings. With 2 to 3 million records logged each month, the platform is able to show – in real time – the migration patterns of different birds and how the Bird Returns program provided needed habitat for 20 times the usual shorebird density. When these migratory maps were compared to maps showing surface water changes over time, the Bird Returns managers discovered a need to extend the seasonable habitat in the rice fields even longer.

The program experimented with “habitat auctions” in which farmers were asked to submit bids for what it could cost them to provide habitats. The Bird Returns creators achieved their goal of obtaining the

highest quality habitat for the lowest price. “We’re saving about 25 percent on each dollar because we are doing the auctions,” said a representative.

Dynamic Marine Reserves. Larry Crowder, director of Stanford’s Center for Ocean Solutions, gave several examples of dynamic conservation solutions designed to protect marine animals. Examples focused on using close to real-time data to make management decisions that take into account dynamism in the system:

- It took several years to negotiate moving a shipping lane farther north in Boston Harbor to avoid ship collisions with right whales. Although it now takes ships 28 minutes longer to get into the harbor, right whales are being spared.
- A large ocean conservation zone in Southern California is closed to fishermen from August through September to prevent bycatch of sea turtles. This decision came at a huge economic cost to swordfish fishermen. NOAA and the fishermen are exploring the idea of opening up smaller boxes within the big- box closure area that would allow for some bycatch, based on real-time data.
- A recent paper by Duke University described a program that helped cod come back. The rule for fishermen was that if they caught too many juvenile cod, they would have to move their boats a certain distance away from those areas. This dynamic management experiment resulted in a larger area where fishermen could fish, and it maintained the bycatch reduction and the target catch, thus saving the fishermen \$52 million in the value of released catch.
- The yellowtail flounder in the Northwest Atlantic Ocean in New England is another example. There is a cap on kills there because of the bycatch of scallops. Fishermen report each day on where they fished and whether they caught any yellowtail flounder. Those areas are mapped each day and fishermen are required to move away from hot spots that are determined by data projections. They have benefited because they are now catching more fish.

Habitat Exchanges. A conservationist explained that habitat exchanges connect buyers and sellers of conservation services. Landowners such as farmers and ranchers earn credits by creating, maintaining and improving habitat on their property. They sell these credits to industry to compensate for development, such as roads and transmission lines, that impact species and habitat. The habitat exchange can also be used for voluntary conservation distinct from mitigation.

One example involving this approach concerns the Swainson’s Hawk, which is listed as a threatened species in California. The traditional conservation approach would be to place an agricultural easement on farm fields, which might require some agriculture fields to remain in Swainson’s Hawk compatible habitat such as alfalfa fields for these birds. The problem is that the birds move around and permanently requiring alfalfa production might be unrealistic for the farmer. The dynamic conservation solution was to protect parcels under a long-term, more flexible approach.

Similarly, parcels are protected for the Lesser Prairie-Chicken under an arrangement where the land owner manages the land in response to the bird’s habitat needs, with a requirement that the properties maintain a certain functionality score.

The Potential of Dynamic Conservation

During a discussion on the opportunities for dynamic conservation, participants made these comments:

- There's a big need for big data and citizen science to offer proof of concept, particularly in animated videos that show changing patterns (such as migration) over time.
- We're talking about a change of mind-set, going from thinking statically to flexibly. It's a radical shift from thinking of maximizing and optimizing outcomes to managing flexibility and adaptability.
- We expect people will create self-organizing systems under dynamic conservation in which they may do things you don't expect and game the rules.
- Water is a dynamic system. You don't necessarily need to buy a water right all year; what you really need is to adjust the flow from time to time to meet the needs of certain species.
- With dynamic conservation, we're trying to create a new asset class. How do you measure the value and how can you predictively model that for the future? How do you pay for it?
- Can we think of performance as an asset class that ultimately the government would pay for?
- We're talking about not an asset, but a class of assets, not one solution, but a bunch of solutions that respond to different stressors. Ultimately, the different solutions we could be talking about respond to widely different variables.
- Instead of focusing on performance outcomes, we could show how to get the most bang for the dollars. You're not going to be able to measure everything. What's a good proxy? Once you have that, you have a certain measurement which will allow you to do financing.
- First, we should decide what kinds of systems and species dynamic conservation works for and does not work for. Then we should look at it from the application standpoint: Is it static or prone to mitigation? Who are the people you're going to be working with? How do you show that this is working?
- There's value in the parties that need to make a mitigation. You can monetize it.
- The joint venture process is very time intensive and labor intensive, but it has many benefits.
- If a nonprofit or researcher takes a shot at something new, it is not as problematic as if a government agency takes a shot and it is wrong.
- We need something to give to decision makers to make them comfortable that it's working.
- How will the regulatory community face more uncertainty?
- What made people more receptive to the case study ideas?
- We need to bring together all the different species and habitats together – not just protect this land for this species, but figure out how they all work together.
- If you have a dynamic conservation program, how can you guarantee that many years from now it will still continue?

Larry Crowder noted, "None of us are here today because doing this is easy. It's interesting and challenging research, but we're only doing it because we have to. Other approaches are failing."

What's Known About the Thorniest Obstacles

The conservation world has built-in preferences for long-term and sometimes permanent restrictions. The rulemaking and public participation processes are time-consuming and take resources. Some regulations, such as the Endangered Species Act, require recovery plans that often take a long time.

During a discussion about obstacles, participants also identified these issues:

- Some government agencies (like Fish and Wildlife) have very competent staffs, but have a serious capacity issue.
- With leasing arrangements, if the landowner dies, the subsequent landowner is subject to the requirements. This is not true of dynamic conservation arrangements, where the land use may change when the owner changes.
- Some landowners are balking at farm bill programs because they think mitigation credits might be more profitable. (There is a small but growing business in mitigation banking, where investors purchase land to dedicate to conservation and in return get mitigation credits that they can sell to third parties to offset impacts.)
- With conservation programs, one unintended consequence is that if a landowner is good at fulfilling the program's requirements, his reward is additional regulatory restrictions. The Safe Harbor program made it possible for landowners to carry out some beneficial practices to help endangered woodpeckers with the understanding they would not be held to additional regulatory requirements. Few landowners have withdrawn from this program.
- Having some reasonable understanding of the funding and metrics to measure success is important.

Reports by Working Groups

Participants broke into four groups to discuss regulatory issues, policy and funding, biological performance measures and tracking, and developing incentives and safeguards.

Summary by the Regulatory Issues Group

Barriers:

- The regulatory issues are not insurmountable.
- Durability of impact is important.
- Agencies don't have enough personnel to evaluate projects they have in front of them today.
- Competition barriers: People with skin in the game don't necessarily want new ideas.
- Risk aversion
- Trust issues: If you're an agency and want to innovate, it helps to know you're not going to get sued.
- Fundamental statutory barriers seem to be a major problem.
- There aren't a lot of cases where permanence is required by statute.

Actions that could be taken right now:

- We need a series of additional pilots where these ideas are fleshed out.
- We need to push the envelope on what can be approved/not approved.
- There's existing dynamism within existing habitat conservation plans (HCPs). An example is timberland, where there are rotating areas that can be harvested.
- Test dynamic conservation ideas within existing HCP habitat.
- In the case of an HCP, where you have a county with land use planning authority, when a plan is in place, do they have authority that uplift will be present? The goal in Nevada is that a single landowner has land use authority on the property to assure this uplift.

- There is no single entity that controls all of the Prairie-Chicken program, but the range is large enough that there was the sense they could continually supply property for conservation lands, and that was acceptable to the agency; it was credible. At other times, the continuous supply of conservation lands is iffy.

What needs more exploration/research:

- There are early acceptable species that require certain wetlands and grasslands. Thousand-year-old forests take longer. Somewhere on that spectrum is a way to articulate what works.
- Which types of institutions allow regulatory systems that might feel comfortable with dynamic conservation?
- We could adapt some traditional methods to dynamic conservation.
- Ways to shape a pilot that could use conservation include asking regulatory agencies to choose between permanent conservation and more flexible use of conservation – a specialized form of conservation.
- You need to make sure there is inventory, and that there will be funding to ensure viability and an entity to ensure the program's existence into the future.
- Mitigation is currently based on acres and formulas. In order to have a truly functioning dynamic conservation, ecologic functioning is useful to think about.
- Acres are a proxy for a functioning system. To convince a regulator that this is a good idea, you have to make a temporary program look permanent – to check those boxes.

Summary by the Policy and Funding Group

Critical needs for success:

- We recognize we are in an era of experimentation and need to push that curve faster, that dynamic habitat is a viable solution.
- There probably needs to be a lobbying activity, but also better articulation of our success models, to build on them in a more convincing way.
- We had a discussion on the need for more pilots, but thought we just need to drive our stories forward.
- We need to have a scientific process that is showing effective results from dynamic conservation that are durable over time.
- A white paper is a critical missing link. It should cover what has been successful and repeated by others.
- We have a continuing challenge from agencies that say, "I see how good it is for next year, but I have trouble seeing five to 10 years out."
- We need a wider base of support, both within the state as well as nationally, to drive the adoption, especially at the policy level.
- At the state level we can drive legislation to have an Office of Dynamic Habitat within the division of Fish and Wildlife so there is accountability to have this incentive and accountability.
- On the mitigation element, there is a potential opportunity on the federal stage where there is a big infrastructure package coming. We ought to be shaping an element of mitigation to be directed at dynamic habitat. There are exciting opportunities.
- In thinking about federal legislation, in particular we are looking at the EQIP program in the farm model that will look at practices that drive conservation. They are looking at renewing the Farm Bill in the near term.

- We have just gone through drought and flood stress. We need to ensure that, in the framework of solutions, that we're looking at opportunities for dynamic habitat solutions in the crisis of the year, whatever that might be, such as a drought or flood crisis.
- Groups that are working in the legislature need to look at how to qualify a significant amount of funding for dynamic habitat.
- We also need to think about O&M (observations and measurements) so that there is a long-term funding stream for funding and science.
- It is important to have champions in agencies and along the chain who can be leaders on this issue.
- A full element of storytelling is a critical piece.
- As we think about the funding stream, we also need to recognize that legislators in the state care about equity and access, and environment and health issues.
- Dynamic conservation is coming to the fore when there are significant stresses like flooding. Let's take advantage of that. It's also a nice funding source.
- The mitigation piece is a funding source. Sometimes you have to match it to be permanent, but sometimes not. Let's use that as a test and prove the advantages of a dynamic conservation solution.

Summary by the Biological Measures and Performance Group

- We need performance measures to make better decisions about where dynamic conservation is going and to track and reward successes and then report on them.
- Scientific monitoring helps us understand how our performance is contributing to changes over time. We can build a body of evidence as to why dynamic conservation works.
- We need to talk about performance – everything from actions on the ground if you do XYZ, all the way to looking at outcomes and achievements, and to the Goldilocks outcome in the middle.
- Having clear, shared evidence as well as a suite of flexible actions – that's our gold vision.
- Performance measures may be different from time to time, as things change.
- We are anticipating resistance from regulators and from landowners who might consider new measurement more costly or more risky or might raise uncertainty, specifically in linking practices to the outcome.
- Demonstrating where the dynamic habitat solution works and where it doesn't is important.
- We were focused on using existing pilots and using the data from those pilots. We all thought we have a lot to learn from existing pilots.

Summary by the Developing Incentives and Safeguards Group

The big obstacles to innovation:

- People could game the system.
- How do you build durability over time?
- There is an institutional capacity dilemma. Big agencies are already stretched.
- When you look at a large system over time, with some static and some dynamic elements, it doesn't make sense to talk about dynamic conservation out of context. You need to talk in the context of a large landscape, saying here are different needs we are trying to meet.
- Look for those landscapes where permanent and dynamic conservation can work together – and also look at places where they work against each other, so we are not trying to use the wrong tool in the wrong place.

What are some incentives?

- Landowners need safeguards. They have a lot of people coming to them, saying, “Hey, we have this great program.” So they have to understand there are lots of pitfalls (for example, if they have an endangered species on their property).
- Landowners have a mosaic of people approaching them with lots of ideas. We have created a really inefficient economy for these people. We don’t have a consumer approach. We should be thinking of it from the consumer/customer lens to engage them.
- The Endangered Species Act seems to be the thing that drives a lot of it because it creates a funding source. Because it is species focused, it creates a lot of pitfalls for landowners. Maybe that’s not the right approach.
- There may be need to think of some straight landowner incentive programs that aren’t driven by regulatory requirements – to work through the concept in the least challenging environment.
- Real-time data makes dynamic conservation really dynamic.
- Citizen science and satellite imagery could help gather data on a faster time frame.
- You can’t have a 90-day public comment on these things. If you fly in and out of SFO airport, they have rules about what’s safe and it’s autonomous. They don’t have a public meeting about it, they don’t even have a meeting in the tower about it, it just happens. You would need the rules adopted, the autonomous implementation, but actually doing it would have to be semi-automatic.

Plenary on Obstacles and Solutions

Leon Szeptycki, Executive Director of Water in the West, summed up key points.

The value that dynamic conservation can deliver:

- Meeting shifting needs
- Management across the matrix of land tenure to expand the footprint of conservation practices
- Increase connectivity in fragmented landscapes
- More cost-effective and resilient outcomes with scarce resources

Partitioning: Should there be one monolithic idea or should we partition our work into several ideas?

There are approaches or methods you can implement in almost any context to make it more effective.

Ideas include:

- Changing project locations or management rules in much shorter time frames
- Creating more flexible options for landowners/producers
- Data:
 - Real time
 - Citizen science
 - Integration for decision making
- Adapting to climate change

Cross-cutting issues that apply to any type of conservation learning:

- Need better metrics
- Need to link metrics to outcomes
- Need for better monitoring of metrics and outcomes

- Should we shift from single species approaches to ecological health/function?

Obstacles and broad overarching issues:

- Legal mandates/restrictions
- Need for durability and continuity
- Institutional capacity
 - Agencies don't have the time and staff to constantly revisit decisions on a real-time basis.
 - Landowners – There is a confusing mass of opportunities for landowners mingled with threats.
 - New institutions? One question is whether institutions like county government would be the best example for a habitat exchange.
- Agency risk aversion – the difficulty in experimenting with and adopting new ideas, politics and other pressures
- Ramp up of monitoring – It requires a lot more monitoring.

How can we move forward?

- Analyze and report existing successes
- Financial and other tools for durability and continuity
- New institutions – a durable and responsible entity
- Relationship between dynamic and permanent
- New data tools
- Monitoring
- Legal analysis
- Policy vehicles
- “Self-organizing systems” or “gaming”
- Autonomous systems
- Communications
 - White paper
 - Landowners/producers
 - Agencies
- Policy
 - “Office of Dynamic Habitat”
 - Infrastructure bill
 - Farm Bill renewal (EQIP)
 - Drought and flood response
 - Conservation bond funding
 - Dynamic marine management
 - Environmental water budget

There are three broad topics:

- Existing projects
- New projects
 - Terrestrial
 - Marine
 - Freshwater
- Pilots? Scaling up?

Leon Szeptycki invited participants to offer other suggestions on how to move forward. These included:

- Communication is one thing; engagement is another. We need to be engaging partners directly (not just working with agencies) in a discussion of what the possible solutions are. Let's talk about a full-out engagement strategy.
- Regarding financing, in some cases, rather than looking at external funding, we could see if there is some funding in that enterprise, like fishing restricted by regulations.
- If we set up dynamic conservation with the right forces behind it, there may be more funding for the agencies and a better flow of conservation funding.
- What is the essence of the story you are trying to tell and that really governs your audience? I think it's a great idea but I don't understand why, what's driving it.
- There is sectoral interest. If you are working on a landscape, you have to do it in the context of everything else going on (like they do with marine spatial planning).
- Working with those with working lands is an approach that can enlist working lands and farmers cooperatively.
- We have a lot of opportunities to make lots of less-expensive experiments.
- The static landscape has to be broader. You have to take into account that the area has to be larger because you have to follow that dynamism.
- We need to stick with static conservation where we can, but it's not enough. We're really talking about much broader landscapes, so static conservation is a piece of it. We need to move beyond these static boundaries and find added benefits.

The purpose of dynamic conservation:

- We really need to know where we're going with 21st century conservation. We kind of knew where we were going. We just don't have all that built. And how does the mix of permanent vs. dynamic work?
- The dynamic approach is when that spatial planning doesn't work, you have to have some flexibility.
- I thought the function was to build in structure to handle changes. I think that is likely to build in more effective environmental management than static management.

Obstacles to dynamic conservation:

- We have been successful in funding and building a movement of conservation leaders. We also need to remember that there is a left flank that is going to be suspicious.
- In our storytelling as we approach this work, we need to talk about ways to really bring the folks who've been activated to the conservative message along with us.
- Something that worries me is that people are so activated about a series of rollbacks. Depending on who adopts your ideas, the ideas could become very toxic.
- In the Central Valley, we are going to see fallowed lands. How do we align the values so that dynamic conservation will avoid the hopscotch effect and more strategically create ribbons of habitat?
- We're mixing up what makes this approach great with why we're doing it. This really is a focus on working lands and spaces. It reminds me of the Quivera Coalition (where ranchers and conservationists worked together). We're not going to demonize ranchers; we're going to work with them. It's a different niche. It doesn't require you to tear down traditional conservation methods.
- There is a need for better tools that are accessible to landowners.

- A Safe Harbor agreement might be what you have to do to make this work.
- Regarding economics: To the point we're talking about working landscapes, it gets at some of the tradeoffs as to what happens to the production curves. Building out and understanding those tradeoffs is important; a lack of understanding is an obstacle.
- In terms of legal restrictions, there are clearly legal issues you need to address, but most of the laws have enough wiggle room in them so you can figure out how to accomplish what you need to accomplish.
- If you can map out dynamic conservation and it solves problems and doesn't create new problems, then I think you're there. Those perceptual issues go away if there's demand and comfort and reliability in results.

To what extent do you need durability and certainty to satisfy regulatory agencies?

- This thinking about permanence and durability is part of static thinking. (Gives the example of a fishery with a cooperative that was well managed with the approval of a government agency. Then there was an unexpected event that killed all the abalone.)
- That depends on the funding source. There are funding sources out there that are designed for temporary results.
- If you have 20-year requirements, it strikes me that 20 years is a really long time. There could be funding programs that don't require permanence but are, in effect, a really long time.
- I think it's a huge problem. Doing any kind of conservation deal is hard.
- The environmental part of it – the part of it that is not sure what the benefit is – there's a real chance you're making a deal and not sure what you're getting. In the deal-making world of conservation, you have to get permanence.
- One issue is that people aren't satisfied if a deal is not permanent, but the other issue is, isn't it more cost-effective to do temporary deals because it's less work?
- If there's no deal, it's easy. But something tangible is lost.
- I wonder if we're trying too hard for the middle ground: dynamic and durable. Is it better to do some permanent deals or throw some spaghetti on the walls and try to do some good things?
- I think the conversation is mixing terms. What we're really doing is building a durable conservation system. Some of that system ends up being permanent because it works. If other things change, we have enough flexibility to shift the priority down.
- I hate to think we would make perfect the enemy of the good.

Wrap-Up Discussion

How does this community address specific obstacles and advance dynamic conservation?

- If you don't have people stewarding, protected areas aren't durable. Engaging stewards would be most successful.
- There is room within the Williamson Act for natural habitat.
- I wonder if there is any statute where you can define permanence as 100 years with some sort of statutory re-upping for longer.
- I think we need a narrative, or a few sentences, about what we're talking about.
- Habitat exchange is one of the leading ideas for making it easier for farmers to participate in conservation.
- Folks in government agencies need to have some air cover to do dynamic conservation.

- There needs to be a cultural shift in the conservation world. What does it take to make the mind shift? Do we need more examples, better data?
- We are going from the direction of using the term “regulatory certainty” to “predictability.”
- Let’s celebrate the value, get some monitoring and get some fruitful concepts. If we can’t validate what we think is happening, at some point the funding will go away.
- I don’t think people recognize how valuable the landowners’ piece is to conservation.
- One of the most compelling arguments for this flexibility is we can actually see that the resources are moving. The data sets that depicted the movement of those resources are incredibly powerful.
- We need to acknowledge a different federal strategy for this than what we did at the state level.
- Do we need to change laws? No. But we do need a framework to adopt this and own it and post results.

What can this community do to advance dynamic conservation?

- There could be a really helpful collection of examples. We could look at what they are, what they teach us, what the body of evidence is, and also where the gaps are.
- When we think about new pilots, we need to be very strategic about what we are trying to overcome or show with each one of those.
- The Strategic Growth Council has some money it is putting into agricultural easements.
- If the conversation is about an agreed-upon conservation goal, then that would be hard to debate.
- Dynamic doesn’t mean you have things come in and out. Keep the goals in mind, and compensate the farmer if things go south.
- One of our great opportunities is to identify leaders who are interested in thinking about how to dynamically manage our public lands. We could be working with them to hear what issues they are grappling with and what ways we can help them use dynamic conservation to help solve their problems.
- One of the products that could be useful is some sort of risk analysis. Having risks for permanent and dynamic conservation next to one another could show how they complement one another. We also need to think of risks from the landowner perspective as well.
- Trying to develop models is the best way that will provide more assurance to agencies.
- Two frameworks are more persuasive: One is climate adaptation and making sure conservation investments we make address that. The second frame is farmers, working with them. We can get there with different frames instead of wonky internal conservation dialogue.
- Data is an essential element in making the case, but it is not a key sales tool.
- We can put a project, a process, on the ground and see how it works.
- People have been talking about a white paper. It might be useful, but I think the way to start is to write first a blog. If you can’t write a blog, then you can’t write a white paper. (Offers to coauthor a blog on dynamic conservation.)
- Bird Returns uses data, software and reverse auctions to make funding more efficient. We could try to take those tools and export them to other concepts to increase the efficiency of conservation dollars.
- A habitat quantification tool could be really powerful, tailored to achieve a result.
- For next steps, there is an opportunity around funding. We could enlarge (this effort) well beyond public funding. There are sophisticated people around here (impact investors) we know who could help think about innovative financing tools.

- A big part of this is how do we make conservation happen on working landscapes. That requires thinking of a whole system that includes people.
- Finding ways that these can be self-organizing is an area we ought to be exploring.
- There is a way to do research inexpensively in the academic world by inviting graduate students to participate.