TESTIMONY OF

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REGARDING

Habitat Conservation Plans and Biodiversity Loss: A Solution to the Problem

BEFORE THE

Committee on Environment and Public Works Committee of the United States Senate

ON

Wednesday, May 19, 2021

Introduction

Chairman Carper, Ranking Member Capito, and Members of the Committee, thank you for the opportunity to appear today and speak to the theme of Examining Biodiversity Loss: Drivers, Impacts, and Potential Solutions.

My name is Edmund Sullivan, and I serve as the Executive Officer of the Santa Clara Habitat Agency (Habitat Agency) and a member of the California Habitat Conservation Planning Coalition (CHCPC). Today, it is my honor to testify on behalf of the Habitat Agency and CHCPC, which represents Habitat Conservation Plan (HCPs) stakeholders across California.

Why is Biodiversity Important?

Biodiversity underpins all life on Earth. Without species, there would be no air to breath, no food to eat, no water to drink. There would be no human society at all. The map of biodiversity hotspots overlaps extraordinarily well with the map of the natural places that most benefit people.

Biodiversity also refers to the number or abundance of different species living within a particular region. It represents the wealth of biological resources available to us. It is all about sustaining the natural area made up of a community of plants, animals, and other living things that is being reduced at a steady rate.

Biodiversity is important to most aspects of our lives. We value biodiversity for many reasons, some utilitarian, some intrinsic. This means we value biodiversity both for what it provides to humans, and for the value it has in its own right.

Biodiversity offers several ecosystem services which we all depend upon. They are as follows.

1. Keeping Biodiverse Ecosystems Intact Helps Humans Stay Healthy
    - ✓ As 2020 has shown us, there is a close link between disease outbreaks and the degradation of nature.
2. Supports a Variety of Plant Species
    - ✓ With greater biodiversity, the variety of plants increases. This leads to more opportunities, especially for farmers, since they can plant a greater variety of crops and thus use their land more effectively.
3. Ecosystem Balance
    - ✓ Recycling and storage of nutrients, combating pollution by breaking it down and its absorption, stabilizing climate, protecting water resources, forming, and

protecting soil, recovery from unpredictable events and maintaining overall eco-balance.

4. Freshwater Resources
    - ✓ Through a variety of microorganisms and other creatures, it can be assured that freshwater resources are sustained.
5. Biodiversity and Economy
    - ✓ Biodiversity is priceless. However, there have been attempts to put an economic value on biodiversity. At least 40 percent of the world's economy and 80 percent of the needs of the poor are derived from biological resources.
6. Biodiversity and Industry
    - ✓ Biological sources provide many industrial materials, including rubber, cotton, leather, food, paper, timber, water, fiber, oil, and dyes.
7. Food Resources
    - ✓ Biodiversity provides for a variety of foods for the planet. Because of the availability of different species, humans can obtain a range of materials and foods to support their well-being and health.
8. Climatic Stability
    - ✓ Biodiversity protects the planet from global warming. For example, rainforests store huge amounts of greenhouse gas CO2. In addition, forests and wetland ecosystems provide crucial buffers to extreme storms and flooding related to climate change.
9. Sustain Recreation Areas
    - ✓ Whether it is animals or humans, every species needs a place to rest. It is therefore crucial that we contain the natural variety of our planet to provide recreational areas where people can rest and escape from the stresses of life.
10. Source of Drugs
    - ✓ Nature, especially our plants, provide an immense variety of ingredients which are used for pharmaceutical processes.

How can HCPs Stem the Loss of Biodiversity?

I hope my testimony will prove to be a catalyst into further exploration of the benefits of and lessons learned from large-scale, multi-agency Habitat Conservation Plans (HCPs), which are effective solutions to biodiversity loss, while assisting economic development. In thinking about the future of habitat conservation planning, it is important to appreciate HCPs legacy. Through the Endangered Species Act's (ESA) HCP program, endangered species conservation has evolved considerably, and several lessons can be gleaned from this development – most notably, that with foresight, planning and investment, economic developing and biodiversity are not mutually exclusive.

Area-wide, multi-agency HCPs have particularly altered the landscape of habitat conservation. These plans introduced the possibility of a more comprehensive, adaptive, and collaborative approach to mitigation and conservation. In assessing these pioneering arrangements, it is important to consider not only the efficiency of their formation and implementation processes, but also their effectiveness in advancing valuable conservation goals.

Landscape scale HCPs are attempting to implement sustainable development principles of facilitating economic development while at the same time protecting wildlife habitat, biodiversity, and local food systems, and sequestering carbon. The integration of environment and development will lead to improved living standards for all, better protected and managed ecosystems, and a safer, more prosperous future.

Regional HCPs also facilitate the development of major infrastructure projects in addition to the substantial private development that is dependent on this infrastructure. Direct economic benefits of large-scale HCP include:

1. Cost savings through reduced uncertainty, time delay, and compliance costs. Regional HCPs dramatically speed up project permitting.
2. Large-scale regional HCPs accelerate the completion and operation of regional infrastructure projects and other development projects.
3. Cost savings for the USFWS – public sector efficiencies – due to a significant reduction in time required to review and negotiate "take" permits by delegating ESA permitting authority through an approved HCP to local government.

Numerous bridge and road infrastructure projects, including the widening of US-101 in Santa Clara County, benefited from the streamlined permitting provided by the Santa Clara Valley Habitat Plan. And in turn, the mitigation that resulted from these projects resulted in the protection of and the in-perpetuity management of thousands of acres of core habitat of listed threatened and endangered species.

Another example of how effective HCPs are is the Western Riverside County Multi-species HCP, which expedited a new Metrolink rail line, two new freeways, and six major freeway widening projects and resulted in conserving 33 federal and state listed species and 500,000 acres of wildlife habitat.

My final example highlighting HCPs is the Columbia Pipeline Group HCP, which covers 15,000 miles of pipeline across 14 states, and 3 Fish and Wildlife Service Regions. It addresses 90 endangered species and conservation within a 9.5 million acres area. The HCP proponents worked closely with federal and state agencies as well as numerous NGOs. The Columbia Pipeline Group HCP resulted in expedited self-implemented permitting, reduced ESA and NEPA risk, and

landscape level conservation that coordinates mitigation with the goal of protecting areas with the highest conservation biodiversity values.

Overview of Regional HCP Benefits

Landscape scale regional HCP careful management of wildlife habitat and permit certainty is the backbone of their success. The benefits to species and their habitat, all levels of government, and the community are listed below.

Species & Habitat

- Directly supports the covered species.
- Improves protection for species and their habitats at a landscape scale.
- Improves habitat quality.
- Increases species population size.
- Increases extent of habitat.
- Provides an "umbrella of protection" for many other local species.
- Increases connectivity for species between occupied areas.
- Creates a program to identify and reduce future threats and impacts to species.

Federal, State and Local Governments

- Provides for coordinated monitoring, management, and restoration planning.
- Provides a substantial commitment of resources at the onset of the program which allows for the initiation of conservation actions.
- Increases knowledge of threatened and endangered species.
- Provides clear guidelines on how and where to protect habitat and where to focus development.
- Provides framework to take advantage of future opportunities and partnerships.
- Helps promote resource conservation and education.
- Allows for the streamlined permitting of new development and infrastructure.

- Resolves many contentious land use planning disputes because all parties to the agreement understand the development and conservation game plan.

The Community

- Increases local knowledge of threatened and endangered species and related ecological resources.
- Creates opportunities for cooperative regional efforts to conserve national resources.
- Public access to some of the lands HCPs protect.
- Working lands conservation – keeping farmers and ranchers on the land.
- Enhancing ecosystem services functions including flood retention, carbon sequestration, and buffers against oceanic storm events.
- Voluntary land conservation – fee title or conservation easements purchased from willing sellers.

How Regional Landscape Scale HCPs are Protecting Biodiversity Hotspots

Protected areas are the backbone of global biodiversity conservation. Land conservation at the ecosystem scale is a key driver for achieving that objective and regional HCPs are one of the best mechanisms available capable of implementing that objective. Why do I believe large scale multi-species HCPs are well positioned to implement a policy goal focused on biodiversity conservation?

1. It is our core mission.
2. Financial sustainability.
3. Endowment financing focused on in-perpetuity funding for land management and monitoring.
4. Collaborative partnership between all levels of government, NGOs, and private landowners.
5. Adaptative management drives HCP land management and conservation decision making.
6. Science driven land conservation decision-making process focused on protecting biodiversity hotspots.

In the past, conservation primarily focused on preserving existing biodiversity patterns and acted reactively with respect to new threats. With the effects of climate change, regional HCPs and

other similar conservation efforts are leading a paradigm shift in habitat reserve design and function. A relatively straightforward and intuitive approach is to focus on identifying and protecting biodiversity in those areas least likely to undergo rapid climate-induced changes. Regional efforts are best suited for tackling climate change impacts since they are ecosystem focused, building resiliency and redundancy into the landscape, establishing wildlife linkages, and protecting climate refugia.

For example, the Santa Clara Valley Habitat Plan (SCVHP) identified biodiversity hotspots based on the best available science, critical species occurrence data, remote sensing analysis, and growth truthing when and where feasibility. This decision matrix as well as understanding critical wildlife linkages drives our land acquisition decision-making. Because of this process, my agency has purchased several properties dominated by California native endemic plants, some found only in Santa Clara County, and home to the Bay checkerspot butterfly and other species only found in California.

The United States has many biodiversity hotspots including parts of California, the Appalachian Mountains, the North American Coastal Plain, and Madrean Pine-Oak Woodlands. One of those hotspots in California is in Riverside County. One my asks today is for Senate support establishing the Western Riverside County National Wildlife Refuge (WCRCNWR) in a biodiversity hotspot found in Southern California which would protect habitat and vulnerable species, increase access to public lands for underserved communities, and provide expedited permitting for infrastructure and development. Moreover, the proposal would directly protect 146 species—33 of which are listed as threatened or endangered under the Endangered Species Act or state law. WCRCNWR would ensure finalization of the country's largest and most extensive HCP and is directly linked to biodiversity.

Threats to Biodiversity

The threats to biodiversity are many, but today I will be focusing on invasive species, climate change, and loss of habitat, and how landscape scale HCPs can help tackle these threats.

Invasive Species

Invasive species are among the leading threats to native wildlife. Approximately 42 percent of threatened or endangered species are at risk due to invasive species. Human health and economies are also at risk from invasive species. The impacts of invasive species on our natural ecosystems and economy cost billions of dollars each year. Many of our commercial, agricultural, and recreational activities depend on healthy native ecosystems.

America has a very large and increasing number of non-native species, which are spreading rapidly due to the consistent decline of native species for many of the reasons discussed above related to climate change. Non-native species are excellent opportunists, often better suited to take advantage of a newly disturbed site from an extreme event like fire or flood, and once they have developed a strong position, it is very hard for native species to effectively compete for necessary resources such as water, light, and food. Non-native species can often change the habitat in a way that it becomes ill suited for natives and therefore change the ecosystem dynamics in a way that is nearly irretrievable and can also affect the most fundamental levels of ecosystem health, such as complex food webs. Controls that worked in the native habitats do not work in their new locations, the reasons ranging from lack of predators to our native species being susceptible to the new disease.

Examples of invasive species' impacts include non-natives killing animals and plants along with disrupting ecological functions. Much of south Florida is infested by Burmese pythons. They eat virtually any animal they encounter in the Everglades, with huge impacts on the native mammal and bird populations. Unnatural wildfires result from invasive species in some locations. Non-native grasses in desert areas that were historically fire resistant are a major example. Historically, vegetation was very sparse, so that fires from lightning or other causes would not spread to catastrophically large size. A carpet of non-native grasses can result in devastating wildfires in locales such as saguaro cactus lands of Arizona, Joshua tree woodlands in the Mohave desert and the common desert creosote bush scrub. At one creosote bush scrub fire location, there was no reappearance of the scrub after 40 years. In some eastern United States areas, up to 80% of the hemlock trees have been killed by an invasive insect making these forests particularly vulnerable to non-native tree species creating type conversion to a different ecosystem in the long-term.

Freshwater aquatic ecosystems are among the most imperiled ecological communities worldwide. Invasive alien species are a major threat to freshwater ecosystems, and American bullfrogs (Lithobates (Rana) catesbeianus) are among the world's 100 most prominent aquatic invasive species. Moreover, there is a strong historical link between the introduction of the American bullfrog into the western United States and the emergence of the deadly chytrid fungus, a pathogen that has caused declines and extinctions of amphibians around the world. The bullfrogs, native to the eastern United States, likely coevolved with the deadly fungal pathogen, Batrachochytrium dendrobatidis (Bd), and brought it with them when the bullfrogs were introduced as a food source in the West and later traded throughout the world. As invasive species and disease vectors, bullfrogs continue to threaten amphibian populations that may have no defenses against Bd, including endangered species like the California red-legged frog, the mountain yellow-legged frog and the California tiger salamander.

By mitigating for environmental impacts at the landscape/ecosystem scale, it is harder for invasive species to take hold. Furthermore, HCPs have the long-term focus on eradicating non-native species threatening natural landscapes because this is a critical component of our land

management enhancement strategy. Invasives are a threat to the long-term viability of our special status species: a threat we cannot ignore. The SCVHP has taken on the invasive species challenge by removing feral pigs from our Reserve System, bullfrogs from wetlands and ponds, and invasive plants like barb goatgrass (Aegilops triuncialis) from our serpentine bunchgrass plant community.

Climate change drivers of biodiversity and species decline

One of the principal challenges to our mission as HCP practitioners is climate change and its impact on ecosystem health. It is a major threat to biodiversity, to species extinction, and a big challenge to conservation. Globally, an estimated 8 million species of animals and plants are threatened with extinction by climate change. Climate change is currently affecting 19% of species listed as threatened on the International Union for the Conservation of Nature's Red List of Threatened Species, increasing the likelihood of their extinction.

Climate change affects species range, biology, abundances, and community composition; communities that have adapted over time based upon key relationships and interdependencies amongst various species. This is where consequences of biodiversity loss become a national risk and the importance of planning for ecosystem resilience becomes imperative.

In the past, conservation primarily focused on preserving existing biodiversity patterns and acted reactively with respect to new threats. With the effects of climate change, HCPs are leading a paradigm shift in habitat reserve design and function. A relatively straightforward and intuitive approach is to focus on identifying and protecting biodiversity in those areas least likely to undergo rapid climate-induced changes. Large scale HCPs are best well suited for tackling climate change since they are ecosystem focused on building resiliency and replication into the landscape, establishing wildlife linkages, and protecting climate refugia.

Historically, species have been able to adapt to changing climates because these changes to their habitat took place slowly. The current rapid climate change is too fast for many species to adapt to new and changing conditions. Additionally, the many stressors related to climate, such as increased temperature, extended drought, increased fire intensity, extreme cold, extreme flooding, and sea level rise, potentially compound with other threats such as habitat loss and degradation, increased pollution, and human impacts at the urban/wildland interface. Together these threats and stressors decrease the functional resilience of species, populations, and ecosystems as a whole.

If our natural communities are not resilient and do not remain ecologically functional, serious impacts could be seen within the communities and our nation. For example, the black mangroves of south Louisiana are an important component of a very complex saltmarsh ecosystem. The complexity of the habitat provided by this system provides important fisheries nursery habitat supporting the world-renowned seafood, sportfishing, and tourism industries of the Gulf Coast.

What is less known, however, is that this ecosystem also offers protection from impacts of hurricanes and storm surge. These mangrove communities slow storm surge and protect the coast from land loss. In fact, mangroves build land over time through their robust below-ground root systems, sequestering carbon in the process. Local extinction of black mangrove from coastal Louisiana and other Gulf states would have serious consequences, to not only aquatic food webs supporting thousands of species, but also Gulf coast economies, infrastructure resilience to hurricanes and ultimately global carbon dioxide levels. Unfortunately, black mangrove communities along the northern Gulf Coast are at risk due to sea level rise and extreme cold events that may increase due to climate change.

Climate change results in a variety of drivers that affect biodiversity, species populations, and ecological communities across our nation. They include increasing temperatures, changes in precipitation patterns, increasing severity and frequency of extreme events, sea level rise, changing ocean currents, and salinity fluctuations. There are also interactions with other factors, such as invasive species and habitat fragmentation. Often the impacts are complex and variable from species to species and biological community to biological community.

Changes in the geographic ranges of individual species

Geographic range is the overall area where a species lives. For example, almost all occurrences of the greater sage grouse are in Nevada, Oregon, Idaho Wyoming, and Montana. The eastern flying squirrel in the U.S. ranges from Florida to Texas in the south, northwards to the Canadian border from North Dakota to Maine. Many species have much more limited geographic ranges. And, like the greater sage grouse, they may depend on a particular type of habitat. The desert tortoise is limited to certain desert areas in California, Nevada, Arizona, and Utah. The Texas toad's range is almost entirely central and west Texas. The northern pin oak is limited to a small area south and west of the Great Lakes. A very large number of native plant species are only found in California. Often, they are in very small areas, with particular needs for soil type, moisture and other factors. Species with small ranges and/or requiring niche ecological conditions are often more vulnerable to the various effects of climate change. For example, researchers have predicted that future temperature changes could threaten up to 66% of California's unique plants, including current range losses of 80% or more.

There are many examples of species ranges shifting northwards and /or to higher elevations in response to rising average temperatures and /or climate change induced changes in rain and snowfall patterns. As of 2015, 55% of the species in temperate North America had either disappeared from the southern edges of their ranges or expanded to new areas in the north. The Edith's checkerspot butterfly has disappeared from many locations in the southern portion of its range [California, Nevada, Utah]. As of 2006, the average [mean] location had moved 32 miles northwards. Alpine species such as the pika are moving uphill but will run out of habitat because they cannot go higher than the tops of mountains. This is a dramatic example of how a shift in a species range can disconnect that species from the ecosystem it requires.

Combined effects of increased temperature and changing precipitation patterns

Increased temperature has led to ecological changes including the migration of Chinook salmon (Oncorhynchus tshawytscha) to rivers from the Artic to California, while behavioral changes in species include earlier breeding times for numerous North American songbirds. Climate change is also causing significant physiological changes. Warmer temperatures during egg incubation are causing imbalanced female to male sex ratios among endangered green sea turtles (Chelonia mydas), with females accounting for 99% of newly hatched turtles on some nesting beaches. Genetic changes attributed to climate change include hybridization – interbreeding as species' habitats change.

Climate change is also causing changes in precipitation patterns. The latter will vary from region to region as local and regional weather is driven by climate conditions. For example, the Southwest is becoming drier. Over time, we will see dramatic distribution changes in biological community composition and loss of species, including the major plant species that define a region. This is occurring already. For example, between 1997 and 2006, the average elevation of the dominant plant species in the California's Santa Rosa Mountains rose by 213 feet because of changes in regional climate. The Mohave Desert's Joshua trees may become extinct due to shifting precipitation patterns and California blue oak woodlands will shift uphill over time and may eventually disappear altogether from much of Central California. Temperature and precipitation also have significant effects on overall forest health. A stressed forest ecosystem is more susceptible to disease, invasive pests, and catastrophic wildfire.

Natural processes are also being disrupted by climate change. Southern California scrub habitats regenerate after fire. But if the next severe fire occurs too soon, the natural regeneration will not occur. The result is replacement of the native vegetation with non-native grasses. Intense fires over a large area of the landscape in turn affects many ecosystem services that are important to the surrounding communities such as water supply, soil health, water quality, public recreation, carbon sequestration, air quality, etc. Forests devastated from fire are often unable to fully re-establish and instead become infested with non-native and invasive species.

Intense wildfires, major floods, extended droughts, extreme cold spells, etc. are all becoming more severe and more frequent because of rising temperature within the atmosphere and oceans. Historically, these events have occurred at frequencies and extents which nature could handle, with native vegetation regenerating after the fire or flood. However, the rapidly changing climate is pushing species and populations outside their zone of resilience, to a place where they do not have the biological fitness nor tools for adaptation available to survive. For these reasons, climate change is one of the biggest challenges to global biodiversity that we face.

Habitat fragmentation affects the ability of nature to handle climate change

It has long been understood that when animals are left without large areas of intact habitat, they are at greater risk of extinction: fragmentation leaves animals confined to ever-smaller areas, restricting movement and gene flow, and leaving species vulnerable to threats ranging from poachers to climate change. A 2017 study published in the Proceedings of the National Academy of Sciences set out to quantify this risk for more than 4,000 land-dwelling mammal species across the globe — and found that species with more fragmented habitats were at greater risk of extinction. A prime example of this challenge is for the San Juaquin kit fox a once abundant species where there are now fewer than 7,000 scattered among fragmented populations.

Habitat loss and fragmentation have long been considered a primary cause for biodiversity loss and ecosystem degradation and is a key challenge for landscape scale HCP implementation. Although some habitats are naturally patchy, human actions have profoundly fragmented landscapes across the North America, altering the quality and connectivity of habitats. Therefore, understanding the causes and consequences of habitat fragmentation is critical to preserving biodiversity and ecosystem functioning. Connectivity among elevational and other gradients, between vegetation communities, and along north-south pathways is a mainstay for successful climate adaption for plants and animals alike. The challenge is particularly severe in already depleted and fragmented landscapes, where future development or agriculture may foreclose connectivity options. Connectivity does not respect jurisdictional boundaries, and will take state, federal, local, and private partnerships with coordinated land protection strategies and acquisitions. Connectivity is one of the primary tools that species have to be resilient in the face of climate change.

In these challenges lies opportunity though. Landscape scale HCPs recognize threats to biodiversity in fragmented landscapes and are positioned to help mitigate these threats by re-establishing critical wildlife linkages and conserving large habitat patch areas linked to one another through protected wildlife corridors. HCPs have the capacity, in-perpetuity funding, and a focus on adaptive management to mitigate the effects of habitat fragmentation.

Roads unfortunately pose a significant threat to wildlife across North America. Roads serve as a direct barrier to movement, impeding the ability of wildlife to move safely to find food, water, and mates. Hundreds of millions of animals die because of wildlife-vehicle collisions on North American roads every year. As barriers to movement, roads can cause genetic isolation within populations, thereby contributing to biodiversity decline. Wildlife-related car accidents are also a danger to people, resulting in thousands of human fatalities every year.

Large-scale HCPs with our local, state, and federal partners, are identifying roads of critical concern for wildlife, conducting field research to better understand the issues at hand, and develop location-specific measures to address them. But we cannot do it alone. We also need the help of lawmakers at the state and federal level to craft policies designed to incentivize

greater investment in road crossings and other wildlife-friendly improvements, as well as to integrate these considerations into planning for new projects from the outset.

My agency, the Santa Clara Valley Habitat Agency, and others are working with Caltrans and California Highspeed Rail Authority (HSR) to build wildlife crossings into their respective project designs. Specifically, HSR will have a significant impact on wildlife movement across Santa Clara County. We are working with HSR to appropriately mitigate their project with one potential outcome being the construction of a land bridge across State Highway 152 in the Pacheco Pass area as well as construct of new or enhancement of existing undercrossings throughout the rail alignment benefiting endangered amphibians, Kit fox, mountain lion, elk, and American badger.

Another great example is the Interstate 90 wildlife crossings project through the Central Cascades. Since 2000, The Cascades Conservation Partnership and the I-90 Wildlife Bridges Coalition, led efforts to reconnect Washington's north and south Cascades by protecting and restoring habitat and establishing safe wildlife crossings under and over I-90. Two fully vegetated, 150-foot-wide overpasses are planned. Construction on the Keechelus Wildlife Overcrossing was completed in 2018, becoming Washington's first-ever wildlife bridge over a highway or freeway, and the largest wildlife overcrossing in North America. Construction has also been completed for numerous undercrossings benefiting elk, deer, salmonids, and wolverine.

My final example is Montana's U.S. Highway 93. A 56-mile stretch of U.S. Highway 93 has been redesigned to allow animal crossings over and under the existing road, facilitating the safety of both wildlife and motorists. The highway redesign came about as a means of preventing dangerous and sometimes lethal collisions between motorists and wildlife. The 56 miles of the redesigned Highway 93 now boasts 41 underpasses and overpasses. Species benefiting from these improvements include grizzly bear, elk, deer, mountain lion, moose, wolve, turtles, and amphibians.

Closing Remarks

Regional large-scale HCPs are federalism in action: local government is delegated federal and state permit implementation authority integrating federal and state permits into the local land use development review process. They are a negotiated agreement between local government, in some instances a state, and the federal government instituting permit conditions and conservation actions established for the stated purpose of project specific mitigation and covered species recovery. Regional HCPs foster a partnership between local government and the federal government, a shared vision so to speak, for conservation and economic development. Moreover, landscape scale regional HCPs have a strong track record in aiding infrastructure and other economic development, assisting federal, state, and local governments, and gaining support from the private sector and NGOs.

I hope my testimony presents a wide range of illustrative actions for sustainability and pathways for achieving them across and between sectors such as agriculture, forestry, marine systems, freshwater systems, urban areas, energy, finance, and many others. I believe it highlights the importance of, among others, adopting integrated management and cross-sectoral approaches like regional landscape scale HCPs that consider the trade-offs of food and energy production, infrastructure, freshwater and coastal management, and biodiversity conservation. Will striking these balances require substantial financial investment? Yes, but not nearly as much as losing the $125 trillion worth of ecosystem services that experts estimate nature provides to us every year.