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RESILIENCE AND CLIMATE CHANGE EXTINCTION

The Sad Tale of the Bramble Cay Melomys



David Salt is the co-author of *Resilience Thinking* and *Resilience Practice*. He is a science and environment writer at the Australian National University, and has more than two decades experience writing and producing popular science magazines and books.



Brian Walker is the co-author of *Resilience Thinking* and *Resilience Practice*. He is the past Chief of Australia's CSIRO Division of Wildlife and Ecology and is currently the Program Director of the Resilience Alliance.

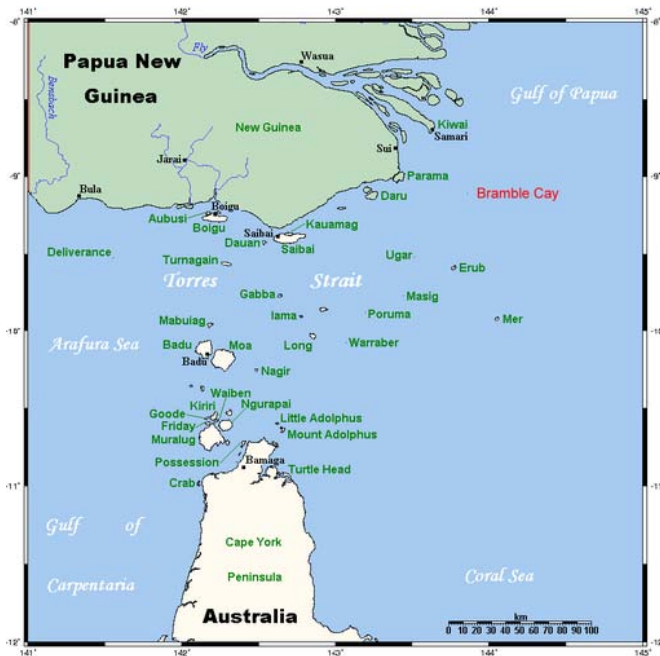
A few weeks ago the world learnt of the disappearance of the Bramble Cay melomys, a small Australian rodent only known to occur on a tiny coral cay off the northern tip of Australia. The finding is noted in a government report that documents how a comprehensive search for the species in 2014 had failed to detect a single animal.

The report's authors state that the population had "almost certainly" disappeared because its habitat had been destroyed by the ocean stripping vegetation from the low-lying cay. Indeed, so close to sea level is the tiny island that it probably provided little refuge to the melomys from big weather events. The authors even suggested ocean inundation could have directly killed or carried away individual animals! It's a tragic situation to contemplate, the final specimen of a species being washed away by a rising sea.

Thousands of species around the world are on the lip of extinction but the loss of the Bramble Cay melomys is particularly poignant in that human-induced climate change has been identified as the root cause of its demise. Sea-level rise and increased frequency and intensity of weather events have been noted as the cause of the loss of its island home.

The loss of a species of island rat does not overly concern everyone, something that is clear if you peruse the discussion threads following some of the articles on this event (for example, see *Nature* and *The Washington Post*) and many simply deny the existence of climate change (read those same discussion threads). And yet the loss of the Bramble Cay melomys should be ringing alarm bells everywhere. It's a symbol of clear and present danger, an example of irreversible consequence and a portent of things to come.

The Bramble Cay melomys has crossed an irreversible threshold. It's gone with no possibility of return. And with its passing, the system it was a part of has lost a natural component, making it



Bramble Cay melomys were only known to occur on a tiny coral cay off the northern tip of Australia. Map via Wikimedia Commons

less able to cope with change and disturbance; such is the consequence of biodiversity loss.

Scientists across multiple disciplines have identified what they believe is a 'safe' level of greenhouse gas concentration in the atmosphere. It is 350 parts per million of carbon dioxide. This year we crossed 400 ppm. The consequences of transgressing this 'planetary boundary' is climate change, rising sea levels and more extreme weather events. This increase in disturbance threatens to overwhelm the resilience of many species, especially those living in low areas, and the loss of the Bramble Cay melomys is but the start of this process.

Given the already devastating change to Bramble Cay, it's unlikely that the loss of melomys will have any effects on what's left of its ecosystem. However, in more-or-less intact ecosystems the loss of species serves to erode the system's resilience to climate change. It's a

synergistic set of secondary feedback effects making things progressively worse. Biodiversity loss makes us more vulnerable to climate change, and less able to absorb the disruption it brings.

Resilience thinking helps us engage with the complexity of the world, guiding our management of ecosystems. Part of that complexity is the strength of policy feedbacks to change. Some have suggested we should have moved the last Bramble Cay melomys to some safe harbor before they were swallowed by the hungry sea. And, indeed, we should have; we've known they were at risk for many years. That we didn't suggests our feedback to the challenge of climate change are inappropriate. They need to be tighter. In this case it's resulted in the irreversible loss of a mammal species. And maybe we should see this rodent as a canary in the coalmine.



Bramble cay melomys *Melomys rubicola*. Photo Credit: Government of Queensland, Australia, via Wikimedia Commons



THE DAKOTA ACCESS PIPELINE

An Issue of Tribal Sovereignty



Lucy Moore worked as a mediator, facilitator, trainer, and consultant, specializing in natural resource and public policy disputes since the late 1980s. She continues to work, as Lucy Moore Associates, with a diverse group of colleagues on both regional and national cases, often with a multi-cultural or tribal component. She has a credibility and depth of experience in Indian country rare in conflict resolution practitioners. Her book, *Common Ground on Hostile Turf*, was published in 2013.

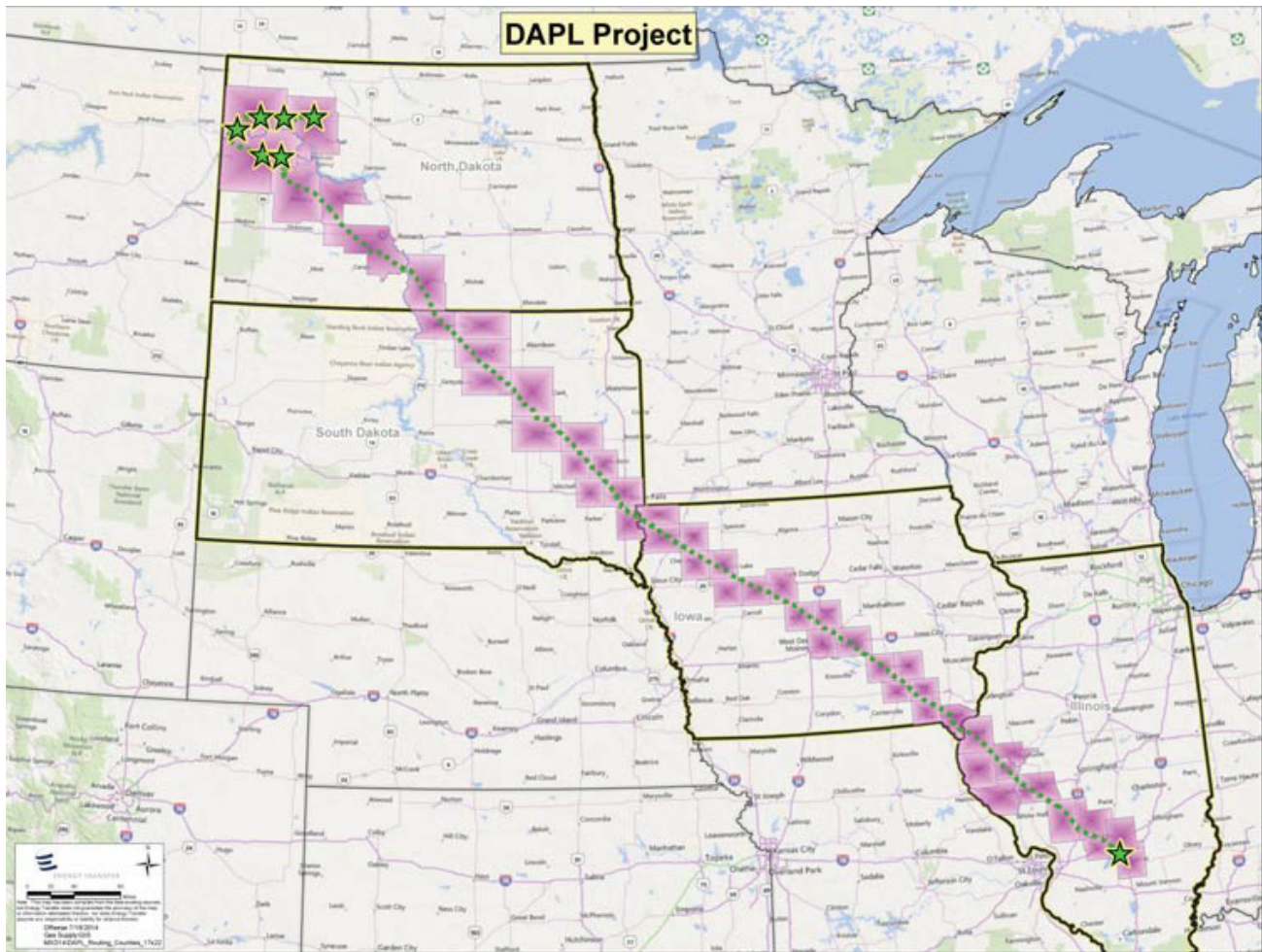
A few months ago, I wrote a post about the occupation of the Malheur Wildlife Refuge building in Oregon by the Bundy brothers gang. They had come to the rescue (in their opinion) of locals who had been convicted of burning forest land. They saw these rural Oregonians as fellow victims of the federal lands policies—policies that deny them free use of public lands. They were not welcomed by most locals who preferred to handle the situation in their own way and resented the outsiders capitalizing on their site specific conflict.

The Standing Rock Sioux in North Dakota have drawn thousands of sympathizers, Indian and non-Indian, from all over the country, who are encamped near the site of a proposed pipeline that would cross under the Missouri River just upstream of the reservation. They are protesting with the tribe against the pipeline company and what they see as the complicity of federal agencies. Non-Indian residents in the area are concerned for their property, and some are frightened by the mere presence of thousands of Indians so close by. But the tribal leadership expresses gratitude for the support that they feel will help draw attention to the injustice of the situation.

So, is this the same scenario—Malheur and North Dakota?

I would argue that the stakes are different, that this is an issue of tribal sovereignty, not an individual citizen complaint against the feds. This is about US history, treaties, court cases, and policies that define the unique government-to-government relationship between tribes and the federal government. Standing Rock is calling for scrutiny of this relationship and a recognition of abuses in the past as well as the present. This is an objective shared by every federally recognized tribe across the country. The encampment at Standing Rock has galvanized tribal voices into a powerful protest. Many feel they are reclaiming a cultural identity and finding a new unity among tribal people which they hope to maintain and nurture.

But the two situations share one important reality. When all the commotion is over, the locals—in this case the tribe and their non-Indian neighbors —will need to resume the task of living side by side. As Standing Rock Sioux chairman David Archambault II reflected “I have to live here when everybody’s gone.” Public officials quoted in the recent *New York Times* article have started to talk about their hopes of a “peaceful endgame.” And a county commissioner summed up the



Credit: DAPLPipelineFacts.com

future: “When this is all over, we’re still friends and neighbors.” The protest has empowered and emboldened Standing Rock, but it has also put yet another strain on local relationships. Perhaps coming from a place of greater strength, the tribe will be able to forge stronger relationships with their neighbors. After all, they share a deep love of the land and caring for their communities. All they have to do is reach across those fences with respect and a desire to be good neighbors. I wish them luck.



WHAT WILL A 21ST CENTURY TRANSPORTATION SYSTEM LOOK LIKE?

Last week, President Obama had this to say about the future of transportation at his final State of the Union Address: “Rather than subsidize the past, we should invest in the future—especially in communities that rely on fossil fuels. That’s why I’m going to push to change the way we manage our oil and coal resources, so that they better reflect the costs they impose on taxpayers and our planet. That way, we put money back into those communities and put tens of thousands of Americans to work building a 21st century transportation system.”

We wanted to know—what will this 21st century transportation system look like? We turned to some of our authors to find out:



Carlton Reid, author of *Roads Were Not Built for Cars*

Cars? Where we’re going we won’t need cars. The past can tell us a lot about the future, and the past tells us that we’re very poor at predicting the next transport revolution. Eighteenth-century folk thought canals would last forever. Early 19th-century folk thought the same about turnpike roads. And for those who grew up in the “railway age,” the only future imagined was of steel rails and steam trains. Few predicted the motor car’s eventual dominance, and it’s reasonable to assume that the same inability to accurately predict the future afflicts us, too. As “car age” people, we tend to extrapolate into the future of transport using what we know, and that’s car-shaped objects on roads. The Tesla is a wonderful thing but the technology that underpins it is hardly new – electric cars were more popular in the 1890s than gasoline cars. And electric cars may appear to be “cleaner,” but this is only true if they’re replenished by solar power – all other recharging methods involve traditional power sources so, really, most electric cars are coal-powered cars.

And what of autonomous cars? Again, this is hardly the disruptive technology that many think it is. I’ve been using driverless cars for 50 years, cars which scuttle away and hide when not needed. Taxis. I can summon one with an app when in a meeting and it will appear outside and whisk me to wherever I want to go. When I use taxis, including Uber, I can kick back and let the driver – a silent automaton if I so will it – worry about the road ahead. I fiddle on my smartphone without even raising my eyes. Where autonomous vehicles might change the world – if we let them, and I’d rather we didn’t – is over who has priority on roads. Currently, driverless cars are programmed to avoid cyclists and pedestrians. In a city full of cars driven by onboard computers it will be a great game to ride or step in front of them, safe in the knowledge they’re programmed not to touch you.

Because cities are expected to fill with more and more people I don't see how driverless cars will be able to navigate around these empowered pedestrians or emboldened bicyclists, at least not in central business districts. It's far more likely that there's another technology waiting in the wings that we can scarcely even imagine. That is certainly what happened to our forebears. Until then (and, if I'm allowed to, even after then) I'll continue to ride my bicycle. A driverless car has clear user benefits, but an autonomous bicycle would be rather dull and pointless.



Ray Tomalty, co-author of *America's Urban Future*

The president was of course alluding to a carbon tax, which he is known to favor over cap-and-trade systems. Economists estimate a carbon tax could raise \$1.2 to \$1.5 trillion per year in the US, and if even a small part of this were spent on developing innovative transportation technology, a 21st-century transportation system would be a real possibility in the US. At present, only about \$2.3 billion in federal spending is devoted to transportation research. This is helping to test new technologies such as vehicle-to-vehicle communication, which has great potential to avoid accidents and improve traffic flow, reduce greenhouse gas emissions, improve travel times, and obviate the need for road infrastructure expansion. This technology is being tested on small stretches of urban highways across the country, but at the present rate of investment, it will be decades before fully automative vehicles are widespread in the US.

Many transportation experts believe the most pressing application of driverless technology is in driverless buses, which can greatly reduce the cost of public transit and vastly improve service. Unfortunately, little research and development is being dedicated to this purpose, something that could be addressed with funding from a carbon tax. Drone technology is another research and development area in need of greater public investment, a technology that is bringing the driverless movement to aviation and creating new possibilities for personal and goods transportation. Beyond research, new investment is needed in innovative transportation infrastructure. High-speed train service is a proven technology all over the developed world but in its infancy in the US (only one high-speed route in the country, the Acela Express linking Boston to Washington).

More thinking and research is also needed to explore the link between new transportation technologies, behavioral responses, and land use planning. This will require greater cooperation among local, regional and state planning authorities and cross-sectional cooperation among planning and transportation agencies. As the soon-to-be-released book, *America's Urban Future*, written by Alan Mallach and myself shows, this is a field in which Canadian metropolitan areas have a long history of experimentation, so there may be something to be learned by looking north of the border for ideas on moving forward on this front.

Grady Gammage, author of *The Future of the Suburban City*



By about 2050, driving your own vehicle will be a recreational activity like off-road four wheeling. Routine travel in autonomous, mostly electric vehicles will be commonplace. The cars will be smaller, lighter and often shared use but mostly they will still have only one or two people in them at a time. Transit

in all forms will dramatically increase, but in most cities people will still be living in houses with driveways and garages and they'll use personal mobility vehicles to get around.



Jeffrey Kenworthy, co-author of *The End of Automobile Dependence*

New technologies will clearly be part of any 21st-century transportation system, including autonomous cars, but they should not be embraced in the way they are currently envisaged. A car is a car and takes up space with roads and parking, as well as helps to facilitate the continued destruction of agricultural land and natural areas through sprawl. This can be said of autonomous cars as well as electric cars, so ideally a 21st-century transportation system will not look like the current automobile-dependent system in the USA, where cars are still responsible for around 96% of all the motorized passenger travel in cities.

A 21st century urban transportation system will have a multitude of modes (walking, bikes, car-sharing, transit, car-on-demand, private cars and probably other innovative technologies such as pedelecs, Yikes, etc.) seamlessly linked together. This will be achieved increasingly through the use of smart communications technologies, which will give people instant access via smart phones and tablet computers, for the best combination of modes for any trip.

In all the excitement over autonomous cars, we must not forget that electrically powered conventional transit modes such as light rail (LRT) and metro systems are still vastly underprovided for in US cities, due to being starved of adequate funding over the last 80 years. With advances in design, materials, comfort, on-board facilities, wireless networks and many other improvements, especially more protected rights-of-way, using transit in the future will be very different from what we know today. 21st-century transportation systems should not only see more transit, but much more non-motorised movement, such as walking and cycling, leading to a less obese nation. This change alone will see billions shaved off US health care costs, not to mention the cost savings of a “road diet.”



Richard Willson, author of *Parking Management for Smart Growth*

Just as we need to stop subsidizing the past in energy policy, we need to stop subsidizing the past by favoring driving and parking over more appropriate transportation modes. Parking should be priced to cover both its actual cost and the costs it imposes on others and the planet. This is rarely the case in US cities, where the dual legacies of excessive minimum parking requirements and parking subsidies have distorted vehicle ownership and travel choices. These distortions have in turn, undermined land use efficiency, design, social equity, and livability. The 21st-century transportation system will have fewer privately-owned cars and less parking. New technologies will ensure that we have all the mobility we want with fewer cars. Car companies know this—that’s why they are redefining themselves as mobility companies.



John Renne, co-author of *Transport Beyond Oil*

Rapid changes in technology, such as self-driving electric cars and trucks, hold promise that the transportation industry will continue to innovate during the 21st-century. Combined with a societal move towards an information and sharing-economy there is no doubt that marginal efficiencies will allow for a less carbon-intensive transportation system. However, the scale and intensity of weather impacts due to climate change necessitate a more drastic approach to achieve the key goal of limiting global temperature rise. The good news is that the path is simple. Anything we can do to promote walkable and bikeable communities will have the greatest impact. Therefore, we need to prioritize mass transit, which is the only transportation technology that has been proven to create walkable communities at the local level and deliver regional connectivity with the lowest consumption on carbon and emissions.



THE LEGACY OF THE 2010 WINTER OLYMPICS IN VANCOUVER



Ray Tomalty is the co-author of *America's Urban Future: Lessons from North of the Border*, which draw lessons from Canada's urban policy successes to offer ways to revitalize US cities and suburbs.

This month, the Olympic torch relay began in Brasília. After leaving the capital, the torch will visit more than 300 Brazilian cities and as it winds its way to Rio de Janeiro, gradually shift the nation's attention from its political and economic troubles onto its Olympic hopes. The 2016 Summer Olympics in Rio de Janeiro will give Brazilians 16 days to prove their athletic and organizational mettle, but many are hoping the massive public investment and world attention occasioned by the games will bring lasting economic and social benefits well beyond the closing ceremonies.

Although all host cities of major international sporting events hope their games will bring lasting benefits, not all have succeeded. While the 2008 Summer Olympics in Beijing brought accolades for the architectural icons built for the games, long term reuse of the facilities was not a high priority for planning officials. As a result, the billions of dollars invested in the world's biggest sporting event left little of permanent importance. A similar story can be told of the 2014 Winter games in Sochi, where much of the \$50 billion spent on the Olympic build-up has now been all but abandoned.

Not all Olympic events have been followed by such unpleasant hangovers. Some, like the 2010 Winter Games hosted by Vancouver and Whistler in British Columbia, have made concerted efforts to repurpose infrastructure and leave a lasting legacy of sporting facilities, housing, and public infrastructure. Moreover, the Vancouver experience shows that that you can turn even relatively modest investments to lasting advantage: A total of \$6 billion was spent between all three levels of government (federal, provincial, and municipal) to deliver the the 2010 Olympic Winter Games in Vancouver and Whistler, including the direct costs of Olympic facilities and the indirect costs associated with supporting infrastructure.

Mindful of mistakes by previous host nations, the Vancouver Organizing Committee set aside a \$110 million legacy fund to ensure that public investment in the games would continue to pay dividends well beyond the games themselves. The trust fund is being used to sustain Olympic facilities indefinitely after the games. As a result, six years after the Olympics left town, these venues are in good shape, being actively used, and contributing to the vitality of the communities around them.

The Pacific Coliseum, which housed the figure skating and short-track speedskating events in 2010, is home to the Western Hockey League's Vancouver Giants and also hosts dozens of concerts and other events annually. The Richmond Speedskating Oval attracts more than 700,000 visitors a year by hosting a variety of championship events. The Vancouver Olympic/Paralympic Centre was built to host curling events at the games and now serves as a community centre with with ice hockey and curling rinks.



The Richmond Oval. Photo Credit: adrian8_8 via Flickr

The Whistler Sliding Sports Center has become a training hub for luge, bobsled, and skeleton. The Whistler Olympic park, which was used to host the Nordic events in 2010, today offers 130 kilometers of picturesque ski and snowshoe trails, along with biathlon, ski-jumping, tobogganing, and baseboarding facilities. The Whistler Athletes' Centre has transformed into a high performance training and accommodation facility for all levels of sport, educational groups, as well as art and culture organizations.

Another major legacy of the Vancouver Olympics is the Olympic Village, a mixed-use complex costing nearly \$1 billion that housed athletes during the 2010 games. The village was built in an abandoned industrial area mostly covered in parking lots, at the southeast corner of False Creek near the Olympic Village SkyTrain station. The private developer went under in the real estate meltdown of 2008-2010, but the project was taken over by the City of Vancouver and completed in time for the Olympics. The LEED-Gold certified project has 1,100 living units, of which almost one-third are designated as affordable rental or ownership. The development triggered further investment and is now at the hub of a vibrant mixed-use district, expected to reach a population of 20,000 by 2020.

When planning for the 2010 Olympic Games began, the Sea Salt Processing Building was one of the last buildings still standing from the industrial era along southeast False Creek. The abandoned factory was purchased by the Vancouver Organizing Committee and transformed into



The Salt Building: A venue for athletes turned into an eco-friendly and popular watering and eating spot. Photo Credit: Recollective

an entertainment venue for the athletes. Today, the LEED-certified building has been transferred back to the private sector and serves as a popular food destination with a micro-brewery, craft pub, bakery, café and restaurant.

As another result of the 2010 Olympics, seniors across British Columbia are now being provided with much needed affordable living accommodations. Following an agreement between the



Repurposed Olympic Legacy Modular Buildings Providing Housing for Low-Income Seniors. Photo Credit: Modular Building Institute

provincial government and the Vancouver Organizing Committee, 320 modular housing units from the Olympic Village at Whistler are currently being relocated and converted into permanent, affordable apartments in six communities across the province.

Almost half of the total public investment in the 2010 games was for supporting infrastructure like road and transit upgrades. The lion's share of this indirect funding (\$2 billion) went for the Canada Line, a 19.2 kilometres (11.9 mi) rapid transit route linking the Vancouver International Airport with Olympic facilities and the downtown. Although it had been on the planning books for decades, the 2010 Olympics was the catalyst needed for it to hurdle from plan to reality. Although many criticized the investment as politically motivated and said other transit projects would give more bang for the buck, the Canada Line has turned out to be phenomenally successful. Unlike many transportation megaprojects where demand fails to meet rosy projections, actual ridership on the Canada Line is 50 percent higher than anticipated even by the project boosters. Moreover, the line has resulted in a building boom along its axis and around many stations.



The Canada Line at a station in Richmond surrounded by high-density development.
Photo Credit: The Canada Line

The most remarkable makeover is happening in Richmond, a suburb south of Vancouver, which was until recently a bedroom community with a typical suburban landscape of low-density residential precincts, highway-like main streets, large low-rise malls, and sprawling parking lots. City planners went into high gear as soon as the route was announced in 2005. Developers lined up early with projects and kept coming after the 2010 Winter Olympics focused the world's attention on Vancouver. Now, apartment towers cluster around stations and along the elevated track with many more projects in the works. By 2040, Richmond expects to see 30,000 more people living around the line with nary a surface parking lot remaining in sight.

The Vancouver 2010 Olympics were anything but extravagant. No equivalent to the Beijing Bird's Nest or the Montreal Olympic Stadium (the "Big Owe") was built in Vancouver. Nonetheless, the Vancouver Olympics had its fair share of doubters. The Olympic organizers were dogged at every turn by vocal opponents who claimed the games would saddle the province with expensive "white elephants" that would go all but unused after the splash of the Olympics seeped away.



VIOLENCE IN CONSERVATION

A Blatant Travesty



Alan Rabinowitz, one of the world's leading experts on big cats, is the CEO of Panthera, a nonprofit organization devoted to saving wild cat species. He is the author of *An Indomitable Beast*, among many other books and papers.

Recently I was informed by my publisher, Island Press, of a report stating that 2015 was deadliest year on record for environmental activists. Given that over the last three decades I have worked on protected areas and corridors for jaguars and tigers in 11 of the top 15 countries listed in the report, I was asked if I would like to comment on the issue. My first thought was that there was no proper response to such an egregious fact. That anyone should be martyred trying to protect the environment through non-violent means seems a blatant travesty. But then I found myself reflecting on my own career in conservation, recalling dozens of incidences when violence or potential violence threatened my life or well-being simply because I was trying to study and protect wildlife.

In all my years in the jungles of the world, it was never the forest or the wildlife that scared me—never the poisonous snakes with their quick acting toxins, the elephants protecting their young, the hair raising roar of a tiger at night, or the groups of peccaries clacking their long tusks warning me to back off. There was potential danger in the forest, to be sure, but it was always the people that worried me the most – people who feared I was trying to change their way of life or had no understanding of why I was there, soldiers and rangers who didn't want me to see their abuses of power, drug growers, and wildlife poachers.



Rabinowitz and Panthera researchers in the field. Photo Credit: Sharon Guynup

I had my first taste of the less “congenial” side of the conservation world while majoring in wildlife ecology in graduate school. After writing an op-ed in the local paper about how the construction of a controversial dam might cause the extinction of a tiny fish, I received a letter threatening my life along with an obscene caricature depicting myself with the fish. Not long afterwards, while surveying a river for an endangered bat species as part of an Environmental Impact Assessment for another dam project, I was physically attacked by a local farmer who was certain I was out to stop the dam.

In the years that followed, as I traveled to more distant and exotic places to pursue research and conservation, some of my encounters became stranger and more violent than anything I imagined I might experience. While surveying rhinos in the forests of Sabah, Malaysian Borneo, I was charged by a local villager wielding a machete because he thought I was there to remove him from his land. While studying jaguars in Belize, I was cursed by an Obeah man (a form of sorcery), threatened at gunpoint by a hunter from Belize City, and nearly shot while tracking a collared jaguar into a marijuana field. Years later in Thailand, while researching tigers, I had to wrestle and shoot crossbows with indigenous Karen villagers along the Burmese border if I wanted to traverse their lands.



Read more about Alan Rabinowitz’s work to save big cats in *An Indomitable Beast* and his other books.
Photo Credit: Steve Winter/Panthera

In another part of the protected area I was working, while driving a trailbike to check my tiger traps, I landed in a pit trap filled with punji sticks (sharpened bamboo stakes) set by poachers. My left foot was pierced through, fortunately resulting in only minor nerve damage after surgery at a Bangkok hospital. In Myanmar, while setting up what was to become the world’s largest tiger

reserve, I narrowly avoided a shotgun trap set along an opium plantation that I didn't know was there. In Columbia, while putting cameras out to photograph jaguar movements, my team had to consult maps of known minefields that had been placed by FARC rebels.

Suffice it to say, it didn't take long in the field to learn that the world of wildlife conservation was not the calm, joyous escape from human life that I once imagined it would be. And with the ensuing years of my career, as I continued to preserve large wild landscapes with intact populations of apex predators (such as big cats), conservation became harder rather than easier. Loss of habitat and illegal poaching became more rampant and poachers were often more sophisticated and outfitted with better weapons than the forest guards charged with protecting wildlife. Finding lands to protect became more difficult, certain animal parts increased in value, and human rights seemed to always trump any right animals might have to even a tiny piece of the earth. I could see the world becoming more difficult and more dangerous for those who tried to protect what was left.

But despite these stories, the violence I encountered were outliers, while the norm was meeting and living with good people who simply wanted better lives for themselves and their children. From these people, I learned an important lesson: To have a truly wild world as part of the heritage we wish to pass to future generations, wildlife and people have to find ways of living together, both inside and outside the forest. Just as the human world does not stop at the forest edge, neither does the animal world for large, wide-ranging carnivores. These animals need not only inviolate protected areas as their homes, but they need to share the landscape with humans via wildlife corridors. Human behavior is not simply the problem, but also part of the solution. And in the end it is the humans that will determine the fate of most of the other species on earth.



PRESERVATION OF THE NORTH WOODS

“A Vision with Great Foresight”



John Pastor is an ecologist and professor of biology at the University of Minnesota, Duluth, where his teaching and research focus on the natural history and ecology of northern ecosystems. He is the author of *What Should a Clever Moose Eat?*

Unable to gather support from Maine’s congressional delegation, supporters of a North Woods national park are now setting their sights on a new goal: getting President Obama to designate the North Woods as a national monument. We asked John Pastor, an ecologist with 40 years of experience studying the North Woods and author of *What Should a Clever Moose Eat?*, to weigh in on the debate.

The North Woods is a magnificent band of forest, stretching from northern Minnesota to Nova Scotia, and is home to moose, wolves, beaver, bobcat, lynx, loons, and many other iconic northern animals. The North Woods is where the range of sugar maple to the south overlaps the range of balsam fir and spruce to the north. This is the land of fall colors, Christmas trees, and maple syrup.

The beauty of the North Woods has been preserved in many parks, recreation areas, and wilderness areas throughout much of its range. These parks have been kingpins of the economy of the surrounding region. But, as Aldo Leopold said, natural preserves are also “land laboratories” where we can learn how nature works to help us better manage the natural resources outside them. These land laboratories need to be large to encompass the scales of ecological processes such as fires, watersheds, and animal movements, among many others. Many of our ideas in ecology have been shaped by research in the large preserves of the North Woods. How fire controls the dynamics of forests was first documented in the million-acre Boundary Waters Wilderness of northern Minnesota. The long-term research on wolf-moose and moose-vegetation relationships in the 575,000 acre Isle Royale National Park in Lake Superior are classic studies in population and ecosystem dynamics. The concept of a watershed to protect the headwaters of the Hudson River was the basis for the preservation of the six million-acre Adirondack Park in New York.

But east of the Adirondacks, there are few nature preserves of the size needed to understand how this part of the North Woods works. The largest is the 209,000 acre Baxter State Park in Maine, home to Mt. Katahdin at the end of the Appalachian Trail. But now, due to the generosity of the Quimby Family Foundation, an additional 100,000 acres is available for preservation adjacent to Baxter State Park. This is the area Thoreau wrote about in “The Maine Woods.” Together, Baxter State Park and Katahdin Woods will be the largest preserve of North Woods east of the Adirondacks. Discussions are underway for this tract of land to be awarded federal protection as a national monument, recreation area, or perhaps park.



The North Woods. Photo credit: John Pastor

Katahdin Woods and Baxter together will make a valuable land laboratory for learning about the North Woods. This area of Maine differs from the rest of the North Woods in several important respects that will determine how it will respond to climate change, the largest ecological problem facing this biome. There is a strong gradient from wet maritime climate in Maine to a dry continental climate in Minnesota, and it is unlikely that the North Woods will respond to climate change in the same way at both ends of its range. Maine is the center of the range of red spruce, which does not extend much farther west than the Adirondacks, and how red spruce will respond to a warmer climate is currently unknown.

Three hundred thousand acres of natural preserve in the center of Maine's North Woods would greatly enhance our ability to address these and other questions in ecology. As is the case with almost every national park or monument, federal designation for Katahdin Woods is bathed in controversy at the moment. But if we take the long view Aldo Leopold had, the preservation of Katahdin Woods will eventually be hailed as a vision with great foresight.



WANT TO RAISE BACKYARD CHICKENS IN THE NATION'S CAPITAL?

You're out of Cluck



Baylen J. Linnekin, a food lawyer, scholar, and speaker, teaches food law and policy courses at George Mason University and American University, and founded the nonprofit Keep Food Legal. His opinion pieces on food and law have been published by the *Boston Globe*, *New York Post*, *Newsweek*, *Playboy*, *Reason*, *Huffington Post*, and many others. He is the author of *Biting the Hands that Feed Us*.

Washington, DC attorneys Allison Sheedy and Daniel McInnis share their home in the city's Chevy Chase neighborhood with their four children. They share their large yard with Mrs. Tiggy-winkle, Minnie Mouse, India, and Red, their four egg-laying hens. And they share their eggs with neighbors.

Or they did, at least, until Washington, DC, regulators came calling.



Photo credit: woodleywonderworks via Flickr

"Mrs. Tiggy-winkle and her feathered friends have been targeted by the D.C. Department of Health," the Washington Post reported last week. "The health department has declared the chickens contraband—and Sheedy and McInnis, both attorneys, have filed suit against the department and sought a temporary restraining order to keep their birds."

A hearing this week may determine the fate of Mrs. Tiggy-winkle and her fellow egg-layers.

Why did the District declare Mrs. Tiggy-winkle pullum non grata? It turns out that Washington, DC,

rules prohibit keeping a chicken coop within fifty feet of any residence.

Many cities around the country—including Seattle, Salt Lake City, and New York City—have

embraced backyard chickens and urban agriculture in yards of all shapes and sizes. They recognize that a well-maintained chicken coop in a yard, like the one maintained by Sheedy and McInnis and their children, benefits a home and community and poses no more health risks than does keeping a dog or cat.

But many other cities are stuck in reverse. The nonsensical poultry prohibition in the District is exactly the sort of rule that drives the discussion in my forthcoming Island Press book, *Biting*



They're just like cats and dogs, really. Photo credit: normanack via Flickr

the Hands that Feed Us: How Fewer, Smarter Laws Would Make Our Food System More Sustainable. The book reveals countless federal, state, and local rules either that promote unsustainable food practices or that—as in the case of Washington, DC’s chicken rules—prohibit sustainable food practices. In fact, *Biting the Hands that Feed Us* contains an entire chapter on terrible food rules around the country that bar people from gardening, foraging, sharing food with the homeless and less fortunate, and otherwise providing food for themselves, their families, and those in need.

What’s the solution to this mess? As I describe in the book, we must repeal bad rules like these. That doesn’t mean all rules are bad. In the case of backyard chickens, for example, sensible rules are those that embrace egg-laying hens but that ban roosters—loud male chickens that

don't lay eggs, and which are nothing more than nuisances in an urban environment.

In the end, rules that prevent people from embracing more sustainable food practices aren't keeping us safe or making us better off. Rather, they're what's biting the hands that feed us.



ELECTION 2016

If Island Press Authors Advised the President

In honor of the first presidential debate tonight between Hillary Clinton and Donald Trump, we asked Island Press authors: “If you were advisor to the president, what would your top priority be and why?” Check out their answers, in their own words, below.



Dan Fagin, author of *Toms River*

I'd urge the President to act on every possible opportunity to reduce the influence of money in the political process, because until that happens it will be increasingly difficult to make progress on anything else.



John Fleck, author of *Water is for Fighting Over*

Maintaining and extending the collaborative relationship with the Republic of Mexico over the shared waters of the Colorado River should be a sustained priority. The 2012 agreement known as “Minute 319”, signed in 2012, included important water sharing provisions and for the first time allowed water to be returned to the desiccated Colorado River for the environment and the communities of Mexico. The deal was an important milestone, but it was only a temporary agreement. We need permanent solutions to the overuse of the Colorado River, and sustaining our partnership with Mexico is a critical piece.



Baylen Linnekin, author of *Biting the Hands that Feed Us*

Ending farm subsidies and other protection/promotion of food crops.
Embracing GMO neutrality.
Ending federal support for state unpasteurized (raw) milk bans.

Reining in the FDA.

Ending the federal ban on sales of locally slaughtered meat.

Ending federal policies that promote food waste.

Improving food safety and choice by requiring good outcomes, rather than mandating specific processes.

Ending the federal ban on distilling spirits at home.

Deregulating the cultivation of hemp.



Alan Kolok, author of *Modern Poisons*

My advice to a presidential candidate would be to recall the words of Neil DeGrasse Tyson, “The good thing about science is that its true whether or not you believe in it.” Natural forces are at work that will have adverse consequences, many of which are diametrically opposed to our national interests. Global climate change, the spread of vector borne diseases, and the rampant overuse of nonrenewable and renewable resources are just three such forces currently in play. The decisions that you make during your tenure will be pivotal relative to the health and well-being of our citizens, as well as the citizens of the world. Recognize the fact that you are governing, just as Lincoln did, during a period of history that will resonate for centuries to come. Make wise environmental decisions even if they are not necessarily politically advantageous. Our futures depend upon it.



Rob McDonald, author of *Conservation for Cities*

Iwould urge the President to take strong action to pass climate change legislation in Congress. The form that climate change legislation would take would depend on the politics, but it is imperative that the U.S. begins to lead the world to action on climate change. Climate change isn’t even my own professional issue of focus (I would love to talk to the President about how to make our cities more resilient, green, and livable), but it seems to me clearly the crisis issue. Every major scientific study that is coming out is pointing toward serious consequences of climate change, happening now. Rather than thinking about climate change that will impact my kids’ lives, I am realizing it will deeply impact my own as well.



Charles Eley, author of *Design Professional's Guide to Zero Net Energy Buildings*

If I had a chance to sit face-to-face with the winning candidate, my advice would be something like: Think about the welfare of our grandchildren when you make decisions on energy and environmental issues. Consider not just the short-term impacts but the long-term consequences of sea-level rise, extreme weather events, droughts, and loss of agricultural land. Set an example for reducing carbon emissions based on energy efficiency and renewable energy that can serve as a model for developing countries. Listen to our climate scientists and heed their warnings. Trust their advice on global warming in the same way you trust the advice of your physician with regard to your personal health.



Robert Keiter, author of *To Conserve Unimpaired*

Given the evident impact of rampant development pressures and climate change on our nation’s wildlife populations and diverse ecosystems, I urge the next President to endorse and promote a strong federal leadership role in collaborative landscape-scale planning efforts among federal, state, tribal, and private landowners in order to ensure that our natural heritage is conserved for present and future generations.



Yoram Bauman, author of *Cartoon Introduction to Climate Change*

I would push for the next President to try again (yes, again!) to work on bipartisan climate action, perhaps with a revenue-neutral carbon tax like the Initiative 732 campaign that I'm a part of in Washington State. We're proud to have endorsements from three Republicans in the state legislature as well as from a bunch of Democrats. The short-sighted opposition from some left-wing groups (including some mainstream 'environmental' groups) highlights the risk of making climate change a partisan wedge issue for electing Democrats instead of an existential issue for all Americans. We need to try harder to build a big tent for lasting climate action, and that's one reason I'm so fond of the quote at the end of this *NYT* story (about the failed attempt by enviros to win control of the Washington State legislature for the Democrats in Nov 2014): 'The most important thing is to normalize this issue [climate change] with Republicans,' said Mark Mellman, a Democratic strategist. Anything that makes it more partisan makes it less likely that there will be legislation, until such time as Democrats take over the world. Which, according to my watch, will not be happening anytime soon.



Charles Wolfe, author of *Seeing the Better City*

I would urge the President to reassert cross-departmental efforts such as the Partnership for Sustainable Communities to further empower local governments and constituents to meet ongoing challenges of urban development, because those challenges of land use, transportation, affordability will not be entirely met by private market solutions. I would also advise that the new administration investigate further centralizing resources relevant to urban areas, and evaluate (as was once proposed by Richard Florida) a new cabinet-level position focused on cities and rapidly urbanizing areas. Finally, I would suggest to the President that the federal government should lead by example by illustrating methods to elevate civic dialogue, including program development and funding to encourage individuals to obtain firsthand knowledge of the cities around them through careful observation and input into urban political and regulatory processes.



Robert Engelman, author of *More: Population, Nature, and What Women Want*

Challenging as this will be even to try, much less accomplish, the next President should work to return a spirit of compromise and cooperation to the American political conversation. On the current course, no real progress toward environmental or social sustainability is possible. The impacts of climate change and demographic pressure are now becoming obvious to people of all political persuasions. Growing awareness may eventually offer room for fresh policy ideas: a carbon tax with proceeds turned into dividends and a universal basic income for all citizens, access for all to comprehensive sexuality education and reproductive health services, and humane and sustainable migration law.



Charles Chester, author of *Climate and Conservation*

As much as climate change will affect the United States, we likely have the capacity to adapt more effectively than most other countries—at least in terms of human welfare. At the same time, US demand for foreign goods and services is not going away; I, for one, don't care what you say about the damn environment—I'm having my morning cup of tea or coffee come hell or high water (the latter an increasingly distinct possibility). If my personal recalcitrance is at all reflective of our national attitude, we nonetheless ought to be striving for a broadly-defined international stance that fully and coherently accounts for climate change. Specifically, in a world where the actions of our friends and our enemies will be increasingly defined by surging resource constraints (as well as 'releases'—think Arctic oil...), our next President should focus on integrating foreign aid, fair trade, free trade, and military/security policy in a way that anticipates the incoming tsunami of threats—and opportunities—posed by climate chaos.



Lucy Moore, author of *Common Ground on Hostile Turf*

You could have knocked me over with a feather when I read Glenn Beck's recent commentary in the *New York Times*. 'The only way for our society to work is for each of us to respect the views of others, and even try to understand and empathize with one another,' he wrote. He took the words right out of my mouth. And so, Glenn and I urge the next President to do exactly that, reach across the aisle, connect with the great diversity of people and views in this country, and with respect and empathy seek to understand.



Julianne Lutz Warren, Plain member of the U.S. and Earth, and author of *Aldo Leopold's Odyssey*

Dear Future POTUS,
The U.S. must be consumed with the urgent goal of retooling the energy infrastructure of our country and the world. Cooperatively mobilizing with other nations, our government—we, the people—must immediately, using all just and complementary means at our disposal—e.g., directives, incentives, and disincentives—close down fossil fuel operations and facilitate replacing coal, oil, and gas dependencies with cradle-to-cradle manufacture and ecologically and socially sensitive installation of ready, climate-responsible technologies, including locally scaled wind turbines, geothermal plants, and solar panels.

No less urgently, as a globally-responsible facilitator, the U.S.—members of all administrative branches together with the citizenry who have chosen them—must, with forthright honesty and transparency, support a matured narrative of progress that is alluring across political spectrums. This story must redefine power to integrate economic prosperity with other commonly held values—such as equality, justice, democratic liberty, and skillful love for land that interpenetrates with human health and flourishing. It must recall people to ourselves and each other not as mere individual consumers, but as diverse, empowered, capably caring members—across generations—of families, neighborhoods, and of the whole ecosphere of interdependencies—bedrock to sunlight—the source of Earth's life.



Michael Murphy, author of *Landscape Architecture Theory, Second Edition*

In general terms, I believe the wealth of the nation lies in two areas: natural resources and human resources. As a matter of national defense priority, these areas require policy attention at the national level. Attending to these issues requires commitment and collaboration among all political, ethnic, religious and socio-economic affiliations—it is time for the adults to take charge. In particular, it will be necessary to harness their combined strengths in a public and private partnership initiative. An outline of my top priorities topics includes the following:

Natural Resources/Climate Change:

- Clean energy and carbon reduction
- Ecosystem and land management
- Coastal and interior infrastructure protection
- Water resources
- Agriculture

Human Resources:

- Science and technology
- Public primary and secondary education

Public health:

- Immigration reform
- Terrorism
- Social equity and income equality



DESIGNING YOUR OWN LANDSCAPE

Tips from Margie Ruddick



Margie Ruddick, principal of Margie Ruddick Landscape and author of *Wild By Design*, has designed numerous high-profile projects including New York City's Queens Plaza, Shillim Institute and Retreat in India, and the Living Water Park in Chengdu, China. She has taught at Harvard's Graduate School of Design, Yale, Princeton, Parsons School of Design, and more, and has received extensive recognition for her contributions to landscape design, including the Cooper Hewitt National Design Award.

Many years ago, when I was first pegged as a “sustainable landscape designer,” I gave a talk to a group of students enrolled in one of the world's first sustainable design courses at Schumacher College in England. I was surprised during the question-and-answer period that almost all the students' questions were not about their work, but revolved around how they could address issues of sustainability in their personal lives. How they could conserve energy and water in their households, for example—it was these questions that started me on the path to writing and publishing my book, *Wild by Design*, which lays out principles for achieving sustainable and life-enhancing landscapes.

The most frequent questions I get from homeowners are about pests—how to discourage mosquitoes, for example; how to encourage pollinators; and how to manage storm water. Here are some basic ideas. I hope others will add to these ideas, and maybe create more of an open source manual to help people who want to design their own landscapes in ways that are more sustainable.

Mosquitos

Animals (more properly, creatures), aromas, and aridity. Small ponds with fish can reduce the load of larvae that become mosquitoes. This is an uphill battle, requiring vigilance in terms of pond management to keep populations of fish up. Similarly, bat houses can attract mosquito-eating species, but there are many requirements for

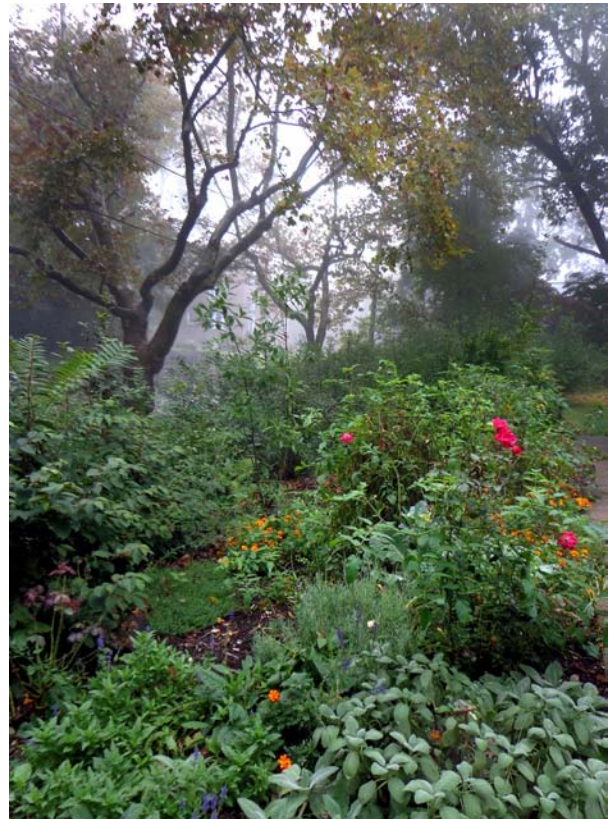


Photo credit: Margie Ruddick

shade, mounted on a tree trunk, for example—are not successful. There are many online guides to building ponds and placing bat houses to discourage mosquito breeding. Removing standing water helps—remembering that roof gutters and sometimes even big-leafed plants can hold water long enough for mosquitoes to breed and hatch. There are also methods of introducing the kind of pungent aromas that mosquitoes hate—from planting marigolds, catnip, or beebalm, to spraying plants with a garlicky (but expensive and obnoxious-smelling to humans) cocktail—that have worked for me. The trick to reducing mosquitoes is constant work.

Encouraging Pollinators

There is a real science to knowing how to encourage pollinators, including not just knowing which native species to attract but understanding their nesting habits, etc. There are many guides online for encouraging bees and other pollinating species; one rule of thumb is to avoid cultivars of any sort, but even this is not a hard and fast rule. Cultivars are often hybrids that do not produce the exact pollen of the original. This is really disappointing to people who love certain cultivars, want showier flowers, longer bloom time. There are, however, cultivars that will breed true. The trick to encouraging pollinators is in doing your research.



A hybrid cultivar, *Leucospermum glabrum* × *L. tottum*. Credit: Flying Freddy, via Wikimedia Commons

Storm Water

This is perhaps the easiest problem to address, with the rule of thumb being broad and shallow versus narrow and deep. Letting rain water out into the garden rather than piping it away is easy to do if you have enough land. Avoid narrower and deeper channels, which are more likely to cause erosion and degradation of the whole system. Instead, create gentler bioswales with taller meadow plants, shrubs, or tree, which can disperse more water over a bigger area, allowing the roots to absorb more water and reducing the amount of runoff downstream. The trick to integrating sustainable storm-water management into your landscape without just problem-solving is multi-layered design.

I do not mean to imply that it is only constant work that will repel mosquitos, nor is it only research that will help a homeowner encourage pollinators, nor is it just design that will manage storm



Margie Ruddick home garden. Credit: Margie Ruddick

water sustainably. What makes the landscape feel cohesive, and makes all of these components work together, is good design. Just problem-solving—a pond here, native plants everywhere, a swale there—can result in piecemeal design. Including features such as ponds, selecting plants that will breed true, and integrating storm-water dispersal and ground-water recharge—to make it all work together, feel inevitable and of a piece, takes practice, not just in designing on paper but in actually constructing the landscape. One of the most important lessons I think we ever learn in

landscape is that the last phase of work, the actual construction, is one of the most critical design phases. The decisions that we make in this last phase are generally based on our eye—how things look going into the ground—but it's also a time to implement design to solve problems like pests. Ultimately, it's in this phase that we can make the difference between a place that looks as if it was built yesterday, and a functional place that feels as if it has been there forever.



PETER NEWMAN'S RESILIENT CITIES

The Sustainable Transport City



Peter Newman is the Professor of Sustainability at Curtin University and Director of CUSP. Newman has served on the Board of Infrastructure Australia and a Lead Author for Transport on the IPCC's 5th Assessment Report. He is the author of *People Cities*, *The End of Automobile Dependence*, and others.

The agenda for cities of the future is to have more sustainable transport options available so that a city can indeed reduce its traffic whilst reducing its greenhouse gases 50 percent by 2050 (the global agenda set through the International Panel on Climate Change). For many cities the reduction of car use is not yet on the agenda apart from seeing it as an obviously good thing to do. Unfortunately for most cities, traffic growth has been continuous and appears to be unstoppable. To reduce a city's ecological footprint and enhance the liveability of the city, it will be necessary to manage the growth of cars and trucks and their associated fossil fuel consumption.

The variations in private transport fuel use across 84 cities shows that there is a very large difference in how cities use cars and petroleum fuels. Through a number of studies it has been shown that these variations have little to do with climate, culture or politics, and even income is very poorly correlated, but they have a lot to do with the physical planning decisions that are made in those cities—see especially our *Sustainability and Cities*. There is debate about the relative importance of urban planning parameters though within the profession there is increasing awareness that sustainable transport will only happen if there is an emphasis on urban form and density; infrastructure priorities, especially the relative commitment to public transport compared to cars; and, street planning, especially the provision for pedestrians and cyclists as part of sustainable mobility management

Urban Form and Density Planning

The density of a city determines how close to urban activities most people can be. Very high density city centres mean that most destinations can be reached with a short walk or they can have highly effective public transport opportunities due to the concentration of people near stations. If densities are reduced but are focussed along corridors, it is still feasible to have a good transit system. If, however, low densities are the dominant feature of a city, then most activity needs to be based around cars as they alone can enable people to reach their destinations in a reasonable time. Public transport finds it hard to be competitive as there are just not enough people to justify reasonable services. Most low density cities are now trying to increase their densities to reduce their car dependence.



The view of New York City's skyline from the Empire State building. New York City was named one of the most walkable metropolitans in the U.S. by George Washington University due to its high density. Photo credit: Aurelien Guichard via Flickr.

Density is a major tool available to planners in cities. It is best used where a city has good transit or wants to build transit as the resulting Transit Oriented Developments (TODs) are found to reduce car use per capita among its residents by half and to save households around 20 percent of their household income as they have on average one less car (often none). TODs are thus an affordable housing strategy as well. In the U.S., according to a 2007 study by Reid Ewing, "shifting 60 percent of new growth to compact patterns would save 85 million metric tons of CO₂ annually by 2030." TODs reduce ecological footprint in cities and undermine the kind of car-based sprawl that eats into the green agenda of cities. Thus this strategy of TODs can enable a city to put in place a clear urban growth boundary and to build a green wall for agriculture, recreation, biodiversity, and the other natural systems of the green agenda. Cairo's green belt is one attempt to do this.

If cities are dense, as in many developing cities, but they do not have adequate public transport and they allow too much traffic to develop in their streets, then they can easily develop dysfunctional transport systems. However, their density will always enable them to provide viable public transport solutions if they invest in them, whereas low density cities are always struggling to provide any other options. High density means easier non-car based access, but it can also mean much greater congestion whenever vehicles are used. If the vehicles in these confined spaces are poorly maintained diesel engines, then very serious air pollution can result so cities need to be very serious about managing the source of such emissions.

Infrastructure Priorities-Especially Transit Planning

The relative speed of transit-to-traffic measures how effective public transport is in competing with the car. The best European and Asian cities for transit have the highest ratio of transit-to-traffic speeds and have achieved this invariably with fast rail systems. Rail systems are faster in every city in the

sample by 10-20 kph over bus systems that rarely average over 20-25 kph. Busways can be quicker than traffic in car-saturated cities but in lower density car-dependent cities it is important to use the extra speed of rail to establish an advantage over cars in traffic. This is one of the key reasons why railways are being built in over 100 US cities, and in many other cities, modern rail is now seen as the solution for reversing the trend to the private car. The trend to electric urban rail is now called a Global Megatrend. Rail is also important as it has a density-inducing effect around stations which can help to provide the focused centres so critical to overcoming car dependence and they are electric which reduces oil vulnerability.

Many cities in the world are unable to make transit politics work effectively. While major US cities such as New York and Chicago are dense and walkable, and their mayors have been lauded for their green plans and for signing onto the Mayor's Climate Change Initiative, the mass transit systems for these cities continue to experience budget cuts. The city of Seattle, whose mayor is credited with initiating the US Mayor's Climate Change Initiative, has struggled to implement any type of rail system. And while the State of California is a global leader on some state initiatives, it has not yet developed a plan for how its heavy oil-using cities will wean themselves off their cars.

Yet across the world cities are building modern electric rail systems at vastly increasing rates as they solve the simultaneous problems of fuel security, decarbonising the economy for climate change, reducing traffic congestion sustainably, and creating productive city centres. The trend to fast electric rail in cities is now being called a mega trend. Chinese cities have moved from their road-building phase to building fast modern rail across the nation. China is committed to building 120,000 km of new rail by 2020. Investment will rise from 155 billion Yuan (US\$22b) per year in 2006 to 1000 billion per year by 2009 (US\$143b), with around 6 million jobs involved; the projects are part of their response to the economic downturn. Beijing now has the world's biggest Metro.

In Delhi, the city has built a modern electric metro rail system which has developed considerable pride in their community and belief in their future. The 250km rail system is being built in various stages and will enable 60 percent of the city to be within 15 minutes walking distance of a station.

In Perth, Australia, a 172 km modern electric rail system has been built over the past 20 years with stunning success in terms of patronage and the development of TODs; the newest section runs 80 kms to the south and has attracted 50,000 passengers a day where the bus system carried just 14,000 a day – the difference is that the train has a top speed of 130 kph and averages 90 kph so the trip takes just 48 minutes instead of over an hour by car. London, especially with its congestion tax which is recycled into the transit system, and Paris have both shown European leadership in managing the car.

While greening buildings, looking to renewable fuel sources, and creating more walkable communities are critical pieces of the sustainable city, investing in viable, accessible transit systems for cities is the most important component for them to become resilient to waning oil sources and in minimizing the impact of urban areas on climate change. Transit does not only save oil, but it also helps restructure a city so that it can begin the exponential reduction in oil and car use so necessary for the future.

The opportunities for making major changes in a city if quality transit is a priority can be imagined, but their extent is often not seen to be more than a mere slowing of traffic growth. We suggest it is possible to imagine an exponential decline in car use in cities that could lead to 50

percent less passenger kms driven in cars. The key mechanism is a quantitative leap in the quality of public transport whilst fuel prices continue to climb, accompanied by an associated change in land use patterns. This is due to a phenomenon called Transit Leverage whereby one pass km of transit use replaces between three and seven pass kms in a car due to more direct travel (especially in trains), trip chaining (doing various other things like shopping or service visits associated with a commute), giving up one car in a household (a common occurrence that reduces many solo trips), and eventually changes in where people live as they prefer to live or work nearer transit.

Street Planning and Mobility Management

If cities build freeways then car dependence quickly follows. This is because the extra speed of freeways means that the city can quickly spread outwards into lower density land uses as the freeway rapidly becomes the preferred option. If, on the other hand, a city does not build freeways but prefers to emphasise transit, it can enable its streets to become an important part of the sustainable transport system. Streets can be designed to favour pedestrians and cyclists and wherever this is done, cities invariably become surprised at how much more attractive and business-friendly it becomes – see the many projects and publications from Jan Gehl.

Sustainable mobility management is about "streets not roads," whereby the streets are used for a multiplicity of purposes, not just maximising vehicle flow. The emphasis is on achieving efficiency by maximising people movement, not car movement, and on achieving a high level of amenity and safety for all street users. This policy also picks up on the concept of integration of transport facilities as public space. One of the ways that US and European cities are approaching this is through what are called 'Complete Streets' or in the UK 'Naked Streets.' This new movement aims to create streets where mobility is managed to favour public transport, walking and cycling in streets as well as traffic which is reduced in capacity somewhat, mainly through reduced speed. The policy often includes removing all large signs for drivers which means they automatically slow down; in Kensington High Road in London the traffic accident rate has halved.

Building freeways helps neither the brown agenda nor the green agenda. It will not help a city save fuel as each lane rapidly fills leading to similar levels of congestion that were found before the road was built. Indeed, studies have shown that there is little benefit for cities when they build freeways in terms of congestion and as that is the main reason for building them it does seem a waste. Data from Texas Transportation Institute shows there is no overall correlation between delay per driver and the number of lanes of major roads built per head of population for the 20 biggest cities in the USA.

Thus, for urban planners the choices for a more sustainable city are quite stark, though politically they are much harder as the allure of building more road capacity remains very high. Many cities that have confronted the provision of a freeway have been global leaders in this move towards more sustainable transportation. In Copenhagen and Zurich, in Portland, Vancouver, and Toronto, all had to face the cathartic experience of a controversial freeway. After a political confrontation the freeway options were dropped. They decided instead to provide other greener options and hence the building of light rail lines, cycleways, traffic calming, and associated urban villages began to occur. All these cities had citizen groups that pushed visions for a different, less car-oriented city and a political process was worked through to achieve their innovations. Similar movements are active in Australia.

Freeways have blighted the centres of many cities and today there are cities that are trying to remove them. San Francisco removed the Embarcadero Freeway from its blighted waterfront district in the 1990's after the Loma Prieta earthquake. It took three ballots before consensus was reached but the

freeway has been rebuilt as a friendlier tree-lined boulevard involving pedestrian and cycle spaces. As in all cases where traffic capacity is reduced, the city has not found it difficult to ensure adequate transport as most of the traffic just disappears. Regeneration of the land uses in the area has followed this change of transportation philosophy.

Seoul in Korea has removed a large freeway from its centre that had been built over a major river. The freeway had become controversial because of its blighting impacts on the built environment as well as the river. After a mayoral contest where the vision for a different kind of city was tested politically the newly elected mayor began a five year program that saw:

- The freeway dismantled
- The start of a rehabilitation process for the river
- The restoration of an historical bridge over the river
- The restoration and rehabilitation of the river foreshores as a public park
- The restoration of adjacent buildings
- The extension of the underground rail system to help replace the traffic

The project has been very symbolic for the city as the river was a spiritual source of life for the city. Now other car-saturated Asian cities are planning to replace their central city freeways.

What these projects have shown is that we should, as David Burwell from People for Public Spaces says 'think of transportation as public space.' Freeways thus, from this perspective, become very unfriendly solutions as they are not good public spaces. However, boulevards with space for cars, cyclists, pedestrians, a busway, or LRT, all packaged in good design and with associated land uses that creates attractions for everyone – these are the gathering spaces that make green cities good cities. In the UK, the Demos Institute has shown how public transport helps create good public spaces that help define a city. The change of awareness amongst traffic engineers of this new paradigm for transportation planning is gathering momentum. Andy Wiley-Schwartz says that "road engineers are realising that they are in the community development business and not just in the facilities development business." He calls this the 'slow road' movement. In essence it means that urban planners are asserting their role over traffic engineers or at least making an integrated approach rather than one that reduces city function down to vehicle movement.

With this changed approach to city planning, the small scale systems of pedestrian movement and cycling become much more important. Pedestrian strategies enable each centre in a city to be given priority to the most fundamental of human interactions, the walking-based face-to-face contact, that gives human life to a city and in the process reduces ecological footprint.

Cycle strategies can go across the city with greenways that improve the green agenda as well as lowering energy use. Enough demonstrations now exist to show that pedestrian strategies and bicycle strategies work dramatically to improve city economies and to help create a Resilient City. The work of Jan Gehl in Copenhagen followed by pedestrian strategies in all Australian cities, London, New York, and San Francisco, the work of Enrique Penelosa in Bogota, the dramatic changes in Paris with the Velib bicycle scheme, and the growing awareness that it works in developing cities as well, are all testament to this new approach to cities.





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