The neoliberalization of ecosystem services: wetland mitigation banking and problems in environmental governance

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Abstract

Wetland mitigation banking is an American neoliberal environmental policy that has created a functioning market in ‘ecosystem services’, commodities defined using the holistic measures of ecological science. The development of this market is discussed as a project of environmental governance, defined as the nation-state’s regulation of ecological relations within its territory towards stabilizing capitalist relations of power and accumulation. I argue that the wetland banking industry serves as a bellwether that presages problems that other strategies of neoliberal environmental governance will experience. Ethnographic, economic and ecological data from the Chicago-area wetland banking industry inform a discussion of two major obstacles to neoliberal strategy: the problem of relying on ecological science to define the unit of trade, and the problem of aligning the somewhat independent relations of law, politics, markets and ecosystems across an array of spatial scales. Theoretical guidance is sought from recent work on ‘social natures’ and from the Regulationist approach to institutional political economics.

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1. Introduction

Just northwest of Aurora, Illinois, on the outskirts of Chicago, lie 120 acres of silt loam soils, planted in the latest variety of feed corn. Nailed to a machine-shed, a large “For Sale” sign indicates that this particular piece of real estate is about to be thrown into the circuit of capital once again, but this time there will be a difference: the prospective new owner, a residential development firm, is not planning to plant corn or soybeans. Instead, they will produce and sell ecosystem services, by restoring the site to its presettlement wetland condition, and establishing a commercial wetland mitigation bank. By entering into a complex agreement with federal and county regulatory agencies, the banking firm will sell “wetland credits” to individuals compelled to buy them by those same agencies. Within five years, the production and sale of ecosystem services in the farm field outside of Aurora will have grossed nearly three million dollars.

Commercial wetland mitigation banking is an American environmental management policy that has been developed collaboratively since 1991 by local and federal regulators, in partnership with private-sector interests. They seek to develop a market in privately-owned “wetland ecosystem services”, such as duck habitat, flood protection and biodiversity, as a way of achieving the goals of the US Clean Water Act of 1977 (CWA). Young though it is, it is the most mature effort yet to create commodity markets in ecosystem services per se in the United States. While well-deserved attention has been paid to the development of markets in air pollution abatement credits (Tietenberg, 1985) and in tradable harvest rights in fisheries (McEvoy, 1986; St. Martin, 2001), there have been very few actually functioning markets in which the commodity is defined and measured as a holistic character of ecosystems (rather than being measured in tons of pollutant, or number of fish). And yet it is a continual refrain of neoliberal environmental economists that ecosystem services, and not just their material components, are the commodities.
of the future in market-based environmental policy (Daily, 1997; Costanza et al., 1997; Heal, 2000).

The story of wetland banking indicates that there may be important differences within neoliberal strategy that geographers are well positioned to investigate. A neoliberal consensus shared by both the current US Administration and the Kyoto Accord signatories suggests that ecosystem service commodification might soon happen at a global scale, and a flood of recent titles such as “Hard Green” (Huber, 1999) and “Nature’s Services” (Daily, 1997) reflects the growing belief that conservation is best approached with a CEO’s sensibility. However, the history of wetland banking suggests that the process by which the language of ecosystem ecology is used to commodify nature as “services” may encounter very different obstacles than the use of more traditional, reductionist measures (in which, for example, the commodity is defined as a ton of CO2).

The theoretical premise of this paper is that wetland banking is a special case of what has come to be known as “the regulation of biopower” (Luke, 2000; Braun, 2000; Darier, 1999), or “environmental governance” (Bridge and Jonas, 2002; Feldman and Jonas, 2000). This is defined as the nation-state’s project of securing hegemony by regulating ecological relations within its territory so as to assure the stability of capitalist relations of power and accumulation. In this paper, I suggest that the massive process of codifying and commodifying the ecological relations around us is a never-concluded project of disciplining both ecosystemic relations and people as consumers of these relations. I interpret the development of banking as an “actually existing [environmental] neoliberalism” (Brenner and Theodore, 2002), a project of mobilizing ecological forces in the service of neoliberal hegemony, in order to understand the work that banking does in creating and stabilizing new areas for capitalist activity, even as it is subject to the tendential crises of capitalism which guarantee that this work is never concluded (Polanyi, 1944; O’Connor, 1994).

I will focus here on two aspects of banking which complicate the smooth neoliberal account of the process of commodifying ecosystem services:

- **The Problem of Measurement:** Countless studies of capitalist modernity have made it clear that standardized methods of abstraction are a basic tool in the regulation of a smoothly running socio-economic system (e.g., capital treats only with labor-power, which is an abstract quanta homogenizing diverse particular labors). But nothing has vexed the banking community so much as the task of creating abstract and generalizable measures of the commodity that they sell. The use of ecosystem science to define ecosystem services in easily measured, abstract units that can be transacted across space (as all commodities must) without losing their value has proven to be very difficult in practice.

- **The Problem of Governance:** Banking reveals that environmental governance is achieved through negotiated relations between and among different levels of government and the private sector. There is a lack of clear dominance among scales of state governance, scales of market activity, and scales of ecological process, the result of which has been the creation of a haphazard spatial patchwork of regulatory regimes controlling wetland banking. In banking, the work of environmental governance has encountered a major obstacle in aligning the separate but “structurally coupled” spheres of the state, capital and ecosystem science to achieve the commodification of ecosystem services.

I will first describe the institutional structure and history of mitigation banking, a subject likely to be unfamiliar to all but the most dedicated of environmental policy wonks. This is followed by a discussion of the obstacles current political economic theory poses in addressing our relations with ecological phenomena. To illustrate the difficulties neoliberalism faces in the creation of ecosystem commodity markets, I will then discuss in depth the two “problems” noted above. Much of the material supporting these arguments is interview-based data from ongoing research discussions with bankers and regulators around the United States.

2. What is commercial wetland mitigation banking?

After all, capital is about creative destruction, not simply ecological degradation. (Castree, 2002, p. 141).

When the 1972 Federal Water Pollution Control Act (FWPCA) was passed, it gave the US federal government what is still one of its most far-reaching powers to regulate land-use: the power to regulate dredging or dumping in seasonally or shallowly inundated land. Section 404 of the FWPCA (reauthorized as the 1977 Clean Water Act) provides for a permitting system: if someone wishes to fill a wetland, they must apply for a permit from the Regulatory Branch of the local District...
of the US Army Corps of Engineers (COE). Following consultation with the regional office of the US Environmental Protection Agency (EPA), the COE Project Manager may then allow them to proceed, or deny them a permit altogether, or thirdly, allow them to proceed on the condition that they create a certain amount of wetland to compensate for the loss of a natural wetland. This action is known as compensatory mitigation.

This practice of requiring compensatory mitigation became so common by the mid-1980s that the COE could claim that it had halted the trend of wetland losses in the United States (Tiner, 1984), while filling and development continued more or less unabated. However, a spate of field reports in the late 1980s made it clear that many mitigation sites either had never been constructed, or if they had, that they were highly degraded sites in the judgment of ecologists (NRC, 2001). This was outrageous to environmental advocates, and highly embarrassing to federal regulators. At the same time, a push by the housing industry to make the Section 404 permitting system more “reasonable” and streamlined had resulted in a set of policy proposals gathered together under (the first) President Bush’s “No Net Loss of Wetlands” agenda. This agenda blamed mitigation’s failures on the command-and-control, federally directed system of administering the Clean Water Act, and strongly promoted the adoption of market-based incentives as the way forward.

In this turbulent policy context, commercial wetland banking appeared in 1991, apparently through nearly simultaneous independent developments in Illinois, Florida and Georgia. Commercial wetland banking is a regulatory arrangement by which a private firm will restore a former wetlands area to a sufficiently functional and diverse condition. People required to perform compensatory mitigation can then purchase “wetland credits” from this firm, instead of creating the wetland themselves. There are four components to a commercial wetland bank:

- the bank site is the physical location of the restored wetlands, usually a former wetland site that had been drained for agricultural usage;
- the bank instrument is the administrative document which establishes ecological criteria for the COE approval of bank credits, the financial sureties the banker must provide against site failure, the kind of ecological monitoring which is required, and other administrative details;
- the service area is the geographic area within which impacts can be mitigated at a given bank;
- the mitigation bank review team (MBRT) is composed of scientists who work for the local offices of state and federal regulatory agencies. Their role is to assess the banker’s restoration of a site, and to monitor the site’s continuing performance of ecological functions.

Their estimation determines how many credits the bank can sell, based on the site’s continued success at meeting the functional standards described in the instrument.

This arrangement was a striking innovation. First, it proposed to perform mitigation in advance of impacts, in that Section 404 permittees would purchase “wetland credits” whose value was grounded in wetlands that had already been constructed. Second, it proposed to perform mitigation “off-site” (not on the same parcel as the impact). Third, it proposed to “consolidate” mitigation acreages at a few, well-monitored sites that would be held to high performance standards. Finally, because bankers are free to compete and set any price for credits, it promised to provide the price signals necessary for a real market in wetland services. Some of these innovations helped to assuage the concerns of environmentalists, while others promised speedier Section 404 compliance for developers. State and federal highway agencies had been banking wetlands solely for their own use since the early 1980s, but a “free market” in ecosystem services was new, and seemed to be perfectly in tune with the neoliberal turn in American environmental policy.  

Despite Presidential interest, banking was not legislated into existence in Washington, DC. In early 1991, Chicago-area earthmoving contractor Bob Terry 3 was searching for a way to make Section 404 compliance simpler for the development community, whose biggest complaint was spatial: the COE required that mitigation wetlands be constructed on the same parcel of (often very expensive) land on which the impact was occurring. Because this construction tended to throw off budgets and timetables, Terry was looking for a way to build wetlands before they were needed, and on cheaper land. He hit on the idea of banking:

... I just said, “Maybe I’ll build some big-ass wetlands somewhere, somewhere out there, and build some really good ones, and that ought to make these agencies really happy.” And when we met with the agencies, they said, “Gee, this sounds like mitigation banking that some of these other agencies are doing…” And my comment was, “Well, whatever you want to call it, I mean, the idea sounds like a good idea, and we want to do it.”

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2 The Bush and Clinton Administrations were in perfect agreement on the subject of banking, which was promoted in Clinton’s wetland policy as well (WHOEP, 1993).

3 Pseudonyms have been used by request in some instances cited in this paper.
John Rogner, Project Manager at the Chicago COE office, approved of this idea and soon notified Terry of a chance to make it happen: just a mile from where Rogner lived, a real estate developer was trying to donate unbuildable land to the local parks district. The parks district was resistant, lacking the funds to restore and manage the formerly agricultural site. Terry and Rogner intervened: Terry drafted plans to restore the site to wetlands, and began a series of meetings with local officials of the EPA and COE to create the first bank instrument agreement. In the end, Terry sold hundreds of thousands of dollars worth of wetland credits to other real estate developers holding Section 404 permits, after which the parks district took possession of a high-quality riparian wetland site, and the original developer fulfilled its obligation to commit a portion of the development to open-space use.

The set of banking guidelines developed for Terry’s bank became the blueprint by which the dozens of banks in the Chicago District are now governed: the Interagency Coordination Agreement of 1994 (US Army Corps of Engineers et al., 1994). This document, after review by the COE Regulatory Branch Headquarters in Washington, then became the foundation for the national COE “Guidance” on banking policy. Because of the high level of autonomy enjoyed by each District Office, COE implementation of this “guidance” has been geographically uneven, absent, or in direct contradiction to it; however, it remains the federal government’s most comprehensive statement to date on the regulation of a market in wetland services.

Let me summarize this rather dense story. In outline, what has happened is that a coalition of local regulators and businesspeople formed a network based largely on acquaintance and proximity to draft the rules by which something called a “wetland credit” can be defined and traded as a commodity. Though some were representatives of the nation-state, they acted with only the vaguest of federal directives that market-based tools were desirable. This was possible within the Chicago District of the COE because of many factors: the relative autonomy of COE Districts; the spatial coincidence of the regional offices of all major federal environmental regulatory agencies; an extraordinary level of coordination between these agencies due to the fact that staffers move serially between them; and a community of private land developers who, in a wetlands-dense landscape, have had to become very knowledgeable about the Section 404 permitting system. The process of drawing ecological relations into circuits of capital bears no resemblance to a simple fiat of capital, or to a simple directive from the federal coordinators of a hegemonic project of environmental governance (Henderson, 1998; Robertson, 2000). The development of banking has been, and continues to be, a process extended by personal relationships and geographic proximity.

3. Denaturalizing nature: ecology is a social relation

Above I suggested that ecological phenomena might impose certain limits on ecosystem commodification and environmental governance. This claim about purported “natural limits” to social and economic forces is at once both rather common-sensical and quite dangerous, as recent scholarship on “the social construction of nature” demonstrates, and it demands some explanation before I continue. “Limits talk” has long been a foundational trope of both neoliberal economics and certain critical reflections on nature, and its deficiencies seem to be tolerated by some social scientists because the only going alternative to “limits” appears to be “no limits”. This neatly avoids the more crucial question of why discussions about nature always seem to consist of shuffling the objects of analysis back and forth across a bright line that separates the contingent from the essential.

This analytic playing field has been frustrating as I attempt to understand wetland mitigation banking. On the one hand, it is clear that some scientific data about wetland ecosystems are received as ‘objective’, and play apparently determinative roles in the banking market as they shape the responses of regulators to the strategies of bankers (and vice versa). On the other hand, the kinds of scientific information that are considered relevant to banking markets have shown an extreme degree of temporal and spatial variability as the market matures. Additionally, my work as an ecologist employed to create and certify these data has made it clear to me that the process by which ecological data becomes objective has a life of its own, one that does not map cleanly onto the strategies of bankers or regulators (Latour, 1999). In short, the forces of nature which constrain the commodification process in this instance are revealed as extremely fluid as they are manipulated by, but not reducible to, the needs of capital or the directives of the nation-state.

In light of this, after briefly discussing certain problems of current neoliberal and critical approaches to nature, I will outline my attempt to bring together two current (but rarely intersecting) lines of theoretical work to understand the commodification of ecosystem services. I use the literature on “social natures”, which has wrestled with the difficult questions of nature’s constructedness, alongside the Regulation Approach to political economy, which focuses on only temporarily resolvable crisis tendencies in capitalist strategy across a variety of temporal and spatial scales, in order to point some potential new directions for theorizing about nature as neoliberalism attempts its domination.

3.1. Neoliberal environmentalism and natural limits

If neoliberal contemplations on the environment are united by a fundamental conceit, it is that the environ-
ment is *that which is common to all of us*, the spatially differentiated matrix of economic activity, an external presence whose dynamics affect us all. Hence, global environmental management emerges as a main trope of neoliberal globalization: if people of all nations are to be treated as rational economic agents (which goes without saying) who differ only in our subjective preferences, then a strategy which focuses on “the global environment” (the matrix through which all such agents move) is one more way of sweeping aside troublesome institutional/collectivist obstacles to trade (Taylor, 1997; Goldman, 1998). This imagined general interest justifies—indeed, demands—the management of these external forces through a mechanism that is believed to guarantee the equal treatment of all: the market mechanism.

Imposing market relations on uncapitalized environmental phenomena requires techniques by which a dollar value can be placed on “environmental services”, and such techniques have proliferated over the past decade on the strength of the imagined consensus on the need to price nature. “Although ecosystem valuation is certainly difficult and fraught with uncertainties, one choice we do not have is whether or not to do it,” says one prominent economist, who describes the Earth as “a very efficient, least-cost provider of human life-support services”, the entire value of which is between 16 and 54 trillion dollars (Costanza et al., 1997, p. 255). Since he admits that this is more than the then-current global GNP, the real utility of studies like these is to present ecosystem services as amenable to being treated as commodities. If environmental goods can be alienated and owned, the economists tell us, then they will behave as commodities behave: those environmental services that are in demand (clean air and water) will increase in supply. Similarly, once environmental harms have been valued and defined as property, payment of the social costs of these harms can be determined by bargaining between the parties involved (Coase, 1960; Hocken, 1997; Heal, 2000). In this way, the lowest-cost solution is adopted, which by definition creates the highest welfare.

### 3.2. Social natures

If neoliberal economists assume that which must be proven (that ecosystem commodities will smoothly follow the laws of supply and demand), some Marxist approaches have simply turned the fundamental conceit of neoliberalism on its head: rather than understanding nature as an external source of limits and shocks (whose utility can nonetheless be internalized), the environment may be understood as essentially the will of capitalism writ onto the landscape as nature becomes commodities (Smith, 1990; O’Connor, 1994). In response to this and other “deconstructions” of nature, other marxists have called for a reconstructed notion of environmental determinism that imposes limits on capitalist strategy (Benton, 1992; Peet and Watts, 1996; Walker, 2001). Such debates fall prey to the binary trap of “limits talk” discussed above.

Recent poststructural work on nature has attempted to describe a “social” or “hybrid” nature that is “simultaneously material and discursive” (Bridge, 2001; Swyngedouw, 1999). This approach at least relieves us of a stark choice, and makes possible the fruitful question of how and why certain hybrids emerge and persist. However, others have pointed out that this “simultaneity” has remained more invocation than analysis: while this work has concentrated intently on the discursive character of scientific knowledge, much of it has raised but not addressed the issue of materiality (as Bunker (1992) and Castree (1995, 2002) point out). The best work on “social natures” has allowed us to understand the materiality of elements of nature as a social achievement, made possible by a certain discipline of “ordering appearances” known as science (Haraway, 1997; Mitchell, 1988). The work of ordering is not a capricious construction reducible to political or capital dynamics; rather, it produces a materiality effect which can both enable and confound the work of environmental governance or capital accumulation. Such work points toward the next, more difficult, task: to engage with practices of natural science by which nature (socially) comes to be “material” or “limiting” to the other social relations in which it is embedded, while rejecting the constant invitation to make ontological commitments that such engagement will bring.

For example, I might assert that “ecological problems” induce a local crisis of continued accumulation in a particular locale. However, reading these problems off of the larger needs of capital, or as natural limits (however reformed), may both mischaracterize such a crisis by mystifying the contingencies with which complex ecological relations take shape (Robertson, 2000). In short, ecological detail matters. Unfortunately, these mystifications are well guarded by the disciplinary authority of science, and even dedicated constructivists have been known to succumb in dazzlement to the evident ‘thingness’ of natural phenomena. But instead, if we say (to paraphrase Marx’s famous declaration about capital) that “ecology is a social relation”, our attention is drawn away from a fetishization of natural objects and towards the practices of creating and mobilizing specific ecological data, which is precisely

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4 While close variants of this phrase have cropped up in Marxist writings from Lukács (1923, cited in Bassin 1996) to Lipietz (1995, p.8; 1996, p. 220), these writers tend to depend on a critical realism that segregates “social nature” from its material underpinnings (see Jessop, 2001 on the critical realism implicit in many current marxisms).
what Marx was urging us to do with commodities. This might then cause us to understand somewhat differently nature’s strategic role in securing the circulation of capital or state hegemony; it is this understanding of ecological phenomena that undergirds the discussions below. 5

3.3. Autopoiesis

The work on social natures can get us to a point where we recognize important epistemic distinctions between understanding nature as a material force and as the effect of a logically coherent realm of processes and knowledges that we can term ‘biological’ or ‘ecological’. But it has only hinted at why this matters, and at how nature is, in fact, enrolled to do work for capital on a daily basis all around us. The story of banking, after all, is the story of an extremely motivated group of capitalists using highly sophisticated ecological arguments to catch a ride on the larger neoliberal project of expanding market relations. How do we fit the bankers’ strategic involvement in ecological relations into the more familiar story of neoliberal strategy, and understand how nature and other social relations are tied together in the pursuit of larger goals?

For this I turn to the Regulationist work of Bob Jessop. The Regulation Approach is an institutionalist school of political economics built on very different principles than the neoliberal approach. Regulationists understand capitalism as embedded in a constellation of institutions which reside both inside and outside of the formal state apparatus. In regulating a capitalist society, these institutions perform an inherently unstable and inconcludible task of disciplining social relations. Stability may be achieved temporarily, as during the long growth cycle of Atlantic Fordism, but only through the iterative work of regulating the interaction between components of the state, economy, and civil society (Peck and Tickell, 2002; MacLeod, 1997; Goodwin and Painter, 1997; Jessop, 1997; Tickell and Peck, 1992). 6

One of Jessop’s concerns has been to dissolve the ages-old stalemate between seeing economic relations as determinative of all social relations, and seeing the state (or other institutional orders) as relatively autonomous of capital. To “finally break with the search for determinism in the first, last or intermediate instance”, Jessop argues that “a non-necessary correspondence can emerge among various institutional orders and their operations so that the different economic and extra-economic conditions for capital accumulation come to be secured” (1990: 79). 7 To express the co-evolution of connected but discrete systems, Jessop describes relations between the institutional orders of state and capital as autopoietic (Jessop, 1990, 2000; Painter, 1997). An autopoietic system, here, is a logically closed, self-reproducing institutional order that nonetheless communicates with other institutional orders through forums of articulation and translation (the Federal Reserve, for example), at which their relationship is structured and iteratively regulated. Jessop follows Luhmann (1989) in proposing that the key sites of regulation occur between a number of autopoietic, but “strategically articulated” systems such as the economy, politics, law, religion, and others. Scientific knowledge features prominently in Luhmann’s work as an institutional order alongside other logical realms.

Jessop stresses that considerable work goes into the process of articulation: that is, making information from one logical realm legible to, and effective in, others. Thus, when ecological phenomena factor into the stabilization or destabilization of capital relations, they never do so as ecological phenomena per se. They do so only after going through a process of coding by which they are made legible to the logic of capital. 8 As I will describe below, this is precisely the task for which the MBRTs were created: they assess ecological phenomena at bank sites, turning these data into certifications of the economic value of wetland credits. The struggle of the banking industry can be understood, in part, as a problem of setting up these forums of articulation between distinctly different logical orders. Following Jessop, one may say that the institutional logic of capital is dominant (but not determinative) over the institutional logic of science, in its very ability to compel ecologists to create assessment measures that “work” for capital. But because these measures do not always “work,” a theory which avoids both determination and autonomy is required.

It is this notion of regulation by strategic articulation between institutionally ordered realms of logic that I believe holds the promise of a regulation-theoretic approach to ecological relations. Consistent with work on “social natures”, nature is treated as one of many

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5. This has led me often to substitute “ecological relations” for “nature”.
6. I assert that it is not an abuse of Regulationist concepts to suggest that the inconcludable process of regulating the social form of a capitalist state also requires the regulation of specific ecological relations, along with the relations that are the more standard fare of Regulationist analysis. Those few Regulationists who have considered environmental issues have tended to share the principal conceit of neoliberal environmentalism, that “physical nature” is a commonly experienced heterogeneous external surface on which regulatory regimes play out (Altvater, 1993; Hudson and Weaver, 1997). Others have respected a strange boundary, considering “environmental narratives” as constructed while simultaneously confirming their belief in a non-constructed “material nature” (Bridge and McManus, 2000).

7. Emphasis in the original.
8. This treads close to realizations expressed in other work on social natures, and points to further commonalities between the approaches.
institutional orders that can be articulated with capital in its quest for stability. And the strategic constitution of ecological relations is clearly incorporated into a broader theory of political economic stability and change. Capitalism’s supposed dominance over, or limitation by, nature can thus both be understood as result of a historically contingent articulation.

4. The problem of measurement

This section is concerned with the problems of this articulation as bankers attempt to fashion stable markets in *ecosystem services*. For a stable system of prices to emerge, the institutional rules of the market must be clear on how the value of the commodity is to be measured. Wetland loss at the site of impact must be rendered commensurable with wetland gain at the site of banking in a regular and reliable way. However the commodity is defined, if two different developers both buy one credit of mitigation at a bank, some measure must express the equivalence of these transactions. Not only have the institutions of banking not settled upon a system of measurement, but they have not even agreed upon what the commodity is that they wish to measure; it is this problem that sets the development of markets in ecosystem services apart from the more mature markets in easily quantified commodities such as emissions.

Here is the way it is supposed to work according to most bankers, regulators and economic theorists. The value of the banked wetland credit is said to rest in an *increment of change* in a bundle of ecological functions at the bank site, as the bank site is restored to a preregulation wetland condition by the banker. Purchase of this credit is said to compensate for a reduction in the bundle of ecological functions at the site of a wetland impact. Thus, ecosystem functions at the site of impact must be made *commensurable* with ecosystem functions at the bank site: ideally, the customer will buy exactly enough bank credit to cover the lost ecosystem functions at the impact site. Measuring these functions, bank proponents admit, “is one of the most complex issues in mitigation banking”. But “once those services are known, they may be translated into a ‘currency’ which can serve as the medium of trade for a wetland mitigation bank” (ELI, 1993, p. 77).  

4.1. Measuring function versus measuring area

Economic theorists have insisted that a standardized technology be used to measure these functions (ELI, 1993). Such standardized functional assessments have proliferated since the early 1980s, and are known collectively as “rapid assessment methods” (RAMs). RAMs are usually sets of algorithms, created by wetland scientists, that use easily measured site characteristics (e.g., plant species diversity or water levels) to make inferences about harder-to-measure “wetland functions” (e.g., habitat provision or peak flow attenuation). Most wetland RAMs use algorithms which translate an empirical observation (“25% canopy cover”) into a score (“0.5”), and most produce a series of scores—one for each function. These numeric scores then stand for the wetland. In this way, the commodity sold at a bank is defined in units of incremental ecological function, or as bankers often put it, “environmental lift”:

So we’re selling the most perfected environmental lift, under the strictest circumstances, as a method of determining what our product is. Our product is the lift from the pastureland to a thriving, unbelievable wetland with zero exotics on it. That’s what our product is. (Florida bank owner)

Unfortunately, in practice the use of RAMs has not resulted in a smoothly functioning system of valuation. Ideally, to ensure equivalence on both sides of the transaction, RAMs would be used to evaluate functions at *both* the bank site and the site of impact. At bank sites, however, MBRT scientists frequently use a combination of RAMs and “best professional judgment” in certifying bank credits for sale (ELI, 1993, p. 88). Thus, quantitative information from RAMs is often used to inform the MBRT’s certification of credits at a bank, but not in any standardized or reproducible way. Any number of contingencies can introduce unpredictability into what, from a banker’s standpoint, should be a very predictable process:

...because if... Fish and Wildlife said “well, you know the Corps says this should be a ‘three’ but I think it’s a ‘two’...” it always winds up being a ‘two’... (Florida bank owner).

The other end of the transaction is no better: the use of RAMs at impact sites is almost nonexistent. Just keeping track of massive numbers of wetland impacts already places a strain on the Regulatory Branch staff of any COE District. To additionally sort out each wetland impact into its component functional impacts would require an unthinkable commitment of time for COE personnel. Therefore, COE Districts have overwhelmingly chosen to use *area*, and not function at all, to
quantify the impact to a site: functions at impact sites are measured in the imprecise, but easy-to-use, proxy unit of the “acre”. In the Chicago District of the COE, for example, under most circumstances, regulations allow that an impact to one acre of natural wetland can be mitigated by the purchase of one certified credit at a mitigation bank.

4.2. Markets in segregable ecological functions

This is more or less the current state of affairs in much of the banking industry: functional degradation measured in acres is considered commensurable with functional lift measured using an idiosyncratic mixture of judgment and formalized inference. This is not exactly what the neoliberals had in mind, and objections to this system are framed in the familiar neoliberal language of “creating a level competitive playing field”. Remember that someone holding a Section 404 permit can either go to a bank or create their own “on-site” mitigation: since mitigation bankers consider the “on-site” option to be a form of competition with their services, they naturally would like the system of measurement to be the same for all impacts and mitigations, banked or not.

... go to the builder’s site who has a marginally-functioning [on-site] wetland [mitigation], and if his ten acres are functioning at 50% based on the same [RAM] determination as my [bank site’s] lift, then in my opinion he needs to buy five credits from me. Some mathematical formula that equates my lift to his dredge-and-fill activities. (Florida bank owner)

In short, the ‘solution’ of using acreage as a proxy for function violates market principles, treats impact sites differently from mitigation sites, and satisfies no one. Bankers, using their growing leverage with state and federal policymakers, have begun to lobby to have regulations changed so that all wetland impacts will be assessed “on the same basis on which the bank received its credit evaluation” (Lautin, 2001).

This prepares the ground for the neoliberal economist’s solution to the problem of commensurability, which is to consider each wetland function as a segregable commodity (Kieser, 2002; Waters, 2002). Thus, if the usage of a RAM reveals that an impact has reduced “hydrologic function” by 3 units, and “duck habitat” by 4 units, the 404 permittee should be able to purchase separate credits, perhaps even at different banks, to mitigate for these impacts. And if a bank’s credit-certification process uses the same RAM, then market actors can have greater faith in the equivalence of exchange values. Bankers can then take advantage of the once-inconvenient ecological sophistication of RAMs, by using them to break the mitigation process down into several component transactions. This solution has been enthusiastically embraced by bankers who see the value of their bank multiplying as new, segregated ecosystem services are defined:

... if you can do the same work and ‘get paid twice’, this sure helps ... It has been shown that a project, which is designed for both functions, can serve the needs of those seeking water retention and wetland restoration. As such, is there any reason not to design the project around an economic model, which produces revenue from both—certainly not. (Sokolove, 2001)

In comparison, the COE’s traditional practice of forcing the customer to use an index of value that has no relation to the banker’s costs of production is ridiculed as faintly communist.

4.3. Conflicting logics

This solution, as some have realized, is a trap: as the logic and language of ecosystem ecology are used more extensively to dictate the definition of ecosystem service commodities, smaller and smaller ecological differences begin to matter, and this creates an entirely new set of problems for commensurability. For all its faults, the system of ignoring ecosystem information and dictating that “one acre here equals one acre there” provides a unit of measure that offers few geographic barriers to trade. By contrast, incorporating more ecological information may allow different banks the opportunity to reap comparative advantage from their locations and site characteristics; but simultaneously, opportunities for trade in each function become more restricted. An exasperated EPA official explained it as a “Pandora’s box”: the slippery slope that bankers have started down may lead, ad absurdum, to a market in habitat for middle-aged great blue herons who don’t like shrimp, or something. Obviously, I can’t imagine even trying to do that. ... you can define a unit so that you’re going to have flourishing mitigation banking. You can also define a unit so that, should there ever be one exchanged, it would be environmentally precise. And those are at potentially different extremes...

It gets worse for bankers. Sophisticated RAMs recognize that ecosystem functions are embedded feature of landscapes, and subject to ecosystem dynamics at many spatial and temporal scales. Therefore, any definition of an ecosystem commodity expressed as a function of ecosystem dynamics will carry with it an implicit argument about the spatial limits to its commensurability. The result is that the further a mitigation bank is away from...
the site of an impact, the harder it is to argue for commensurability. A vigorous debate has erupted about the appropriate spatial limits to trade in various functions, with some functions (such as duck habitat) seen as “more mobile”, and others (such as flood attenuation) seen as “less mobile”. Regulators shudder at the prospect of a single bank having, say, seven different geographic service areas for seven different functions. With acreage as the proxy standard, at least, increasing distance between impact site and bank site simply required the purchase of more acres. But with detailed measures of function, ecologists can argue that it is impossible to move a given function away from its constitutive landscape relations. For example, it is formally impossible to create the function “floodwater storage for the Kishwaukee River basin” outside the Kishwaukee River basin.

Thus, appealing to the logic of ecosystem science produces a double movement in neoliberal environmental strategy. 10 On the one hand, banker strategy in appealing for more ecological precision is part of an understandable pursuit of new markets:

If capitalists become increasingly sensitive to the spatially differentiated qualities of which the world’s geography is composed, then it is possible for the peoples and powers that command those spaces to alter them in such a way as to be more rather than less attractive to highly mobile capital (Harvey, 1990, p. 295).

On the other hand, the role of ecosystem science in this strategy takes them farther and farther from the kinds of generalizing abstractions that characterize the internal logic of capital, and that are the basic tools of its operation. Acreage-based commensurability is maintained at the cost of ignoring a great deal of ecological information. But in using that information to expand opportunities for the circulation of capital, bankers are beginning to use measurements that restrict the actual mechanics of trade. One EPA official made a comparison between the prospect of abolishing acres as an abstract measure of “functional lift”, and the prospect of abolishing wages as an abstract measure of labor-value:

Well, it’s almost as if we get rid of the dollar bill and we have “my hour of contribution doing X, your hour of contribution doing Y,” and et cetera... we’re trying to get at the contribution of function that led to the surrogate of the dollar bill.

In this debate over commensurability, which could have been lifted straight from Marx’s Capital, we are witnessing a renegotiation of the boundary institutions that articulate between the logics of capital and science. While systems of measuring ecosystem commodities must be functional for capital (they must define a commodity that is alienable, fungible and mobile), they must also be grounded the naturalized authority of scientific disciplines that are not entirely answerable to the banking industry. 11 These requirements seem to guarantee an inconcludable dynamic of contradictory, and perhaps cyclic, impulses in any attempt to constitute markets in ecosystem services.

5. Rolling out environmental governance

As this environmentalized engine, the Earth then generates ‘ecosystem services’... and systems of green governmentality must be adduced to monitor and manage the system of systems which produce all these robust services... enforcing ‘the right disposition of things’ between humans and their environment. (Luke, 1999, p. 146)

While the initial phase of neoliberal hegemony, roughly from the early 1980s to the early 1990s, was dominated by the ‘rolling-back’ of existing Keynesian welfare state institutions, Peck and Tickell argue that the period since the economic recession of the early 1990s is characterized instead by the ‘rolling-out’ of new neoliberal institutions which attempt to compensate for some of the more deadly effects of the rollback without compromising “the constitution and extension of competitive forces” (2002, 381). In this section I use wetland banking, as a rapidly developing component of this rollout, to look at disruptions to the smooth deployment of environmental governance that can originate in the articulation between the state, law and capital. As recent Regulationist work describes, the state’s project of environmental governance may run afoul of scalar mismatches in the forces and agents that it must bring

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10 This might be thought of as a version of the tendency for capitalism to oscillate between homogenization and differentiation (Harvey, 1990; Smith, 1990).

11 One might well ask to whom scientists are answerable: how physical do we want to get in specifying the “ground” in which science’s naturalized authority is grounded? It is of course extremely tempting to take the critical realist position that normal science has some mediated, but falsifiable, access to real nature, which is seen to explain normal science’s stability and precision. I argued above against this position; Scientists’ ability to resist capital logics is grounded in the stability and coherence of a system of knowledge production, not in their access to real nature. The notion that letting go of the security of the realist ‘teddy bear’ is to embrace a rudderless social constructivism is one of the most pernicious false dichotomies going in social science (Latour, 1993).
together under a hegemonic project (Feldman and Jonas, 2000, Bridge and Jonas, 2002).

The section on the history of banking describes the successful establishment of a rather delicate set of institutional arrangements that create a “disposition of things” which allow trade in wetland services. Just how delicate became shockingly evident on January 9, 2001, with the handing down of the US Supreme Court Decision Solid Waste Agency of Northern Cook County v. US Corps of Engineers (known now as SWANCC). With this decision, the Supreme Court struck down a COE policy that had been used to protect an entire class of wetlands (“isolated wetlands”—those without a clear surface-water connection to a navigable stream) under the Clean Water Act.

Suddenly, it appeared that the COE no longer had the power to require mitigation for many wetland impacts. The chaos in the banking industry was immediate. One Chicago-area banker estimated that up to 90% of the credits he had ever sold were for impacts to “SWANCC wetlands”, and claims not to have sold a single credit in the year following the decision. Across the country, bankers in landscapes full of isolated wetlands (such as Chicago) found that their prospective market had dried up. In the weeks after the decision, developers began to behave as if the entire Clean Water Act had been repealed, and unpermitted filling of wetlands has continued at a very high rate since then. At the time of this writing, the COE and EPA have been unable to agree on how to protect wetlands, as well as the nascent market in wetland services. As Executive Branch agencies, each has had to craft a response that does not appear to be “too environmentalist” for the conservative Bush Administration, while at the same time helping to foster the market-based environmentalism that President Bush has explicitly advocated; this has essentially paralyzed federal wetland regulatory activity. In January 2003, after interminable delays, countless meetings, and promises made and broken with bank industry leaders, the COE and EPA published proposed changes to CWA rules that seemed to exempt “SWANCC wetlands” from regulatory protection; at the time of writing, these proposed changes are being vigorously debated.

While federal agencies have stalled, the spatial and scalar variety in response to SWANCC has provided a vivid example of the geography of environmental governance. Municipal, county, and state governments have taken charge in the vacuum of federal guidance: in suburban Chicago, four counties have passed ordinances that allow them to require mitigation for wetland impacts, an authority they exercise because they successfully lobbied the Illinois state government to give it to them, and which is entirely independent of the federal Clean Water Act. Furthermore, certain Chicago-area municipalities have enacted their own city code that governs wetland impact and banking, using their urban stormwater utility oversight. Each new ordinance is somewhat different from COE practice prior to SWANCC: it may (or may not) require that mitigation must take place within the county or city boundaries, or require different RAMs, acreage ratios, and financial sureties.

The upshot of this proliferation of multiscaled responses has been a complex patchwork of market regimes, imposed on what in retrospect seems to have been a blissfully simple mode of market regulation that applied to the entire COE District. Bankers now find themselves having to pay maddeningly close attention to the shifting geography of their customer base. Whereas prior to SWANCC, Terry’s Kane County banks could have sold credits throughout the multi-county Fox River watershed, now impacts in the DuPage County portion of the watershed must stay within the county, and are off-limits to Terry. A customer in neighboring Will County, however, might be able to buy Terry credits, unless their impact is in the City of Naperville, in which case it would have to be mitigated within city limits. In essence, the spatial subdivision of geographic areas within which wetland services are held to be commensurable is approaching the microscopic.

Bankers hate this. Profitable banks require large service areas: development in the city of Naperville, however energetic, will never generate enough wetland impacts to sustain even a single commercial wetland bank. Conforming to the COE’s spatially segregated markets was bad enough, they complain, without every little municipality getting into the game as well. In response, the bankers have launched a federal-scale strategy. The newly constituted National Mitigation Bankers Association has promoted several pieces of legislation that would protect isolated wetlands while overruling similar municipal and county-level ordinances, and hired a prestigious Washington lobbying firm to press their case. Furthermore, they have begun to argue vociferously for uniformity in COE District interpretation of the Clean Water Act. While it was precisely the differences between Districts which initially allowed banking to develop in some of the ‘greener’ jurisdictions, the bankers’ organization now castigates the Regulatory Branch Headquarters for not bringing rogue Districts into line:

[Districts] borrow some GUIDANCE, and other GUIDANCE they say, “well, that’s just GUIDANCE, we don’t have to do that.” And that’s very frustrating. I’ve personally talked to the Assistant Secretary of the Army... and presented to him that these Corps Districts are choosing to follow some GUIDANCE and not choosing to follow others, and he was mortified, couldn’t believe it. (Chicago banker)
Apparently turning their backs on a decade in which they profited from regionally diverse environmental governance, leaders of the banking industry have now embraced the stability of a regime of environmental governance centered on the nation-state.

The consequence for constituting a regime of environmental governance is clear: the scale at which “the proper disposition of things” is determined is unfixed. The strategy of capitalists can guide them towards action at any or all of several scales of governance, and the nation-state itself can find itself caught between incompatible political and legal directives. The effort to roll out new forms of neoliberal institutions clearly must attend to several scales of governance, as well as to the difficulties in getting political, legal and capital logics to operate smoothly in concert.

6. Conclusion

I have examined wetland mitigation banking as a novel institutional form in the current moment of neoliberal governance: an attempt to coordinate the institutions of capital, the law, the state and of science across many scales in the creation of a market in ecosystem service commodities. I will conclude by discussing three lessons drawn from the neoliberal encounter with wetlands that may point to difficulties that will be experienced by future neoliberal environmentalisms.

(1) Neoliberalism can be seen as the latest attempt by capital to colonize and dominate the rationalities of other systems with which it articulates, notably the political and ecological.

Arguably, neoliberal environmental strategies have been quite successful. Environmental governmentality is secured when, as Luke (1999, p. 146) says, “ecological analysis emerges as one more productive power formation”: when scientists create ecologically sophisticated RAMs which provide the necessary definitions for the expanded circulation of capital, or when scientific data are used to define the “natural” spatial limits appropriate for the trade of certain functions across landscapes. Capital appears to have successfully established a dominant articulation with other logics, incorporating the naturalized authority of scientific data into its own arguments, and lobbying for laws which stabilize its new markets.

But what the story of banking shows, beyond the efficacy of this articulation, is its potential limits. As the problem of measurement shows, the attempt to colonize ecological knowledge towards spawning further rounds of accumulation may disrupt the very mechanics of accumulation. The instance of SWANCC, too, shows how fragile the alliance between the state and capital can be: the state has clearly adopted some of the language of capital, but only to the extent to which it can be trans-}{ATED INTO THE LEGAL RATIONALITY OF THE STATE. AS ENTHUSIASTIC AS SOME EPA OFFICIALS ARE ABOUT BANKING, THEIR PRIMARY GOAL IN PROMOTING BANKING IS ALWAYS EXPRESSED IN THE LEGAL AND SCIENTIFIC LANGUAGE OF THE CLEAN WATER ACT: AS ONE OFFICIAL EXPLAINED: “I'M TRYING TO DO THE RIGHT THING, AS MUCH OF A RIGHT THING AS YOU CAN DO FROM A BIOLOGICAL-HYDROLOGY PERSPECTIVE”. AT THIS JUNCTURE, BANKING IS AN ARENA OF LIMITED AGREEMENT BETWEEN AUTOPOIETIC SPHERES, BUT THE FRAGILITY OF THAT AGREEMENT IS DEMONSTRATED BY SWANCC.

(2) Environmental governance occurs at no fixed scale.

The story of banking reinforces the findings of recent regulation-theoretic work that regulation and governance happen at many scales at once, and can depend as much on interpersonal networks as on top-down structural forces. If environmental governance consists of disciplining ecological relations through strategic articulations with state and capital, then one of its tasks is to find the appropriate spatial and scalar “fixes” that will enable the commoditization of ecosystem services. It is evident from the effect of SWANCC that these are moving targets, and that the scales of ecological significance, political significance and economic significance may only ever coincide by accident and through the work of particular people in particular places (Feldman and Jonas, 2000). Finding these places and people will involve observing those who occupy the forums of articulation with capitalism, and must continue to perform the inconclusive work of translating and coding information from one realm into another.

I don’t have time for the fools of the [banking] business, I’m gonna be direct and say, “Look, I can’t do this...” Have they pushed and pulled, and hollered and harassed? They have. And I try to remind the [COE District] Commander, [that] you don’t have to please them, you have to listen to your own experts and go with what the science says. The Commanders are very, sort of, “You shouldn’t be telling people that”; I said, “Yeah, it’s their money,”... they’re wasting tens of thousands of hours to find out that it’s something that wasn’t permissible in the first place (Chicago COE Project Manager).

(3) Ecology is a social relation.

I have found that it does not pay to treat the particulars of ecological science with any less attention than the particulars of labor relations or industrial processes as they factor into state strategy or capital circulation. And yet this is not an impatient call for “sound science”: it is simply to recognize that some ecological knowledges ‘work’ in articulation and that some do not (Braun, 2000; Wainwright and Robertson, 2003). Neoliberal hegemony appears much less potent when its use of ecological science is revealed as one more unstable, crisis-ridden moment. The commodification of nature...
looks much more complex than either neoliberal economists or eco-Marxists have allowed when we assume that, “Capital circulation and accumulation are not… imposed on a putatively separate domain of natural entities. Rather, they are necessarily embedded in a qualitatively diverse world of flora, fauna, minerals, bodies and ecologies” (Castree, 2002, p. 137).

Thus, one’s approach to the concept of ‘nature’ has everything to do with how one will understand crisis and resistance in neoliberal environmentalism. Economic and political geographers must study the way ecological science achieves the effect of materiality in describing a “territory with qualities”, because this achievement is essential in allowing economic and political strategies to effectively play out across that territory (Braun, 2000). Alternatively, if we insist on understanding nature as either fully determined by other cultural forces, or as having a robustly material ontology, or as some arbitrarily segregated combination of the two, then we have little choice but to commit to some form of environmental determinism or to be altogether silent on the subject.

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