ARTICLE

CITIES, GREEN CONSTRUCTION, AND THE ENDANGERED SPECIES ACT

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ABSTRACT

The geographic footprint of cities—the space they occupy—is relatively small in comparison to their ecological footprint, which is measured in terms of impact on the sustainability of resources situated mostly outside of the urban realm. Ironically, the Endangered Species Act (ESA), though widely regarded as one of the most powerful environmental laws, has been and continues to be administered with respect to urbanized land masses primarily with the objective of managing their geographic footprints. This Article uses the example of "green construction" techniques to explore this disconnect between the macro-scale contribution of cities' ecological footprints to species endangerment and the micro-scale orientation of ESA law and policy toward cities' geographic footprints. The movement toward codifying standards for green construction is less concerned with geographic footprints than with ecological footprints, thus widespread adoption of green construction codes could significantly improve the condition of imperiled species. So why is the ESA not being used to require or facilitate green construction techniques? I argue that one reason is the statute's harm-preventing focus, which does not fit well with the benefit-providing emphasis of green construction. Another reason is that the ESA is least effective at managing the kind of com-

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plex, large-scale, indirect causal mechanisms that account for cities' vast ecological footprints. Nevertheless, the Article identifies ways in which the ESA can be used directly and indirectly to support green construction and thereby help mitigate the ecological footprints of cities.

INTRODUCTION

Urban population growth over the past century has occurred on less than three percent of the earth's land surface, yet the world's urban population accounts for seventy-eight percent of carbon emissions, sixty percent of residential water use, and seventy-six percent of wood use.[1] Electricity consumption attributable just to buildings, which accounts for two-thirds of all electricity consumed in North America, is one of the largest factors contributing to North American greenhouse gas emissions.[2] The *geographic* footprint of cities—the space they occupy—thus is relatively small in comparison to their *ecological* footprint measured in terms of impact on the sustainability of resources situated mostly outside of the urban realm.[3] That this has always been the case is made depressingly clear in *Collapse*, Jared Diamond's sweeping environmental history of how past and modern civilizations have managed to outstrip local and regional natural resource bases time and again, often leading to societal ruin.[4] The effect, however, has clearly gone global in dimension and is no longer responsible only for placing stress on sustainable human living conditions—the modern city threatens all species far and wide.[5]

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[1] Nancy B. Grimm, *Global Change and the Ecology of Cities*, 319 SCIENCE 756, 756 (2008).

[2] *See* NAT'L SCI. & TECH. COUNCIL, FEDERAL RESEARCH AND DEVELOPMENT AGENDA FOR NET-ZERO ENERGY, HIGH PERFORMANCE GREEN BUILDINGS 5 (2008), *available at* http://www.ostp.gov/galleries/NSTC%20Reports/FederalRDAgendaforNetZeroEnergyHighPerformanceGreenBuildings.pdf; U.S. CLIMATE CHANGE SCIENCE PROGRAM, THE NORTH AMERICAN CARBON BUDGET AND IMPLICATIONS FOR THE GLOBAL CARBON CYCLE 6 (2007), *available at* http://www.climatescience.gov/Library/sap/sap2-2/final-report/default.htm.

[3] For a thorough discussion of the urban ecological footprint concept, see PETER NEWMAN & ISABELLA JENNINGS, CITIES AS SUSTAINABLE ECOSYSTEMS: PRINCIPLES AND PRACTICES 80-90 (2008).

[4] JARED DIAMOND, COLLAPSE: HOW SOCIETIES CHOOSE TO FAIL OR SUCCEED (2005).

[5] The full range of urban ecological footprint impacts is discussed in detail in WORLDWATCH INST., STATE OF THE WORLD 2007: OUR URBAN FUTURE, *passim* (2007), and Grimm et al., *supra* note 1, *passim*.

The Endangered Species Act (ESA)[6] is widely regarded at the same time as "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation,"[7] and the "pit bull" of environmental laws.[8] Thus, it might reasonably be expected to be in full play on the issue of cities and their ecological footprints. Ironically, however, the ESA has been and continues to be administered in practice and described in academic scholarship with respect to urbanized land masses primarily with the objective of managing their geographic footprints. To be sure, it makes perfect sense for the agencies delegated to administer the ESA, the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS),[9] to aim the statute at one of the leading direct causes of species decline—the loss of intact habitat to urbanizing land uses.[10] But as seen, the ecological footprint of cities extends well beyond direct habitat conversion. Cities suck in resources from far outside their borders and pump out wastes to areas at least as distant. Rather than addressing only where cities *are*, shouldn't the ESA also be employed to address what cities *do*?

This Article uses the example of "green construction" techniques to explore the disconnect between the contribution of cities' ecological footprints to species endangerment and the orientation of ESA law and policy toward cities' geographic footprints. In its nar-

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[6] Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified as amended at 7 U.S.C. § 136 (2000), 16 U.S.C. §§ 1531-44 (2000), and in other scattered sections of 16 U.S.C.). This Article is not intended to provide a comprehensive overview of the ESA. Rather, it focuses on the ways in which the ESA can or cannot require or facilitate what is described herein as green construction. For comprehensive treatments of the ESA, several of which are referred to frequently *infra*, see generally MICHAEL J. BEAN & MELANIE J. ROWLAND, THE EVOLUTION OF NATIONAL WILDLIFE LAW (3d ed. 1997); ENDANGERED SPECIES ACT: LAW, POLICY, AND PERSPECTIVES (Donald C. Baur & Wm. Robert Irvin eds., 2002) [hereinafter LAW, POLICY, AND PERSPECTIVES]; LAWRENCE R. LIEBESMAN & RAFE PETERSEN, ENDANGERED SPECIES DESKBOOK (2003); STANFORD ENVTL. LAW SOC'Y, THE ENDANGERED SPECIES ACT (2001); TONY A. SULLINS, ESA: ENDANGERED SPECIES ACT (2001); 1 THE ENDANGERED SPECIES ACT AT THIRTY: RENEWING THE CONSERVATION PROMISE (Dale D. Goble et al. eds., 2006) [hereinafter THE ENDANGERED SPECIES ACT AT THIRTY].

[7] Tennessee Valley Auth. v. Hill, 437 U.S. 153, 180 (1978).

[8] *See, e.g.*, Steven P. Quarles, *The Pit Bull Goes to School*, ENVTL. F., Sept.-Oct. 1998, at 55, 55 (discussing the origins of this reputation). For additional historical context highlighting the Act's "overbearing statutory certainty," see Steven P. Quarles & Thomas R. Lundquist, *The Pronounced Presence and Insistent Issues of the ESA*, NAT. RESOURCES & ENV'T, Fall 2001, at 59.

[9] The FWS administers the ESA for all terrestrial, freshwater, and certain other specified species and the NMFS (also known as NOAA-Fisheries) administers the ESA for most marine species and anadromous fish. *See* 50 C.F.R. § 402.01(b) (2008).

[10] *See* David Wilcove et al., *Quantifying Threats to Imperiled Species in the United States*, 48 BIOSCIENCE 607, 609 (1998).

rowest sense, green construction is the practice of designing, constructing, and operating buildings with greater attention to energy efficiency, water use efficiency, waste reduction, toxics reduction, and use of recycled and other resource-efficient construction materials.[11] The foremost compilation of such *green building* techniques has come through the industry-led Leadership on Energy and Environmental Design (LEED) Green Building Rating System,[12] and there is a growing movement to adopt green building codes to integrate these techniques into state and local development regulations.[13] In the broadest sense, and the application I will use in this Article, green construction also includes techniques designed to "green" the urban infrastructure installed to support cities and their buildings, such as storm water retention facilities and drainage facilities. Thus, *green infrastructure* techniques eschew traditional "hard infrastructure" such as curbs, gutters, and impervious drains, preferring alternatives such as grassy swales, vegetative buffers, and permeable pavements.[14] As such, the movement toward codifying standards for green buildings and green infrastructure is less concerned with geographic footprints than with ecological footprints, and widespread adoption of green construction codes thus could significantly improve the condition of imperiled species. So why is the ESA not being used to require or facilitate green construction techniques?

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[11] *See* NAT'L SCI. & TECH. COUNCIL, *supra* note 2, at 6-7; U.S. Environmental Protection Agency, Green Building, http://www.epa.gov/greenbuilding (last visited Sept. 22, 2008).

[12] *See* U.S. Green Building Council, LEED, http://www.usgbc.org (last visited Sept. 30, 2008). The LEED initiative has produced a series of rating systems for awarding "points" to buildings based on defined attributes, such as building materials, siting, and energy efficient building techniques. *See, e.g.*, U.S. GREEN BUILDING COUNCIL, LEED FOR NEW CONSTRUCTION & MAJOR RENOVATIONS (2005), *available at* www.usgbc.org/ShowFile.aspx?DocumentID=1095 [herinafter LEED FOR NEW CONSTRUCTION].

[13] *See* Sara Bronin, *The Quiet Revolution Revived: Sustainable Design, Land Use Regulation, and the States*, 93 MINN. L. REV. 231 (2008); Carl J. Circo, *Using Mandates and Incentives to Promote Sustainable Construction and Green Building Projects in the Private Sector: A Call for More State Land Use Policy Initiatives*, 112 PENN. ST. L. REV. 731 (2008); Les Lo Baugh, *LEED Green Building Incentives*, Practising Law Institute Real Estate Law and Practice Course Handbook Series No. 16007, Westlaw 556 PLI/Real 23 (2008) (Appendix B provides a survey of federal, state, and local green building incentives and requirements).

[14] *See generally* MARK BENEDICT & EDWARD T. MCMAHON, GREEN INFRASTRUCTURE: LINKING LANDSCAPES AND COMMUNITIES (2006); U.S. EPA, MANAGING WET WEATHER WITH GREEN INFRASTRUCTURE: ACTION STRATEGY 2008 (2008), *available at* http://www.epa.gov/npdes/pubs/gi_action_strategy.pdf; U.S. Environmental Protection Agency, Green Infrastructure—Basic Information, http://cfpub.epa.gov/npdes/greeninfrastructure/information.cfm#greenpolicy (last visited Sept 30, 2008).

Part I of the Article explores that problem by examining the structure of the ESA and the practical obstacles it imposes on using the statute to require use of green construction. The regulatory programs of the ESA are powerful, but nonetheless are hamstrung in two significant respects. First, the ESA is primarily a harm-preventing statute, not a benefit-mandating statute. It is easier to portray green construction as a plus for species than it is to target the failure to employ green construction at a particular location as a threat to species, which make green construction less of a solution to concerns of species endangerment. Second, even when directed at harm-producing actions, the ESA has worked more effectively in direct micro-scale causation contexts, such as conversion of a patch of habitat to a shopping mall, than it has for the kind of macro-scale indirect causation associated with cities' ecological footprints.

Part II of the Article examines how these two features operate to create a scale mismatch between the ESA, cities' ecological footprints, and green construction. The impact of cities' ecological footprints on species, and the difference green construction can make in that regard, are macro-scale cumulative effects, whereas the ESA works best in micro-scale applications. Nevertheless, Part II of the Article also explores opportunities for the FWS and NMFS to use the ESA to promote green construction. While not well positioned to demand green construction, experience from other contexts suggests ways to use the ESA to link with, reward, or otherwise facilitate the use of green construction techniques at the micro-scale based on benefits at the macro-scale. The Article concludes with some general observations of what lessons the green construction context has to offer for the future of cities and the ESA.

I. LIMITS ON INCORPORATING GREEN CONSTRUCTION AS AN ENDANGERED SPECIES ACT MANDATE

A central purpose of the ESA is to "provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved."[15] The FWS and NMFS administer several core programs aimed toward that objective:

The Listing Programs: Section 4 authorizes the agencies to identify "endangered" and "threatened" species, known as the listing

[15] 16 U.S.C. § 1531(b).

function,[16] and then to designate "critical habitat"[17] and develop "recovery plans"[18] for the species.

- *Interagency Consultation and the Jeopardy Prohibition*: Section 7 requires all federal agencies to consult with the FWS or NMFS (depending on the species) to ensure that actions they carry out, fund, or authorize do not "jeopardize" the continued existence of listed species or "adversely modify" their critical habitat.[19]
- *The Take Prohibition*: Section 9 requires that all persons, including all private and public entities subject to federal jurisdiction, avoid committing "take" of listed species of fish and wildlife.[20]
- *Incidental Take Permits*: Sections 7 (for federal agency actions)[21] and 10 (for actions not subject to Section 7)[22] establish a procedure and criteria for the FWS and NMFS to approve "incidental take" of listed species.[23]

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[16] 16 U.S.C. § 1533(a)(1) (2000). For a description of the listing process, see generally LIEBESMAN & PETERSEN, *supra* note 6, at 15-20; STANFORD ENVTL. LAW SOC'Y, *supra* note 6, at 38-58; SULLINS, *supra* note 6, at 11-25; J.B. Ruhl, *Section 4 of the ESA: The Keystone of Species Protection Law*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 6, at 19, 19-33.

[17] 16 U.S.C. § 1533(a)(3). For a description of the critical habitat designation process, see generally LIEBESMAN & PETERSEN, *supra* note 6, at 20–24; STANFORD ENVTL. LAW SOC'Y, *supra* note 6, at 59-69; SULLINS, *supra* note 6, at 26-28; Federico Cheever, *Endangered Species Act: Critical Habitat*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 6, at 47-70; Murray D. Feldman & Michael J. Brennan, *The Growing Importance of Critical Habitat for Species Conservation*, 16 NAT. RESOURCES & ENV'T 88 (2001).

[18] 16 U.S.C. § 1533(f). For a description of the recovery plan process, see generally LIEBESMAN & PETERSEN, *supra* note 6, at 24-26; STANFORD ENVTL. LAW SOC'Y, *supra* note 6, at 71-77; SULLINS, *supra* note 6, at 34-37; John M. Volkman, *Recovery Planning*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 6, at 71-86.

[19] 16 U.S.C. § 1536(a)(2). For a description of the consultation process, see generally LIEBESMAN & PETERSEN, *supra* note 6, at 27-39; STANFORD ENVTL. LAW SOC'Y, *supra* note 6, at 83-103; SULLINS, *supra* note 6, at 59-86; Marilyn Averill, *Protecting Species Through Interagency Cooperation*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 6, at 87-113.

[20] 16 U.S.C. § 1538(a)(1). For a description of the cases developing the legal standards for what constitutes "take," see generally LIEBESMAN & PETERSEN, *supra* note 6, at 39–46; STANFORD ENVTL. LAW SOC'Y, *supra* note 6, at 104–12; SULLINS, *supra* note 6, at 44–54; Alan M. Glen & Craig M. Douglas, *Taking Species: Difficult Questions of Proximity and Degree*, 16 NAT. RESOURCES & ENV'T 65 (2001); Gina Guy, *Take Prohibitions and Section 9*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 6, at 191-206; Steven P. Quarles & Thomas R. Lundquist, *When Do Land Use Activities "Take" Listed Wildlife Under ESA Section 9 and the "Harm" Regulation?*, *in* LAW, POLICY, AND PERSPECTIVES, *supra* note 6, at 207-51.

[21] 16 U.S.C. § 1536(b)(4).

[22] *Id.* § 1539(a)(1).

[23] "Incidental take," although not explicitly defined in a specific statutory provision, is described in section 10 of the statute as a take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." *Id.* § 1539(a)(1)(B). FWS, for example,

These programs generate the regulatory firepower needed to intervene effectively in several categories of environmental change that cause species decline: (1) "the present or threatened destruction, modification, or curtailment" of habitat; (2) "over-utilization for commercial, recreational, scientific, or educational purposes"; (3) "disease or predation"; and (4) "other natural or manmade factors."[24] Of course, habitat displacement associated with the geographic footprint of urban buildings and infrastructure could easily fit into the first causal category. From there, however, where do ecological footprints and green construction tie into the ESA's regulatory framework? Is an urban building's demand for wood in its construction and for water and electricity in its operation something the ESA is designed to *regulate*? Indeed, two features of the ESA suggest the tight fit between cities' geographic footprints and the statute's regulatory programs will not easily be replicated when it comes to managing cities' ecological footprints.[25]

A. *Harms versus Benefits—Is Being Maximally Green Mandated?*

The ESA is at bottom a harm-preventing law, not a benefit-mandating law. Causing take or jeopardy of species is prohibited, but promoting the recovery of species is nowhere required by the statute. The courts have interpreted recovery plans, for example, to have no mandatory effect on federal agencies, much less anyone else.[26] They are plans, and that's it. The criteria for issuance of incidental take permits require only that the effects of the take are minimized and mitigated "to the maximum extent practicable"[27] and do not require that the permittee provide net benefits to the species.[28] Even section 7(a)(1) of the statute, which requires fed-

has adopted this meaning in regulations implementing section 7's incidental take authorization. 50 C.F.R. § 402.02 (2003). For a description of the incidental take authorization procedures, see generally LIEBESMAN & PETERSEN, *supra* note 6, at 46-50; STANFORD ENVTL. LAW SOC'Y, *supra* note 6, at 127-73; SULLINS, *supra* note 6, at 87-102.

[24] These are the factors upon which listing decisions are made. *See* 16 U.S.C. §§ 1533(a)(1)(A)-(E).

[25] In this Article, I do not address possible amendments to the ESA to change the general features discussed in this section or to otherwise more directly connect the ESA specifically with green building.

[26] *See* LIEBESMAN & PETERSEN, *supra* note 6, at 25-26; *cf.* STANFORD ENVTL. LAW SOC'Y, *supra* note 6, at 76-77 (noting that this area of law is still unclear).

[27] 16 U.S.C. § 1539(a)(2)(B)(ii). *See, e.g.*, Nat'l Wildlife Fed. v. Norton, 306 F. Supp. 2d 920, 928 (E.D. Cal. 2004) (agreeing with the FWS that full mitigation of take effects is not required if it is not practicable).

[28] For example, incidental permits issued under section 10(a)(1)(B) need only ensure that the permittee's actions "will not appreciably reduce the likelihood of the survival and

eral agencies to "utilize their authorities . . . by carrying out programs for the conservation of . . . species,"[29] has been interpreted by the FWS, NMFS, and courts to require essentially no specific affirmative efforts to promote species recovery.[30] In short, the ESA punishes those who harm species, but does nothing to encourage species protection.

Where does green construction fit into this framework? This question strikes profoundly at the heart of the ESA's future. Green construction is about holistically changing the way we conceive of buildings. Its implementation, however, requires the incremental application of a multitude of small changes in building design, construction, and operation. The net effect of green construction—that is, of employing the entire toolbox of techniques of green construction to produce a maximally green building and its green infrastructure—is likely to be good for species. But does that mean failure to use any or all of the techniques of green construction for any new building or infrastructure violates any prohibition of the ESA? If it does, then so does the failure to use the "greenest" technique available to accomplish any activity—irrigating crops, producing paper, driving automobiles, or mining gold—that has some effect on species.

Almost any activity conducted in modern economies could be done in a way that is a little bit better for species. But that is not enough to enlist the ESA. The ESA requires a showing that an activity causes either take of a member of a listed species or jeopardy to the continued survival of the species. The take and jeopardy prohibitions measure what impact an activity in fact imposes on the species, not what impact it might have imposed under different circumstances. So, as good as the greening of construction (or any other activity) might be for listed species, the question demanded under the ESA is whether "brown" (i.e., non-green) construction (or any other activity) causes take or jeopardy. If not, the ESA has nothing directly to say about greening the activity. For green construction, therefore, we must turn next to the question of causation.

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recovery of the species in the wild." 16 U.S.C. § 1539(a)(2)(B)(iv). Courts have declined to interpret this standard as requiring net benefits to the species. *See* Ctr. for Biological Diversity v. FWS, 202 F. Supp. 2d 594, 624-46 (W.D. Tex. 2002).

[29] 16 U.S.C. § 1536(a).

[30] *See* J.B. Ruhl, *Section 7(a)(1) of the "New" Endangered Species Act: Rediscovering and Redefining the Untapped Power of Federal Agencies' Duty to Conserve Species*, 25 ENVTL. L. 1107 (1995) (explaining the legal background and proposing a more demanding standard).

B. Causing Take or Jeopardy—The Indirect Causation Dilemma

The distinction between a city's geographic and ecological footprint goes straight to the heart of the ESA's powerful but narrow regulatory structure. When the causal mechanism of harm to a species is direct, as in the case of a city's geographic footprint, the ESA's regulatory programs swing easily into gear. But when the causal mechanism is indirect, diffuse, and complex, as in the case of a city's ecological footprint, the statute becomes unwieldy and ineffective.[31] The two regulatory arms of the ESA—the take prohibition and the jeopardy prohibition—are particularly limited in scope by demanding burdens of proof that place tremendous stress on the statute when the cause of a species' decline involves indirect, diffuse, cumulative mechanisms.[32]

1. Take

The take prohibition instructs that "with respect to any endangered species of fish or wildlife . . . it is unlawful for any person subject to the jurisdiction of the United States to . . . take any such species within the United States or the territorial sea of the United States."[33] This broad prohibition applies to all federal, state, and local governments and all private organizations and individuals,[34] anywhere "within the United States," on public and private lands alike. And through the statutory definition of "take" it applies to any acts that "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" the protected species.[35] From that list of prohibited activities, moreover, the FWS and the NMFS have by regulation defined "harm" to include any modification of the species' habitat that "actually kills or injures" individuals of the species "by significantly impairing essential behavioral patterns."[36]

Although the United States Supreme Court upheld the regulatory definition of "harm" in *Babbitt v. Sweet Home Chapter of*

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[31] *See* Barton H. Thompson Jr., *Managing the Working Landscape*, *in* THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 6, at 101, 104 ("[ESA enforcement] has had the greatest impact on active changes in species habitat (e.g., the construction of new subdivisions, timber harvesting, and water diversions) . . . .").

[32] I have explored this feature of the ESA in connection specifically with greenhouse gas emissions in J.B. Ruhl, *Climate Change and the Endangered Species Act: Building Bridges to the No-Analog Future*, 88 B.U. L. REV. 1, 39-49 (2008), from which the discussion in this article is adapted.

[33] 16 U.S.C. § 1538(a)(1), (a)(1)(B).

[34] All of these entities fit the ESA's definition of "person." *See id.* § 1532(13).

[35] *Id.* § 1532(19).

[36] 50 C.F.R. § 17.3 (2006) (FWS definition); *id.* § 222.102 (NMFS definition).

Communities for a Great Oregon,[37] the Court placed significant boundaries on the prosecution of take claims in indirect causation scenarios. The harm definition unquestionably extends the take prohibition from cases in which the action causes direct death or injury (e.g., hunting, shooting, and trapping), to cases in which causality is indirect – i.e., loss of habitat leads in some way to actual death or injury. However, theories of indirect take can become quite attenuated and speculative.[38] The *Sweet Home* Court found it appropriate in such cases to impose the burden of proof on the proponent of the indirect harm theory. Thus, the majority emphasized that the harm rule incorporates "but for" causation, with "every term in the regulation's definition of 'harm' . . . subservient to the phrase 'an act which actually kills or injures wildlife.'"[39] Furthermore, the term should "be read to incorporate ordinary requirements of proximate causation and foreseeability."[40] The majority thus implicitly endorsed "strong arguments that activities that cause minimal or unforeseeable harm will not violate the [ESA] as construed."[41] Since the Court established these tort-like evidentiary burdens, the lower courts have steadfastly refused to enforce the take prohibition based on attenuated indirect take theories, instead enjoining case-specific instances of take only when death or injury was proven to be likely.[42]

Green construction is unlikely to be mandated frequently under this standard. To be sure, the construction of buildings and infrastructure presents a geographic footprint dimension—the conversion of intact habitat to residential and commercial land uses—that has triggered the ESA take prohibition time and again around the

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[37] 515 U.S. 687, 708 (1995).

[38] *See, e.g.*, Morrill v. Lujan, 802 F. Supp. 424, 430-32 (S.D. Ala. 1992) (rejecting ESA claim for injunctive relief against a new subdivision based in part on the theory that some of the home owners would have pet cats, some of the cats would wander into the habitat of a listed mouse, and some of those cats would kill some of the mice). In settlement of another round of litigation initiated following the denial of the injunction request, the developer in *Morrill* nonetheless agreed to prohibit house cats in the development. *See* William H. Satterfield et al., *Who's Afraid of the Big Bad Beach Mouse?*, 8 NAT. RESOURCES & ENV'T 13, 15 (1993) (citing *Developer Agrees to Protect Beach Mice*, BIRMINGHAM NEWS, Jan. 19, 1993).

[39] *Sweet Home*, 515 U.S. at 700 n.13.

[40] *Id.* at 696 n.9.

[41] *Id.* at 699. In her concurrence, Justice O'Connor was more concise, limiting the scope of the harm rule to "significant habitat modification that causes actual, as opposed to hypothetical or speculative, death or injury to identifiable protected animals." *Id.* at 708-09 (O'Connor, J., concurring).

[42] For a thorough survey of the post-*Sweet Home* cases, see Glen & Douglas, *supra* note 20, at 68-69.

nation. That was the point of the *Sweet Home* litigation. But green construction is not focused primarily on geographic footprints, and thus is unlikely as a regular matter to be superior to brown construction in making any difference under the take prohibition. A green building can take up as much space as a brown building suited to the same purpose.[43] The geographic and physical configurations of brown infrastructure are more likely on occasion to harm a listed species through displacement of habitat. By contrast, green infrastructure alternatives such as natural drainage and wetland buffers might avoid or mitigate some of the impact that would be felt under their brown infrastructure equivalents. By and large, however, green construction is about reducing the ecological footprint of buildings and infrastructure. Certainly, building practices that incorporate recycled construction materials, energy efficient designs, and water conservation measures can be beneficial to listed species, but usually only indirectly, as when they reduce excess demand for water, timber harvesting, and greenhouse-gas-emitting energy production. Nevertheless, the mere fact that green construction reduces demand for commodities, the production of which harm a listed species, is a thin plank on which to base the argument that using anything less than green construction techniques violates the take prohibition. Which spotted owl in California did the new "brown" house in Orlando kill? Which polar bear in the Arctic did the new "brown" building in Topeka kill? Which salmon in Oregon did the new "brown" concrete curb and gutter in Chicago kill? In short, the argument that construction that is not green causes take of a listed species would rely on proving indirect causal chains that fall far outside the boundaries *Sweet Home* has placed on the take prohibition.

2. *Jeopardy*

Similarly, the jeopardy prohibition becomes difficult to apply in complex, indirect causation scenarios. The ESA requires that federal agencies ensure actions they authorize, fund, or carry out are "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or

[43] Green building standards do take into account the impact of siting on species, however. For example, the LEED standards for new buildings provide points for protecting or restoring habitat, and the pilot standards for neighborhood developments even more directly include prerequisites for siting that take into account impact on imperiled species. *See* LEED FOR NEW CONSTRUCTION, *supra* note 12 at 17-18; U.S. GREEN BUILDING COUNCIL, PILOT VERSION: LEED FOR NEIGHBORHOOD DEVELOPMENT RATING SYSTEM 11-13 (2007), http://www.usgbc.org/ShowFile.aspx?DocumentID=2845.

adverse modification of habitat of such species which is determined . . . to be critical."[44] Agency regulations define "jeopardize" as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."[45] For this purpose, *indirect* effects are defined as "those that are caused by the proposed action and are later in time, but still are reasonably certain to occur."[46]

The "reasonably certain to occur" causal burden for indirect effects constrains the use of jeopardy analysis when macro-scale theories of indirect causation do not translate well into micro-scale evidence of causation. At a macro-scale, for example, it is easy to construct a theory of jeopardy causation for buildings: buildings receiving federal permits consume electricity produced at power plants (a direct effect of the action); power plants emit greenhouse gases (an indirect effect of the action); greenhouse gases are reasonably certain to warm the troposphere (a secondary indirect effect of the action); a warming troposphere is reasonably certain to adversely alter ecological conditions (a tertiary indirect effect of the action); and it is reasonably expected that such ecological changes will cause some species to decline to the point of jeopardy (the ultimate indirect effect). At the micro-scale, however, it becomes difficult to tag any individual building or street gutter as the jeopardizing agent for a species residing potentially hundreds or thousands of miles away.[47]

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[44] 16 U.S.C. 1536(a)(2) (2000).

[45] 50 C.F.R. § 402.02 (2006).

[46] *Id.*

[47] There is also the additional problem that most urban buildings and infrastructure projects in fact do not require federal authorization or funding that would trigger inter-agency consultation under Section 7. State and local governments have primary authority over land use permitting, *see* Solid Waste Agency of N. Cook County v. U.S. Army Corps of Eng'rs, 531 U.S. 159, 174 (2001) (describing the "States' traditional and primary power over land and water use"), and the federal government has not promulgated general permitting programs for buildings, curbs, and other urban structures. Like many state and local governments, however, the federal government has actively promulgated green building standards for buildings it constructs or operates. *See, e.g.*, 10 C.F.R. pt. 435 (2007) (mandatory energy conservation standards for federal low-rise residential buildings). Moreover, the Energy Policy Act of 1992 requires states to compare energy efficiency standards in their respective residential and commercial building codes to model codes, such as the Council on American Building Officials' Model Energy Code, as those codes are periodically updated. *See* 42 U.S.C. §§ 6832(15), 6833(a)-(b) (2006). Neither of these federal programs, however, involves federal agency funding or authorization actions that would trigger inter-agency consultation over particular buildings under the ESA.

II. Thinking Outside the ESA Box to Support Green Construction

The problem for green construction under the ESA, it follows, is the mismatch in scale between the effects of construction and the regulatory focus of the ESA. In the aggregate macro-scale, brown construction is more harmful to species than green construction. In the applied micro-scale, however, it will be practically impossible to prove that failure to use green construction techniques violates the ESA's take or jeopardy prohibitions.[48] This does not mean, however, that the ESA is completely out of the green construction picture. First, the FWS and NMFS can employ the ESA's non-regulatory programs in ways that support green construction at the macro-scale. Second, when the take or jeopardy prohibition is in play because of habitat displacement at the micro-scale, the FWS and NMFS may be able to leverage opportunities for green construction in striving for the optimal regulatory outcome.

A. Support at the Macro Level

Although it would be exceedingly difficult to identify a particular building or item of infrastructure as causing take or jeopardy, the ESA gives the FWS and NMFS several ways to promote green construction. For example, the agencies can identify the ecological footprints of cities as contributing to the decline of species, thus highlighting the benefits of green construction. If the reasons for listing a species include effects that green construction is intended to mitigate, such as loss of forest habitat, climate change, or water resource depletion, the agencies could alert stakeholders to the macro-scale connection between building techniques and the effect of concern, and demonstrate the ways in which use of green construction could have obviated the need to list the species.

Similarly, although recovery plans cannot establish mandated green construction practices, they could point to the positive impact that using green construction on a macro-scale might have on a species' recovery potential. Indeed, if widespread use of green construction could promote species recovery more cost-effectively than other conservation measures that could be mandated under the take and jeopardy prohibitions, the recovery plan

[48] As noted in the text, the exception would be where use of green infrastructure techniques could avoid or reduce the habitat displacement effects that would be felt using conventional techniques.

could also explain the economic benefits of shifting to green construction.

When designating critical habitat, moreover, the FWS and NMFS could point to green construction as an opportunity to reduce the scope of critical habitat in the future. As cities reduce their ecological footprints, habitat conditions generally may improve and the need to identify a critical subset of habitat for a particular species may be less urgent.

To be sure, the scale mismatch between green construction and the ESA is likely to dampen the incentive to implement such practices when the costs of the take and jeopardy prohibitions are primarily felt locally and with regard to a particular species. Why should someone in Kansas use green construction to reduce the costs of ESA compliance for someone in Texas? But the unfortunate growing ubiquity of species decline[49] may overcome this collective action obstacle. Over time, as the FWS and NMFS drive home the macro-scale benefits of green construction in multiple listing decisions, critical habitat designations, and recovery plans for species around the nation, the reciprocal benefits of engaging in green construction may become evident to everyone in areas where listed species present ESA compliance constraints. Among the already numerous practical reasons to use green construction techniques, this macro-scale strategy will, at the very least, promote the general perception of green construction as beneficial to species.

B. Leverage at the Micro Level

As difficult as it is to prove that failure to use green construction causes take or jeopardy to a species, it may be relatively easy for the FWS and NMFS to integrate green construction techniques

[49] There are 612 animal species and 746 plant species with at least part of their range in the United States listed under the ESA as threatened or endangered. U.S. Fish & Wildife Serv., *General Statistics for Endangered Species*, http://ecos.fws.gov/tess_public/TessStatReport (last visited Nov. 9, 2008). This number is not expected to fall any time soon, as climate change has been described as "a major threat to the survival of species and integrity of ecosystems world-wide." Philip E. Hulme, *Adapting to Climate Change: Is There Scope for Ecological Management in the Face of a Global Threat?*, 42 J. APPLIED ECOLOGY 784, 784 (2005). In its *2007 Synthesis Report*, the Intergovernmental Panel on Climate Change predicts that "[t]here is *medium confidence* that approximately 20-30% of species assessed so far are *likely* to be at increased risk of extinction if increases in global average warming exceed 1.5 to 2.5°C," and that if warming "exceeds about 3.5°C, model projections suggest significant extinctions (40 to 70% species assessed) around the globe." INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007 SYNTHESIS REPORT: SUMMARY FOR POLICY MAKERS 13-14 (2007) (emphasis in original), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf.

into regulatory scenarios triggered by the geographic footprints of construction activities. For example, where an incidental take permit is needed because a construction activity would take a listed species, the agency must require the permittee to "minimize and mitigate the impacts of such taking."[50] If the species in question is suffering from, among other things, the indirect macro-scale effects of urban ecological footprints, then green construction could be credited as a mitigation technique for specific instances in which the ESA take prohibition is triggered due to direct micro-scale habitat impacts affecting the species.

This approach would be difficult to implement on a building-specific level, as the benefits to the species of a single building's use of green construction are unlikely to fully mitigate the directly harmful effects of the habitat displacement caused by the building. But the FWS and NMFS have developed benefit aggregation techniques to address this problem in the habitat context. For example, "conservation banking"—where one landowner voluntarily conserves habitat to "market" as "credits" to other landowners in need of mitigation habitat required for issuance of an incidental take permit—is increasingly the mitigation method of choice under the ESA.[51] Additionally, the FWS has developed a policy to promote "recovery crediting" for federal agencies, whereby the agency accumulates "credits" based on the recovery benefits a species receives from habitat conservation practices voluntarily implemented on non-federal lands. The agency can then apply these credits directly to agency projects that might impact the species, thereby avoiding the need for inter-agency consultation.[52] In other words, where it is possible to accumulate small benefits into a large aggregate benefit, it is easier to satisfy mitigation needs for projects that have significant impacts.

A similar "banking" technique could be used to amass benefits from green construction. For example, if a residential home builder or a commercial company with significant building needs were to engage in widespread voluntary green construction practices having beneficial macro-level effects for a species, then when

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[50] 16 U.S.C. § 1539(a)(2)(B)(ii).

[51] *See* U.S. Fish and Wildlife Serv., Guidance for the Establishment, Use, and Operation of Conservation Banks, 68 Fed. Reg. 24,753 (May 8, 2003). For an overview of ESA conservation banking policy and practice, see J.B. Ruhl, Alan Glen, and David Hartman, *A Practical Guide to Habitat Conservation Banking Law and Policy*, NAT. RESOURCES & ENV'T, Summer 2005, at 26.

[52] U.S. Fish and Wildlife Serv., Recovery Crediting Guidance, 73 Fed. Reg. 44,761 (July 31, 2008).

the company triggers the take or jeopardy prohibition for a particular construction project based on habitat displacement's direct impacts to the species, it could draw down on the "bank" of green construction credits it has amassed over time. Similarly, numerous state and local jurisdictions have entered into regional "habitat conservation plans" (HCPs), which are essentially large-scale incidental take permits administered to manage ESA compliance for public and private land development within the jurisdiction.[53] Often the underlying mechanism of these plans is to build a large habitat preserve to offset the incremental losses of habitat from the numerous particular building projects authorized by the permit. If the species covered in the plan are suffering from, among other things, the indirect macro-scale effects of urban ecological footprints, the FWS and NMFS could also assign some level of mitigation credits to jurisdiction-wide use of green construction.

To be sure, this approach will require careful calibration of the indirect macro-scale benefits of green construction with the direct micro-scale impacts of habitat displacement. Caution is generally required in designing such "apples-for-oranges" trading programs, to ensure market forces do not produce unintended consequences such as habitat fragmentation.[54] But if we believe that cities' ecological footprints threaten species and that green construction can mitigate that threat, both of which seem undeniable propositions, it seems prudent to explore the potential avenues by which the ESA can leverage green construction through its powerful regulatory presence.

CONCLUSION

Judging by the literature on green construction, in which the ESA is left entirely out of the discussion, one would reasonably conclude that the ESA has absolutely no role to play. In this Arti-

[53] For background on the HCP program, see U.S. Fish & Wildlife Service, *Endangered Species Habitat Conservation Planning*, http://www.fws.gov/endangered/hcp/index.html (last visited Nov. 19, 2008). For a survey of early regional permits, see TIMOTHY BEATLEY, HABITAT CONSERVATION PLANNING: ENDANGERED SPECIES AND URBAN GROWTH (1994). For contrasting views on the regional permit experience, compare Alejandro E. Camacho, *Can Regulation Evolve? Lessons from a Study in Maladaptive Management*, 55 UCLA L. REV. 293 (2007) (critical of regional permits), with Robert D. Thornton, *Habitat Conservation Plans: Frayed Safety Nets or Creative Partnerships?*, NAT. RESOURCES & ENV'T, Fall 2001, at 94 (2001) (in favor of regional permits).

[54] *See* Jamison E. Colburn, *Trading Spaces: Habitat "Banking" Under Fish & Wildlife Service Policy*, NAT. RESOURCES & ENV'T, Summer 2005, at 33; James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN. L. REV. 607 (2000).

cle, I have explained why, on the one hand, the ESA cannot directly mandate green construction despite its impressive regulatory weight, but also how, on the other hand, the ESA nonetheless can play a significant part in promoting green construction and should be included in the discussion. In this sense, green construction is just one example of a policy response to macro-scale phenomena that threaten species, but which are difficult to fit into the ESA because complex, indirect, diffuse causal mechanisms make it challenging to find the micro-level regulatory handle. Other challenges include climate change generally, ineffective water conservation, and wasteful commodity consumption. The strategies I have outlined for using the ESA to promote green construction offer lessons for these other contexts. By researching the benefits of green buildings for species, and thinking creatively about how to support policies at the macro-scale and leverage them at the micro-scale, the FWS and NMFS can ensure that the ESA has a productive role to play in our response to these and other problems of similar dimensions.