



# DOT EARTH

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February 25, 2008, 9:21 pm

## Our Exhausted Oceans

By Andrew C. Revkin



Heaps of abalone shells in Santa Barbara, Calif., from a 1920 postcard. (Census of Marine Life)

I've written off and on about research revealing that [ocean resources today are a pale shadow](#) of the extraordinary abundance of just a few generations ago, and I touch on

this theme again in a [Science Times feature](#) this week on new maps of human impacts on the sea.

Societies tend to have “[ocean amnesia](#),” in the words of some scientists and campaigners who’ve highlighted the recent, and largely unnoticed, vanishing of marine life. Daniel Pauly of the University of British Columbia coined the phrase “shifting baselines” to describe how our definition of “normal” changes over time.

Several studies of the Gulf of California have vividly illustrated the phenomenon. A [2005 paper](#) charted changing impressions of fish abundance through three generations of Mexican fishers, finding that “old fishers named five times as many species and four times as many fishing sites as once being abundant/productive.”

For a 2006 paper in the journal [Fish and Fisheries](#), the same team estimated marine abundance in the same region by combing diaries and other written records from the 16th to the 19th century.

“The diaries written by conquerors, pirates, missionaries and naturalists described a place in which whales were ‘innumerable,’ turtles were ‘covering the sea’ and large fish were so abundant that they could be taken by hand,” the scientists said.

When I went fishing off Long Island with the marine biologist and author Carl Safina in 2006 ([video here](#), [article here](#)), we had no problem reeling in fluke and bluefish in the right spots. But a century earlier, the right spot could have been just about anywhere.

The right spots for Pacific abalone along the West Coast are now few and far between. In 1920, as you can see on the postcard above (provided by scientists working on the [Census of Marine Life](#)), they were abundant.

A growing body of research shows that significant increases in fish populations could come with the expansion of [marine reserves](#), more careful oversight of shared ocean resources like [bluefin tuna](#), and education of fishing communities around coral reefs.

But the pressures on marine fisheries appear to be mounting faster than the push for new practices to shift to more sustainable harvests.

As the human species heads toward 9 billion in the next few decades, with a tendency to eat up the food chain as prosperity rises, is there any prospect of sustaining yields of seafood, whether wild-caught or farmed?

Jesse Ausubel of Rockefeller University told me he was worried, for example, about

the “democratization of sushi” as a growing source of pressure on tuna and other coveted species.

Views diverge sharply on how to keep oceans productive and at least somewhat wild.

Many environmental groups strongly oppose expanded marine aquaculture and, at the same time, are pushing for a vast expansion of protected areas, both to shield ecosystems and to provide nurseries for commercial fish.

Scientists seem divided, with some supporting the idea of concentrated husbandry of high-value species (tuna, salmon) and others warning of indirect harm from the equivalent of factory farming of the sea.

Sylvia Earle, the oceanographer and explorer, sees no future for wild harvests, given rising human populations and their growing appetite for protein.

“One way or another, commercial fishing as a way of life does not have a future, any more than market hunting of terrestrial birds and furry creatures,” she said in an e-mail message on Monday, just after returning from the Galápagos. “Our long-ago ancestors lived by hunting and gathering wild things, a recipe for success that worked when our numbers were small and the wild world was relatively intact. Six billion people cannot be sustained on bush meat from the land — or from the sea.”





If you’re a seafood lover, where do you expect your yellowtail or fried clams will come from a couple of decades from now?

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25 comments so far...

1. February  
25th,  
2008  
9:33 pm

Sushi do, sushi don't. Given that 70 percent of the Earth's surface is water, salted and fresh (sic), your headline says it all: "our EXHAUSTED oceans."

Yes, "ocean fatigue". It's setting in.

I especially liked Jesse Ausubel's "democratization of sushi" remark. I wonder what the sushi think about that? Oh, I forgot, sushi can't talk!

— Posted by danny bloom

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2. February  
25th,  
2008  
9:42 pm

Ocean map showed that only 4% ocean did not touched by human being. Now we have 6.6 billion people, if the population is up to 9 billion, there will be no ocean which do not touched by human being. Over population make people to explore more and more resource to satisfy them, ocean and land resource. If keep population growth as usual, there will be no resource to feed people. People want to live so that they will destroy the ecosystem more. Because over population human will lose beautiful ocean environment, all the resource of earth will be digged by people. Over population is the root cause of losing balance of ecosystem. In order to keep our ecosystem and left resource for our next generation, we have to control the population!!

— Posted by Wang Suya

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3. February  
25th,  
2008  
10:44 pm

If there's even the slightest possibility that we can maintain and enhance various fish populations effectively, then the requisite research and education need to be fully supported. Fish Banks, a simulation game that has been around since the mid 90's, ([http://www.sustainabilityinstitute.org/tools\\_resources/games.html](http://www.sustainabilityinstitute.org/tools_resources/games.html))

is a fabulous tool for teaching all sorts of groups what's involved in avoiding a Tragedy of Commons scenario. Players learn what happens to fish populations when competing teams try to earn as much \$ as possible. Unless teams learn to negotiate with one another and set limits, they will all lose because there won't be any fish left. I played Fish Banks for the first time this year with my high school students and they were so thoroughly engaged, they were practically

screaming when the bell rang at the end of the class period...no one wanted to leave. Most importantly, they had a visceral understanding of what's at stake when we put personal greed ahead of working together to protect our resources.

We can't ignore the doom and gloom data but I don't think we should let it immobilize us.

**[ANDY REVKIN says: I'll go play it right now! Thanks for posting the link, Donna.]**

— Posted by Donna Light-Donovan

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4. February  
25th,  
2008  
10:56 pm

Rush Limbaugh, in 2004, on CHEERS star Ted Danson, who, in the 1980s, that 'our oceans are dying':

"The story hasn't changed in 20 years, folks. I remember when I started this program in 1988, the great Ted Danson, a well-known scientist — he also dabbled in television; you may remember a show called Cheers — but he was primarily a great ocean researcher, and I remember in 1988, Ted Danson announcing that if we didn't clean up the oceans in 10 years — and that was '98 — so six years ago, the oceans were to die and along with the oceans dying, so were we. You know, in some places, the oceans are nine, ten thousand feet deep, even deeper than that. Have you ever given thought to polluting something 10,000 feet deep — from a cruise ship? Do you know that the ocean eats oil alive? Do you know that oil seeps through the floor of the ocean but it never reaches the surface, because it gets destroyed because the seawater is pretty powerful stuff. It will kill you if you're in it too long, one way or the other. It will dehydrate you or what have you and we didn't create that. Yeah, we need a whole lot of Morton's to go out there and salt the oceans in case they lose their salt. This stuff is just so absurd!"

— Posted by Sanjong Thapa

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5. February  
25th,  
2008  
11:55 pm

There's fishing done wrong and fishing done right. Done right, we can have rich fisheries for wild fish far into the future.

The same holds for fish farming, done right it can boost seafood production and do little harm to oceans and wild fish.

The question is whether we have the political will to do fishing and fish farming right. I'm an ocean conservationist and an optimist and I think we can do it right.

Progress is evident in building shared investment in a better ocean future. Gulf of Mexico red snapper is on the road to recovery, after decades of serious overfishing, thanks to the work of Ocean Conservancy and others.

Mega-retailer Wal-mart is working to increase the supply of sustainable seafood, because they want to sell it to all of us.

Balancing our hunger for seafood with a finite ocean is possible if we truly invest in finding solutions, and reward the right kind of innovations. I've participated in pilot projects of this type, and they work.

I write about these subjects at blogfish <http://blogfishx.blogspot.com/> if you would like to read more.

Mark Powell  
Vice President, Fish Conservation  
Ocean Conservancy

— Posted by Mark Powell

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6. February 26th, 2008 12:42 am

yes, the oceans are exhausted. considering that much of the world's population lives by the coasts and relies directly on the oceans for their nourishment, what better evidence could there be that our exploding numbers are likely in for a rude shock. nutritionally speaking. soon.

— Posted by sas

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7. February 26th, 2008 12:55 am

Every time you write or talk to a politician ask them when they're going to implement the recommendations of the Presidential Commission on Oceans Policy chaired by former CNO Admiral Watkins. We're running out of time.

<http://www.oceancommission.gov/>  
<http://ocean.ceq.gov/about/welcome.html>  
[http://en.wikipedia.org/wiki/United\\_States\\_Commission\\_o](http://en.wikipedia.org/wiki/United_States_Commission_o)

## [n\\_Ocean\\_Policy](#)

— Posted by Johnny E

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8. February 26th, 2008 1:00 am

How do you propose controlling the population? Starvation, Death Camps, Forced Sterilization??? A lot of people who post here are really really scary.

— Posted by Wow

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9. February 26th, 2008 4:22 am

Wang Suya (#2) hits the nail perfectly on the head. Since the last century's backlash against discussing population size management, serious advocacy of limiting human fertility has been ridiculously regarded as nothing less than an attack on the poor and disenfranchised. With a level of insanity that defies belief, the privilege of procreation has even come to be considered some sort of human right, fundamentally beyond regulation. Yet the suffering of the poor and disenfranchised is endlessly compounded by excess population size – and, at the least, breeding your way out of poverty is a faulty strategy. Although access to some resources may be increased (for some) with increasing population size, there is one absolute resource which cannot be increased – surface area. More people inevitably means more banged elbows. This fact alone is reason enough for procreation to be consciously limited. That it puts into jeopardy the very stability of the environment, the very basis of mankind's existence, makes limits not merely tolerable, but as desirable as limiting murder, WMDs and genocide.

The counter arguments that the demographic transition will take care of population size growth and that we can technologize and public manage our way through environmental limits are probably valid. However, there is no free lunch. As implied in the article, the only way the oceans can be maintained even at today's impoverished level is by imposing severe restrictions on their use. In other words, the counter arguments are valid if we're willing to accept ever greater limits on individual freedom and give ever greater trust to public management schemes of immensely complex and ill understood systems. Quite simply, more people equals many more controls and limits in daily life and, as the need to organize and manage every aspect of our lives increases, less cultural and environmental

diversity.

The Census Bureau estimates current US population at 303 million and projects the 2050 population at 420 million. How many of those 100 million people, added in just 40 years, will be your close and supportive friends? How many from the projected 3 billion?

— Posted by Old Stone

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10. February 26th, 2008 4:34 am That's it! James Hansen is Captain Ahab.  
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— Posted by kim

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11. February 26th, 2008 5:27 am I agree with Wang. Population growth must be controlled. Seems more logical to do it voluntarily than to wait for Mother Nature to do it for us. A much more painful option I would assume.

— Posted by Agnes Witter

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12. February 26th, 2008 8:33 am This ties back to the Tierneylab post on the economics of sustainable fisheries. The problem is the fisheries remain a commons from which anyone can pluck what they can manage to pluck. Creating ownership interest in the living stock of the seas would change that dynamic.

We have no shortage of swine.

— Posted by A3k

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13. February 26th, 2008 8:46 am I urge everyone who is concerned about environmental issues to read "The World Without Us" by Alan Weisman. The explanations of causes and their effects, especially the often destructive role of the human species, is most illuminating. There is also a very good discussion of the oceans. — Paul



— Posted by Paul D Spreiregen

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•  
14. February  
26th,  
2008  
8:53 am

This is a good article.

Eating sushi, (raw fish) lessens your carbon foot print. :-)

Sea otters are decimating the abalone. :-)

The observation on the decline of fishing of wild stocks seems valid. Note the comparison to the decline of market hunting. (Market hunting is largely illegal.) Fish farming is much less expensive than fishing. And there are opportunities to do a lot more of it.

White tail deer have made a comeback from the 1800s. They are now a pest that could become a regular protein source in the future. (I have some in my freezer.) Fishery management is a lot more complicated but striped bass have also increased from past declines.

Right now, I would say “exhausted” overstates the case. I would like to see more control over “lost” drift nets and long lines.

Elery

— Posted by Elery Fudge

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•  
15. February  
26th,  
2008  
8:53 am

Years of research proving its Agriculture and overfertilizing paid for by farm subsidies in which farmers waisfully pull there fertilizer wagons around all fields knowing its going past the root into the groundwater, lakes, rivers, and streams. Planting buffer zones all around the country for over twenty years has done nothing like notill farming is not helping and now growing corn on corn will leave our water drinkless. Our oceans and corral reef is dead like all other water supplies from lack of oxygen thanks to our politicians who took farm subsidies and turned there heads. Here in Pennsylvania we have one congressman and one senator all on the Agricultural payroll even though babies are dying from bluebaby syndrome and they cant even answer my plea for help. Above the law are farmers killing more people than all are wars while in my opinion people are not fit to vote because of the food produced by your tumor producers in which cancer is door to door. Ban hams and turkeys for Easter and genetically modified potatos that make antibiotics resistant in which the dead people are filling our cemeteries and taken away prime

farmland in which should eliminate our problems in a lifetime.  
Wake up America and vote all incumbents out of office and take back  
our country for our children.

— Posted by Dennis

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16. February  
26th,  
2008  
9:17 am

How amazingly narcissistic of the author, and many in the green movement. The article suggests that someone's Subaru in Tasmania is the cause and culprit to the build up of the "evil carbon emperor", and fails to include that the great majority of carbon produced on this earth lay beneath it, and leaches out through the tectonic plates, in many cases being trapped by — you guessed it - the oceans! Fully 99 percent of all animals that ever lived on this planet are now extinct, and were so BEFORE man arrived.

Another fine example of the arrogance that is the "Green Team" is that Carbon is the great evil in our world. Not only is it one of the foundational building blocks of life itself, but there is no substantiated scientific evidence (fact) that it is the cause of current global warming. Carbon tracking has been going on for years, and the "sky is falling" folks point to it over and over again to cite the fact that man is the cause. They do this by skewing the facts. True that the globe has been warming ever so slightly over the past 40 years, and true that carbon data suggests the man's output has risen during this time. What they refuse to admit to or tell us, the "lowly non-informed" is that carbon data for the 40 years prior to this indicated an almost equal upturn in carbon emissions, with a cooling of the earth's temperatures. Then, these same "holier than thou" hominids were decrying the looming ice age, and the need to remove hairspray from the planet to secure the ozone layer and eliminate the hole in it that man so gluttenously produced. Funny, it seems the "hole" is a natural occurrence, but, then I regress!

The conclusion should be that yes, we all should be responsible for "picking up" after ourselves because we all want as clean a planet as we can get, for ourselves, and for our children. But those who advocate some "governmental body" to do the thinking for you, and tax you where they deem needed, are no friend of the environment and certainly no friend of man. They are the doomsayers of opportunism!

When you come in contact with a person who seems to have his/her talking points down, ask them a simple question - "So, are you a socialist?" and watch them squirm!

— Posted by Rob Dentry

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17. February  
26th,  
2008  
9:30 am

As a avid fisherman for 35 years in both deep sea and fresh water on the California coast I also have deep concerns. On one side the fishing boat owners need to make a living but have a responsibility to control the fisherman on that boat. I have seen and am guilty of taking fish that should have been released due to their size. Greed and excitement during a flurry of men and women yelling hook up can change one's perspective on conservation. The crew and captain must step in and control the catching frenzy and remind the fisherman/women to release smaller fish. If every captain on every sportfisher had a meeting before the fishing started and explained the overall goal of conservation I believe it would make a great impact on future fisheries. Closing areas completely does not solve the problem and may cause other problems in the future. I am going fishing in Alaska in May 08 and the fishing limits there are pretty strict, and reasonable. Due to the size of the catch you stand a pretty good chance to be eating great fish for most of the year. Trying to control human reproduction will never work, you must educate the harvester first then the local fisherman. It does no good to have a small percentage of people trying to conserve and a giant fishing industry vacuuming the ocean bottom with huge ships destroying everything. We must not forget pollution and its effects on the coastal waters. I have noticed a big change on the southern California coast over the past 20 years. Worms invading fish, smaller sizes, and fewer catches.

God created a perfect world and it is our job to do our best to protect it while we enjoy the great life given to us.

RDG

— Posted by Bob G

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18. February  
26th,  
2008  
9:31 am

I think the US should establish a marine recovery university in Gloucester Massachusetts to experiment with restoration of the George's Bank cod fishery, among other things.

Why can't anybody among our fatheaded politicians and overcompensated CEOs think of anything for people to do?

— Posted by Steve Bolger

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19. February  
26th,  
2008  
9:51 am

Mr Hearsay told me that decades back people caught blue marlin that were upwards 250 pounds and now 80 pounds is a big one. Seems it would take a 40 year moratorium to allow some generations to restore larger ones.

He told me that the New England fishing fleet is sitting in harbor. He said Emerald Isle Cod were in danger of extinction and there had to be moratoriums imposed to allow numbers to be restored. He said the Senegalese fishing rights were sold to Europeans and that they overfished and the native population is suffering. Something about the government officials having been corrupted. He said there were dead spots in the oceans.

It seems that Japanese fisherman kill thousands of sharks for the fins and throw them overboard reducing the oceans workforce of sharks. Now they are suffering from an angst to kill whales. They made their herring extinct.

Radar has been a boon to killing off large fish stocks and long netting that drags the oceans “vegetable” stock has allowed overfishing. Even Mediterranean Tuna is endangered in the wild with moratoriums needed.

So What to do?

My fantasy from my book Metaphysician’s Dilemma is that the Metaphysician says what to do. That anarchy world wide and even within nationalities has to stop. Pollution has to be controlled and savaging of the seas has to be humanized. Rivers, whenever possible have to be clean and have natural fish stock. The US still has 40% of its rivers overly polluted according to the Kerry’s book but a number of them including the Hudson have been restored allowing the fish the thrive. China has more then 90% of its rivers terribly polluted according to Mr. Hearsay.

And when hearing that the oceans have absorbed as much CO2 as possible it adds another dilemma to the confusion about how good that is for the fish, whales and other creatures. Will the dead spots grow larger?

I get paranoid with every can of tuna, even the good stuff. I fear shrimp because of toxins. And even salmon is confusing wondering if farmed is safe and wild is too expensive.

Oh MY !!!

— Posted by Karl S Schwartz

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20. February  
26th,  
2008  
10:08 am

Andy, did you actually get to play Fish Banks yet?

Were you deterred by the \$200 cost? it's a multiplayer game "for groups of 10 to 40 players" and, regrettably, not playable online at the link given above. It sounds like it'd be engaging.

[http://www.sustainabilityinstitute.org/tools\\_resources/games.html](http://www.sustainabilityinstitute.org/tools_resources/games.html)

If there were an online version, I'd subscribe. I hope you do find a way to play it and write about it — maybe DotEarth could host a game? it'd be appropriate for your column. No jokes about the NYT playing with its readers, I promise.

— Posted by Hank Roberts

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21. February  
26th,  
2008  
10:18 am

#4 SThapa

unfortunately, rush limbaugh was as wrong about the oceans as he was entertaining. best evidence imo is that they our ocean fisheries are rapidly becoming depleted to the point of irreversible exhaustion.

#8 wow

"How do you propose controlling the population? Starvation, Death Camps, Forced Sterilization??? A lot of people who post here are really really scary."

yes, quite scary! dr. albert bartlett, in his well received and oft given lecture on "population, arithmetic and the exponential function," presents a 2-columned chart. on the left side are human solutions to the population explosion, and on the right are nature's solutions.

most humanitarians would nature's solutions to the exploding and utterly unsustainable human population — famine, plague, etc. — to be distinctly more scary than the human ones.

— Posted by sas

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22. February  
26th,  
2008  
12:15 pm

Meanwhile, Ford tantalizes its employees with job-buyout offers of free tuition to study how to create jobs out of thin air and zero capital by becoming entrepreneurs themselves.

Bring on the clowns, apes.

— Posted by Steve Bolger

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23. February  
26th,  
2008  
12:23 pm

I think a useful way to look at this situation is to play an instructive ‘trick’ with the title of Andy’s piece here (he likely intended it this way, but I’m not sure he expounded on it, and the first comment said it “Ocean Fatigue”).

While ‘exhausted’ as in: “all used up” is the immediate literal imagery most people get, as depicted in the postcard of the abalone shells...

Think of ‘exhausted’ as in a Body that is just plain tired of Keeping Up. A System who’s parts are being taxed to its limits and can no longer Maintain itself.

Thinking of the Oceans as a System is MUCH more helpful than thinking of the individual resources within them and how each of them are getting “used up” ... (We do indeed call them “bodies of water” right?)

Because when the Ocean System goes beyond “Exhaustion” and becomes utterly Spent and Collapses... We will be not far behind it...

— Posted by David J Evans

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24. February  
26th,  
2008  
12:26 pm

#16 (Rob Dentry) trots out the same ignorant assertions we’ve been hearing for years from the anti-global warming crowd.

How about some references to back up your statements Rob? (the “natural ozone hole”, or the lower temps in the 1st half of the century) Ah yes, stuff is so easy to make up, harder to demonstrate convincingly...

And the use of the word opportunism: is revealing: taking advantage of opportunities for achieving an end or self-advancement, usually with no regard for principles or consequences.

— Posted by Dave

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•  
25. February    And it’s not just the oceans, we forget so easily what we’ve done to

26th,  
2008  
12:51 pm

the land. I'm in Maryland. In the spring I expect occasionally to hear honking, look up and see a Vee of a few dozen geese. Not often. Two hundred years ago, in migrating season you couldn't look up without seeing flocks of geese. Day and night, the sound of their honking was continuous.

— Posted by Spencer

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## About Dot Earth

By 2050 or so, the world population is expected to reach nine billion, essentially adding two Chinas to the number of people alive today. Those billions will be seeking food, water and other resources on a planet where, scientists say, humans are already shaping climate and the web of life. In Dot Earth, reporter Andrew C. Revkin examines efforts to balance human affairs with the planet's limits. Supported in part by a John Simon Guggenheim Fellowship, Mr. Revkin tracks relevant news from suburbia to Siberia, and conducts an interactive exploration of trends and ideas with readers and experts.



## On the Dot

### Slide Show

#### **A Planet in Flux**

Andrew C. Revkin began exploring the human impact on the environment nearly 30 years ago. An early stop was Papeete, Tahiti. This narrated slide show describes his extensive travels.



## Your Dot

Dot Earth is meant to be a two-way street, incorporating ideas, anecdotes, links and other contributions from readers, as well as exchanges with scientists, officials, tinkerers and thinkers working to smooth the interactions between people and the home planet. Get in touch.

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