Multiscale Networks for

Global Environmental Governance

by

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Global environmental politics has the fascinating distinction of being the only attempt in the history of mankind to manage trans-boundary multiscale problems using a tool that is constituted by its identification with fixed boundaries and a single scale: the nation state. Recognizing this, it is not surprising that Robert Cox criticizes modern attempts to improve global governance for taking "the existing order as given, as something to be made to work more smoothly, not as something to be criticized and changed."[1] Nonetheless, although Cox may be right when he "rejects all attempts to reform the international system top-down,"[2] his contention that "the national context remains the only place where effective opposition to the prevailing order can be organized"[3] is too reactionary. We are, in fact, not forced to choose between equally limiting extremes, because there exists a way to both increase the effectiveness of global governance as well as radically alter the states system.

The rigid hierarchy that characterizes state bureaucracies has also been embedded into international institutions, and it is this architecture that can be vastly improved by restructuring it into a **multiscale network**. There are both descriptive and prescriptive reasons for doing so: 1) increases in functional efficiency and robustness, and 2) improvements from a normative perspective. As we enter the 21st century, the international system already exhibits many aspects of multiscale networks, but these are typically seen as liabilities and not assets. By providing a richer understanding of multiscale networks, this paper proposes an alternative to Cox's "with them or against them" ultimatum.

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[1] Andreas Hasenclever, Peter Mayer, and Volker Rittberger, *Theories of International Regimes*, *Cambridge Studies in International Relations ; 55* (Cambridge ; New York: Cambridge University Press, 1997), 200.
[2] Ibid., 196.
[3] Ibid.

Multi-Scale Networks

Global environmental politics takes place in a hierarchical social network of interrelated actors coordinating governance from the local level to the global. To adequately appreciate the advantages of multiscale networks over hierarchical ones, we must first recognize governance systems "as *networks of information processors*, where the role of the network [is] to handle large volumes of information efficiently and without overloading any *individual* processors."[4] When communicative groups are required to coordinate upward through hierarchies before that coordination can reach other groups in distant sections of the hierarchy, the result is *congestion* in the core (top) of the hierarchy, and *delay* at the periphery (bottom).[5] This is the primary reason that hierarchies do not scale well, and possible a dominant reason why there is no "world state" on which global environmental governance can rely. The solution to congestion and delay is to continuously create channels of communication between actors on *all levels* of the hierarchy. For example, when a member of the system realizes that it is spending too much time merely coordinating other members, it can form a direct link between them and drop out of the coordination process. In this way, "the burden of any particular node can be relieved by the greatest possible amount by connecting the two neighbors"[6] that need to coordinate. Because this strategy "always selects the most congested node to relieve, and because the nodes that it connects were handling those messages anyway [i.e. coordinating], the effect is always to reduce overall congestion without increasing any individual's burden."[7] This kind of redistribution effectively allocates efforts, reduces

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[4] Duncan J. Watts, *Six Degrees: The Science of a Connected Age*, 1st ed. (New York: W.W. Norton, 2003), 273.
[5] Ibid., 278-84.
[6] Ibid., 279.
[7] Ibid.

congestion, and enhances implementation by rewiring a very structured hierarchy into a

multiscale network. Not only is a multiscale network the most efficient structure for

network processing, but "in multiscale networks there are no longer any 'critical' nodes

[actors] whose loss would disable the network…. Essentially one can remove chunks of

almost any size from a multiscale network and it will remain connected, and thereby able

to access whatever resources were not directly destroyed. A multiscale network 1)

realizes network efficiencies from distributed parallel processing [i.e. simultaneous

efforts], and 2) minimizes the effect of failures when they *do* occur. The most important

consequence of this perpetual reconstruction is that institutional designs are "driven away

from that of a pure hierarchy by virtue of the new links that are formed."[8]

Elinor Ostrom has stated that "the challenge of linkage… is not to identify an

appropriate institutional level for resource management – institutions at different levels

all may have essential contributions to make – but to determine how institutions at

various levels can be vertically linked."[9] Ostrom has proposed a "nesting of institutions,"

and Young and Berkes have also proposed "arrangements that can maintain the benefits

of each level of organization."[10] However, the essential problem with these proposals is

that they still rely on *preserving the hierarchy rather than restructuring it*. So, for

example, even though these writers focus on both vertical and horizontal linkages, those

linkages reinforce the hierarchy by using only vertical and horizontal pathways.[11] A

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[8] Ibid., 288.

[9] Elinor Ostrom et al., "Knowledge and Questions after 15 Years of Research," in *The Drama of the Commons*, ed. Elinor Ostrom (Washington, DC: National Academy Press, 2002), 466.

[10] Fikret Berkes, "Cross-Scale Institutional Linkages: Perspectives from the Bottom Up," in *The Drama of the Commons*, ed. Elinor Ostrom (Washington, DC: National Academy Press, 2002), Ostrom et al., "Knowledge and Questions after 15 Years of Research," 466, Oran R. Young, "Institutional Interplay: The Environmental Consequences of Cross-Scale Interactions," in *The Drama of the Commons*, ed. Elinor Ostrom (Washington, DC: National Academy Press, 2002).

[11] Oran R. Young, *The Institutional Dimensions of Environmental Change : Fit, Interplay, and Scale* (Cambridge, Mass.: MIT Press, 2002), 83-138.

multiscale network links actors across both scales *simultaneously*, effectively flattening hierarchy by bridging distant parts of the network.

Political Advantages of Multiscale Networks

Distance and Perception: First, underscoring "the importance of perception," Robert Axelrod notes, "Leaders of one state live far away from the leaders of other states. They are far away not only in space, but also in their cognitive framework: their tacit assumptions differ about what is important, what needs to be done, and who bears the responsibility for change."[12] It is not just leaders who suffer from distances. Actors exist in both physical and conceptual spaces, and along continuum of proximity – from close to distant – in each space. James Rosenau , in his most recent book Distant Proximities, explores these spaces in regard to governance specifically. "To maintain clarity with respect to the important distinction between spatial and contextual proximities, henceforth I shall refer to the former as *local phenomena* and to the latter as *localized phenomena* (suggesting they have to be contextually redefined in order to become proximate)."[13] Multiscale networks, by bridging near and far, provide a mechanism for the continual reinterpretation involved in perceiving newly "localized phenomena." In addition, Rosenau distinguishes between *structures of authority* and *spheres of authority*. Structures of authority, the institutional carriers of control, are often perceived as distant from the spheres of authority, the domain to be controlled, that they need to influence. Similarly, local and transnational groups "on the ground" in a sphere of authority are often remote from the structures of authority overhead.[14] This institutional dissonance is often a major cause of failures in environmental governance.

Second, as Oran Young has stated, actors at different scales often have conflicting interests, and while a multiscale network alone won't solve these problems it *can* enhance

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[12] Robert M. Axelrod and Robert O. Keohane, "Achieving Cooperation under Anarchy: Strategies and Institutions," in *Cooperation under Anarchy*, ed. Kenneth A. Oye (Princeton, N.J.: Princeton University Press, 1986), 247.

[13] James N. Rosenau, *Distant Proximities : Dynamics Beyond Globalization* (Princeton, N.J.: Princeton University Press, 2003), 88.

[14] Ibid., 273-314.

communicative efficiencies in attempt to resolve conflicting interests.[15] Often these interests are based on observational differences that are themselves a function of "distance." "Depending on the scale considered, an analyst and a manager may or may not observe all processes affecting a common-pool resource…"[16] Multiscale networking can enhance observational efficiencies as well.

Third, multiscale networking can ameliorate the distinction between *rational agency* and *normative agency*.[17] Insofar as states are more likely to exhibit rational agency, i.e. behave as utility maximizers, and community members normative agency, i.e. behave in accordance with cultural traditions, multiscale networking creates pathways for shared understandings. "Locals" can learn rational reasons for protecting environments and "globals" can develop an appreciation for the strong normative prescriptions that are transmitted by interaction with communities.

[15] Oran R. Young, *Governance in World Affairs* (Ithaca, N.Y.: Cornell University Press, 1999).
[16] Elinor Ostrom and Nives Dolésak, "The Challenges of the Commons," in *The Commons in the New Millennium : Challenges and Adaptation*, ed. Elinor Ostrom and Nives Dolésak, *Politics, Science, and the Environment* (Cambridge, Mass.: MIT Press, 2003), 28.
[17] Young, *The Institutional Dimensions of Environmental Change : Fit, Interplay, and Scale*, 149.

Legitimacy: "There is a fundamental problem with state and government *legitimacy* that arises in the effort to alter patterns of resource management."[18] When actors at one scale are affected by decisions at another scale, the legitimacy of those decisions and the decision-makers is crucial. For example, domestic interests occasionally need help imposing sanctions on violators. "In order to further their cause, they, therefore, often resort to encouraging the formation of transnational networks and to mobilizing the support of societal actors."[19] In additon, "self-organizing CPRs may need access to external enforcement of their agreements."[20] Again, the legitimacy of external authorities is crucial for the effectiveness of environmental governance. "We need to understand how to 'mesh' the structure and organization of environmental protection, preservation and restoration with the structure and organization of local societies and groups in affected areas. This means that these communities must be central actors in planning efforts…."[21] By creating this "mesh" multiscale networking increases legitimacy of efforts at all scales.

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[18] Ronnie D. Lipschutz and Judith Mayer, *Global Civil Society and Global Environmental Governance : The Politics of Nature from Place to Planet, Suny Series in International Environmental Policy and Theory* (Albany: State University of New York Press, 1996), 31.

[19] Hasenclever, Mayer, and Rittberger, *Theories of International Regimes*, 204.

[20] Elinor Ostrom, Roy Gardner, and James Walker, *Rules, Games, and Common-Pool Resources* (Ann Arbor: University of Michigan Press, 1994), 327.

[21] Lipschutz and Mayer, *Global Civil Society and Global Environmental Governance : The Politics of Nature from Place to Planet*, 31.

Social Capital: "Social capital can be conceived of as an asset that arises from and enables the use of networks existing in a community in such a way that norms of trust and reciprocity are promoted."[22] "Horizontal networks, according to Putnam… bring 'together agents of equivalent status and power,' whereas vertical networks link 'unequal agents in asymmetric relations of hierarchy and dependence.'"[23] Multiscale networking combines the horizontality of transnational networks with the verticality that enables the exercise of social capital. Environmental groups domestically may have little social capital but factor in transnatinal multiscale linkages and their leverage can increase substantially. Moreover, traditional hierarchies force social capital to "trickle up" through government bureaucracies. Multiscale networking spans vertical *and* horizontal divides, increasing the likelihood that social capital can be exercised where it needs to be.

[22] C. Leigh Anderson, Laura A. Locker, and Rachel A. Nugent, "A Framework for Analyzing the Physical-, Social-, and Human-Capital Effects of Microcredit on Common-Pool Resources," in *The Commons in the New Millennium : Challenges and Adaptation*, ed. Elinor Ostrom and Nives Dolésak, *Politics, Science, and the Environment* (Cambridge, Mass.: MIT Press, 2003), 276.
[23] Ibid, Robert D. Putnam, Robert Leonardi, and Raffaella Nanetti, *Making Democracy Work : Civic Traditions in Modern Italy* (Princeton, N.J.: Princeton University Press, 1993), 173.

Static v. Dynamic: Multiscale networking is an ongoing optimization process, and as such it changes governance structures from *static* to *dynamic* institutions. In current environmental governance, even though "linkages can be loose or strong, hierarchical or decentralized" the implication is that the linkages are formulated, implemented, and static.[24] And yet, Ostrom admits that "the pertinent question, then, is how to devise institutions that allow for the necessary flexibility."[25] In fact, Gehring's concept of "dynamic environmental regimes" hinges on the continual renegotiation of environmental norms by a multiscale network of interconnected actors. "A group of actors having developed common norms forms a community within which these norms are valid. And the emergence of this community may affect… constellations of interests and decision situations."[26] Furthermore, "international regimes designed to *purposefully improve* outcomes must be made up of [perpetually] negotiated norms."[27]

Multiscale Net"works"

There are a number of promising examples of multiscale networking in environmental governance. First there is Lindayati's analysis of local forest tenure in Indonesia.[28] Second, we can see the use of "green microcredit" by environmental NGOs facilitated by "partnering with more specialized credit suppliers such as local or international banks or other NGOs."[29] Third, as regards multilateral emission trading we

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[24] Ostrom and Dolésak, "The Challenges of the Commons," 23.
[25] Ibid., 9.
[26] Thomas Gehring, *Dynamic International Regimes : Institutions for International Environmental Governance* (Frankfurt am Main ; New York: P. Lang, 1994), 378.
[27] Ibid., 400.
[28] Rita Lindayati, "Shaping Local Forest Tenure in National Politics," in *The Commons in the New Millennium : Challenges and Adaptation*, ed. Elinor Ostrom and Nives Dolésak, *Politics, Science, and the Environment* (Cambridge, Mass.: MIT Press, 2003).
[29] Anderson, Locker, and Nugent, "A Framework for Analyzing the Physical-, Social-, and Human-Capital Effects of Microcredit on Common-Pool Resources," 269.

see attempts to "coalesce the voluntary network of controls into a more binding international system"[30] by establishing multiscale linkages between the various parties involved. And we have Martha Geores recent analysis of multiscale issues in forests management in which she concludes that "operational scale is a crucial concept…. Representatives of all people claiming allocative and authoritative rights over a particular forest from various scales should be reflected in the management group for that forest."[31] Attempts to create multiscale linkages may yet provide us with a global forests regime.

Networking Whom?

Who are the primary actors that we should attempt to network and why: 1) states, 2) corporations, 3) NGOs, 4) epistemic communities, 5) individuals.

States: By definition, in the absence of a "world state," states in the international anarchy constitute the primary network. For states "difficulties may be overcome when external authorities facilitate the acquisition of reliable information, the development of long-term contracts, and enforcement mechanisms to complement internal mechanisms. The difficulties do not simply disappear by presuming that larger governmental units must impose solutions…"[32] In essence, states can gain from sharing the costs of governance with other *non-governmental* actors in the network.

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[30] Alexander E. Farrell and M. Granger Morgan, "Multilateral Emission Trading: Heterogeneity in Domestic and International Common-Pool Resource Management," in *The Commons in the New Millennium : Challenges and Adaptation*, ed. Elinor Ostrom and Nives Dolésak, *Politics, Science, and the Environment* (Cambridge, Mass.: MIT Press, 2003), 207.
[31] Martha E. Geores, "The Relationship between Resource Definition and Scale: Considering the Forest," in *The Commons in the New Millennium : Challenges and Adaptation*, ed. Elinor Ostrom and Nives Dolésak, *Politics, Science, and the Environment* (Cambridge, Mass.: MIT Press, 2003), 95.
[32] Ostrom, Gardner, and Walker, *Rules, Games, and Common-Pool Resources*, 328.

Corporations: Nazli Choucri has already suggested "establishing a corporate consortium for environmental management."[33] Choucri asserts that 1) multinationals are both instruments of states and shapers of state policy, 2) multinationals shape policies in host countries also, 3) multinationals shape public preferences.[34] Including corporations in global governance is merely making de facto de jure. Corporations "employ special political assets, including particular technical expertise, privileged access to certain government ministries, and political clout with legislative bodies" and can even "avert negotiations on a binding regime altogether."[35]

NGOs: "NGOs influence the environmental regimes by defining issues, swaying the policy of a key government, lobbying negotiation conferences, providing information and reporting services, drafting entire convention texts, and monitoring the implementation of agreements."[36] In addition, both Raustiala and McCormick have provided excellent analyses of the ever-increasing role of NGOs in global environmental governance.[37]

Epistemic Communities: Peter Haas has amassed considerable evidence of the influence of epistemic communities. "An epistemic community is a network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area."[38] As

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[33] Nazli Choucri, "Multinational Corporations and the Global Environment," in *Global Accord : Environmental Challenges and International Responses*, ed. Nazli Choucri, *Global Environmental Accords Series* (Cambridge, Mass.: MIT Press, 1993), 251.
[34] Ibid.
[35] Gareth Porter and Janet Welsh Brown, *Global Environmental Politics*, 2nd ed., *Dilemmas in World Politics* (Boulder, Colo.: Westview Press, 1996), 78.
[36] Ibid.
[37] John McCormick, "The Role of Environmental Ngos in International Regimes," in *The Global Environment : Institutions, Law, and Policy*, ed. Norman J. Vig and Regina S. Axelrod (Washington, D.C.: CQ Press, 1999), Kal Raustiala, "States, Ngos, and International Environmental Institutions," *International Studies Quarterly* 41, no. 4 (1997).
[38] Peter M. Haas, "Introduction: Epistemic Communities and International Policy Coordination," *International Organization* 46, no. 1, Knowledge, Power, and International Policy Coordination (1992): 3.

influential knowledge-brokers regarding environmental issues in particular, epistemic communities need a clear role in global environmental governance.

Individuals: Paul Wapner has consistently illustrated the emergence and rising impact of "global civil society" in international relations.[39] Arguably the most neglected actor in global governance, steps should be made to include these bottom-most actors in the multiscale network.

Moving Forward

Norms and rules "define intersubjectively who can lay claim to the status of an actor in international politics and what rights and duties each actor bears in principle."[40] We are witnessing an increase in the diversity of the actors, but we are still funneling their actions and activities through the bottleneck of state hierarchies with the accompanying symptoms of congestion and delay. The kind of "international communitarianism" that Alexander Wendt and others advocate suffers from the assumption that states are effective representatives of local preferences and needs via "trickle up" processes. As Robert Putnam has noted, international negotiators for states often have agendas that are not aligned with domestic or local preferences.[41] Ostrom, too, has shown that those "who stand to gain from the current situation, while others lose, may block efforts by the less powerful to change the rules of the game."[42]

[39] Paul Wapner, "Politics Beyond the State: Environmental Activism and World Civic Politics," *World Politics* 47, no. 3 (1995).
[40] Hasenclever, Mayer, and Rittberger, *Theories of International Regimes*, 158-59.
[41] Robert D. Putnam, "Diplomacy and Domestic Politics: The Logic of Two-Level Games," *International Organization* 42, no. 3 (1988).
[42] Elinor Ostrom, *Governing the Commons : The Evolution of Institutions for Collective Action*, *The Political Economy of Institutions and Decisions* (Cambridge ; New York: Cambridge University Press, 1990), 21.

Ultimately, this resistance is grounding in the perception that states are increasingly having to share the stage with other actors. "The more crowded the global stage gets with steering mechanisms, the less can any one of them, or any coalition of them, dominate the course of events, and the more will all of them have to be sensitive to how sheer numbers limit their influence. Every rule system, in other words, will be hemmed in by all the others, thus conducing to a growing awareness of the virtues of cooperation...."[43] But an overly hierarchical focus "on the emergence of various transnational processes that have erosive effects on the power and authority of states" overlooks "the growth of institutions of governance at all levels of analysis, with concomitant implications for state and system."[44] Scale is neither being *eliminated* nor *exacerbated*; it is being *redefined*.

A New Ontology of Scale: Oran Young and many others are trapped considering the question of the validity of "scaling up" or "scaling down," a distinction that makes little sense in the increasingly networked information age. Being wedded to an ontology of hierarchical scale, that treats scale as a given, prevents Young from seeing that scale in institutions is multidimensional and subject to human reconstruction. The dichotomy is no longer between local and global, but between close and distant, connected and isolated, participant or marginalized. "Glocalization" is a function of ever-increasing multiscale connectivity, and although I have presented its advantages, it is worth a brief look at some of its potential deficiencies.

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[43] Rosenau, *Distant Proximities : Dynamics Beyond Globalization*, 399.
[44] Lipschutz and Mayer, *Global Civil Society and Global Environmental Governance : The Politics of Nature from Place to Planet*, 249.

Obstacles: More players of course introduces new degrees of process complexity.[45] And, while it is true that institutional linkages can reinforce each other and be beneficial, they can also conflict causing mutual interference.[46] Ostrom rightly asserts the "need for multiscale research that is spatially and temporally explicit" to explore the "contestation of the different concepts of scale."[47] In addition, old norms must be overcome. For example, in environmental projects "international [financing] donors prefer engaging in projects with national governments rather than with the recipient community."[48] Also, giving up our rigid hierarchies requires a sense of "common fate," or shared journey, similar to Kenneth Oye's "shadow of the future."[49] This at least may be alleviated by multiscale connectivity, if, as Ostrom suggests, "participants may simply have no capacity to communicate with one another, no way to develop trust, and no sense that they must share a common future."[50]

Conclusion

> *"Power, as the capacity to impose behavior, lies in the networks of information exchange*
> *and symbol manipulation, which relate social actors, institutions, and cultural*
> *movements…"*[51]

Through multiscale networking we "encompass all the diverse collectivities and individuals who participate in the processes of governance." [52] Echoing Gehring's

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[45] Fen Osler Hampson and Michael Hart, *Multilateral Negotiations : Lessons from Arms Control, Trade, and the Environment* (Baltimore: Johns Hopkins University Press, 1995), 28-29.

[46] Oran R. Young, "Governance without Government," in *Governance in World Affairs*, ed. Oran R. Young (Ithaca, N.Y.: Cornell University Press, 1999).

[47] Elinor Ostrom et al., "Adaptation to Challenges," in *The Commons in the New Millennium : Challenges and Adaptation*, ed. Elinor Ostrom and Nives Dolésak, *Politics, Science, and the Environment* (Cambridge, Mass.: MIT Press, 2003), 339.

[48] Ostrom and Dolésak, "The Challenges of the Commons," 19.

[49] Kenneth A. Oye, "Explaining Cooperation under Anarchy," in *Cooperation under Anarchy*, ed. Kenneth A. Oye (Princeton, N.J.: Princeton University Press, 1986).

[50] Ostrom, *Governing the Commons : The Evolution of Institutions for Collective Action*, 21.

[51] Manuel Castells, *End of Millennium*, 2nd ed. (Oxford ; Malden, MA: Blackwell Publishers, 2000), 379.

[52] Rosenau, *Distant Proximities : Dynamics Beyond Globalization*, 396.

"dynamic regimes," Rosenau suggests that multiscale governance regimes "constitute a hybrid structure in which the dynamics of governance are so intricate and overlapping among the several levels as to form a singular, weblike process that, like a mobius, neither begins nor culminates at any level or at any point in time. Mobius-web governance does not culminate with the passage of a law or compliance with its regulations. Rather, it is operative as long as the issues subjected to governance continue to be of concern."[53] Lipschutz, too, claims "rules, in other words, take the place of explicit rule; governance replaces government; informal networks of coordination replace formal structures of command…. There is reason to think that a governance system composed of collective actors at multiple levels, with overlapping authority, linked thorough various kind of networks, might be as functionally-efficient as a highly-centralized one."[54] Even Young, who is skeptical, admits that "nurturing a dialogue between students of small-scale common-property regimes and students of international environmental regimes should be a matter of high priority for all concerned."[55] If it is true that "the state is engaged in government; civil society, in governance,"[56] then it is essential for us to construct environmental governance systems of "networks and alliances, national, transnational and global, [all] linked together."[57] These multiscale networks improve governance through both "*function* and *social meanings*, anchored to particular places but linked globally through networks of knowledge-based relations. Coordination will occur not only because each unit fulfills a functional role where it is located but also because the stakeholders in functional units share goals with their

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[53] Ibid.
[54] Lipschutz and Mayer, *Global Civil Society and Global Environmental Governance : The Politics of Nature from Place to Planet*, 252.
[55] Young, *The Institutional Dimensions of Environmental Change : Fit, Interplay, and Scale*, 162.
[56] Lipschutz and Mayer, *Global Civil Society and Global Environmental Governance : The Politics of Nature from Place to Planet*, 249.
[57] Ibid., 59.

counterparts in other functional units."[58] "Consequently, state agencies will have to become participants or stakeholders in a complex network of resource regimes and institutions, helping to coordinate among them, and foster the creation of large numbers of 'mediating organizations' whose purpose is to act as a buffer and filter between local contests and these bureaucracies…. The model of environmental protection, conservation, and restoration described here thus consists of a consciously-developed system of multiple layers and actors, lined loosely together in systems of political and social governance."[59] We can conceive of fishing companies, monitored by NGOs, regulated by labeling requirements by international treaties and enforced domestically. We can envision corporate emission trading managed by governments but with emission credits for non-polluting energy sources (who are currently excluded from emission trading altogether) and implemented by transnational networks and NGOs. And so in the end, we improve both functional governance as well as normative equity by increasing participation through the creation of multiscale networks.

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[58] Ibid., 255-56.
[59] Ibid., 46.

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