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# The Political Economy of Climate Change Winners

J.B. Ruhl

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**Article**

**The Political Economy of Climate Change  
Winners**

**J.B. Ruhl**<sup>†</sup>

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<sup>†</sup> David Daniels Allen Distinguished Chair in Law, Vanderbilt University Law School. I am thankful to Eric Biber, Caroline Cecot, Robin Craig, Brigham Daniels, Alex Klass, John Nagle, and Jim Salzman for detailed comments on drafts, to my research assistants Will Airhart and Wyatt Sassman, and to the Vanderbilt University Law School for research support. This project also benefitted tremendously from comments and critiques, by people too numerous to name here, in posts on the Environmental Law Professors Listserv made in response to my November 2011 posting of an early abstract and request for feedback. All who participated, I thank you for your helpful input and collaborative spirit. All views expressed and mistakes made are solely my own. Please direct any comments or questions to [jb.ruhl@vanderbilt.edu](mailto:jb.ruhl@vanderbilt.edu). Copyright © 2012 by J.B. Ruhl. [Editor's Note: For further discussion of Climate Change Winners, see Robin Kundis Craig, *The Social and Cultural Aspects of Climate Change Winners*, 97 MINN. L. REV. (forthcoming 2013); Victor B. Flatt, *More Than Winners and Losers: The Importance of Moving Climate and Environmental Policy Debate Towards a More Transparent Process*, 97 MINN. L. REV. HEADNOTES (forthcoming 2013), [www.minnesotalawreview.org](http://www.minnesotalawreview.org).]

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“I’ve been betting on it for years . . . . This farm here has been set up for the future.”<sup>1</sup>

## INTRODUCTION

What if for every person or business harmed by the effects of climate change in the next one hundred years, another person or business is benefited by the effects of climate change in equal magnitude? Although an unlikely scenario, it calls attention to the fact that many people and businesses in the United States will receive market and nonmarket benefits from climate change, and some may even conclude they are better off—that they are climate change “winners.” One may ask how there can be any winners given how disastrous climate change could be for the global population. But that is the point—even accepting that climate change presents a significant net loss for the global population, it is not necessarily a net loss for everyone. Whether you are a climate change winner or loser depends on your perceptions and circumstances.

The biophysical effects of climate change will be uneven around the globe and within the United States.<sup>2</sup> Some impacts

1. Michael Hill, *Surf’s Up, Buffalo: The Good Side of Global Warming*, USA TODAY, June 17, 2007, available at [http://www.usatoday.com/weather/climate/globalwarming/2007-06-14-warming-winners\\_N.htm](http://www.usatoday.com/weather/climate/globalwarming/2007-06-14-warming-winners_N.htm). Chris Loken, a Hudson Valley apple grower, uttered this response when asked why he diversified his farm to include peach, apricot, and plum trees, crops not usually associated with frosty Upstate New York. *Id.* The “it,” of course, is climate change—the 75-year-old Mr. Loken is counting on milder weather. *Id.*

2. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT *passim* (2007) [hereinafter IPCC SYNTHESIS REPORT], available at [http://www.ipcc.ch/publications\\_and\\_data/publications\\_](http://www.ipcc.ch/publications_and_data/publications_)

will open up opportunities for people and businesses to secure benefits in some areas, such as by increased rainfall, longer growing seasons, and more temperate weather.<sup>3</sup> Some impacts will open up highly profitable business opportunities in some areas, such as building seawalls or outfitting warm weather outdoor recreation.<sup>4</sup> Hence, although it most likely is the case that at global scales the net aggregate economic impacts of climate change will be negative over time,<sup>5</sup> at local scales there will be significant variation in impact profiles.

Indeed, many people and businesses will receive benefits of significant magnitude, enough to lead them to conclude they are better off because of climate change. Their attitudes about climate policy could be influenced by their perception that “life is good” thanks to climate change. Their behaviors with potential climate impacts, such as energy use and product consumption choices, could also be shaped by their climate change winner profiles. Thus, whereas legal scholars have extensively explored how to protect climate change *losers*, this Article is the

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ipcc\_fourth\_assessment\_report\_synthesis\_report.htm; U.S. GLOBAL CHANGE RESEARCH PROGRAM, GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES (2009), available at <http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf>.

3. See, e.g., IPCC SYNTHESIS REPORT, *supra* note 2, at 69 (“For increases in global average temperature of less than 1 to 3°C above 1980–1999 levels, some impacts are projected to produce market benefits in some places and sectors while, at the same time, imposing costs in other places and sectors.”); U.S. ENVTL. PROT. AGENCY, FREQUENTLY ASKED QUESTIONS ABOUT GLOBAL WARMING AND CLIMATE CHANGE: BACK TO BASICS, 6–7 (2009), available at [http://www.epa.gov/climatechange/Downloads/ghgemissions/Climate\\_Basics.pdf](http://www.epa.gov/climatechange/Downloads/ghgemissions/Climate_Basics.pdf) (acknowledging “a warming climate will have both positive and negative impacts” and mentioning benefits to some crops, improved water availability, lower heating bills, and outdoor recreation as examples); U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 30 (increased precipitation), 65 (decreased severe cold), 88 (recreational benefits of warmer weather), 139 (longer frost-free periods), 140 (longer growing seasons). See generally *infra* Part I.

4. See FRANCES G. SUSSMAN & J. RANDALL FREED, PEW CTR. ON GLOBAL CLIMATE CHANGE, ADAPTING TO CLIMATE CHANGE: A BUSINESS APPROACH 2–4 (2008) (discussing various business opportunities resulting from climate change).

5. See DALE W. JORGENSEN ET AL., PEW CTR. ON GLOBAL CLIMATE CHANGE, U.S. MARKET CONSEQUENCES OF GLOBAL CLIMATE CHANGE, at v (2004) (“Once temperature and other key climate parameters reach certain thresholds . . . benefits peak and begin to decline—eventually becoming damages.”); U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 99 (“[W]hile there are likely to be some benefits and opportunities in the early stages of warming, as climate continues to change, negative impacts are projected to dominate.”).

first in legal scholarship to ask what to do about the prospect of many people and businesses believing they are climate change *winners*.

Talk of climate change benefits goes against the grain of prevailing climate policy dialogue. It is not for polite “green” conversation. It certainly has not been the subject of legal scholarship. True, some economists, not uncontroversially, have developed integrated assessment model (IAM)<sup>6</sup> projections showing the United States faring relatively well under plausible climate change scenarios compared to other nations and, from this, have argued that this national “winner” outcome militates against pursuing aggressive domestic greenhouse gas emission regulation policies.<sup>7</sup> In more focused econometric research, a number of detailed studies have also suggested the potential for gains in the agriculture sector.<sup>8</sup> But most scientific and policy analyses of climate change impacts, especially official ones, pay little attention to the climate change impacts

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6. IAM is “insider lingo for a multiple-equation computer-simulated model that combines dynamic economics with geophysical climate dynamics for the purposes of analyzing the economic effects of global climate change. An IAM is essentially a model of economic growth with a controllable externality of endogenous greenhouse warming.” Martin L. Weitzman, *A Review of the Stern Review of the Economics of Climate Change*, 45 J. ECON. LITERATURE 703, 705 (2007) [hereinafter Weitzman, *A Review of the Stern Review*]. See generally Hadi Dowlatabadi, *Integrated Assessment Models of Climate Change: An Incomplete Overview*, 23 ENERGY POL’Y 289 (1995) (providing a broad overview of IAM methods and policy uses); William D. Nordhaus, *Integrated Economic and Climate Modeling* (Cowles Found. Discussion Paper No. 1839, 2011), available at <http://ssrn.com/abstract=1970295> (surveying current IAM techniques).

7. Compare Robert O. Mendelsohn, *A Critique of the Stern Report*, REGULATION, Winter 2006–2007, at 42, 42 (“[E]conomists have long argued that stabilizing greenhouse gases at 550 ppm is not efficient because the costs far outweigh the benefits.”), with Jody Freeman & Andrew Guzman, *Climate Change and U.S. Interests*, 109 COLUM. L. REV. 1531 (2009) (describing and challenging this position). The economist William Nordhaus started this debate with his classic paper on “going slow” with greenhouse gas regulation. See William D. Nordhaus, *To Slow or Not to Slow: The Economics of the Greenhouse Effect*, 101 ECON. J. 920 (1991).

8. See, e.g., Oliver Deschênes & Michael Greenstone, *The Economic Impacts of Climate Change: Evidence from Agricultural Output and Random Fluctuations in Weather*, 97 AM. ECON. REV. 354 (2007); Günther Fischer et al., *Socio-Economic and Climate Change Impacts on Agriculture: An Integrated Assessment, 1990–2080*, 360 PHIL. TRANSACTIONS ROYAL SOC’Y B 2067, 2074 (2005); Cynthia Rosenzweig & Martin L. Parry, *Potential Impact of Climate Change on World Food Supply*, 367 NATURE 133, 133 (1994) (noting that crop declines are only small to moderate); I. Supit et al., *Recent Changes in the Climatic Yield Potential of Various Crops in Europe*, 103 AGRIC. SYS. 683, 688 (2010).

that will produce market and nonmarket benefits, begrudgingly acknowledging them in the most general of terms and then invariably qualifying with discussion of adverse impacts.<sup>9</sup> In particular, within-country distributions of costs and benefits of climate change are poorly understood,<sup>10</sup> the benefits side of the ledger has been only superficially studied,<sup>11</sup> and how to take advantage of any benefits is virtually never discussed.<sup>12</sup> Conse-

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9. See, e.g., CAL. NATURAL RES. AGENCY, 2009 CALIFORNIA CLIMATE ADAPTATION STRATEGY: A REPORT TO THE GOVERNOR OF THE STATE OF CALIFORNIA IN RESPONSE TO EXECUTIVE ORDER S-13-2008, at 94 (2009), available at <http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF> (“[T]he production of high-quality wine grapes is expected to benefit from a warmer climate because of a longer growing season and more favorable growing conditions in the short-term. At some point, however, the magnitude of the warming may become too large for certain grape varieties.”); IPCC SYNTHESIS REPORT, *supra* note 2, at 48 (“Overall it is expected that benefits will be outweighed by the negative health effects of rising temperatures.”), 49 (“The negative impacts of climate change on freshwater systems outweigh its benefits . . . impacts of increased annual runoff in some areas are likely to be tempered by negative effects of increased precipitation variability and seasonal runoff shifts on water supply, water quality and flood risk.”); THE COMMONWEALTH OF MASS. EXEC. OFFICE OF ENERGY & ENVTL. AFFAIRS, MASSACHUSETTS CLIMATE CHANGE ADAPTATION REPORT 15 (2011), available at <http://www.mass.gov/eea/docs/eea/energy/cca/eea-climate-adaptation-report.pdf> (“While a longer growing season due to increased temperatures may support new crops and fruits, agricultural activities could experience compounded impacts due to changes in precipitation and runoff, and increasing weed and pest problems.”); U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 12 (“Many crops show positive responses to elevated carbon dioxide and low levels of warming, but higher levels of warming often negatively affect growth and yields.”), 30 (“[P]otential water resource benefits from increasing precipitation could be countered by the competing influences of increasing evaporation and runoff.”).

10. See Robert Mendelsohn et al., *The Distributional Impact of Climate Change on Rich and Poor Countries*, 11 ENV'T & DEV. ECON. 159, 174 (2006) (conducting a broad study of relative effects at national scales, but acknowledging that “many countries are large enough so that different regions will have different effects within national borders”).

11. See Jason Scott Johnston, *A Looming Policy Disaster*, REGULATION, Fall 2008, at 38, 39 (complaining that official impact assessments are “not at all keen on identifying benefits from global warming”). Economist Robert Mendelsohn claims that “as economic research on impacts has improved, the magnitude of projected damages from climate change has fallen,” one reason being “that the early studies . . . did not always take into account some of the benefits of warming to agriculture, timber, and tourism.” Robert Mendelsohn, *Climate Change and Economic Growth* 10–11 (Comm’n on Growth & Dev., Working Paper No. 60, 2009), available at <http://environment.yale.edu/files/biblio/YaleFES-00000397.pdf>.

12. For example, a recent federal government report on climate change adaptation policy fails to mention that there will be any benefits from climate change, and thus necessarily fails to discuss how adaptation policy could help harness them. INTERAGENCY CLIMATE CHANGE ADAPTATION TASK FORCE,

quently, although most analysts agree some areas of the world will be hit harder than others,<sup>13</sup> the probability that millions of people and thousands of businesses and communities within particular nations such as the United States will actually receive significant market and nonmarket benefits from climate change is rarely mentioned in official statements as something climate policy should take into account.<sup>14</sup>

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FEDERAL ACTIONS FOR A CLIMATE RESILIENT NATION 2 (2011), available at [http://www.whitehouse.gov/sites/default/files/microsites/ceq/2011\\_adaptation\\_progress\\_report.pdf](http://www.whitehouse.gov/sites/default/files/microsites/ceq/2011_adaptation_progress_report.pdf). Similarly, state and local adaptation analyses and plans developed to date are devoid of any discussion of benefit-securing adaptation measures. See, e.g., CAL. NATURAL RES. AGENCY, *supra* note 9, *passim*; CHICAGO CLIMATE ACTION PLAN (2011), available at <http://www.chicagoclimateaction.org/filebin/pdf/finalreport/CCAPREPORTFINALv2.pdf>; THE COMMONWEALTH OF MASS. EXEC. OFFICE OF ENERGY & ENVTL. AFFAIRS, *supra* note 9, *passim*; MD. COMM'N ON CLIMATE CHANGE, CLIMATE ACTION PLAN (2008), available at <http://www.mdclimatechange.us/ewebeditpro/items/O40F14798.pdf>; WASH. STATE DEP'T OF ECOLOGY, PREPARING FOR CHANGING CLIMATE: WASHINGTON STATE'S INTEGRATED CLIMATE RESPONSE STRATEGY (2012), available at [www.ecy.wa.gov/climatechange/ipa\\_responsestrategy.htm](http://www.ecy.wa.gov/climatechange/ipa_responsestrategy.htm). A recent business adaptation strategy report by the Pew Center on Global Climate Change mentions several opportunities climate change presents for businesses but does not discuss any of these in the larger discussion of business adaptation strategies. See SUSSMAN & FREED, *supra* note 4, at 2–4, 7–10. One exception to this pattern comes from Scotland, where the national adaptation strategy includes ample references to climate change benefits the nation might enjoy and includes them, albeit with little detail, within the scope of the adaptation strategy. See THE SCOTISH GOV'T, SCOTLAND'S CLIMATE CHANGE ADAPTATION FRAMEWORK 9 (2009), available at <http://www.scotland.gov.uk/Resource/Doc/295110/0091310.pdf> (discussing benefits like increased outdoor recreation opportunities and fewer deaths because of cold). I have been unable to locate any public, private, or nonprofit-sector analyses of how to design and implement adaptation strategies for securing climate change benefits in the United States.

13. A number of the national scale IAM studies show North America, Russia, and Eastern Europe as best off under a range of climate change scenarios, with small to substantial increases in GDP, and Africa, parts of Asia, and small island states as worst off. See RICHARD S.J. TOL, AN ANALYSIS OF MITIGATION AS A RESPONSE TO CLIMATE CHANGE 6, 10 (2009) (chart based on synthesis of a dozen IAM studies); Asbjørn Aaheim et al., *Impacts and Adaptation to Climate Change in European Economies*, 22 GLOBAL ENVTL. CHANGE 959, 964–67 (2012) (concluding that Eastern European nations will see a rise in GDP under a scenario of a global mean temperature rise of 2°C); Robert Mendelsohn et al., *Country-Specific Market Impacts of Climate Change*, 45 CLIMATIC CHANGE 553, 561–65 (2000) (“Given these regional results, it is no surprise that the impacts of global warming are not felt uniformly across countries.”).

14. See Karen L. O'Brien & Robin M. Leichenko, *Winners and Losers in the Context of Global Change*, 93 ANNALS OF ASS'N AM. GEOGRAPHERS 89, 89 (2003) [hereinafter O'Brien & Leichenko, *Winners and Losers*] (“In the case of global climate change, policy-makers are often reluctant to identify or acknowledge winners and losers, particularly winners. Many consider such

Indeed, only a handful of legal scholars weighing in on U.S. policy for climate change mitigation (avoiding climate change)<sup>15</sup> and adaptation (coping with climate change)<sup>16</sup> so much as mention that there will be climate change benefits of any kind or magnitude. Most of those who have examined the topic confine the analysis to whether the United States will be an overall winner *among nations* and, if so, what that means for our domestic and international policies.<sup>17</sup> Few legal scholars even allude to the possibility that significant streams of climate change benefits in different regions and industries of the United States could complicate domestic politics.<sup>18</sup>

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discussions to be divisive and detrimental to efforts to develop a global accord on climate change abatement.”); *see also id.* at 97 (“[E]xplicit references to winners and losers is largely avoided in official documents.”). There is anecdotal evidence that talk of climate change winners was not merely officially suppressed early in the international climate policy dialogue, but was punished. A researcher who obtained international and domestic agency funding for a 1990 workshop on national climate change winners and losers claims that one funding agent was subsequently reprimanded and the other fired. M. Glantz, *Oh! What a Lovely Climate Change: Global Warming’s Winners and Losers*, FRAGILECOLOGIES (Aug. 21, 2007), <http://www.fragileecologies.com/?p=692.html>.

15. Climate change “mitigation” refers to “measures to reduce climate change by, for example, reducing emissions of heat-trapping gases and particles, or increasing removal of heat-trapping gases from the atmosphere.” U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 8.

16. Climate change “adaptation” refers to “measures to improve our ability to cope with or avoid harmful impacts and take advantage of beneficial ones, now and in the future.” *Id.* at 11.

17. *See* Daniel A. Farber, *Adapting to Climate Change: Who Should Pay?*, 23 J. LAND USE & ENVTL. L. 1, 4–37 (2007) (examining theories of which nations should finance adaptation efforts in hard-hit poor countries and rejecting the “winners pay” approach); Freeman & Guzman, *supra* note 7 (challenging the argument that the United States is a climate change winner); Symposium, *Climate Change and U.S. Interests*, 41 ENVTL. L. REP. 10695 (2011) (featuring a series of responses by economists and environmental law and policy experts to Freeman and Guzman’s *Climate Change and U.S. Interests*); Cass R. Sunstein, *The World vs. the United States and China? The Complex Climate Change Incentives of the Leading Greenhouse Gas Emitters*, 55 UCLA L. REV. 1675, 1677 (2008) (discussing the national scale costs and benefits as guiding domestic policy); Jonathan Baert Wiener, *Global Environmental Regulation: Instrument Choice in Legal Context*, 108 YALE L.J. 677, 697–99 (1999) (observing that climate change impacts will vary across nations and thus complicate international solutions); *see also* Jason Scott Johnston, *Climate Change Confusion and the Supreme Court: The Misguided Regulation of Greenhouse Gas Emissions Under the Clean Air Act*, 84 NOTRE DAME L. REV. 1, 22–42 (2008) (arguing that the national aggregate of local benefits from climate change undercuts the case that Congress intended the Clean Air Act to regulate greenhouse gas emissions).

18. *See* Johnston, *supra* note 11, at 38–39, 41 (arguing that “the moderating effect of global warming on wintertime temperatures in the cold northern,



But there will be climate change beneficiaries living among us at every geopolitical scale.<sup>19</sup> Regardless of whether the United States in the aggregate will be a climate change winner compared to any other nation, there will be climate change benefits flowing to some people and some businesses within every region, state, county, city, and neighborhood in our nation. The major construction business building seawalls where coastal properties face sea level rise,<sup>20</sup> the farmer enjoying longer growing seasons<sup>21</sup> within sight of mountains with dying ski areas,<sup>22</sup> and the impoverished family with lower heating bills<sup>23</sup> living in the same community as other people faced with increased flooding<sup>24</sup>—they and many people and businesses like them will all be receiving climate change benefits near people and businesses suffering climate change harms. And if enough climate change beneficiaries are concentrated in any particular region, they may very well influence local and even state political units to take their constituents' benefits into account.<sup>25</sup> In short, people and businesses are likely to begin to attach im-

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interior, and northeastern regions of the United States will be a decided benefit to people living in such places, worth billions of dollars a year" and predicting that this uneven projected geographic distribution of costs and benefits of climate change will complicate achieving agreement on national policy); Richard J. Lazarus, *Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future*, 94 CORNELL L. REV. 1153, 1185 (2009) ("The potential for short-term benefits from climate change in nations like the United States will fuel other climate change lawmaking skeptics."). I have briefly raised domestic climate change benefits as a policy issue in several previously published articles but have not developed the topic as I set out to do in this Article. See, e.g., J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL. L. 363, 383–84 (2010).

19. See IPCC SYNTHESIS REPORT, *supra* note 2, at 50.

20. See SUSSMAN & FREED, *supra* note 4, at 3 (noting that climate change might increase the market for "climate proofing materials").

21. See Fisher et al., *supra* note 8, at 2074.

22. See SUSSMAN & FREED, *supra* note 4, at 3 (noting that winter tourism will decline due to climate change).

23. See U.S. ENVTL. PROT. AGENCY, *supra* note 3, at 7.

24. See U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 41.

25. It has been shown, for example, that legislators from jurisdictions with high greenhouse gas emissions tend to vote against climate change mitigation initiatives that could impose costs on the emission sources. See Michael I. Cragg & Matthew E. Kahn, *Carbon Geography: The Political Economy of Congressional Support for Legislation Intended to Mitigate Greenhouse Gas Production* (Nat'l Bureau of Econ. Research, Working Paper No. 14,963, 2009), available at <http://www.nber.org/papers/w14963.pdf>. There is every reason to believe that legislators in jurisdictions receiving substantial climate change benefits will be similarly likely to base their climate policy positions on the interests of their constituents.

portance to their climate change benefits, enough to lead them to behave like climate change winners in the political arena.<sup>26</sup> One need only consider as an example how successful the agriculture industry has been at challenging and avoiding environmental regulation<sup>27</sup> to see how the emergence of a class of climate change winners could similarly warp climate policy.

This Article explores what policy steps to take now in anticipation of the growth in the United States of a substantial and diverse class of people and businesses believing they are climate change winners. My central argument is that climate change winners are, on average, likely to place low priority on mitigation policy aimed at regulating greenhouse gas emissions, or perhaps even oppose such policy, and high priority on adaptation policies that will secure their climate change benefits. Indeed, lest there be any doubt about this potential, there is evidence from the popular press that some people and businesses already are aware of their potential winner status and are enjoying thinking about the possibilities. As one prominent commentator has summed up:

It may sound odd to ask of global warming, What's in it for me? But the question is neither crass nor tongue-in-cheek. The ways in which climate change could skew the world's distribution of wealth should help us appreciate just how profoundly an artificial greenhouse effect might shake our lives. Moreover, some of the lasting effects of climate change are likely to come not so much from the warming itself but from how we react to it: If the world warms appreciably, men and women will not sit by idly, eating bonbons and reading weather reports; there will be instead what economists call "adaptive response," most likely a great deal of it. Some aspects of this response may inflame tensions between those who are winning and those who are losing. How people, the global economy, and the international power structure adapt to climate change may influence how we live for generations. If the world warms, who will win? Who will lose? And what's in it for you?<sup>28</sup>

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26. See *infra* Part III.A.

27. See generally J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 *ECOLOGY L.Q.* 263 (2000) (reviewing the numerous and substantial safe harbors agriculture has secured from environmental regulation).

28. Gregg Easterbrook, *Global Warming: Who Loses—and Who Wins?*, *THE ATLANTIC*, Apr. 2007, available at <http://www.theatlantic.com/magazine/archive/2007/04/global-warming-who-loses-and-who-wins/305698> (discussing broadly the climate change winner issue); see also Olaf Stampf, *Global Warming: Not the End of the World as We Know It*, *SPIEGEL ONLINE INT'L* (Christopher Sultan trans., May 7, 2007), <http://www.spiegel.de/international/germany/global-warming-not-the-end-of-the-world-as-we-know-it-a-481684.html> (discussing likely climate change winners in Germany).

Some respected policy analysis organizations also are beginning to pay attention to opportunities in climate change. Particularly telling is a passage from a recent study of business and climate change observing that

for many businesses, at least some of the physical changes associated with climate change may present opportunities as well as risks . . . . Adaptation may also create new product markets, such as climate proofing materials and building designs, or result in market shifts, by making locally sourced materials more attractive in order to reduce travel miles, for instance.

Similar examples can be constructed for many other businesses, suggesting that climate change will produce both winners and losers, risks and opportunities.<sup>29</sup>

Going even further, the State of Oregon has observed that government economic development policy could take advantage of potential opportunities from climate change, in that

[r]esponding to climate change will cause large amounts of capital to flow into both low-carbon technology and adaptation technology. Oregon should view this transition as an economic development opportunity. By choosing to act now, Oregon can create a business environment that stimulates and supports both mitigation and adaptation technologies. As early adopters, Oregon businesses can earn critical early market share. This can drive economic growth in the state and will establish a foundation for exporting both products and expertise to other states and the rest of the world.<sup>30</sup>

The message is clear—many people and businesses in the United States are going to see a bright side to climate change, and some of them are already thinking about it. It seems unlikely that these and other climate change winners will be leading the way for aggressive greenhouse gas emissions regulation.<sup>31</sup> Moreover, even if they generally support or are indifferent about regulation of greenhouse gas emissions, they are likely to be interested in how to direct public policy to reap their climate change benefits while available. Clearly, therefore, the time to consider how climate change winners factor in-

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29. See, e.g., SUSSMAN & FREED, *supra* note 4, at 3.

30. GOVERNOR'S CLIMATE CHANGE INTEGRATION GRP., FINAL REPORT TO THE GOVERNOR: A FRAMEWORK FOR ADDRESSING RAPID CLIMATE CHANGE 10 (2008), available at <http://cms.oregon.gov/ENERGY/gblwrm/docs/ccigreport08web.pdf>. Although it is unique among domestic government climate change adaptation policy documents in recognizing these climate change benefits, like other official reports the Oregon study does not delve into details about the scope of economic opportunities or how to take advantage of them.

31. Cf. J.P. Palutikof et al., *Public Perceptions of Unusually Warm Weather in the UK: Impacts, Responses and Adaptations*, 26 CLIMATE RES. 43, 58 (2004) (concluding that people will be unlikely to take steps to mitigate climate change when they view climate change as personally beneficial).

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to the climate policy debate is now. That is the objective of this Article.

Part I of the Article opens by framing the premises and limitations of the analysis and by developing a typology of climate change benefits and beneficiaries. Given the inevitable emergence and broad distribution of climate change benefits and beneficiaries, Part II of the Article uses a framework social scientists have developed for thinking about winners and losers in global change processes generally to define climate change winners as people and businesses who, accurately or not, perceive that their lives and enterprises are better off because of the benefits they are receiving or anticipate receiving from climate change. Part II also explores evidence suggesting that people and businesses are likely to know when they receive climate change benefits and to self-identify themselves as climate change winners if the benefits are substantial. Part III then frames the interests of climate change winners more concretely in the political economy of climate policy, making the case that because people and businesses seeing themselves as climate change winners might be sufficiently concentrated to exert political influence on local and regional scales, they may succeed in influencing the mitigation and adaptation policies of many local political units, thus complicating state and national political discourse on climate change.

Using the background developed in Parts I through III, the remainder of the Article turns to normative dimensions and positive legal responses. Part IV argues that climate change *mitigation* policy should not be influenced by the prospect of a large class of climate change winners, arguing that climate change policy should focus principally on cost-effective measures to stabilize the climate without regard to the impact doing so could have on the sub-national distribution of climate change benefits. By contrast, Part V argues that climate change *adaptation* policy, in addition to its focus on increasing the resilience and reducing the vulnerability of populations threatened by climate change, should also make efficient investments to harness climate change benefits on behalf of climate change winners.

There is nothing inconsistent about working to limit climate change with one hand while working with the other hand to secure and deliver the benefits of climate change to those for-

tunate enough to be able to enjoy them.<sup>32</sup> I argue in Part VI, however, that given the national policy goal of mitigating and adapting to climate change, no vested rights in climate change benefits should accrue. The two-pronged policy outlined in Parts IV and V must be put into place now in order to incorporate and acculturate a “no vested rights” condition of climate change benefits. Part VI thus outlines legal doctrines and techniques that can be employed to support this condition.

Rather than treating it as taboo, the topic of climate change winners should be fully aired in climate policy dialogue. Climate change policy has triggered complex and difficult tradeoff decisions, even with relatively little thus far in the way of climate change impacts.<sup>33</sup> These tradeoffs can only become more complex and contested as tangible climate change harms and benefits begin to take hold across the landscape and throughout the economy.<sup>34</sup> Climate change benefits, and those who believe they are climate change winners, are in our not-too-distant future.<sup>35</sup> By the time they do emerge, climate policy needs to have already settled what to do about them. The approach I advocate in this Article is designed to build a climate change winners component into the front end of climate policy development, so that the benefits of climate change can be reaped through adaptation policies without derailing the mitigation policies designed to eliminate them.

#### I. A TYPOLOGY OF CLIMATE CHANGE BENEFITS AND BENEFICIARIES

Although the dimensions and demographics of the climate change winners problem cannot be predicted with any more certainty than can other impacts of climate change,<sup>36</sup> there is no scenario of climate change in play in official policy dialogue that can reasonably be interpreted to rule out the possibility of substantial market and nonmarket benefits from climate change for people and businesses in many areas. There is simp-

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32. See, e.g., GOVERNOR'S CLIMATE CHANGE INTEGRATION GRP., *supra* note 30, at 10 (recommending both mitigating the effects of climate change and preparing for economic opportunities from climate change).

33. See U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 12 (listing early impacts of climate change and noting that impacts “are expected to increase”).

34. See SUSSMAN & FREED, *supra* note 4, at 3.

35. See *id.*

36. See TOL, *supra* note 13, at 17 (noting that the positive effects have not been quantified).

ly no plausible way to project warming in the climate system and not concede there will be many people and businesses benefitting directly and indirectly from the changes taking place at the ground level. This part of the Article first demonstrates that this reality of direct and indirect streams of climate change benefits is inescapable, and then develops a typology of the different ways in which people and businesses will receive these benefits.

There are several premises I assume to be true to put these arguments in motion. First, I assume that people and businesses are able, even if in very rough form, to connect climate change to changes in their economic circumstances. Second, I assume they act primarily out of self-interest. Third, I assume that their planning horizons do not extend in any manner meaningful to my purposes beyond one or two generations for people, and a decade or two at most for businesses and communities. Fourth, I assume that climate change integrated assessment models (IAMs)<sup>37</sup> cannot accurately predict local flows of climate change benefits and harms beyond those planning horizons, at best. Fifth, I assume that mitigation techniques (e.g., emissions regulation) and technology (e.g., carbon sequestration) cannot deliver climate stabilization benefits within those planning horizons, and likely not until much later. Sixth, I assume that climate change IAMs cannot accurately predict when a particular mitigation policy's package of techniques and technologies will stabilize climate or what the new climate regime will be.

I concede that any of these premises is subject to debate: people may have limited capacity to understand how climate change affects them; some people care deeply about and act on behalf of people in other countries and ecosystems around the globe suffering from climate change; some people care deeply about and act on behalf of the environment and people of the very deep future; the predictive capacity of climate models could improve dramatically beyond present capacities; and some new technology might appear that allows far more rapid and precise manipulation of climate than we currently believe possible.<sup>38</sup> Nevertheless, my premises seem reasonably secure

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37. See *supra* note 6.

38. If people cannot perceive the risks of climate change, support for mitigation would likely fall. See Sammy Zahran et al., *Climate Change Vulnerability and Policy Support*, 19 SOC'Y & NAT. RESOURCES: AN INT'L J. 771, 781 (2006) (showing that individuals who perceive climate change as harmful to

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given what we know about psychology, personal and business planning, the climate system, climate modeling capacity, and technology; otherwise we would not have much of a climate change policy problem in the first place. I do not discuss these premises further except where necessary to the analysis that follows below. Rather, my focus is on establishing that there will be people and businesses that believe they are climate change winners, and then on exploring what policy implications they present given how they might behave under these assumptions.

If I am right about the emergence of climate change winners, they are likely soon to become a force in the climate policy dialogue as their enjoyment of substantial climate change benefits alters not only the dispassionate cost-benefit analysis of mitigation and adaptation measures, but also the political economy of climate policy. I write from the perspective that these influences will be of most concern to policymakers interested in pursuing effective mitigation policy and robust investment in harm-reducing adaptation measures to advance our nation's climate agenda, and therefore I adopt that position as the reference point for examining how the emergence of a substantial class of climate change winners will influence that policy package's success.

Given this reference point, it is appropriate for me to make some disclosures and representations about my scope and purpose. First, I do not purport to build econometric models of climate change at any scale—national, local, or individual—or to weigh in on the heated debates regarding the design and interpretation of the expanding universe of IAM studies. Nevertheless, one unequivocal goal of the Article is to add reason to believe that mitigation policy should not rely on IAMs as much as it has, especially when taking climate change benefits into account. Second, I do not explore the psychology of how people form perceptions of what is harmful or beneficial to them generally. My inquiry picks up with the point at which they have formed such impressions about the market and nonmarket impacts of climate change. However, from there I do explore the available psychological literature on whether and how people

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their personal welfare are significantly more likely to support climate change mitigation and adaptation policies). On the other hand, people with an integrated concern for intergenerational equity, carrying capacity, and resource scarcity, and who regard the biosphere as deserving of moral consideration, have been shown to be more willing to assume the costs of climate change prevention. *See id.*

will associate those personal effects with climate change and how they will act on those associations. Third, I attach no normative moral significance to the idea that people may conclude they are climate change winners. For my purposes they are simply people who believe climate change has been or will be good to them. The question of whether holding such a belief is immoral is outside the scope of my inquiry;<sup>39</sup> however, what they do about their beliefs in the political sphere raises normative questions I do explore. Fourth, my focus on climate change winners in the United States is not intended to trivialize the likelihood that people and businesses in the United States and many other nations will be overwhelmingly on the losing side of climate change.<sup>40</sup> Given the likelihood of many winners in the United States, however, and given how important U.S. policy is to overall global action on climate change, it is useful to isolate the winners phenomenon in our nation to consider its domestic political impact. Finally, nothing about my description of climate change benefits and winners is intended to support the case for climate change skepticism or opposition to mitigation and adaptation policies.<sup>41</sup> In fact, my purpose is just the opposite. It is necessary, however, to describe the benefits and their beneficiaries in order to discuss the political implications and appropriate policy and legal responses.

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39. It would be difficult to make the case that any descriptive morals against recognition of climate change benefits or beneficiaries have formed in the United States given the significant numbers of people who continue to be skeptical of climate change in general or, even if they believe it is happening, oppose more aggressive regulatory responses. Most Americans perceive of climate change as a low to medium political priority, and almost half of Americans believe their local, state, and federal governments are devoting sufficient attention to climate change or should be doing even less. See ANTHONY LEISEROWITZ ET AL., YALE PROJECT ON CLIMATE CHANGE COMMC'N & GEORGE MASON UNIV. CTR. FOR CLIMATE CHANGE COMMC'N, CLIMATE CHANGE IN THE AMERICAN MIND: PUBLIC SUPPORT FOR CLIMATE & ENERGY POLICIES IN MAY 2011, at 2–4 (2011) [hereinafter LEISEROWITZ, PUBLIC SUPPORT MAY 2011] (producing results from a May 2011 survey of over 1000 interviews); ANTHONY LEISEROWITZ ET AL., YALE PROJECT ON CLIMATE CHANGE COMMC'N & GEORGE MASON UNIV. CTR. FOR CLIMATE CHANGE COMMC'N, CLIMATE CHANGE IN THE AMERICAN MIND: PUBLIC SUPPORT FOR CLIMATE & ENERGY POLICIES IN MARCH 2012, at 2 (2012) [hereinafter LEISEROWITZ, PUBLIC SUPPORT MARCH 2012] (producing results from a March 2012 survey of over 1000 interviews).

40. See generally IPCC SYNTHESIS REPORT, *supra* note 2 (describing generally the harms of climate change).

41. See LEISEROWITZ, PUBLIC SUPPORT MARCH 2012, *supra* note 39, at 2.



## A. BENEFITS

For purposes of the policy analysis following later in the Article, it is useful to divide climate change benefits into those that are direct consequences of the biophysical changes brought by climate change—such as longer growing seasons<sup>42</sup>—and benefits that flow indirectly from those biophysical changes—such as the coffee shop experiencing increased business in an agricultural district enjoying longer growing seasons, or a business selling adaptation products or services. The distinction is important to policy given how different the climate change winners associated with each are likely to be distributed and to perceive their benefits.

## 1. Direct Benefits

Most of the direct benefits of climate change are associated with the initial warming of temperature regimes.<sup>43</sup> Higher temperatures are, of course, the root of the climate change problem for most climate change losers, but consider that there are areas today which, for one reason or another, are held back in some way because they are cold, sometimes severely so. Hence, warming in such regions could produce benefits such as longer growing seasons for agriculture,<sup>44</sup> reduced strain on transportation infrastructure from freezing,<sup>45</sup> longer outdoor recreation and tourism seasons,<sup>46</sup> reduced health hazards of se-

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42. See Fisher et al., *supra* note 8, at 2074.

43. See, e.g., TOL, *supra* note 13, at 30 (mentioning increased Arctic harbor access from melted ice as a benefit of climate warming).

44. See Fisher et al., *supra* note 8, at 2074 (“[L]arge gains are predicted for North America . . . due to longer planting windows and generally more favourable growing conditions under warming.”). See generally Johnston, *supra* note 17, at 33–36 (summarizing agriculture studies).

45. See TOL, *supra* note 13, at 17 (mentioning reduced traffic disruptions due to snow and ice); U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 61 (“Decreased extreme cold will provide some benefits such as reduced snow and ice removal costs.”).

46. See Mendelsohn, *supra* note 11, at 10 (“[S]ummer recreation is substantially larger than winter recreation and would increase with warming.”); SUSSMAN & FREED, *supra* note 4, at 3 (“Tourism will also face a mixed picture, with opportunities for winter tourism and some ecosystem uses declining, but being replaced in some cases by extended spring and summer recreation opportunities.”); TOL, *supra* note 13, at 17 (observing that tourism economies are likely to shift as a result of warming); U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 88 (“The length of the season for, and desirability of, several of the most popular activities—walking; visiting a beach, lakeshore, or river; sightseeing; swimming; and picnicking—are likely to be enhanced by small near-term increases in temperature.”).

vere cold,<sup>47</sup> fewer work stoppages due to cold weather conditions,<sup>48</sup> lower winter heating bills,<sup>49</sup> and better ocean transportation and resource extraction options in previously frozen regions.<sup>50</sup> Many people also simply enjoy mild climates and are willing to pay for them.<sup>51</sup>

Warming will also drive changes in precipitation patterns, in some areas to the benefit of some water users by increasing water availability.<sup>52</sup> More water, of course, can be a good or a bad thing, but the point is that it can be a good thing for many people.<sup>53</sup> Increased water supplies could, for example, benefit agricultural land uses, reduce regional supply scarcity problems, and enhance hydropower production capacity.<sup>54</sup>

It is more difficult to predict with any detail the direct benefits from other biophysical impacts of climate change. Indeed, here I have to speculate as there is such a paucity of robust studies of climate change benefits. Rising sea levels, for example, will certainly have adverse effects on many existing coastal land uses. But it is not merely facetious to observe that some

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47. See IPCC SYNTHESIS REPORT, *supra* note 2, at 48 (“Climate change is projected to bring some benefits in temperate areas, such as fewer deaths from cold exposure . . .”). See generally Johnston, *supra* note 17, at 26–29 (summarizing health effect studies).

48. See SUSSMAN & FREED, *supra* note 4, at 3 (offering the example of a roofing company able to extend its work season).

49. See U.S. ENVTL. PROT. AGENCY, *supra* note 3, at 7 (“Warmer temperatures may result in higher energy bills for air conditioning in summer, and lower bills for heating in winter.”).

50. See Joshua Ho, *The Implications of Arctic Sea Ice Decline on Shipping*, 34 MARINE POL’Y 713, 714 (2010) (predicting that “tremendous shipping benefits would accrue” given that Arctic routes “would trim about 5000 nautical miles and a week’s sailing time” compared to routes using the Suez Canal); TOL, *supra* note 13, at 17 (mentioning improved harbor access, resource exploitation, and transport routes in the Arctic).

51. See Johnston, *supra* note 17, at 21–26 (summarizing studies showing mild climate as an amenity value).

52. See U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 30 (noting that northern areas of the United States will become wetter).

53. See IPCC SYNTHESIS REPORT, *supra* note 2, at 48 (discussing “[t]he beneficial impacts of increased annual runoff in some areas”); U.S. ENVTL. PROT. AGENCY, *supra* note 3, at 7 (“An overall increase in precipitation may increase water availability in some regions, but also create greater flood potential.”).

54. See, e.g., INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, IPCC SPECIAL REPORT ON RENEWABLE ENERGY SOURCES AND CLIMATE CHANGE MITIGATION: SUMMARY FOR POLICYMAKERS 12 (2012), available at [http://srren.ipcc-wg3.de/report/IPCC\\_SRREN\\_Full\\_Report.pdf](http://srren.ipcc-wg3.de/report/IPCC_SRREN_Full_Report.pdf) (“For hydropower the overall impacts on the global technical potential is expected to be slightly positive.”).

land areas will benefit from becoming closer to the coast, though exactly where, in what ways, and by how much are hard to say.<sup>55</sup> Even more difficult to project are the benefits some people may derive from shifts in ecological regimes. Some species will migrate from one area to another to follow changing temperature and precipitation regimes.<sup>56</sup> If a species exiting a region was considered undesirable by some people in the area, or if a species moving into a new area is considered desirable by some people in the area, they have potential climate change benefits. Indeed, some species will stay where they are but actually prosper from climate change,<sup>57</sup> and if people in the area find the species desirable for whatever reason, there are potential climate change benefits. My point is that even the climate change impacts portrayed in climate policy dialogue as the sources of the worst of climate change—sea level rise and ecological shifting—will nonetheless produce some direct benefits for some people in some places.

These and other direct benefits would, obviously, be concentrated around the areas where the relevant biophysical changes are occurring, though some benefits, such as more water, could be transported considerable distances. This is not to say that all people in such areas will be beneficiaries, or that the biophysical changes always will produce some benefits. Agriculture, for example, presents a complex set of conditions defining where and when benefits of warming and precipitation can be secured, as temperature, carbon dioxide levels, precipitation patterns, weeds, pests, and crop type all factor into the profile for any location.<sup>58</sup> Overall, however, we can expect direct

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55. See Mendelsohn, *supra* note 11, at 10–12 (discussing the economic dynamics of coastal transitions and noting that high-value coastal areas are likely to be protected through adaptation measures such as sea walls).

56. See U.S. ENVTL. PROT. AGENCY, *supra* note 3, at 7 (“The range and distribution of many species will change.”). There is evidence such adaptive responses already are occurring. See David Nogués-Bravo & Carsten Rahbek, *Communities Under Climate Change*, 334 *SCIENCE* 1070 (2011) (advocating for new large-scale and interdisciplinary research approaches to measure species movement and adaptation due to climate change).

57. See Nogués-Bravo & Rahbek, *supra* note 56, at 1070 (“Other species will cope with climate change in situ or perish.”).

58. See Supit et al., *supra* note 8, at 693 (explaining the various factors in connection with research showing that the benefits of increased carbon dioxide levels may reduce the adverse effects of increasing temperatures for some crops in some areas); U.S. ENVTL. PROT. AGENCY, *supra* note 3, at 2 (describing the interaction of warming, carbon dioxide, water, and nutrients); see also Wolfram Schlenker et al., *Will U.S. Agriculture Really Benefit from Global Warming? Accounting for Irrigation in the Hedonic Approach*, 95 *AM. ECON.*

climate change benefits to concentrate in some magnitude in some areas where temperatures rise, precipitation increases, and other biophysical climate change effects take hold in ways offering economic benefits directly to people and businesses in geographic proximity to the physical impacts.

Generally speaking, temperature-driven direct benefits will favor areas in northern latitudes and higher altitudes—i.e., the areas currently more likely to be suffering the downsides of being cold.<sup>59</sup> The areas benefitting from increased precipitation are not as easily generalized given how sensitive local water balances can be to climate,<sup>60</sup> though most models have identified the Northeastern United States as receiving more precipitation and the Southwest receiving less.<sup>61</sup> Rising sea levels will affect all coastal areas, and shifting ecosystems are likely to affect the entire nation, making it extremely difficult to predict beyond the fact that there will be some benefits in some places as a result of these and similarly ubiquitous changes.

## 2. Indirect Benefits

Whereas the most significant sources of direct climate change benefits—increased temperature and precipitation—are likely to produce patchy geographies with areas of concentrated benefits and harms, indirect climate change benefits are more likely to produce opportunities everywhere. This is because there will be indirect benefits flowing from both the direct benefits and the direct harms of climate change. Far more than is the case for direct benefits, therefore, the indirect benefits of climate change follow no predictable geographic patterns—they can arise virtually anywhere, anytime, for anyone. No area of the nation, no *neighborhood* in the nation, will be without the

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REV. 395 (2005) (arguing that costs of irrigation in drying areas must be taken into account). The result is a complex geography of winner and loser agricultural districts. It is expected, for example, that agriculture in California and North Carolina will, on balance, be substantial losers whereas Georgia and Arizona will be substantial winners. See Deschênes & Greenstone, *supra* note 8, at 357 (summary), 378 (chart of state outcomes).

59. See Johnston, *supra* note 11, at 38–39, 41.

60. See U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 30 (explaining the difficulty of predicting local precipitation impacts); Mendelsohn et al., *supra* note 10, at 165 (noting that “[w]ater supply and demand in specific regions can change dramatically across climate scenarios”).

61. See IPCC SYNTHESIS REPORT, *supra* note 2, at 47 (map of world projected precipitation pattern changes), 49 (map of world projected relative changes in runoff); U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 31 (map of North America projected precipitation pattern changes).

availability of some indirect benefits from climate change at some point over the next one hundred years in one or more of the following forms.

*a. Direct Benefit Spillovers*

Areas receiving substantial direct benefits of climate change are an obvious case for indirect benefits in the form of positive spillovers. The farmer that benefits directly from a longer growing season purchases more fertilizer and gasoline, spends more at local restaurants, and so on. The farmer's increased prosperity generates benefits for others who in turn continue rippling benefits through the economy. The growing prosperity of the area in general may attract additional immigrants and investments, thus fueling the local concentration of benefits and beneficiaries. An influx of immigrants could improve real estate markets and other sectors of a local economy. Even some of the refugees from hard hit areas may find their situations improved substantially above what their lives were like back home prior to climate change. An entire local economy might begin to thrive as indirect spillover benefits piggyback direct benefits.

*b. Adaptation Products and Services*

Indirect benefits of climate change will not be limited to areas with large sources of direct benefits. Areas feeling more climate change harms than benefits, even lopsidedly so, will need to invest in public infrastructure adaptation measures such as seawalls, health services, and reconstruction of structures damaged by storm surges and floods.<sup>62</sup> People living in such areas will need climate proofing for homes, air conditioning, insurance products, and so on. The demand for these public and private adaptive products and services may lead to technological advances, such as new insulation materials, new insurance products, and new crop strains, positioning businesses selling the new products to profit substantially.<sup>63</sup>

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62. See SUSSMAN & FREED, *supra* note 4, at 4 (offering the possibility of the insurance industry "assisting homeowners and business in reducing losses by taking appropriate adaptive action").

63. See *id.* at 3–4 (offering the examples of new crop strains, new insurance products, new climate proofing materials, and new building designs); see, e.g., OLIVER WYMAN FIN. SERVS., CLIMATE CHANGE: RISKS AND OPPORTUNITIES FOR GLOBAL FINANCIAL SERVICES 1–6 (2007) (examining numerous up-sides and means of "[c]apturing the opportunity" of climate change for financial service providers).

Adaptation benefits will not be limited to areas where adaptation products and services are in demand. Whether a business thrives by selling its wares to people that are directly benefitted or directly harmed, and whether it sells them locally or online, it benefits indirectly from climate change. A business selling a new climate proofing material thus could operate from anywhere, and an individual investor in that business could live anywhere, as well.

*c. Comparative Advantages*

Climate change is likely to disrupt existing comparative advantages in a variety of product and service industries, particularly agriculture, meaning some benefits will emerge in areas of the United States that enjoy newfound comparative prowess.<sup>64</sup> For example, even if conditions for a particular globally important crop decline in the United States, so long as they are declining less drastically here than in other nations, our growing regions for the crop may prosper.<sup>65</sup> Even within the United States, similar shifts in comparative advantages could produce benefits in areas formerly not in comparative advantage to other regions. Some businesses will also profit from climate change simply because they are better at managing for its risks than other companies, thereby gaining competitive advantage.<sup>66</sup> In general, climate change will spur global, regional, national, and local economic transformations which, like any large-scale economic change process, are likely to produce vast numbers of winners and losers.<sup>67</sup>

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64. See U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 106 (“Climate change also has the potential to alter trade relationships by changing the comparative trade advantages of regions or nations.”).

65. See *id.*

66. See SUSSMAN & FREED, *supra* note 4, at 4 (offering the examples of businesses that avoid locking in high-value assets in high-risk areas well before other competitors); Jonathan Lash & Fred Wellington, *Competitive Advantage on a Warming Planet*, HARV. BUS. REV., Mar. 2007, at 95, 96 (“[A] company’s climate-related risk mitigation and product strategies can create competitive advantage.”).

67. Cf., e.g., SANDRA POLASKI, WINNERS AND LOSERS: IMPACT OF THE DOHA ROUND ON DEVELOPING COUNTRIES *passim* (2006) (examining how trade agreements might make “net winners and net losers” out of developing nations); Nancy Birdsall & John Nellis, *Winners and Losers: Assessing the Distributional Impact of Privatization*, 31 WORLD DEV. 1617, 1622–25 (2003) (discussing the distributional effects of privatization in formerly state-dominated economies); Elizabeth Brainerd, *Winners and Losers in Russia’s Economic Transition*, 88 AM. ECON. REV. 1094 *passim* (1998) (studying winners and los-

d. *Regulatory Benefits*

New federal, state, and local climate change mitigation and adaptation regulations necessarily will create opportunities for people and businesses to take advantage of the new regulatory programs for economic gain. This effect is well established by examples such as wetlands mitigation banking, where regulatory programs require someone destroying a protected wetland to compensate for the loss, and the method of choice is to purchase credits from someone else who has improved wetlands elsewhere.<sup>68</sup> Somewhat perversely, this wetland credits industry exists and prospers only because other industries fill wetlands and must comply with regulations, but it exists nonetheless.<sup>69</sup> It seems only likely that climate change mitigation and adaptation regulations fashioned around different regulatory models will create similar opportunities for people and businesses to derive regulatory benefits. New regulatory programs could also erect barriers to entry that may advantage existing firms in an industry, as well as present opportunities for comparative advantage effects as some firms will be able to develop more effective strategies for obtaining incentives and other compliance benefits.<sup>70</sup>

B. BENEFICIARIES

Just as there will be different kinds of climate change benefits, so too will there be different kinds of people and businesses taking advantage of them. A policy-relevant typology of potential beneficiaries includes at least the following somewhat overlapping groups.

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ers in terms of wage disparity in a large-scale economic transformation context).

68. For background information on wetland mitigation banking, see Royal C. Gardner, *Mitigation*, in WETLANDS LAW AND POLICY: UNDERSTANDING SECTION 404, at 253 (Kim Diana Connolly et al. eds., 2005); Palmer Hough & Morgan Robertson, *Mitigation Under Section 404 of the Clean Water Act: Where It Comes From, What It Means*, 17 WETLANDS ECOLOGY & MGMT. 15 (2009).

69. See Hough & Robertson, *supra* note 68, at 24 (explaining that businesses “acquire these [wetland] credits to meet their compensatory mitigation requirements”).

70. See Daniel L. Millimet et al., *Environmental Regulations and Economic Activity: Influence on Market Structure*, 2009 ANN. REV. RESOURCE ECON. 99, 100 (“Environmental regulation may affect market structure by modifying . . . entry of new firms . . . and the relative competitive advantage of active firms.”), 110 (“[R]egulation affects the incentive of firms to invest in technology adoption, innovation, and research and development . . .”).

### 1. Passive

Many will benefit from climate change without any thought or change in behavior at all. The farmer enjoying a longer growing season has done nothing other than add more days to the routine of work and expenditures. A roofing company benefitting from longer outdoor construction seasons does nothing but keep workers working. A family whose heating bills fall because of fewer cold days has done nothing other than keep the thermostat set at the same temperature they would have anyway. A shipping line in high latitudes where the ice season is short does nothing but keep shipping. The coffee shop doing a brisker business in a newly prospering agricultural town does nothing but pour more coffee. No calculated move is needed for these and similarly situated people and businesses to benefit directly or indirectly from climate change—rather, they benefit passively.

Passive beneficiaries of climate change nevertheless are likely to become acculturated to the new good times. Although they have not actively sought their benefits, they no doubt will invest in them, such as the farmer who purchases new equipment and the coffee shop that has expanded to meet new business.<sup>71</sup> Many passive beneficiaries of climate change, therefore, may begin to behave as if they are invested in and entitled to their climate change benefits when it comes to mitigation and adaptation policies.

### 2. Adaptive

Unlike passive beneficiaries, who benefit simply by profitably doing more of what they were doing before climate change, some people and businesses facing deteriorating conditions as a result of climate change will respond by adapting in ways that may ultimately prove highly beneficial. An example comes from the West Coast's wine production industry, where extensive modeling suggests that by sticking with their current wine grapes, growers in California and Washington face significant losses of suitable production acres, but that "adaptation to the warming, such as the introduction of heat-tolerant varieties of

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71. See, e.g., U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 73 (noting that farmers adapting to climate change will have to adjust "a wide range of farming practices," including buying potentially expensive stress-tolerant seeds and investing in new equipment); Ho, *supra* note 50, at 714–15 (arguing that vessels seeking to take advantage of a Northern Sea Route created by global warming will need improved ship technology).



grapes, could sharply reduce the losses in California and turn the Washington loss into a 150% gain.”<sup>72</sup> Washington may be the next California of wines.

The point is that climate change could spur adaptations that lead to economic outcomes for some people and businesses superior to their previous conditions. A farmer who shifts to high-value crops, a ski area that moves heavily into lucrative warm weather recreation, a clothing store that stocks more popular warm weather outfitting—these people and businesses are not passively benefitting, but neither are they passively sitting back and taking their climate change licks.<sup>73</sup> Even more so than passive beneficiaries, we can expect such adaptive beneficiaries, given their ingenuity and investment in the adaptive response, to feel positive about and entitled to their benefits.

### 3. Opportunistic

Some people and businesses will actively work to seize direct and indirect benefit opportunities from climate change. Longer growing seasons, for example, may prompt some people to go into farming or farm supply businesses who otherwise might not have. More opportunistically, a business might work on developing new technologies to market to people harmed by climate change to adapt, such as climate proof building materials, new forms of hot weather clothing, or improved seawall building techniques.<sup>74</sup> And most opportunistic of all, some people will benefit from climate change by making shrewd investment decisions about which businesses will be climate change winners and losers.

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72. Richard A. Kerr, *Vital Details of Global Warming Are Eluding Forecasters*, 334 *SCIENCE* 173, 174 (2011). Similarly, cranberry crop production is expected to rise in Maine, and cranberry producers are seeking land there and even farther north into Canada. North Cairn, *Climate Change May Boost State's Cranberry Take*, *PORTLAND PRESS HERALD* (Maine), Sept. 30, 2012, available at [http://www.pressherald.com/news/climate-change-may-boost-states-cranberry-take\\_2012-09-30.html](http://www.pressherald.com/news/climate-change-may-boost-states-cranberry-take_2012-09-30.html).

73. Outcomes for agriculture and livestock industries in particular are sensitive to adaptive capacity, with efficient adaptations potentially yielding benefits in many cases. See Joel B. Smith & Jeffrey K. Lazo, *A Summary of Climate Change Impact Assessments from the U.S. Country Studies Program*, 50 *CLIMATIC CHANGE* 1, 9–18 (2001).

74. See IPCC SYNTHESIS REPORT, *supra* note 2, at 57 tbl.4.1 (identifying what new technologies or investments might benefit various sectors, such as revenues from new attractions potentially boosting tourism); see, e.g., SUSSMAN & FREED, *supra* note 4, at 30 (“[I]ndoor recreation may substitute more frequently for outdoor recreation in areas that become uncomfortably hot.”).

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This category of climate change beneficiaries, therefore, is defined by the calculated steps and changes in behavior they take to derive benefits from climate change. In other words, they set out to become climate change winners. Although savvy investors may be indifferent to mitigation policy, expecting they can find good positions under any changing scenario, many of the people and businesses who succeed at this opportunistic strategy are not likely to be receptive to aggressive mitigation policies. Moreover, they are likely to seek private and public investment in infrastructure necessary to make their benefits more secure.

#### 4. Migratory

Some people will move because of climate change and will benefit as a result. All such people are opportunistic and adaptive in the sense that the direct or indirect effects of climate change motivated a change in their behavior, but some will appear more opportunistic than adaptive or passive. For example, some people might move simply to avoid severe harms of climate change,<sup>75</sup> having no particular plan to benefit from climate change in their new home region but incidentally benefiting directly and indirectly nonetheless. Another person might lose his or her job in one area because that employment sector is suffering a downturn as a result of climate change (for example, a ski center employee), and decide to move to an area with a better employment outlook in some sectors because of climate change (for example, a beach resort enjoying warmer temperatures). Yet more opportunistically, another person might move from a perfectly fine position in order to take an even better position, such as manager of a seawall construction company.

The point of creating such a category of migratory beneficiaries is not, however, to focus on their passive, adaptive, or opportunistic behavior, but to emphasize the potential *distributional* effects of climate change benefits. The migratory response may both disperse beneficiaries more widely and concentrate beneficiaries in some regions. Moreover, people and businesses making the investment to move as a result of cli-

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75. A number of legal scholars have identified climate-based migration as a significant issue for international and national policy. See, e.g., Kara K. Moberg, Note, *Extending Refugee Definitions to Cover Environmentally Displaced Persons Displaces Necessary Protection*, 94 IOWA L. REV. 1107 (2009) (summarizing the commentary to suggest that current international and domestic laws are inadequate to protect an increasing population of climate migrants).

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mate change, regardless of how opportunistically, and who come out benefitting as a result are likely to take that investment into account when asked by climate mitigation policy to yield the benefits they and their successors will enjoy.

#### 5. Subsistence

Many climate change beneficiaries, whether passive, adaptive, opportunistic, migratory, or some combination thereof, will be net winners only in the sense that their lives are made a little less miserable than they would have been without climate change.<sup>76</sup> For example, a family in poverty living in an area of extreme cold might see heating bills slowly falling, or might have improved transportation options, or might find a little longer work season in agricultural fields. A struggling coffee shop in the area may also enjoy lower heating bills and perhaps a few more customers.

I treat such climate change circumstances in a separate “subsistence” category to emphasize that it is not only climate change losers who present sympathetic policy cases. Moreover, although only marginally ahead and perhaps not seeing themselves as winners in life generally, many people and businesses in the subsistence category might value their climate change benefits dearly and strongly wish to retain them. As they are also likely to be concentrated in areas of rural or urban poverty, they could organize into a substantial political force in some local and state jurisdictions.

## II. WHO ARE THE CLIMATE CHANGE WINNERS?

Thus far I have used the term “climate change winner” to refer to people and businesses who conclude that “life is good” *because* of climate change. Yet, although it is indisputable that there will be climate change benefits available to many people and businesses, that does not necessarily mean any of the beneficiaries will actually be climate change winners or, correctly or not, believe they are. Before we can move from there being benefits and their beneficiaries to there being winners in any sense meaningful to climate policy, it is necessary to step back and explore the idea of climate change winners in more detail. In

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76. For example, although global warming will very likely ameliorate traffic conditions by melting snow and ice, that “pale[s] in comparison to the big unknowns: extreme climate scenarios, the very long term, biodiversity loss, the possible effects of climate change on economic development and even political violence.” TOL, *supra* note 13, at 17.

this part of the Article, therefore, I provide more clarity to what I mean by the term “climate change winner” and then examine evidence regarding whether any people and businesses will perceive themselves to be winners.

#### A. DEFINING CLIMATE CHANGE WINNERS

Within the social sciences, “[t]he idea that global change produces winners and losers has become more or less accepted in the common discourse.”<sup>77</sup> Think, for example, of sweeping technological change such as the Internet, or globalization of trade and the economy, or large-scale war, or the vast political upheavals experienced in many regions of the world—is it conceivable that these global forces of change produce only winners, or only losers, or are completely neutral? Any such claim would be taken as ludicrous.<sup>78</sup> Why would climate change be any different?

But what exactly do we mean by “winners” and “losers” in the context of global change? Their definitions have received little discussion in the global change literature. However, geographers Karen O’Brien and Robin Leichenko recently provided a systematic theoretical examination of these concepts using economic globalization and climate change as case studies.<sup>79</sup> The general framework they develop for thinking about winners and losers under scales of global change is especially useful in the context of climate change impacts.<sup>80</sup>

First, “winners” and “losers” in the global change context are usually meant to refer not to static characterizations reflecting current inequalities, but to “dynamic characterizations that emphasize identification of winners and losers following an event or in conjunction with longer-term processes.”<sup>81</sup> To be sure, the pre-existing inequalities may influence who are winners and losers as the dynamic changes play out, but the global

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77. O’Brien & Leichenko, *Winners and Losers*, *supra* note 14, at 89.

78. See *supra* note 67. Nor is global change, with its winners and losers, a new phenomenon. See CHARLES C. MANN, 1493 (2011) (providing a detailed history of global change impacts during the 1400s–1600s).

79. O’Brien & Leichenko, *Winners and Losers*, *supra* note 14, at 89; see also Karen L. O’Brien & Robin M. Leichenko, *Double Exposure: Assessing the Impacts of Climate Change Within the Context of Economic Globalization*, 10 GLOBAL ENVTL. CHANGE 221 (2000) [hereinafter O’Brien & Leichenko, *Double Exposure*].

80. O’Brien & Leichenko, *Double Exposure*, *supra* note 79, at 223–25.

81. O’Brien & Leichenko, *Winners and Losers*, *supra* note 14, at 90.

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change process may amplify, ameliorate, or alter those patterns of inequality.<sup>82</sup>

Second, the dynamic characterizations most pertinent to global change involve structural processes rather than the more conventional idea of winners and losers from specific voluntary events.<sup>83</sup> Thus, “structural winners and losers emerge from larger societal processes or changes, whereby the distribution of the impacts is unequal, such that gains and losses accrue differentially to participants.”<sup>84</sup> Moreover, the winners and losers are not necessarily participating in the global change process by choice, and their knowledge of all the gains and losses throughout the global system may be incomplete.<sup>85</sup>

Third, winning and losing can be thought of in absolute or relative terms. Absolute wins and losses are judged based on comparison of one’s status before and after the relevant event or change, whereas relative wins and losses are judged based on comparison to the situation of others.<sup>86</sup> Someone who is better off in relative terms might feel like a winner even if he or she is not better off in absolute terms, just as someone better off in absolute terms may feel like a loser if he or she is worse off in relative terms.<sup>87</sup>

Fourth, the identification of winners and losers could be based on self-identification by the winners and losers themselves or on a third-party judgment, such as a government agency measuring various metrics of gains and losses and announcing who has won and who has lost.<sup>88</sup> Self-identification has the advantage of setting the criteria internally, which obviates the need for agreement on the metrics but opens the door to a host of political and personal motives for misidentification.<sup>89</sup> Similarly, if external third-party metrics are used, the assessment of what counts as gains and losses could be framed according to purely neoclassical economic indicators such as income, or on Marxian political-economic theory that includes consideration of political power imbalances and economic de-

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82. *See id.*

83. *See id.*

84. *Id.*

85. *See id.*

86. *See id.*

87. *See id.*

88. *See id.* at 90–91.

89. For example, there may be psychological motives for individuals to self-identify as winners to claim superiority or as losers to seek sympathy and aid. *See id.*

pendency; in either case requiring subjective decisions by the third-party assessment authority.<sup>90</sup>

Lastly, the scale at which winners and losers are assessed is vitally important for understanding the political and economic impacts of global change.<sup>91</sup> Aggregating “wins” and “losses” at smaller scales to assess the “net” status at larger scales can mask the presence of winners and losers at the smaller scale.<sup>92</sup> A net loser nation, for example, could have many “winner” individuals and businesses within its borders, and even significant net winner regions and industries, just as a winner nation could have many losers.<sup>93</sup>

My interest in identifying climate change winners is in assessing their potential impacts on the politics of climate change mitigation and adaptation. Consistent with most treatments of the topic, I am primarily concerned, therefore, with how people and businesses at local scales self-identify their absolute and relative changes in situation from economic gains and losses throughout the dynamic, structural process of global climate change.<sup>94</sup> To clarify this definition further, consider what it includes and excludes.

First, I am concerned with what people and businesses believe they are based on their absolute and relative self-assessments,<sup>95</sup> not what government agencies or other organizations tell them they are.<sup>96</sup> Of course, never mentioning climate change winners in official statements, or even calling all people climate change losers, might condition people against self-identifying as winners, but that framing strategy can only go so far in the face of tangible climate change benefits. In any event, I cover the evidence on self-identification and framing

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90. *See id.* at 91–92.

91. *See id.* at 98 (stating that the assessments of winners and losers from climate change are further complicated with issues relating to spatial and temporal scales).

92. *See id.*

93. *See id.*

94. *See id.* at 97 (“Winners are usually referred to in terms of improved conditions, opportunities, positive effects, and benefits . . .”).

95. Although people who are relative winners but significant absolute losers are unlikely to exhibit the kind of policy preferences of concern to my inquiry, belief that one is a winner is all that matters to my analysis. Whether a person or business arrives at that conclusion based on relative comparisons, absolute comparisons, or a hybrid is inconsequential.

96. *See O'Brien & Leichenko, Winners and Losers, supra* note 14, at 90–91.

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later, as the ultimate number of winners does not affect how we define who they are.

Second, I measure winner status in purely economic terms, not through a political theory frame. It is likely that some people and businesses who are winners under my definition might put that status in the political back seat were they to perceive they are disfavored by strong political imbalances or economic dependencies separately wrought by climate change.<sup>97</sup> However, there is little research on the political effects—even less than what exists on economic benefits. Hence, while recognizing the potential for such perceptions to offset economic gains in terms of how people self-identify, in the absence of firm evidence supporting such an effect in the context of climate change, I limit my definition to a neoclassical economics version of gains and losses.

Third, I am concerned with sub-national scales, particularly local scales at which winners could concentrate sufficiently to dominate political discourse. Most legal scholarship has focused on whether the United States is a potential winner among nations and how the winner nations (generally the developed economies) should assist the loser nations (generally developing nations not significantly responsible for past greenhouse gas emissions).<sup>98</sup> Although those questions surely will play into domestic climate policy, uneven distribution of winners and losers *within* the United States is potentially a far more divisive political force.

Finally, it is likely that many people and businesses will thrive during climate change for reasons unrelated to climate change benefits; for example, through the effects of globalized trade and technological innovations.<sup>99</sup> Winners in that category might oppose mitigation policy because of its cost or some other reason, but that is not my concern. There is already no shortage of such people and businesses, so having more or less of them does not present a qualitatively different policy dynamic.

What we should care about, in other words, are people and businesses who believe they are better off economically as a result of climate change. They are the climate change winners.

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97. See *supra* note 89 and accompanying text.

98. See *id.* at 97–98.

99. See *id.* at 94–97.

## B. WILL THE WINNERS KNOW WHO THEY ARE?

One skeptical about the importance of climate change winners might assert that most people or businesses, notwithstanding their receipt of climate change benefits sufficient to plausibly support their self-identification as climate change winners so defined, will nonetheless not self-identify as winners. Arguably, an overwhelming moral sense of others' suffering, or a fear of the general global instability likely to be wrought by climate change, or a deep shame in claiming winner status among the sea of losers, could dissuade anyone who benefits substantially because of climate change from self-identifying as a climate change winner. Yet, while arguments such as these present profound moral and behavioral questions, very little is known about what people and businesses actually think and say about climate change benefits and their possible status as winners, because no studies have asked the right questions.<sup>100</sup> Indeed, even studies purporting objectively and in balanced framings to test and evaluate peoples' knowledge of climate change and its impacts systematically omit references to possible benefits.<sup>101</sup> In perhaps the most blatant of all such examples, a task force of the American Psychological Association explicitly wrote climate change winners out of the picture based not on any evidence there will be no winners, but on its own ethical orientation, arguing that mention of winners negates concern about "losers."

It neglects the interdependency among people and assumes that the misfortune of some will have little or no negative impact on those who have benefitted . . . Further, attending to the adverse impacts of climate change is consistent with the psychological ethical principle of avoiding harm and ensuring human welfare and psychologists' work

100. With one exception, see *infra* note 108, I have located no survey of public attitudes on climate change asking in any meaningful detail about perceived *benefits* of climate change.

101. One survey, for example, asked respondents whether they agree that "global warming will increase crop yields in some places, and decrease it in others" and "will cause some places to get wetter, while others will get drier," but otherwise identified no potential benefits associated with such effects. See ANTHONY LEISEROWITZ & NICOLAS SMITH, YALE PROJECT ON CLIMATE CHANGE COMMC'N, KNOWLEDGE OF CLIMATE CHANGE ACROSS GLOBAL WARMING'S SIX AMERICAS 37–38 (2010). Another survey asked people in one county to describe effects they had experienced and expected to experience from climate change, but offered only adverse effects such as "forest fires," "public health problems," and "more insects such as ticks and mosquitoes." See Karen Akerlof et al., *Do People "Personally Experience" Global Warming, and If So How, and Does It Matter?*, GLOBAL ENVTL. CHANGE (forthcoming 2013) (manuscript at 8), available at <http://dx.doi.org/10.1016/j.gloenvcha.2012.07.006>.



with marginalized groups who are most apt to experience negative impacts. For reasons such as these, we focus on the risks and negative impacts of climate change.<sup>102</sup>

None of the reasons given, however, is a good reason to ignore how people will perceive climate change benefits and their potential status as winners. Speaking of winners does not negate concern about losers. Indeed, as I explain later in the Article, not paying attention to winners only exacerbates the barriers to effective mitigation and adaptation policies designed to help climate change losers. Given that we know benefits will occur, such biased studies thus systematically fail to provide a complete picture of what people believe about climate change and how they form those beliefs.

It is difficult to learn much about how people perceive climate change benefits from studies framing climate change as only a harmful phenomenon, because how the impacts of climate change are framed in attitude survey questions is likely to change how respondents describe their perceptions of climate change. As psychologists Alexa Spence and Nick Pidgeon explain:

[W]hat we individually consider to be ‘dangerous’ climate change involves at minimum judgments about uncertain and complex science, potential impacts far into the future, as well as the perceptions and values we use to establish whether a particular outcome is acceptable or not. As a result, it is impossible to present information about climate change in a neutral manner without some kind of context, and therefore the way in which such information is ‘framed’ is paramount.<sup>103</sup>

They found, for example, that people are more receptive to climate change mitigation policy if it is framed as providing a benefit rather than avoiding a loss.<sup>104</sup> It stands to reason that people may also respond differently about climate change if studies include questions framed around the sources of market and nonmarket benefits from climate change.

Indeed, we do learn from some studies—biased as they may be against recognition of climate change benefits—that

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102. TASK FORCE ON THE INTERFACE BETWEEN PSYCHOLOGY & GLOBAL CLIMATE CHANGE, AM. PSYCHOLOGICAL ASS'N, PSYCHOLOGY & GLOBAL CLIMATE CHANGE: ADDRESSING A MULTIFACETED PHENOMENON AND SET OF CHALLENGES 14 (2009), available at [http://www.apa.org/science/about/publications/climate\\_change.aspx](http://www.apa.org/science/about/publications/climate_change.aspx).

103. Alexa Spence & Nick Pidgeon, *Framing and Communicating Climate Change: The Effects of Distance and Outcome Frame Manipulations*, 20 GLOBAL ENVTL. CHANGE 656, 657 (2010).

104. *Id.* at 664.

people are not ruling out the possibility of being winners. Some even seem to relish the idea. For example, in a series of surveys Anthony Leiserowitz and Nicolas Smith conducted, when asked generally whether climate change overall would be more beneficial than harmful, almost a third of respondents said that is “definitely false.”<sup>105</sup> Significantly, however, the same number said that this was only “probably false,” a little over a quarter of respondents did not know, and a combined twelve percent said it was “probably true” or “definitely true” that climate change would be more beneficial than harmful.<sup>106</sup> And while almost two-thirds of respondents in that survey believe that climate change on balance will probably or definitely be harmful overall, significant numbers in a related survey leave room for themselves being among the winners, or at least not significant losers. Only about a third of respondents believed they will be harmed by climate change “a great deal” or “a moderate amount,” whereas over half believe they will be harmed “only a little” or “not at all” and just under a half believe climate change will harm their families “only a little” or “not at all.”<sup>107</sup>

More on point, climate change researchers J.P. Palutikof, M.D. Agnew, and M.R. Hoaret asked people in Scotland and Southern England a series of questions framed around the climate extremes of hot dry summers and unusually warm winters.<sup>108</sup> Respondents evidenced “deep concerns about global warming tempered by an appreciation that there is potential for both positive and negative outcomes.”<sup>109</sup> Respondents from Scotland, where it is colder and wetter than Southern England, saw more positives, including improved agriculture, tourism, and lower energy costs as market benefits and greater sociability and increased outdoor activity as nonmarket benefits,<sup>110</sup> leading the researchers to conclude that “regional differences in climate could at least in part explain the apparent geographic

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105. LEISEROWITZ & SMITH, *supra* note 101, at 40. The survey preparers explain that they view the question not as one of truth or falsity but “ultimately a value judgment.” *Id.* at 77.

106. *Id.* at 40.

107. ANTHONY LEISEROWITZ ET AL., YALE PROJECT ON CLIMATE CHANGE COMMC’N & GEORGE MASON UNIV. CTR. FOR CLIMATE CHANGE COMMC’N, CLIMATE CHANGE IN THE AMERICAN MIND: AMERICANS’ GLOBAL WARMING BELIEFS AND ATTITUDES IN MAY 2011, at 4 (2011) [hereinafter LEISEROWITZ, BELIEFS AND ATTITUDES].

108. Palutikof et al., *supra* note 31, at 43.

109. *Id.*

110. *Id.* at 54–58.

differences in responses.”<sup>111</sup> Of course, people who believe they will be better off may turn out to be wrong, but they may be right. The point is that people do seem to be forming their own methods of climate impact assessment and, whether accurate or not, forming beliefs about their potential loser or winner status.

How will people make those assessments as climate change harms and benefits begin to take hold over the landscape and throughout the economy in more tangible forms than they have thus far? For one thing, a number of objective metrics will be available, such as the days in growing seasons, the household heating bill, profits from sale of climate proofing materials, and, obviously, the temperature. Even with these available indicators, it is unlikely that people or businesses will be able to comprehensively and objectively evaluate all the market and nonmarket impacts of climate change and arrive at accurate personal cost-benefit calculations. They are more likely to rely heavily on subjective and relative assessments about what is most important to them to decide whether life is good. For example, demographers Sammy Zahran, Samuel D. Brody, Himanshu Grover, and Arnold Vedlitz framed a number of scenarios designed to present what the authors believed would present objective risks from climate change. They found that risk perception, rather than objective risk, is “far more robust” for explaining how people conceive climate change will affect their lives.<sup>112</sup> To say the least, however, risk perception is a highly complex phenomenon riddled with cognitive processes that can lead to departures between objective and perceived risks.<sup>113</sup>

It is also unclear the extent to which people and businesses will connect life being good (or bad), or better (or worse), to climate change. Palutikof, Agnew, and Hoaret conclude from their studies, however, that respondents “indicate[d] a high level of awareness of the impacts of climate extremes.”<sup>114</sup> Similarly, Spence and Pidgeon summarize the literature showing people can distinguish between personal and societal impacts of climate change, with personal risks often judged to be lower than societal risks.<sup>115</sup> People thus seem to be assigning climate

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111. *Id.* at 43.

112. Zahran et al., *supra* note 38, at 784.

113. *Id.* at 774–76.

114. Palutikof et al., *supra* note 31, at 43.

115. See Spence & Pidgeon, *supra* note 103, at 657.

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change as the causal source of particular social and personal harms and benefits.<sup>116</sup> Again, their assessments may be wrong, but they may be right, the point being that people are consciously perceiving climate change as a source of harms and benefits.

Although I cannot resolve these complex cognitive questions, a few observations offer compelling reasons to pay closer attention to climate change benefits and winners. First, if it is in fact the case that people and businesses simply cannot connect climate change as a causal source of harms and benefits in their and others' lives and livelihoods, there is little reason to believe that effective mitigation policy will ever gain traction. People would simply seek private and public investment in adaptation, not knowing that they are adapting to climate change, and would pay little attention to any need to invest in mitigation. Alternatively, if it seems more likely that people and businesses will not be entirely oblivious to what is going on around them, particularly given how prevalent climate change is in the media and politics, then it follows that they will make connections between climate change and its harms *and* benefits. That is, why would there be cognitive asymmetry in that people have the capacity to recognize only climate change harms? Why would a farmer, for example, attribute introduction of a new pest or weed to climate change, but not make a similar association regarding the consistently lengthening growing season, thinking it is just a case of long-term serendipity? Comprehensively or not, accurately or not, it seems far more likely from the limited attitudinal studies thus far touching on climate change benefits that people will begin to attach climate change as the causal source of some of the losses *and gains* they experience in life.

Assuming that is the case, will any people or businesses perceiving substantial benefits from climate change have reason to conclude they are winners, and will their numbers be substantial? At one level this is an empirical question—will benefits outweigh harms in the minds of many? At another level it is a behavioral question—will such people and businesses decide to think like winners? On the empirical component, although climate change benefits have been systematically understudied, what attention has been given to them suggests that many winners will emerge. As explained previously in

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116. *Id.*; see also Akerlof et al., *supra* note 101, at 8.

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Part I, the agriculture sector is likely to have substantial areas of improved conditions over the next one hundred years, particularly when efficient adaptations are factored in. If some of the models are correct, moreover, overall economic performance in the United States over the next one hundred years is not grim by any means.<sup>117</sup> Even assuming it falls clearly on the negative side, presumably there will be a distribution of individual personal and business outcomes with some falling on the positive side.

Of course, as is explained in more detail later in the Article, all such gains for people and businesses are likely to be transitory over long timeframes without effective global mitigation policies eventually being put in place. But that does not avoid the question of what to do about people and businesses who believe they are winners over near terms. If you do not believe there will be any of them in the next one hundred years, or not enough to matter, the prospect of climate change winners is a blip on the climate policy screen not worth worrying about. Yet even if you believe that there very well may be a substantial number of people (and thus possibly entire communities), and businesses (and thus possibly entire industries) over the next one hundred years who believe they are climate change winners and behave like winners, you still might also question whether they will have any policy significance. In other words, will having them think and behave like winners present substantial policy challenges? I turn to that question in the next part of the Article.

### III. THE POLITICAL ECONOMY OF CLIMATE CHANGE WINNERS

Based on the studies discussed in Parts I and II, we can reasonably assume that climate change benefits will flow to substantial numbers of people and businesses and that many of the beneficiaries will perceive themselves to be climate change winners. So what? Will they make any difference in climate policy? There is every reason to believe they will at the very least complicate the politics of climate mitigation and adaptation, possibly suppressing support for greenhouse gas regulation and diverting resources away from harm-reducing adaptation measures. Of course, it is every bit as likely that climate

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117. Again, the methods and outcomes of IAMs, and even the propriety of using them at all, are hotly contested matters. *See supra* note 6.

change losers will want their say in climate policy, and that their interests will often diverge from the winners' interests. Climate policy, in other words, is soon to become not just about a tradeoff between the present and the future, but also a tradeoff between winners and losers at any given time. Hence it is worth us thinking now about how climate change winners will think about climate policy.

#### A. THINKING LIKE A CLIMATE CHANGE WINNER

It is well established that the public is currently divided over climate policy and the extent of climate change harms.<sup>118</sup> Because no attitude studies ask people about climate change benefits in any detail, however, respondents are never put in the position of evaluating climate policy from the perspective of having received climate change benefits, much less being a climate change winner. And since there are not yet any substantial climate change benefits to be secured, we do not know much about how people will really behave in the political arena once there are.

Acknowledging this vacuum of behavioral knowledge, several factors suggest the emergence of climate change winners across the nation will be complex and problematic for climate policy. Consider first that because of the "committed warming" effect,<sup>119</sup> climate policy is currently centered around a debate over whether, how, by how much, and when to stabilize greenhouse gas emissions, which only well after that would stabilize greenhouse gas concentrations in the atmosphere, which only well after that would (possibly) stabilize the climate in some new (presently unknown) set of conditions.<sup>120</sup>

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118. See LEISEROWITZ, PUBLIC SUPPORT MARCH 2012, *supra* note 39, *passim* (policy opposition); LEISEROWITZ, PUBLIC SUPPORT MAY 2011, *supra* note 39, *passim* (policy opposition); LEISEROWITZ, BELIEFS AND ATTITUDES, *supra* note 107, *passim* (disbelief).

119. The committed warming effect stems from the fact that "no matter how aggressively heat-trapping emissions are reduced, some amount of climate change and resulting impacts will continue due to effects of gases that have already been released." U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 11.

120. See IPCC SYNTHESIS REPORT, *supra* note 2, at 72 ("Anthropogenic warming and sea level rise would continue for centuries even if GHG emissions were to be reduced sufficiently for GHG concentrations to stabilize, due to the time scales associated with climate processes and feedbacks."); Richard A. Kerr, *How Urgent Is Climate Change?*, 318 SCIENCE 1230, 1230 (2007) ("The system has built-in time lags. Ice sheets take centuries to melt after a warming. The atmosphere takes decades to be warmed by today's greenhouse

This means no person alive today is likely to experience the hoped-for climate benefits of mitigation policy put in place today. In fact, no person living *at any point in time* now and into the distant future is likely to experience the climate benefits of regulatory policies put into place during his or her lifetime. Moreover, it is difficult to model with much precision exactly what greenhouse gas emission reduction is needed to stabilize climate and when and by how much any future climate stabilization effects will accrue from any given regulatory scenario.<sup>121</sup> As Professor Eric Biber has comprehensively outlined, this double-whammy of the delayed effects and uncertain outcomes of mitigation policy makes convincing the public to invest in and bear the costs of aggressive emissions regulation measures a tough sell politically—it asks people at any given time to make sacrifices in their lives for the unknown chance of reducing unknown harms by an unknown extent on behalf of unknown numbers of people at an unknown point in the future.<sup>122</sup>

Now add to that dynamic the climate change winners dynamic. Given that climate change will take place for hundreds of years into the future regardless of mitigation policies taken today or at any point in the next one hundred years, there will be a class of people along the way who perceive their situation to be improving *because of climate change*—people who notice their growing season is lengthening, their beaches are more pleasant, their outdoor recreation business is picking up, their new climate proofing invention is selling like mad. Persuading

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gas emissions.”); V. Ramanathan & Y. Feng, *On Avoiding Dangerous Anthropogenic Interference with the Climate System: Formidable Challenges Ahead*, 105 PROC. NAT’L ACAD. SCI. 14245, 14245 (2008) (estimating committed warming of 2.4°C even if greenhouse gas concentrations are held to 2005 levels); Susan Solomon et al., *Irreversible Climate Change Due to Carbon Dioxide Emissions*, 106 PROC. NAT’L ACAD. SCI. 1704, 1704 (2009) (estimating a 1000-year committed warming effect).

121. See IPCC SYNTHESIS REPORT, *supra* note 2, at 44–47 (discussing various emission stabilisation scenarios and impact projections), 73 (“Uncertainty in the equilibrium climate sensitivity creates uncertainty in the expected warming for a given CO<sub>2</sub>-eq stabilisation scenario. Uncertainty in the carbon cycle feedback creates uncertainty in the emissions trajectory required to achieve a particular stabilisation level.”).

122. See generally Eric Biber, *Climate Change and Backlash*, 17 N.Y.U. ENVTL. L.J. 1295 (2009) (identifying ways to reduce the likely backlash against regulations of delayed climate change harms); Eric Biber, *Climate Change, Causation, and Delayed Harm*, 37 HOFSTRA L. REV. 975 (2009) (focusing on how delayed responses shape the climate change debate); Lazarus, *supra* note 18 (arguing how legislators should insulate climate change legislation against short-term concerns).

these climate change winners to get behind mitigation policies seems an even taller political task than climate policymakers have with today's voters. And regardless of their mitigation policy positions, people and businesses anticipating a rosier lifetime for themselves and their successors because of climate change are likely to demand infrastructure investment and other public policies that support the delivery of those benefits.<sup>123</sup> They are also likely to make private investments that entrench them in their beneficial climate change future, and thus may not take kindly to public policy measures designed to unwind those benefits.

The psychological account of public opinion on climate change mitigation policy supports these expectations. Even without experience of climate change benefits, many people and businesses are generally dug in against investing in effective mitigation. One factor is biased assimilation of mixed evidence about a topic, which leads people to select the evidence that strengthens their preconceptions.<sup>124</sup> Professor Jeff Rachlinski has explained why the scientific evidence on climate change is sufficiently contested and ambiguous to lead to biased assimilations, which has further polarized peoples' views.<sup>125</sup> People also generally exhibit loss aversion, making people "relatively unwilling to sacrifice benefits they already possess to obtain other benefits,"<sup>126</sup> particularly when the other benefits are so far off.<sup>127</sup> These and other effects have seriously impeded public support for climate change mitigation, and surely could be no less in play for climate change winners.

For example, numerous studies have shown that people will take environmental action if they perceive that there are high overall risks from nonaction, that the risks of nonaction threaten their personal welfare, or that the benefits of action

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123. See generally INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY 370, 381 (2007) [hereinafter IMPACTS, ADAPTATION AND VULNERABILITY], available at [http://www.ipcc.ch/publications\\_and\\_data/publications\\_ipcc\\_fourth\\_assessment\\_report\\_wg2\\_report\\_impacts\\_adaptation\\_and\\_vulnerability.htm](http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg2_report_impacts_adaptation_and_vulnerability.htm) (describing the relationship between climate change and changing infrastructure needs, and noting that some major updates are already underway).

124. See Jeffrey J. Rachlinski, *The Psychology of Global Climate Change*, 2000 U. ILL. L. REV. 299, 304–05.

125. See *id.* at 304–06.

126. *Id.* at 307.

127. See generally Elke U. Weber, *Experience-Based and Description-Based Perceptions of Long-Term Risk: Why Global Warming Does Not Scare Us (Yet)*, 77 CLIMATIC CHANGE 103 (2006).



exceed the costs.<sup>128</sup> These behavioral trigger conditions are consistent with attitude study findings that “what drives support for costly climate change policies is the extent to which citizens regard climate change as threatening to their material well-being.”<sup>129</sup> People who do not perceive climate change as threatening their material well-being, but instead see themselves as climate change winners, can thus be expected to deliver even less support for climate change mitigation. People today also say they are not willing to pay much even when their payment would assure a solution to climate change,<sup>130</sup> so consider how much less they would be willing to pay if they believe they are climate change winners. In short, if many people in twenty-five years believe they are climate change winners, the evidence is that they will likely integrate evidence that supports their views, be reluctant to jeopardize their benefits, and generally not care as much about supporting climate change mitigation given their lower levels of perceived risk. Indeed, this exact effect held true in a study of people in Scotland and Southern England, leading to the conclusion that “[s]o long as people comprehend climate change as personally beneficial, despite identifying it as a problem for the UK as a whole, they are unlikely to consider the need for personal activities to mitigate climate change as important.”<sup>131</sup>

In areas where such climate change winners are concentrated geographically or sectorally—where whole communities of people and businesses see themselves as winners or where winners are concentrated economically through industry-wide ties—what are their political representatives to say in response to their positions on climate change mitigation and adaptation? How successful will a politician in a winner district, or in a district dominated by a winner industry, be by running on a platform supporting aggressive mitigation regulation, with an exclusive focus on harm-reducing adaptation? Given evidence that legislators in jurisdictions with high greenhouse gas emis-

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128. See Zahran et al., *supra* note 38, at 774.

129. *Id.* at 784.

130. One study on willingness to pay found that less than a third of respondents were willing to spend more than \$25 per month, even assuming such payments when amassed would allow policymakers to “solve” climate change. See THOMAS E. CURRY ET AL., LAB. FOR ENERGY & ENV’T, A SURVEY OF PUBLIC ATTITUDES TOWARDS CLIMATE CHANGE AND CLIMATE CHANGE MITIGATION TECHNOLOGIES IN THE UNITED STATES: ANALYSES OF 2006 RESULTS 19–20 (2007).

131. Palutikof et al., *supra* note 31, at 58.

sions tend not to support greenhouse gas regulation measures,<sup>132</sup> there is every reason to believe that politicians in winner districts will actively pursue the interests of their constituents. Clearly, therefore, the emergence of climate change winners and their concentration in many political districts will present new kinds of political struggles for climate policy as legislators from expected winner and loser districts are unlikely to agree easily on local, state, regional, and national policy directions.<sup>133</sup>

These effects are complicated even further by the fact that who and where the climate change winners are will shift over time. Most studies that bother to include benefits in the analysis “point to initial benefits of a modest increase in temperature, followed by losses as temperatures increase further.”<sup>134</sup> This means climate change winners are likely to start emerging in large numbers relatively early in the era of climate change impacts. But climate change will not stop on the dime to let them bask indefinitely in the benefits. For example, farmers in one region that begin experiencing lengthening growing seasons may like to have that continue and thus may oppose, or at least fail to support, emission regulation efforts. At some point, however, rising temperatures, invasive pests, and other side effects of climate change will turn those winners into climate change losers.<sup>135</sup> But there will be another set of climate change winners to take their places, as other regions begin to benefit from continued climate change. It may take many such cycles and thus many centuries before rising global temperatures and other effects adverse to agriculture outpace the adaptive capacity to secure the flow of benefits in all regions.<sup>136</sup> In short, over the next one hundred years climate change winners will likely begin to emerge across the landscape, shift gradually around the landscape, and demand attention along the way.

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132. See Cragg & Kahn, *supra* note 25, *passim*.

133. See Johnston, *supra* note 11, at 41–42.

134. TOL, *supra* note 13, at 9 (based on a synthesis of numerous economic studies).

135. See U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 2, at 12 (“Many crops show positive responses to elevated carbon dioxide and low levels of warming, but higher levels of warming often negatively affect growth and yields.”).

136. Even then, there might still be businesses and other entities that benefit from climate change indirectly, such as air conditioning and insulation installation businesses. See *supra* Part I.B.

Adding this shifting winners and losers effect to the already snarly climate policy scene makes for a rather complex mosaic of interests. At any given point in time over the next one hundred years and beyond, each person, community, business, and industry will have an initial perceived net climate impacts starting point—net loser, winner, or neutral—and a projected future trajectory of net harms and benefits over their relevant planning horizon toward net loser, winner, or neutral. How people and businesses view mitigation and adaptation policy—assuming they act primarily out of self-interest—will depend on how they perceive their respective present and future climate change impacts profile, and how they perceive different mitigation and adaptation policies will affect that profile. For example, a person with a net losing starting point but increasingly net positive trajectory might increasingly oppose public investment in mitigation, or at best not actively support it, but at the same time enthusiastically support ramped up investments in adaptation measures designed to secure the anticipated benefits stream. By contrast, a business that is a net winner at one point in time but projects an increasingly losing trajectory is more likely to increase its support for mitigation and support immediate investment in infrastructure both to secure the present benefits and to avoid the future harms.

To be sure, not all winners will be in lockstep opposition to mitigation policy and myopically focus on benefit-securing adaptation. Although I have assumed self-interested behavior, it is of course true that people define their interests in many different ways. A winner might support mitigation policy because of an overriding political affiliation, for example, or may support harm-reducing adaptation out of altruistic motives. Some winners might even support mitigation in the belief they can lock in a beneficial climate regime in a few decades. My point is not to pigeonhole people and businesses, but to draw attention to the likelihood that the emergence of classes of climate change winners and losers is likely to make climate policy far more contested than it already is. Given the evidence that people tend to base their climate policy positions on, among other things, their perceptions of their climate change impacts profiles, as real harms and benefits become widespread, the climate change winners are likely, on average, to lend less sup-

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port to mitigation policy and more support to benefit-securing adaptation policy.<sup>137</sup>

There are several important observations to be made about this policy dynamic.<sup>138</sup> First, it does not apply only to the scale of individual people and businesses. As explained above, direct climate change benefits are likely to concentrate in areas of biophysical change, which means that whole communities may self-identify as winners. It is likely, in other words, that some local and even state political districts will on the whole flip into net winner status. Second, even at the individual person and business scale, it matters for the politics who they are. Some people and businesses will profit immensely from climate change, and thus may exert disproportional influence on local, state, or federal policymakers to pursue their policy interests. Third, it may not take much net movement into winner status to make a person or business feel like a winner. In other words, it may take only a slight tip in the balance for a person, business, or community to start thinking like a climate change winner. Finally, some individuals, towns, regions, states, businesses, and industries will change status over time, while others remain relatively static.

At any point in time, in other words, people and their communities, businesses and their industries, and political districts at all scales will be distributed in various climate change impacts profiles, and twenty-five or fifty years later the configuration could be much different. Moreover, all of these effects are equally true for climate change losers, and for everyone in between, which means that the political landscape on climate policy will become increasingly patchy, dynamic, and potentially quite volatile.

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137. See Cass R. Sunstein, *On the Divergent American Reactions to Terrorism and Climate Change*, 107 COLUM. L. REV. 503, 525 (2007) (“[I]f Americans doubt the risk of serious harm [from climate change], they might well resist significant or costly regulatory responses.”).

138. My focus is primarily on attitudes toward mitigation and adaptation policy. It is entirely possible that climate change winners also will be more likely than losers to resist or ignore government efforts to change behaviors associated with greenhouse gas emissions, either because they engage in more consumptive behavior or simply care less about the effects of their emissions footprints. This could complicate strategies to leverage a “behavioral wedge” approach to mitigation, through which relatively simple and nonintrusive changes in personal and business behavior can significantly reduce aggregate emissions. See Thomas Dietz et al., *Household Actions Can Provide a Behavioral Wedge to Rapidly Reduce US Carbon Emissions*, 106 PROC. NAT’L ACAD. SCI. 18452, 18452–55 (2009).

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This is clearly not the linear “loser only” scenario one finds repeated in climate change policy studies and legal scholarship. The point should be clear by now: over the next one hundred years, climate change winners and losers of all sorts will begin to emerge and shift around across the landscape. Who they are, where they are, and how prevalent they are in any region will shift continually across time and space. There is little chance that this dynamic will not influence climate change politics.

The question that motivates this Article, therefore, is: What will the conversation sound like when the losers and the winners in countless urban and rural communities around the nation meet at coffee shops and water coolers and the topic of climate change comes up? I do not purport to have any superior insight into the psychology behind where and when people, communities, businesses, industries, and political jurisdictions place themselves in the winner versus loser matrix, or how they engage the policy debate given where they land. It is difficult to conceive of a future in which no such entities believe they are climate change winners, and it is naïve to assume all those who do consider themselves winners will stay in line with the themes of aggressive mitigation and harm-reducing adaptation. As Richard Lazarus aptly alluded to in his impressive analysis of the current state of climate change politics:

The potential for short-term benefits from climate change in nations like the United States will fuel other climate change lawmaking skeptics. Those who believe they have something to gain, whether from predictions of enhanced agricultural productivity or access to new energy resources, will be naturally reluctant to join a coalition favoring climate change legislation.<sup>139</sup>

What will we do about the climate change winners among us then? Of course, whatever we do about winners, we should not necessarily be concerned about a future full of climate change winners *now*.

#### B. WHY WORRY NOW ABOUT CLIMATE CHANGE WINNERS?

There is every reason to believe that as actual and prospective climate change winner and loser status becomes more tangible, winners and losers will begin to place contested demands on mitigation and adaptation policies. Yet the consequence of stifling talk of climate change winners is that climate policy has no theory of what to do about their presence in this policy dynamic. Legal scholars have acted as if the future includes on-

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139. Lazarus, *supra* note 18, at 1185.

ly climate change losers who will actively support aggressive mitigation and harm-reducing adaptation once they perceive they are losers, and thus have focused only on whether and how to achieve those climate change policies. But if at any point in time fifty million or more people, tens of thousands or more businesses, and thousands or more communities and political units in the United States believe they and the people of the future they care most about would be better off were climate change to continue its course, one has to expect that they will place demands on policy that may not be consonant with aggressive mitigation and harm-reducing adaptation policies. Clearly, climate policy must focus on those who will suffer under climate change, but what should we do about the climate change winners? Climate policy has not openly considered this question—it has formulated no answer for what to say if substantial numbers of climate change winners throughout the nation demand that policy focus on retaining or enhancing the benefits they expect to enjoy as a result of climate change.

To be sure, climate policy has had to deal openly with the sacrifices some people will have to make under an aggressive mitigation regime, such as through higher energy prices or shifting employment opportunities.<sup>140</sup> The standard policy response has been that any such sacrifices are morally, if not also economically, justified to make now to avoid far more serious harms to future generations.<sup>141</sup> More optimistically, policymakers trumpet the prospect of green jobs and other positive economic spinoffs of a climate change mitigation regime as softening the impacts of regulation to present and near-term generations.<sup>142</sup> The debate over these policy tradeoffs is already in full gear in legal scholarship, to be sure.<sup>143</sup>

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140. See generally NICHOLAS STERN, *THE ECONOMICS OF CLIMATE CHANGE: THE STERN REVIEW* (2007) (comprehensively studying costs and benefits of climate change mitigation policies such as regulation of greenhouse gas emissions); Bruce A. Babcock, *Costs and Benefits to Agriculture from Climate Change Policy*, IOWA AG REV., Summer 2009, at 1 (focusing on impacts of different regulatory policies on agricultural sector).

141. See generally Richard L. Revesz & Matthew R. Shahabian, *Climate Change and Future Generations*, 84 S. CAL. L. REV. 1097 (2011) (parsing out common justifications for intergenerational discounting and arguing that morally, people should value future generations as highly as they do their own).

142. See Dorceta E. Taylor, *Green Jobs and the Potential to Diversify the Environmental Workforce*, 31 UTAH ENVTL. L. REV. 47, 47 (2011) (“At the apogee of the 2008 election cycle not a day passed without mention of green jobs or green collar workers.”); see, e.g., THE VICE PRESIDENT OF THE U.S., GREEN

But this is not the tradeoff problem I am suggesting the policy world and legal scholars have yet to confront in any coherent way. It is one thing that greenhouse gas emission regulations may cause some people alive today to lose their “brown” jobs while others gain more lucrative “green” employment. The focus of climate policy has been whether to pursue regulation to avoid making people alive in the future worse off because of climate change—to limit the number of climate change losers. Doing so requires making (or forcing) changes in present behavior that will inevitably make some people in the near term worse off and some better off compared to their lot under the status quo. They are made worse or better off not because of climate change, however, but because of present policy choices made to influence future climate change trends and impacts.

The phenomenon I am concerned with has to do with people, businesses, and communities in the future believing they have been made better off because of climate change, not because of climate change policy. Few today would claim to be this kind of climate change winner, because there have not been enough climate change impacts in the United States to make anyone feel as if it has made them much better or worse off.<sup>144</sup> The issue, therefore, has not been put into play. In fifty years, however, there may be many millions of people and thousands of businesses and communities who begin finding or anticipating sufficient benefits from climate change to think of

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JOBS: A PATHWAY TO A STRONG MIDDLE CLASS, [http://www.whitehouse.gov/assets/documents/mctf\\_one\\_staff\\_report\\_final.pdf](http://www.whitehouse.gov/assets/documents/mctf_one_staff_report_final.pdf) (last visited Oct. 17, 2012) (providing information about climate change policies including green jobs impacts).

143. See generally, e.g., Andrew P. Morriss et al., *Green Jobs Myths*, 16 MO. ENVTL. L. & POL'Y REV. 326 (2009) (challenging arguments that a green jobs economy will develop and will, among other things, offset costs of greenhouse gas regulation); Jason Scott Johnston, *Global Warming Advocacy Science: A Cross Examination* (Univ. of Pa. Law Sch. Inst. for Law & Econ., Research Paper No. 10-08, 2010), available at <http://ssrn.com/abstract=1612851> (challenging arguments for stronger mitigation regulation).

144. When asked to respond to the statement “I have personally experienced the effects of global warming,” over two-thirds of 1010 adult Americans surveyed in 2010 disagreed at least somewhat. LEISEROWITZ, BELIEFS AND ATTITUDES, *supra* note 107, at 18. Neither this question nor any other in the survey asked respondents to differentiate between beneficial and harmful effects, but rather only focused on the harmful effects. See *id.* Similarly, only twenty-seven percent of adults asked the same question in a county-wide study agreed, with over one-third of respondents strongly or somewhat disagreeing and over one third undecided. Akerlof et al., *supra* note 101, at 3.

themselves as winners. Like most winners, many of them will want to stay winners.

So why have legal scholars devoted no attention to what to do about climate change winners? Perhaps one reason not to bother thinking about climate change winners is that there are not many out there yet and we can begin worrying about their policy positions when they begin expressing them. This logic falls apart, however, considering that there are not many climate change losers out there yet either. Climate change has only just begun to take sufficient hold to allow identification of harms and benefits, meaning the policy rationales necessarily are focused on impacts to future generations. Why would the prospect of future generations of losers be the reason for policy to attend to their interests now, but the prospect of future generations of winners would be the reason for policy *not* to account for them now? Clearly, if we are going to ignore the climate change winners problem, there has to be more reason for it than because they are off in the future. Otherwise, we should also be ignoring the climate change losers problem.

One such reason to ignore climate change winners but not losers could be that, simply put, they are winners, not losers. No matter how large in number, their gains are windfalls made possible only because of a phenomenon causing suffering to others. Like those who benefit from war or natural disasters, therefore, we should not countenance any demands by them to lock in their gains by allowing climate change to persist or to stabilize at levels adverse to large populations. To be sure, some people may be unappealing climate change winners because they seek economic opportunity in climate change—for example, someone who builds seawalls may do a brisk business in coastal areas or someone who moves from one area to another to seek better conditions. But many climate change winners will benefit more passively, such as a farmer whose crops thrive because of a longer growing season, and many climate change winners will be people whose lives may improve just barely above subsistence levels thanks to the extra water or warmth climate change provides. It will be difficult, therefore, to lump the climate change winners into the same category as war profiteers and post-hurricane price gougers. Indeed, it is likely that many climate change winners will present sympathetic cases, or at least be seen as acting reasonably.

Another possible basis for ignoring climate change winners could be that they will be too few in number, especially when



compared to the number of climate change losers, to present much of a policy influence. But we do not know that. Indeed, the focus of most policy analyses has been on the adverse impacts of climate change, with very little effort devoted to modeling climate change benefits or identifying locations and numbers of likely beneficiaries.<sup>145</sup> The potential of there being large numbers of climate change winners distributed widely throughout the nation thus cannot be discounted.

Nevertheless, even if climate change winners appear in large numbers and many present sympathetic cases, another possible argument for discounting their presence is that in all likelihood their aggregate numbers and benefits will nonetheless be much smaller compared to the aggregate numbers and harms of climate change losers, so they will not alter the cost-benefit analysis of climate policy options by enough to worry about. But we also do not know that,<sup>146</sup> and we certainly cannot say how much smaller the winners' bounty will be compared to the losers' losses, even if in general that appears likely to be the case. Regardless, even knowing with certainty that the number of winners and their aggregate benefits will be substantially smaller than the number of losers and their aggregate harms is not a good reason for policy to ignore the winners; indeed, it is a reason to pay close attention to them. As explained above, climate change winners may be concentrated in areas sufficient to allow them to take over the climate policy of local or state political districts, and even if outnumbered by losers some politically and economically powerful climate change winners, particularly businesses aligned in winner industries, may find their benefits highly valuable and thus worth fighting for aggressively.<sup>147</sup> Hence, even if only a minority nationally and with less at stake in the aggregate, climate change winners may be quite vocal and aggressive in their efforts to secure their benefits and

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145. See Johnston, *supra* note 11, at 42 (complaining that climate policy reports offered in support of greenhouse gas regulation generally ignore the cost-benefit analyses contained in economic studies); Mendelsohn, *supra* note 7, at 44 (complaining that the influential Stern Report considered only harmful effects of climate change in calculating the costs and benefits of greenhouse gas emission regulation).

146. See TOL, *supra* note 13, at 17 (noting that the positive externalities of climate change have not been quantified); *supra* Part I.A.1 (cautioning that few robust studies have been conducted on how much losers will lose and winners will win in certain areas of climate change).

147. See Cragg & Kahn, *supra* note 25, *passim*; Johnston, *supra* note 11, at 41–42.

may be successful in many local, state, and even federal quarters.

Perhaps the ultimate explanation for not considering what to do about climate change winners is that extrapolating unchecked climate change trends far enough into the future leads to global oblivion. In the final analysis, in other words, if climate change is not put under control there are only climate change losers. Whether true or not, any such climate change apocalypse would be a long way off,<sup>148</sup> and it does not mean there will not be climate change winners along the way, many of whom might not take the long view. After all, notwithstanding the possibility of climate change oblivion, many people and businesses today aggressively resist and even attack greenhouse gas regulations in legal forums.<sup>149</sup> Why should we plan policy around the expectation that the climate change winners of the future will behave any differently, particularly as they will have anticipated, experienced, and even become acculturated to tangible benefits from climate change?

The response might be that climate change winners will be more magnanimous global citizens than people today who are opposed to greenhouse gas regulations, because they will know that climate change is real, is a bad thing for humanity on the whole, and is the source of their individual gains. In other words, out of either a moral commitment or a fear of shaming, they will do the right thing. At the very least, it would be hard to be a climate change winner and a climate change skeptic at the same time, so one would not expect climate change winners to deny climate change as the source of their benefits.<sup>150</sup> It would be monumentally naïve, however, to assume a wholesale norm transformation in the future as the basis for ignoring the climate change winners policy problem in the present. Many people work in or benefit from industries known to produce harmful products or effects, and many of them aggressively re-

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148. See IPCC SYNTHESIS REPORT, *supra* note 2, at 44–47 (discussing impacts through and beyond the twenty-first century under different emissions scenarios).

149. See David Markell & J.B. Ruhl, *An Empirical Assessment of Climate Change in the Courts: A New Jurisprudence or Business as Usual?*, 64 FLA. L. REV. 15, 70–85 (2012) (describing the significant component of climate change litigation challenging government mitigation initiatives).

150. Though, even a climate change winner aware of the source of his or her benefits could rationalize that climate change is a completely natural phenomenon and thus resistance to greenhouse gas regulation is justified as controlling emissions will have no effect on climate.

sist regulation of the industry. Why assume that beneficiaries of climate change will not behave the same way? Particularly as climate change winners begin to invest in and build their lives around the stream of benefits climate change provides them, it is likely that many will not easily be persuaded to let go of thinking like winners even when reminded of the source of their bounty.

Possibly, however, the idea is that even accepting all of the foregoing, talking about climate change winners will prompt people to think about whether they are winners, and if they decide they are then to act like winners. Keeping a lid on the topic thus may be more constructive to mitigation and adaptation policy goals than talking openly about it.<sup>151</sup> The evidence summarized above, however, suggests that people and businesses already are on to the potential for climate change benefits even with nary a word about the topic from official sources. Continued official silence about climate change benefits thus seems no more likely to keep people from concluding they may be winners once the benefits start coming on line.

A final possible reason for why legal scholars are not discussing climate change winners is more personal—that doing so might make one appear to be downplaying the magnitude of climate change harms and the importance of implementing an aggressive mitigation policy. Indeed, it might even be seen as giving ammunition to opponents of greenhouse gas regulation who will argue that the cost-benefit analysis case for regulation suffers once climate change benefits are robustly examined and factored in. But this is the worst reason of all to sidestep the issue. Refusing to confront the climate change winner problem because of appearances, or because of how opponents of climate mitigation measures might distort the message, will only assure that there is no policy in place when climate change winners begin to emerge in significant numbers. Indeed, until recently climate policy dialogue took the head-in-the-sand approach with respect to climate change adaptation, making it taboo to speak of adaptation of any kind—even on behalf of helping climate change losers—out of fear that a growing confidence in adaptive capacity might deflect focus away from establishing effective mitigation policies.<sup>152</sup> No wonder that mention

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151. See O'Brien & Leichenko, *Winners and Losers*, *supra* note 14, at 99 (discussing this position).

152. E. Lisa F. Schipper and Ian Burton sum up the tension that existed through the 1990s and well into the following decade:

of possible climate change benefits has been buried deep in official climate change assessments in fleeting and highly qualified terms.<sup>153</sup> It is just not something anyone seems to want to discuss. But just as delayed attention to adaptation has left adaptation policy in deficit mode,<sup>154</sup> so too would delaying attention to climate change winners leave policy unprepared once they begin to emerge in numbers across the landscape. By then it may be too late to establish effective legal principles for managing the demands they place on mitigation and adaptation policies.

Perhaps raising the topic of climate change winners will not win one many green points, but the bottom line is that ignoring climate change winners will not make them go away or behave selflessly. Their emergence will present a potentially complex policy issue that legal scholars should take into account *now*. In fifty years there may be tens of millions of people and thousands of businesses and communities in the United States considering themselves climate change winners and pushing on their political representatives to serve their interests.<sup>155</sup> Hence, whereas climate policy of the present is about how much to sacrifice now to limit the number of climate change losers of the future, the climate policy of the not too distant future will be made far more complex by the emergence of a class of climate change winners, many of whom will have the

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[I]nterest in adaptation was overwhelmed by concern about the need to reduce greenhouse gas emissions and stabilize atmospheric greenhouse gas concentrations. Proponents of adaptation faced two obstacles that were attributed to adaptation: reducing the apparent need for mitigation; and playing down the urgency for action. For one, "adaptationists" were distrusted because their proposals seemed to undermine the need for mitigation. Critics felt that belief in the potential value of adaptation would soften the resolve of governments to grasp the nettle of mitigation and thus play into the hands of the fossil fuels interests and the climate change sceptics. In addition, because climate change was popularly perceived as a gradual process, adaptation was not considered urgent as there would be time to adapt when climate change and its impacts became manifest. These views dominated in the mid and late 1990s.

E. Lisa F. Schipper & Ian Burton, *Understanding Adaptation: Origins, Concepts, Practice and Policy*, in THE EARTHSCAN READER ON ADAPTATION TO CLIMATE CHANGE 1, 7 (E. Lisa F. Schipper & Ian Burton eds., 2009).

153. See *supra* note 9.

154. See Ian Burton, *Climate Change and the Adaptation Deficit*, in THE EARTHSCAN READER ON ADAPTATION TO CLIMATE CHANGE, *supra* note 152, at 89, 91–92.

155. See generally O'Brien & Leichenko, *Winners and Losers*, *supra* note 14 (explaining the likely emergence of climate change winners).

interest and wherewithal to influence the direction of policy toward keeping their flows of benefits intact.

So, now that we know there will be substantial numbers of people and businesses self-identifying as climate change winners and that their emergence will present complex and contested policy demands, what should we do about it and how do we do it? The remainder of the Article turns to this question and its related normative and positive dimensions for climate change mitigation and adaptation policies.

#### IV. MITIGATION POLICY: IGNORE CLIMATE CHANGE WINNERS

The mitigation policy I have used as the reference point for this Article is the pursuit of aggressive greenhouse gas emission reductions. The United States has achieved little traction toward that goal as things stand today, and the emergence of climate change winners in the near future portends an increasingly complex and contested policy landscape. So what steps could policymakers take now to limit the disruptive effects of the climate change winner phenomenon on mitigation policy? In this section I argue that the most effective policy measure will be to ignore climate change winners. I say “ignore them” not in the sense used thus far in the Article of ignoring their presence, which we should not do, but rather in the sense of ignoring their benefits when formulating mitigation policy, which we should do. In other words, mitigation policy should ignore climate change winners not by default, but *by design*.

Many economists focused on producing a robust cost-benefit efficiency analysis for climate change mitigation policy are likely to object, but there are compelling reasons for supporting a mitigation policy approach that focuses principally on achieving long-term *cost-effectiveness* and thus purposively leaves valuation of climate change benefits (and harms) out of the policy choice equation. An IAM-style cost-benefit approach weighs the costs and benefits of stabilizing the climate under different regulatory options, thus requiring the contentious process of assessing and valuing future climate change harms and benefits and also future mitigation policy harms and benefits.<sup>156</sup> By contrast, a cost-effectiveness approach adopts a politically determined “long run target for limiting the amount of

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156. Richard D. Morgenstern, *Critiquing the Critique of the Climate Change Winner Argument*, 41 ENVTL. L. REP. 10720, 10720 (2011).

projected climate change or atmospheric [greenhouse gas] accumulations, and focuses on what policy trajectory might achieve alternative goals at minimum economic cost.”<sup>157</sup> The latter approach does not employ assessment of harms or benefits—it focuses exclusively on the costs of achieving the legislatively-mandated policy target.

The question of which approach to use is already a matter of intense debate in climate policy,<sup>158</sup> without any attention given to climate change winners. The critique of relying primarily on the cost-effectiveness approach is that the legislatively-mandated targets “must come from somewhere,” and that one of the relevant sources informing that choice necessarily is cost-benefit analysis.<sup>159</sup> The critique of relying primarily on cost-benefit analysis for mitigation policy, besides its underlying normative assumptions about the virtues of efficiency, is that it is extraordinarily unwieldy. A multitude of factors must be integrated into a comprehensive analysis, and there is not much certainty about many of them; across the plethora of such studies conducted to date “there are huge differences about the size of market and nonmarket damages, and the expected catastrophic risks.”<sup>160</sup>

The difference between these two approaches will be amplified as tangible climate change harms and benefits begin to come on line. On the one hand, cost-effectiveness methodology will be unaffected, as it does not incorporate assessment of harms and benefits. By contrast, IAM-style cost-benefit analysis will become more complex as direct and indirect harms and benefits become more prevalent, albeit measuring them will rely less on modeled predictions and more on empirical data. The problem with the IAM approach, however, is just that—we will be able to measure climate change benefits and thus IAM models, to be accurate, will have to incorporate them. There are two reasons for concern in this respect. One is the need to avoid the short term from locking the long term into a social trap. The other reason, which is uniquely pronounced in the climate change context, is the need to hedge against nonlinearities, tip-

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157. *Id.*

158. See Dowlatabadi, *supra* note 6, at 291 (identifying the choice of cost-benefit versus cost-effectiveness as a threshold question).

159. See Jody Freeman & Andrew Guzman, *A Reply*, 41 ENVTL. L. REP. 10726, 10726 (2011).

160. Morgenstern, *supra* note 156, at 10721.

ping points, and risk profiles that complicate the physical and economic future of climate change.

#### A. AVOIDING THE CLIMATE CHANGE WINNERS SOCIAL TRAP

A social trap is commonly defined as “any situation in which the short-run, local reinforcements guiding individual behavior are inconsistent with the long-run, global best interest of the individual and society.”<sup>161</sup> Classic examples include the small-scale prisoner’s dilemma game and the large-scale tragedy of the commons.<sup>162</sup> Many environmental problems find their root cause in social traps,<sup>163</sup> and climate change is sizing up to be one of unprecedented dimension.<sup>164</sup>

Several bait factors can set the trap leading to disconnects between short-term behavior reinforcement and desired long-term outcome,<sup>165</sup> all of which are in play in the climate change scenario. For example, *time delay* between costs and benefits can result in short-term policy focusing on only one side of the ledger, which Eric Biber has shown to be a significant factor in the backlash against mitigation policy as people today are unwilling to spend for the benefits of mitigation not experienced until well into the future.<sup>166</sup> General *ignorance* about the connection between short-term behavior and long-term outcome, such as widespread lack of understanding about how fossil fuel combustion leads to climate change and what the actual risks of climate change are, can also lead to social traps.<sup>167</sup> A *sliding reinforcer* trap occurs when initial desirable outcomes of a certain behavior produce a positive feedback leading to oversupply of the behavior, such as how the benefits of consuming widely available, low-cost fossil fuels lead to more and more consumption.<sup>168</sup> An *externality* trap occurs when, as in the prisoner’s di-

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161. Robert Costanza, *Social Traps and Environmental Policy*, 37 BIOSCIENCE 407, 408 (1987). For seminal works on social trap theory, see J.G. CROSS & MELVIN J. GUYER, SOCIAL TRAPS (1980), and John Platt, *Social Traps*, 28 AM. PSYCHOL. 641 (1973).

162. Costanza, *supra* note 161, at 408–09 (explaining how both these examples fit the social trap model).

163. *See id.* at 407–08 (giving examples).

164. *See* Rachlinski, *supra* note 124, at 300 (describing social traps through cognitive psychology theories and concluding that “[o]ne can scarcely find a contemporary problem that better fits the definition of a social trap than global climate change”).

165. *See* Costanza, *supra* note 161, at 408–09 (taxonomy of social traps).

166. *See* Biber, *Climate Change and Backlash*, *supra* note 122.

167. *See* Costanza, *supra* note 161, at 408–09.

168. *See id.*

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lemma game, individuals mistakenly believe they can pass the costs of their behavior onto others, only to find they suffer the consequences as well, which amply describes how nations are approaching global solutions to climate change.<sup>169</sup> Finally, a *collective* trap occurs when, as in the tragedy of the commons, individually rational short-term behavior leads to long-term collective downfall, which is quite obviously at the root of the climate change problem.<sup>170</sup>

Now consider how much more reinforcement climate change winners would inject into these climate change social traps as they weigh in on climate policy. First, by focusing attention on their short-term gains they further dissociate current policy from future outcomes (time delay trap). Second, their focus on current benefits exhibits ignorance about how benefits are likely over the long run to shift around and eventually diminish over the landscape (ignorance trap). Third, by pointing to benefits of climate change they suggest that more benefits will follow from more climate change (sliding reinforcer trap). Fourth, they act as if the externalities of climate change are shared only by the losers, whereas eventually the progression of climate change will strip them of their own benefits (externality trap). Finally, although winners are behaving perfectly rationally in seeking to secure their benefits by scaling back mitigation policy, the global long-term result is disastrous (collective trap).

As bad as this appears, the climate change winners social trap is particularly devious because it could be baited and set subtly through the well-intentioned use of cost-benefit analysis in the IAMs that are being employed and debated widely in climate policy. Climate change winners will not have to dominate policy-making in order to fuel the climate change social trap, but rather need only to succeed in having their benefits more robustly defined and incorporated into IAM cost-benefit analyses, which is squarely within their interests to advocate. The result of doing so for each generation of climate change winners will be a cost-benefit outcome which, while likely still tilting to the loss side at macro scales, is systematically softened by the rigorous inclusion of benefits. In other words, the policy vector might still be in the direction of adopting mitigation measures, but the strength of the vector will be weakened as climate change benefits are accounted for.

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169. *See id.*

170. *See id.*



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Climate change winners will argue that, strictly speaking, this weakened mitigation policy vector reflects a more accurate cost-benefit analysis. They would be correct, and therein lies the social trap. By softening the case for mitigation throughout the run of time, climate change winners will incrementally reduce the intensity of mitigation policy indefinitely, which in the long term is likely to extend climate change. Less mitigation intensity at any point in time means less climate stabilization at later points in time, which means a longer time before climate stabilizes at acceptable levels.

The response one might make to this observation is that it will all work out over time. In other words, by basing mitigation policy at all times on robust cost-benefit analysis that accounts for all climate change and mitigation harms and benefits projected from present into the future, climate policy will ensure efficiency throughout time and lead to the optimum configuration of greenhouse gas concentrations for the optimum climate stabilization profile. If climate does not stabilize over time to satisfactory levels, the argument goes, benefits will erode and become a less influential factor in the analysis, thus justifying more aggressive mitigation measures to get climate stabilization back on the right track. This line of reasoning, of course, is the underpinning of the “go slow” approach to mitigation policy,<sup>171</sup> and many climate change winners can be expected to be all on board with this way of thinking as a justification for not supporting mitigation policies.

There are several serious problems with this reasoning, all of which stem from the significant time delays associated with climate change. Both climate-destabilizing emissions and climate-stabilizing emission reductions work their effects over long periods of time. To produce reliable policy prescriptions, the cost-benefit analysis must be capable of producing accurate projections of future cost and benefit profiles of different mitigation policy alternatives. The reliability of climate models, however, falls off the further out into the future and the smaller the scale.<sup>172</sup> The long-term end of the cost-benefit analysis, therefore, dissolves the more distant the projection horizon.

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171. See *supra* note 7.

172. See Kerr, *supra* note 72, at 173 (explaining the uncertainties in large-scale models that feed uncertainty into smaller-scale models, such that “[s]witching from global models to models focusing on a single region creates a more detailed forecast, but it also ‘piles uncertainty on top of uncertainty’”). For further explanation of why this is so, see *infra* Part III.B.2.

One technique to make this problem drop out of the picture is to set discount rates sufficiently high to make the future irrelevant in the cost-benefit analysis, leaving short-term costs and benefits as the policy drivers.<sup>173</sup> Even a hefty sum of money two hundred years into the future is worth very little when discounted to present value using a constant positive compounded discount rate. Economist Martin Weitzman has described why this “notorious issue of how to discount the distant future”<sup>174</sup> is especially problematic in the climate change policy context:

The effects of global warming and climate change will be spread out over centuries and even millennia from now. The logic of compounding a constant positive interest rate forces us to say that what one might conceptualize as monumental—even earth-shaking—events, such as disastrous climate change, do not much matter when they occur in the deep future. Perhaps even more disturbing, when exponential discounting is extended over very long time periods there is a truly extraordinary dependence of [cost-benefit analysis] on the choice of a discount rate. Seemingly insignificant differences in discount rates can make an enormous difference in the present discounted value of distant future payoffs. In many long-run situations, almost any answer to a [cost-benefit analysis] question can be defended by one or another particular choice of a discount rate. This is true in general, but it is an especially acute problem when distant future events like climate change (especially catastrophic climate change) are being discounted.<sup>175</sup>

Even putting aside the practical and ethical problems of setting discount rates high enough to paint future generations out of the picture,<sup>176</sup> this approach has the added flaw of assuming that climate policy can move on a dime and with it so too will climate. As experience has demonstrated, however, even in

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173. See Revesz & Shahabian, *supra* note 141, at 1097 (“[W]hen regulators use cost-benefit analysis to evaluate the desirability of climate change mitigation, one factor typically determines whether mitigation is justified: the discount rate, the rate at which future benefits [of mitigation] are converted to their present value.”).

174. Martin L. Weitzman, *Fat-Tailed Uncertainty in the Economics of Catastrophic Climate Change*, 5 REV. ENVTL. ECON. & POL’Y 275, 283 (2011) [hereinafter Weitzman, *Fat-Tailed Uncertainty*].

175. *Id.* at 283–84.

176. See Revesz & Shahabian, *supra* note 141, at 1120–32 (discussing the moral implications of discounting the future). Using low discount rates or zero rates is not without controversy either. See Dieter Helm, *Climate-Change Policy: Why Has So Little Been Achieved?*, 24 OXFORD REV. ECON. POL’Y 211, 228–30 (2008) (discussing the ramifications of using low rates); Ferenc L. Toth, *Discounting in Integrated Assessments of Climate Change*, 23 ENERGY POL’Y 403 (1995) (explaining that using high rates obscures distant losses but using low rates would be inconsistent with other policy methods). For these reasons “[c]ontroversies involving the discount rate have been central to global warming models and policy for many years.” Nordhaus, *supra* note 6, at 43.

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the event that climate change benefits begin to diminish over time in iterations of short-term cost-benefit analyses, moving policy in line with shifting projections can be a formidable challenge. In any case, even if policy can shift quickly to align with new cost-benefit analyses, the climate stabilization benefits will not be experienced until several generations hence. Saying one day that we need to invest more in climate stabilization does not produce climate stabilization the next day, or even perhaps the next century.

One might argue in response that as the demand for climate stabilization increases the market will produce ever more effective techniques and technologies capable of making rapid adjustments to global climate conditions. Whatever climate adjustments cannot be managed on a short-term basis, moreover, can be managed through efficient, rapidly deployable adaptation measures. Climate policy, in other words, will begin to look like food policy, health care policy, or any other policy, riding along on iterations of short-term cost-benefit analyses and relying on the efficient market and rapid policy responses to make the adjustments needed to maintain efficient cost-benefit outcomes perpetually into the future. There will be minor bumps along the way as the need for and implementation of market and policy adjustments experience short timing mismatches, but on average everything will happen as planned—climate will be adjusted at just the right time, to just the right conditions, at just the right cost, forever. The climate change winners social trap is solved!

Clearly, anyone making these arguments must rely on a set of assumptions that, taken together, are fantastical: that physical and economic models of climate change allow reliable projections well into the future; that discount rates are appropriate to apply far into the future; that policy can and will adjust quickly as cost-benefit analyses change; that the market will produce technologies capable of efficiently and significantly shortening the time delay between policy adjustments and climate stabilization benefits; and that efficient, rapidly deployed adaptation measures will manage unavoidable, inefficient harms during any residual gap between market and policy adjustments and their climate stabilization benefits.<sup>177</sup> But let us

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177. Entertaining these assumptions allows some fascinating thought experiments on how global geopolitics would respond. Given how much international friction there is today over climate policy when the benefits of mitigation efforts might not be felt for centuries, one can imagine how international

revel in the sheer arrogance needed to entertain this fiction as reality—let us assume all of this could magically come true—and the social trap remains baited nonetheless. The hitch in this argument—and it is a very big hitch—is that it relies on the additional assumption that climate change is linear, reversible, and conventional in its uncertainty and risk profiles, whereas most likely none of these conditions is true.

#### B. HEDGING AGAINST NONLINEARITY, TIPPING POINTS, AND FAT-TAILED RISKS

No dose of hubris is enough to overcome the constraints on our understanding of climate dynamics as global temperatures continue rising. At the global level, one significant limitation for modeling projection accuracy is the obvious fact that we have no experience with a global climate operating at temperatures like those predicted, and the higher they rise the more acute this uncertainty becomes. In short, “[o]nce the world has warmed by 4°C, conditions will be so different from anything we can observe today (and still more different from the last ice age) that it is inherently hard to say when the warming will stop.”<sup>178</sup>

This prediction constraint stems from the observed fact that climate change is not linear. Rather, as temperatures rise on average, positive and negative feedback effects will eventually be triggered that could amplify or impede further warming. Melting tundra, for example, releases greenhouse gases previously locked in the frozen formations, and researchers have found this effect is far exceeding expected levels because of its feedback properties: as the greenhouse gases are released, they contribute to warming that melts the tundra faster, which releases more greenhouse gases more rapidly, and so on.<sup>179</sup> The

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relations would respond if it truly were possible to manipulate the global climate system over short time frames.

178. Myles R. Allen & David J. Frame, *Call Off the Quest*, 318 SCIENCE 582, 582 (2007); see also Benjamin M. Sanderson et al., *The Response of the Climate System to Very High Greenhouse Gas Emission Scenarios*, ENVTL. RES. LETTERS, July 5, 2011, at 4–9 (discussing climate responses to unabated greenhouse gas emissions).

179. See Katey M. Walter et al., *Methane Bubbling from Northern Lakes: Present and Future Contributions to the Global Methane Budget*, 365 PHIL. TRANSACTIONS ROYAL SOC'Y A 1657, 1671 (2007); K.M. Walter et al., *Methane Bubbling from Siberian Thaw Lakes as a Positive Feedback to Climate Warming*, 443 NATURE 71, 71 (2006). This effect is believed to have played a significant role in the last deglaciation. See K.M. Walter et al., *Thermokarst Lakes as*

scientific literature exploring these complex dynamics and exposing our lack of understanding about what lies ahead as temperature rises is legion,<sup>180</sup> and yet still we do not have a firm grasp of how the feedback systems will work as temperatures rise.<sup>181</sup>

Scientists also believe many of these transformations will be irreversible once conditions pass thresholds. The melting of the tundra, for example, “could be a one-way ticket,” as once melted the tundra cannot recompose itself should climate ever return former tundra areas to permafrost conditions.<sup>182</sup> The problem is that while we know there is a high probability of crossing such tipping points and venturing irreversibly into new climate states, we do not know when we will cross them; in fact, we likely will not know until long after that we have crossed one.<sup>183</sup> That is the nature of environmental nonlinearity and tipping points.<sup>184</sup>

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a Source of Atmospheric CH<sub>4</sub> During the Last Deglaciation, 318 SCIENCE 633, 633 (2007).

180. See Robert A. Washington-Allen et al., *Introduction to Special Feature on Catastrophic Thresholds, Perspectives, Definitions, and Applications*, 15 ECOLOGY & SOC’Y 38 (2010), available at <http://www.ecologyandsociety.org/vol15/iss3/art38>.

181. See, e.g., U.S. CLIMATE CHANGE SCI. PROGRAM, THRESHOLDS OF CLIMATE CHANGE IN ECOSYSTEMS (Colleen W. Charles ed., 2009), available at <http://www.climatechange.gov/Library/sap/sap4-2/final-report/default.htm> (examining numerous positive feedback properties leading to nonlinear thresholds in climate change dynamics); Almut Arneth et al., *Clean the Air, Heat the Planet?*, 326 SCIENCE 672, 673 (2009) (examining the feedback effects between conventional air pollution control and climate change mitigation, concluding that complex positive and negative feedback links exist and that, on balance, the evidence and models suggest that “[a]ir pollution control will accelerate warming in the coming decades”); Gordon B. Bonan, *Forests and Climate Change: Forcings, Feedbacks, and the Climate Benefits of Forests*, 320 SCIENCE 1444 (2008) (explaining the complex and nonlinear forest-climate interactions); I. Eisenman & J.S. Wettlaufer et al., *Nonlinear Threshold Behavior During the Loss of Arctic Sea Ice*, 106 PROC. NAT’L ACAD. SCI. 28 (2009) (describing the nonlinear “tipping points” in the ice-albedo feedback effect); Jerome Gaillardet & Albert Galy, *Himalaya—Carbon Sink or Source?*, 320 SCIENCE 1727 (2008) (explaining the uncertainties of the sinks and sources of the carbon geological cycle); Steven W. Running, *Ecosystem Disturbance, Carbon, and Climate*, 321 SCIENCE 652 (2008) (explaining the uncertainties of ecological sinks and sources such as fires and insect epidemics).

182. John Bohannon, *The Big Thaw Reaches Mongolia’s Pristine North*, 319 SCIENCE 567, 568 (2008). Researchers believe there is a strong potential for similar nonlinear change effects throughout the world’s peatlands. See Nancy B. Dise, *Peatland Response to Global Change*, 326 SCIENCE 810 (2009).

183. See generally Elmar Krieger et al., *Imprecise Probability Assessment of Tipping Points in the Climate System*, 106 PROC. NAT’L ACAD. SCI. 5041 (2009); Timothy M. Lenton et al., *Tipping Points in the Earth’s Climate Sys-*

Moreover, given how severe runaway climate change is likely to be for humanity and ecosystems eventually, the uncertainty and risk profiles on the other side of climate tipping points are potentially loaded with catastrophic problems that defy the conventional bell-shaped probability curves.<sup>185</sup> Basically, we do not really know what will happen, but we do know some very bad things could happen. Obviously, such “fat-tailed” extreme event probabilities,<sup>186</sup> if they are locked in by crossing key climate system tipping points, make the consequences of getting the policy wrong quite severe. As Carolyn Kousky and Roger Cooke of Resources for the Future argue, the greatest downside of relying on conventional risk analysis in the climate change policy context thus stems from what they describe as the “unholy trinity” of fat tails, tail dependence, and micro-correlations:

These are distinct aspects of loss distributions, such as damages from a disaster or insurance claims. With fat-tailed losses, the probability declines slowly, relative to the severity of the loss. Tail dependence is that propensity of dependence to concentrate in the tails, such that severe losses are more likely to happen together. Micro-correlations are negligible correlations between risks which may be individually harmless, but very dangerous when aggregated. These three phenomena—types of catastrophic and dependent risks—undermine traditional approaches to risk management.<sup>187</sup>

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*tem*, 105 PROC. NAT'L ACAD. SCI. 1786 (2008); Johan Rockström et al., *A Safe Operating Space for Humanity*, 461 NATURE 472 (2009).

184. See NAT'L SCI. FOUND., ADVISORY COMM. FOR ENVTL. RESEARCH & EDUC., TRANSITIONS AND TIPPING POINTS IN COMPLEX ENVIRONMENTAL SYSTEMS 28–31 (2009), available at [http://www.nsf.gov/geo/ere/ereweb/ac-ere/nsf6895\\_ere\\_report\\_090809.pdf](http://www.nsf.gov/geo/ere/ereweb/ac-ere/nsf6895_ere_report_090809.pdf).

185. See Weitzman, *A Review of the Stern Review*, *supra* note 6; Weitzman, *Fat-Tailed Uncertainty*, *supra* note 174.

186. A tail event is an outcome that should happen only extremely infrequently given normal probability distributions based on historical event frequencies. As the tail of the probability distribution grows “fatter” the likelihood of a tail event rises. See Nordhaus, *supra* note 6, at 50. For a concise and accessible explanation of fat-tailed risks in climate change policy contexts generally, see Melinda Kimble & Letha Tawney, *The Tale of the Fat Tail*, ENVTL. F., May–June 2009, at 24.

187. Carolyn Kousky & Roger M. Cooke, *The Unholy Trinity: Fat Tails, Tail Dependence, and Micro-Correlations* 1 (Resources for the Future Discussion Paper No. 09-36-REV, 2009). Aggregated micro-correlations have been described as leading to the “Jenga effect,” after the game in which players stack pieces into a tower and then remove them, one by one, stacking the removed pieces on the top of the tower. With skilled players, the structure can stay standing for quite a while, but at some point one more piece removed or stacked on top leads to a sudden crash of the entire structure. Food web dynamics exhibit this effect. Peter C. de Ruiter et al., *Food Web Ecology: Playing Jenga and Beyond*, 309 SCIENCE 68, 68 (2005).

Legal scholars are beginning to recognize the serious challenges nonlinearity, tipping points, and fat-tailed risk effects in the climate change system pose for using IAM cost-benefit analysis as our primary climate policy calibration instrument.<sup>188</sup> The assumption that cost-benefit analysis can pick up on changing climate conditions and seamlessly feed this new information into markets and the policy world for rapid corrective responses is, quite simply, blown apart once the prospect of crossing unpredictable, irreversible, potentially game-changing thresholds is factored into the picture.<sup>189</sup> I cannot sum up this problem more concisely and compellingly than Weitzman does in his work critiquing IAM-style cost-benefit analysis of climate mitigation policy:

[T]he economics of climate change consists of a very long chain of tenuous inferences fraught with big uncertainties in every link: beginning with unknown base-case GHG emissions; compounded by big uncertainties about how available policies and policy levers will affect actual GHG emissions; compounded by big uncertainties about how GHG flow emissions accumulate via the carbon cycle into GHG stock concentrations; compounded by big uncertainties about how and when GHG stock concentrations translate into global average temperature changes; compounded by big uncertainties about how global average temperature changes decompose into specific changes in regional weather patterns; compounded by big uncertainties about how adaptations to, and mitigations of, climate change damages at a regional level are translated into regional utility changes via an appropriate “damages function”; compounded by big uncertainties about how future regional utility changes are aggregated into a worldwide utility function and what its overall degree of risk aversion should be; compounded by big uncertainties about what discount rate should be used to convert everything into expected present discounted values. The result of this lengthy cascading of big uncertainties is a reduced form of truly extraordinary uncertainty about the aggregate welfare impacts of catastrophic climate change, which is represented mathe-

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188. See, e.g., RICHARD A. POSNER, *CATASTROPHE: RISK AND RESPONSE* 43–58 (2004); Daniel H. Cole, *The Stern Review and Its Critics: Implications for the Theory and Practice of Benefit-Cost Analysis*, 48 *NAT. RESOURCES J.* 53, 56–57, 77–78 (2008); Daniel A. Farber, *Uncertainty*, 99 *GEO. L.J.* 901, 926–27 (2011); Ruhl, *supra* note 18, at 416–23; Michael P. Vandenberg & Jonathan A. Gilligan, *Macro-Risks: The Challenge for Rational Risk Regulation*, 21 *DUKE ENVTL. L. & POL’Y F.* 401, 402–07 (2011).

189. The additional assumption one might make to support using cost-benefit analysis, that we can “learn that catastrophe is impending fast enough to make a sufficiently quick and vigorous global response to head off the possibility,” also seems “excessively optimistic.” Farber, *supra* note 188, at 943 n.189.

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matically by a [probability density function] that is spread out and heavy with probability in the tails.<sup>190</sup>

Hence, resting as it must on the unrealistic set of assumptions outlined above and exposing us as it does to tipping points the other side of which is a virtual abyss of uncertainty, but likely catastrophe, it seems particularly risky to use IAM-style cost-benefit analysis as our primary mitigation policy compass.<sup>191</sup> While I do not profess to know the right global surface temperature or atmospheric concentration of greenhouse gases to set as policy targets, it seems far more prudent to hedge against nonlinearity, tipping points, and fat-tailed risks by designing policy goals and time lines through scientific models ra-

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190. Weitzman, *Fat-Tailed Uncertainty*, *supra* note 174, at 284–85. In his survey of IAM models through 2011, Nordhaus observes that “[t]here has been virtually no work applying Weitzman’s insights in empirical IAMs.” Nordhaus, *supra* note 6, at 50. Since Nordhaus’s assessment, however, researchers at the Center for Robust Decision Making on Climate and Energy Policy have developed dynamic IAM models integrating stochastic tipping point parameters for climate change based on climate experts’ subjective opinions about the likelihood of various climate tipping point catastrophes, such as changes in the North Atlantic thermo-haline circulation or massive permafrost melting. See Thomas S. Lontzek et al., *Tipping Points in a Dynamic Stochastic IAM* 3, 6–11 (RDCEP Working Paper No. 12-03, 2012), available at <http://ssrn.com/abstract=1992660>. They consider their dynamic stochastic modeling approach “inevitable for an appropriate analysis of abrupt climate change with permanent and significant damage over a large time horizon.” *Id.* at 13.

191. It is, of course, possible that the analytic capacity of IAM models can be vastly improved. However, they necessarily will have to rely on modeler opinion (or the modeler’s interpretation of other expert opinions) for defining when tipping points will occur, what triggers them, and what lies on the other side. See Lontzek, *supra* note 190, at 6–9 (explaining the use of expert elicitation to calibrate the likelihood, damage, and permanence of tipping point catastrophes in an IAM model using dynamic stochastic methods). Having never experienced a climate system like the one such IAMs must model, however, researchers have little to go on. For example, ecologists now warn of the no-analog future—ecological variability unprecedented in the history of ecology, riddled with nonlinear feedback and feed-forward loops, previously unknown emergent properties, and new thresholds of irreversible change. Matthew C. Fitzpatrick & William W. Hargrove, *The Projection of Species Distribution Models and the Problem of Non-Analog Climate*, 18 BIODIVERSITY & CONSERVATION 2255, 2255 (2009) (“By 2100, a quarter or more of the Earth’s land surface may experience climatic conditions that have no modern analog . . . .”); Douglas Fox, *Back to the No-Analog Future?*, 316 SCIENCE 823, 823 (2007) (“[I]f the climate changes over the next 100 years as current models predict, surviving species throughout much of Earth’s land area . . . are likely to be reshuffled into novel ecosystems unknown today.”); Douglas Fox, *When Worlds Collide*, CONSERVATION, Jan.–Mar. 2007, at 28–30 (arguing that it is likely that the world will enter into a no-analog future within 100–200 years). If there is no scientific basis for reliably describing a future scenario that lies on the other side of climate tipping points, there is nothing reliably to plug into an IAM.



ther than through economic models, at which time cost-effectiveness analysis should guide how we go about achieving those targets.

#### V. ADAPTATION POLICY: EMBRACE CLIMATE CHANGE WINNERS

The adaptation policy I have used as the reference point for this Article is one of pursuing harm-preventing adaptive measures. Unlike the mitigation policy analysis, however, adaptation policy should work in just the opposite direction to embrace rather than ignore winners' interests. The distribution of climate change harms and benefits will shift around the landscape gradually over the next several centuries, meaning benefits will be relatively stable in a given area for relevant personal and public infrastructure planning horizons. For example, an agricultural area enjoying longer growing seasons and beneficial increased precipitation may seek to invest in irrigation and drainage infrastructure, or a shipping business benefitting from improved transport routes in the Arctic may demand public investment in improved navigation infrastructure.<sup>192</sup> In all likelihood the time frame for investment, construction, use, and depletion of such infrastructure investments often will fit within the relevant time frames of the rise and possible eventual erosion of the associated climate benefits.<sup>193</sup> Where that is the case, there are strong adaptation policy reasons to facilitate private and public investment in infrastructure designed to harness and deliver climate change benefits that reduce vulnerability and increase resilience to climate change harms.<sup>194</sup>

Adaptation to climate change impacts will leverage these two different but closely related strategies focused on deflecting

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192. See Ho, *supra* note 50, at 714–15 (explaining that enabling vessels to take advantage of new routes opening up in the melting Arctic will require improved capacities in local environmental monitoring and forecasting, search and rescue, and traffic routing, as well as in ship technology).

193. See generally IMPACTS, ADAPTATION AND VULNERABILITY, *supra* note 123 (describing the relationship between climate change and changing infrastructure needs, and noting that some major updates are already underway).

194. Vulnerability refers to “[t]he degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes,” and resilience refers to “[a] capability to anticipate, prepare for, respond to, and recover from significant multihazard threats with minimum damage to social well-being, the economy, and the environment.” INTERAGENCY CLIMATE CHANGE ADAPTATION TASK FORCE, *supra* note 12, at 2.

and recovering from the blows of climate change.<sup>195</sup> Many human communities and ecological landscapes will require a mix of these strategies to make effective use of available technological, financial, human, social, and natural adaptation capital,<sup>196</sup> and many benefit-securing adaptation measures would contribute to both strategies. Helping climate change winners secure their benefits, in other words, can help climate change losers as well.

#### A. VULNERABILITY-REDUCING BENEFITS

Vulnerability to climate change harms can be reduced by improving the reliability of infrastructure and other mechanisms designed to shield human communities and ecosystems from the harmful effects of climate change, such as by constructing sea walls to protect coastal areas or limiting new development permits on coasts likely to experience sea level rise.<sup>197</sup> If the risks associated with vulnerability can be reduced through such methods, less harm will be sustained and less capital will need to be deployed to recover from the effects of climate change.

Investment in benefit-securing adaptations can support vulnerability-reducing policies. Some infrastructure supporting climate change winners, such as improved water management systems in areas where some people and businesses will benefit

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195. See IMPACTS, ADAPTATION AND VULNERABILITY, *supra* note 123, at 720 (“Adaptation to climate change takes place through adjustments to reduce vulnerability or enhance resilience in response to observed or expected changes in climate and associated extreme weather events.”); John Handmer & Stephen Dovers, *A Typology of Resilience: Rethinking Institutions for Sustainable Development*, in THE EARTHSCAN READER ON ADAPTATION TO CLIMATE CHANGE, *supra* note 152, at 187, 196 (“These two approaches are best seen as extremes; in a complex society there is likely to be—and should be—a mixture of the two in any given situation and across institutions.”); Nathan Hultman, *Worth More than Good Advice: Lessons of Hurricane Katrina for Development in a Changing Climate*, 11 GEO. PUB. POL’Y REV. 47, 49–50 (2005–06) (noting several concrete adaptation strategies that have been gleaned from the example of Hurricane Katrina).

196. Blending the two strategies together is often described under the label of “adaptive capacity.” See, e.g., IMPACTS, ADAPTATION AND VULNERABILITY, *supra* note 123, at 727–30; Brian H. Hurd, *Challenges of Adapting to a Changing Climate*, 26 UCLA J. ENVTL. L. & POL’Y 77, 81 (2007–08).

197. See, e.g., JONATHAN ENSOR & RACHEL BERGER, UNDERSTANDING CLIMATE CHANGE ADAPTATION: LESSONS FROM COMMUNITY-BASED APPROACHES 13–16, 164–65 (2009); P. Mick Kelly & W. Neil Adger, *Theory and Practice in Assessing Vulnerability to Climate Change and Facilitating Adaptation*, in THE EARTHSCAN READER ON ADAPTATION TO CLIMATE CHANGE, *supra* note 152, at 161, 162–74.

from increased precipitation, can help protect other people in the area who might face risks such as flooding. Focusing just on the flooding risk might result in less effective responses than would be the case were the policy designed to capitalize as well on the benefits. For one thing, climate change winners are more likely to support such projects where at least some of the effect, intentional or incidental, is to secure them their benefits. Moreover, facilitating the delivery and security of climate change benefits can strengthen local economies, providing a deeper and more secure base from which to finance vulnerability-reducing adaptations. Indeed, as winners and losers may often live side-by-side in many communities, the winners' prosperity could incidentally enhance local capacity for investment in vulnerability-reducing adaptations. Climate change winners are only winners on net—they will not be immune to all of the adverse effects of climate change and thus will support vulnerability-reducing adaptations that protect their communities.

In short, if farmers in an area experiencing longer growing seasons and more favorable precipitation regimes will not be able to take advantage of those benefits without improved water management infrastructure, or if shipping companies cannot take advantage of newly opened waters without new navigation infrastructure, it makes little sense to decline public investment in the necessary infrastructure simply because it would be helping climate change winners. Rather, the prudent public investment policy would be to evaluate how helping the winners helps reduce the vulnerability of the losers. Nor would it make sense to erect barriers to private investment in benefit-securing adaptations simply because it is about winners helping themselves. A company that benefits through its climate proofing technological innovations is necessarily assisting the harm-reducing adaptations of others. A comprehensive adaptation policy, therefore, would include significant attention to defining climate change benefits and identifying opportunities to leverage public and private investments in benefit-securing adaptations as opportunities to promote vulnerability-reducing adaptations.

#### B. RESILIENCE-ENHANCING BENEFITS

Not all the risks of climate change can be mitigated by reducing vulnerability, as costs, technological constraints, lack of knowledge, and mistaken assumptions will limit vulnerability-reducing capacity. The other strategy thus focuses on recover-

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ing from the blow of climate change by enhancing resilience to impacts, such as through improved emergency response techniques and habitat restoration methods.<sup>198</sup>

Here again, investments in benefit-securing adaptations can help improve overall resilience to climate change. For example, areas that prosper as a result of climate change can serve as refuges in times when other areas suffer catastrophic climate system events. Even in prospering areas, moreover, some adverse climate change effects will necessitate enhanced resilience capacity. Farmers in some regions, for example, may be balancing the benefits of more precipitation (e.g., reduced irrigation costs) with the risks (e.g., increased flooding). That they may be net winners does not mean they face no exposure to losses.

Winners everywhere will want to ensure their communities are resilient to climate change, and thus will support investments in resilience-enhancing adaptations. Supporting their benefit-securing adaptations thus helps them promote community-wide resilience. A comprehensive adaptation policy, therefore, would include significant attention to defining climate change benefits and identifying opportunities to leverage public and private investments in benefit-securing adaptations as opportunities to promote overall resilience-enhancing adaptation policy.

#### VI. ENSURING WINNERS SECURE NO PROPERTY RIGHTS

Mitigation and adaptation are distinct but related climate policy objectives—the more efficient and effective we are at one, the less pressure there is on the other, though it seems inevitable we will need both. It is by no means inconsistent, therefore, to ignore climate change winners for purposes of mitigation policy and simultaneously embrace them for purposes of adaptation policy. One danger that lurks in the second prong of this approach, however, arises if climate change winners begin to treat their benefits and the private and public investments in them as property rights subject to some level of protection. As one adaptation policy scholar has observed, “[t]he challenge will be in the balance between achieving essential adaptation outcomes, respecting existing property rights, and avoiding the

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198. See ENSOR & BERGER, *supra* note 197, at 17–25; Handmer & Dovers, *supra* note 195, at 190–204.

creation of compensable rights under future regulatory regimes.”<sup>199</sup>

For example, although mitigation policy would ignore winners for purposes of its design, as mitigation begins to gain traction on greenhouse gas concentrations current and prospective winners might argue that they are entitled to compensation for reduced streams of benefits. Similarly, as public adaptation investment policy adapts to evolving local and regional climate regimes, some infrastructure supported in the past might be abandoned or curtailed, the beneficiaries of which might seek compensation. Whether winners would have any legal basis for compensation in the future is a question climate policymakers should anticipate now, as steps can be taken at the front end of climate change to ensure no property rights accrue in the future benefits of climate change. Legal doctrine and institutions can begin to lay this groundwork by establishing baselines for reasonable private expectations and by placing clear conditions on the benefits of public adaptation infrastructure.

#### A. ESTABLISHING BASELINES FOR REASONABLE PRIVATE EXPECTATIONS

Climate change winners are likely to make significant investments to secure and maintain their benefits. Passive winners, for example, will invest in the added capital needed to continue working in longer growing and outdoor construction seasons. Adaptive winners will invest in the new capital needed to shift to different crops or production lines. Opportunistic winners most of all will lay out significant investments to seize on their stream of benefits. All of these winners’ investments will have been predicated on the anticipated effects of climate change. In other words, they are backing their investments—they believe reasonably—on an expectation of climate change.

It is obvious where this is leading: among other strategies, climate change winners will resist government-led efforts to deprive them of their secured benefits, whether through mitigation or adaptation, as unconstitutional takings of property without just compensation.<sup>200</sup> A central element in any such claim, however, is that the claimant demonstrates that the

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199. Jan McDonald, *The Role of Law in Adapting to Climate Change*, 2 CLIMATE CHANGE 283, 287 (2011).

200. See U.S. CONST. amend. V (“[N]or shall private property be taken for public use, without just compensation.”).

government is interfering with “distinct investment-backed expectations.”<sup>201</sup> Indeed, this “notion of investment-backed expectations . . . is increasingly being regarded as a prime determinant of what constitutes ‘property’ itself.”<sup>202</sup> Climate change winners are sure to argue that their benefit-securing investments were based on reasonable investment-backed expectations and thus should not be diminished through government mitigation and adaptation policies.

There are two core problems with any such claim. First, as explained above, climate change winners cannot expect their benefits to outlast climate change itself. If the government were to adopt no mitigation policies, letting climate change run unabated, many if not most climate change benefits enjoyed in a particular area will eventually fade away, swamped by the gradual amplification of offsetting harms. Climate change itself is thus the irrefutable rebuttal to reasonable investment-backed expectations in climate change benefits.<sup>203</sup>

But more to the point, climate change winners cannot claim reasonable investment-backed expectations when they know all along that the primary climate policy goal is to mitigate and adapt. As courts have explained, the “regulatory climate,” of which property owners are expected to be aware, can defeat claims of reasonable investment-backed expectations when those investments are clearly not consonant with the policy direction.<sup>204</sup> Climate change winners could hardly claim surprise in this sense when mitigation policies finally begin to gain traction on climate stabilization and alter the trajectory and distribution of climate change harms and benefits. Property doctrines such as the public trust also could evolve so as to preclude takings claims relating to resources necessary to public climate change adaptation.<sup>205</sup>

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201. Penn Cent. Transp. Co. v. City of N.Y., 438 U.S. 104, 124 (1978).

202. Steven J. Eagle, *The Rise and Rise of “Investment-Backed Expectations,”* 32 URB. LAW. 437, 437 (2000).

203. Several commentators have observed that this effect will defeat takings claims by coastal property owners. See J. Peter Byrne, *Rising Seas and Common Law Baselines: A Comment on Regulatory Takings Discourse Concerning Climate Change*, 11 VT. J. ENVTL. L. 625, 627 (2010); Margaret E. Peloso & Margaret R. Caldwell, *Dynamic Property Rights: The Public Trust Doctrine and Takings in a Changing Climate*, 30 STAN. ENVTL. L.J. 51, 59 (2011); Thomas Ruppert, *Reasonable Investment-Backed Expectations: Should Notice of Rising Seas Lead to Falling Expectations for Coastal Property Purchasers?*, 26 J. LAND USE & ENVTL. L. 239, 259 (2011).

204. *Good v. United States*, 189 F.3d 1355, 1361–62 (Fed. Cir. 1999).

205. See Robin Kundis Craig, *Adapting to Climate Change: The Potential*

Hence, rather than ignoring climate change benefits and their beneficiaries, climate policy should fully recognize their presence, allow private benefit-securing investments to flourish, and loudly trumpet that mitigation and adaptation policies are designed to intervene in the profile of climate change harms and benefits across the landscape. The policy, in other words, is explicitly about changing who wins and who loses from climate change—the idea of course being to reduce the severity of harms. Thus, no person or business has a reasonable expectation of always maintaining benefits received or even of staying on a winner trajectory. Meanwhile, adaptation policy should feed into property doctrine to ensure it evolves in favor of defeating takings claims grounded in resources vital to protection of public trust resources and other resources associated with climate change adaptations needed to protect public health and critical environmental resources. The regulatory and judicial climate thus can directly engage climate change winners and make it abundantly clear that their private benefit-securing investments are taken on at their own risk. Legal scholars can supply much of the advanced theoretical and doctrinal design work supporting this approach.

#### B. CONDITIONING PUBLIC INVESTMENT IN BENEFITS

As noted above, my suggested policy approach involves government pursuing aggressive mitigation policy alongside government investing in benefit-securing adaptations that reduce community-wide vulnerability and enhance community-wide resilience. Just as many direct and indirect beneficiaries of public infrastructure investments challenge decisions to curtail those benefits,<sup>206</sup> when climate change winners see mitigation policy eroding the publicly provided infrastructure around which they have based their private lives, they may seek takings compensation. This potential, however, is easy to manage through clear legislative statements that all public investment in climate adaptation infrastructure, whether harm-reducing or benefit-securing, creates no rights, title, interest, or estate in or to the public infrastructure or its incidental benefits. The apt

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*Role of State Common-Law Public Trust Doctrines*, 34 VT. L. REV. 781, 846–50 (2010).

206. For example, irrigation districts and municipalities frequently have sued federal water management agencies when the agencies alter water allocation from reservoir and reclamation projects. *See, e.g., In re MDL-1824 Tri-State Water Rights Litig.*, 644 F.3d 1160, 1167–68 (11th Cir. 2011); *Klamath Irrigation Dist. v. United States*, 635 F.3d 505, 508–09 (Fed. Cir. 2011).

analogy comes from permits and licenses the government issues to private interests for use of and gain from public lands. The Taylor Grazing Act, for example, provides that issuance of grazing permits on public lands “shall not create any right, title, interest, or estate in or to the [public] lands,”<sup>207</sup> and the Supreme Court has held that the increment of value added to a private ranch by a public land grazing permit is not a compensable private property interest.<sup>208</sup>

Once again, therefore, it is important for climate policy *now* to fully recognize that there are climate change benefits and beneficiaries, including beneficiaries of public adaptation investments. From its very inception, climate policy should focus on building the case against the idea that climate change winners have any property right interests in benefits secured or maintained directly or indirectly by public investments in adaptation infrastructure. All legislation, regulations, and government contracting dealing with public climate change adaptation investments, therefore, should explicitly detail the core legal principle that public financial or other support of adaptation projects creates no compensable property interests in the public infrastructure or its incidental private benefits.

#### CONCLUSION

Talking about climate change winners makes me uncomfortable, but not nearly as uncomfortable as I become when I think what could happen if we do not talk about them. Millions of people and thousands of businesses and communities in the United States stand to reap benefits from climate change, and they will undoubtedly factor their beneficiary status into their positions on climate policy. Ignoring this substantial policy dynamic, which is only decades away from coming on line across the nation, cannot possibly be the prudent policy approach. Rather, we must study the benefits of climate change—their sources, their flows, their economic and social proportions, their life cycles, and their beneficiaries—every bit as intensely as we are attempting to do with respect to climate change harms. We must be ready to counter efforts that climate change winners might make to soften mitigation policies, but we should also be ready to make public investments, and facilitate private investments, in benefit-securing adaptations that promote overall

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207. 43 U.S.C. § 315b (2006).

208. *United States v. Fuller*, 409 U.S. 488, 494 (1973).



adaptation policy goals. Most of all, we should begin now to build the legal framework for rebutting any claims that climate change benefits, however secured, are protected property rights. Leaving all of this work for later, when the climate change winners are firmly entrenched throughout society, the economy, and politics, will only make the backlash against climate policy that is already more than evident all the more difficult to overcome.