

## REFLECTIONS ON ECOSYSTEM SERVICES: A STEP FORWARD IN THE PROTECTION OF NATURE?

Article by Giorilyn Bruno ♦

### 1. Introduction

The theoretical concepts of ecosystem services were introduced in natural resource management to engage with the dominant political and economic perspectives and attempt to promote conservation in a pragmatic way. However, due to the challenges in their implementation and their reliance on utilitarian rationales, scholars debate whether this approach is appropriate to achieve long-term sustainability goals.

Based on the literature, this article analyzes some of the practical challenges and main drawbacks of this approach, and attempts to determine the extent to which ecosystem services may assist to protect nature. As a result of this analysis, the conclusion is that the lack of scientific knowledge concerning ecosystem functioning and the challenges of measuring economic values associated with non-marketed ecosystem services are major difficulties for effectively integrating ecosystem services considerations into policy and management decisions. Furthermore, attempting to incentivize environmentally ethical behavior may imply that it is worth conserving nature only when it is profitable. Therefore, while the concepts of ecosystem services may assist to achieve short-term goals, they should not be the main driver of our general efforts to protect nature.

This article is structured as follows. Parts 2 and 3 provide the background and discuss the general theoretical concepts of ecosystem services; part 4 discusses the practical challenges of implementing ecosystem services and developing this concept as a framework for resources management; part 5 discusses the moral implications and the problematic consequences of treating nature as a commodity; part 6 summarizes the results and provides the conclusion.

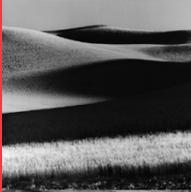
### 2. What are Ecosystem Services?

Ecosystem services are generally defined as the benefits that people obtain from nature.<sup>1</sup> They have received growing attention since the 1990s following

different initiatives with a related aim. These initiatives include (i) the *Convention on Biological Diversity* in 1992, focusing on the conservation and sustainable use of biological diversity,<sup>2</sup> (ii) Daily's et al. volume on *Nature's Services*, providing an overview of the many benefits that nature offers to people,<sup>3</sup> and (iii) a controversial study published by Costanza et al. estimating the global annual value of ecosystem services to be US \$16-54 trillion, with an estimated average of US \$33 trillion.<sup>4</sup>

Much of the current interest in ecosystem services, though, followed the *Millennium Ecosystem Assessment*, a four-year study commissioned by the United Nations in 2001, and involving more than 1300 scientists worldwide.<sup>5</sup> The study grouped the benefits arising from ecosystems into four broad categories of services: provisioning, regulating, supporting and cultural.<sup>6</sup> *Provisioning services* are the products obtained from ecosystems including food, fiber, fuel, fresh water, biochemicals, natural medicines, pharmaceuticals, and genetic resources.<sup>7</sup> *Regulating services* are the benefits obtained from regulation of ecosystems processes including air quality maintenance, climate regulation, erosion control, pollination, regulation of human diseases, and water purification.<sup>8</sup> *Cultural services* include the non-material benefits obtained from ecosystems such as spiritual enrichment, cognitive development, reflection, recreation, aesthetic experiences, inspiration, and cultural heritage values.<sup>9</sup> *Supporting services* are those benefits that are necessary for the production of all other ecosystem services, including the production of oxygen, soil formation and nutrient cycling. They differ from the other services because their impacts on people are either indirect or occur over a very long time.<sup>10</sup>

Following the *Millennium Ecosystem Assessment*, ecosystem services have become an important model for linking the functioning of ecosystems to human welfare, and many scholars recognize that understanding this link is critical.<sup>11</sup> At first, the concepts of ecosystem services were probably meant to merely emphasize societal dependence on ecosystems and the





importance of their conservation; however, in the last decade environmental scientists, economists, and policy-makers have made significant efforts worldwide to develop this concept as a framework for resource management and conservation.<sup>12</sup>

### 3. Nature as a Commodity

The supporters of ecosystem services generally refer to nature as *natural stocks* or *natural capital* that provide a range of goods and services to humans.<sup>13</sup> They argue that in addition to conventional commodities such as timber, fiber and raw materials, the goods and services provided also include *free* benefits such as clean air, climate regulation, flood control and recreation, whose value is not reflected in market transactions.<sup>14</sup> Since many of the benefits provided are not captured by markets and do not have prices, these scholars also argue that nature or ecosystems are mismanaged and tend to be overlooked in economic accounting and in both private and public decision-making.<sup>15</sup> In order to solve this problem, framed as a *market failure*, the strategy proposed is to identify means for measuring the non-market benefits of ecosystems in economic terms and articulating such values through markets to promote economic incentives for conservation.<sup>16</sup>

Public policies may implement two main approaches for correcting the market failures associated with nature. The first consists of a *Pigovian solution* where public intervention plays the leading role through state taxes and subsidies in order to influence human behavior.<sup>17</sup> The second approach follows a *Coasean solution* through private transactions.<sup>18</sup> The latter has been the prominent approach of public policies since the 1990s through the creation of *markets for ecosystem services* (MES).<sup>19</sup>

In very broad terms, MES are mechanisms that allow people to trade nature based on the theory of supply and demand.<sup>20</sup> MES may occur at a variety of scales depending on the type of ecosystem service under consideration and whether or how it is possible to limit access.<sup>21</sup> They may range from complex arrangements among multiple parties, such as the *European Union Emission Trading Scheme* designed to reduce global greenhouse gas emissions, to local watershed initiatives.<sup>22</sup> In general MES include offset credits, habitat banking, payments for ecosystem services, tradable quota systems, eco-labeling, and environment certification.<sup>23</sup> The underlying rationale of many mechanisms such as offset credits is “pay as you use the ecosystem service” or the *polluters pays principle*, according to which those causing environmental harm should carry the economic costs of the *negative externalities* they create.<sup>24</sup> Other mechanisms, such as *payments for ecosystem services* (PES), are designed to reward the restoration and management of ecosystem services or to address the *positive externalities*; for example, landowners may be rewarded for managing their land in specific ways.<sup>25</sup>

### 4. Practical Challenges in making Ecosystem Services Operational

Despite the wide support for the theoretical concepts of ecosystem services, developing this concept in practice as a framework for resources management and conservation is

extremely challenging. The literature identifies three main difficulties: (i) the lack of scientific knowledge, (ii) the non-cooperative nature of ecosystems, and (iii) the limitations of economic valuation.

#### 4.1 The Lack of Scientific Knowledge

The lack of scientific knowledge concerning ecosystems functioning is a major obstacle for effectively integrating services considerations into policy and conservation decisions.<sup>26</sup>

Ecologists emphasize that only rudimentary knowledge is available about (i) the role of biodiversity in ecosystem services, (ii) the number of species required for the sustainability of various ecosystem functions, (iii) the relationship between the different levels of ecosystem services and their relationship to human well-being, and (iv) the level of resistance of ecosystem services to disturbance.<sup>27</sup> Furthermore, scientists emphasize that the knowledge of one ecosystem does not easily translate to another ecosystem even when it seems to be quite similar.<sup>28</sup> In 2009, *Conservation Biology* published a list of 100 questions relevant to conserving ecosystems and global biodiversity needing further scientific research, with the purpose of encouraging new paths of investigation and research projects worldwide.<sup>29</sup> Specific questions include determining which components of biological diversity are essential for providing ecosystem services, identifying thresholds that may ultimately lead to biodiversity extinctions and ecosystems change, determining the effectiveness of different methods for the assessment of ecosystem services, and understanding the impacts of biodiversity loss on human health.<sup>30</sup>

According to the experts, proper answers could have great impacts on conservation practice and policy.<sup>31</sup> However, the knowledge currently available is not able to provide guidance in relation to the sustainable use or the trade-offs of any particular ecosystem service, and there is no certainty that science will ever have this predictive ability.<sup>32</sup>

#### 4.2 The Non-Cooperative Nature of Ecosystems

A second main challenge at the operational level concerns the commodification of ecosystem services. Scholars note that developing functioning markets for ecosystem services requires identifying discrete and well-defined units able to be incorporated within accounting systems and to be exchanged.<sup>33</sup> This requirement turns out to be problematic mainly because ecosystem functions are dynamic, complex, and inextricably linked to each other.<sup>34</sup> Therefore, it is often not possible to draw clean property rights around ecosystem services.<sup>35</sup> Furthermore, whereas typically markets rely on uncontroversial measures such as weight and volume, the new developing markets for ecosystem services, such as wetland banking, are being designed in terms of *units of ecosystem function* having no clear ecological meaning and requiring complex and controversial algorithms to measure habitat value, contribution towards water quality, biodiversity, and other functions.<sup>36</sup> Finally, the assumption of *fungibility*, or that the things valued or exchanged are sufficiently similar, ignores and simplifies complex relations, narrowing biodiversity to a single service or standard unit.<sup>37</sup>

The difficulties in the commodification process reflect the



extremely artificial framework for ecosystem services and the uncooperative nature of many ecosystem functions to be treated as commodities.<sup>38</sup> Furthermore, some scholars emphasize that ecology may be influenced and distorted by the dominance of market thinking, substantially reducing the scientific and public understanding of the true complexities of ecosystems.<sup>39</sup> The concern that scientists are trying to develop “the nature that capital can see” and thus going against the basic principles of ecology, is not isolated in the literature.<sup>40</sup>

#### 4.3 The Limitations of Economic Valuation

The third difficulty for developing ecosystem services as a framework for resources management and conservation concerns quantifying the values associated with ecosystem services.

The concept of *total economic value* (TEV) is the framework generally used by economists to determine the value of ecosystem services, which includes use values and non-use values.<sup>41</sup> In particular, *use values* refer to the values of ecosystem services that flow from direct and indirect use of the natural environment.<sup>42</sup> Use values include all the services provided by the ecosystem to human beings including food sources, water quality, harvesting or extracting natural resources, flood control, and enjoyment of the environment for recreational activities.<sup>43</sup> Furthermore, use values include the option of preserving ecosystem services, for potential future use.<sup>44</sup> On the other side, *non-use values* refer to the value that people ascribe to ecosystem services without actually using them.<sup>45</sup> For instance, some individuals may value the preservation of ecosystem services for their existence alone or for knowing that they will be conserved for future generations.<sup>46</sup>

In last decades, economists have developed numerous methods in attempts to quantify the benefits of the different ecosystem services not captured by the markets and an extensive literature exists on their application.<sup>47</sup> However, these methods are subject to high criticism concerning their limitations, their accuracy, and their failure to reflect any ecological value due to their reliance on social preference or *willingness to pay*.<sup>48</sup> Furthermore, there is no consensus on the most appropriate method to be used.<sup>49</sup>

An additional difficulty of economic valuation concerns the interdependence of ecosystems service.<sup>50</sup> For instance, wetlands provide important ecosystem services, including flood control, water purification and habitat for numerous species.<sup>51</sup> The task of quantifying these services is already difficult. But it is made even more complicated by the complexity of the network that links wetland to ground water and then to streams and lakes and other navigable water.<sup>52</sup> Scholars note that economic valuation should be cautiously used because, by unintentionally omitting key environmental inputs in valuations, there is a risk of sending the wrong signals and thus misleading the policy and decision makers.<sup>53</sup>

### 5. The Limited Role of Incentivizing Environmental Conservation

The supporters of ecosystem services generally promote the

key message that reasons for the conservation of ecosystems include protecting the *economic benefits* provided to society.<sup>54</sup> Scholars often refer to the famous case of the *Catskill/ Delaware Watershed* in New York to prove that if ecosystems became heavily degraded, engineered solutions and large public expenditures would be required to accomplish the same benefits that we now receive for free.<sup>55</sup> Furthermore, they emphasize that the conservation of ecosystem services may in general provide lucrative opportunities for private business.<sup>56</sup>

The literature emphasizes the danger of exclusively relying on incentives to promote conservation. In particular, McCauley notes that there are two main criticisms of this approach. First, the supporters of ecosystem services promote a hypothetical and appealing “world of win-win scenarios”, forgetting that too often conservation is expensive and conflicting with other goals.<sup>57</sup> Therefore, the current framework for ecosystem services offers little guidance on how to protect nature when it conflicts with human interests or how to protect the parts of nature that neither support human welfare nor conflict with it.<sup>58</sup> Second, this approach emphasizes the utilitarian values of nature and ignores the ethical issues that are also involved in our efforts to promote conservation.<sup>59</sup> McCauley uses the following example of a former coffee plantation in Costa Rica to explain why ecosystem services have a limited role.<sup>60</sup> A recent study in Costa Rica concluded that native bees from two forest fragments adjacent to the coffee plantation Finca Santa Fe yielded approximately US \$60,000 a year in pollination services to the coffee plants.<sup>61</sup> However, shortly after the conclusion of the study, due to a severe dip in coffee prices, Finca Santa Fe cleared its coffee plantations and planted pineapple instead.<sup>62</sup> Since pollinators are irrelevant to pineapple production, now probably the monetary value of the native bees in the forest fragments around Santa Finca Fe dropped from \$60,000 per year to zero.<sup>63</sup> Does this mean that it is not worth protecting these species anymore? McCauley emphasizes that the risk of incentivizing environmental behavior and applying the principles of business to achieve global sustainability is “to imply – intentionally or otherwise – that nature is worth conserving when it is, or can be made, profitable”.<sup>64</sup>

Additional criticisms of this approach include the overly strong conception of property rights underlying some incentives, which implicitly assign to the landowners the right to use their lands with no limitations concerning the ecological harm they may cause.<sup>65</sup>

In short, markets and incentives in some circumstances and if properly designed, may assist with short-term gains in conservation.<sup>66</sup> However, these tools alone will not be able to deliver environmental stewardship or long-term goals.<sup>67</sup>

### 6. Conclusion

Human societies face important choices in how they conserve and manage ecosystems. Making the appropriate decisions requires, among other things, reliable information on the conditions and trends of ecosystems, as well as reliable information on the economic, political, social, and cultural consequences of alternative courses of action. The way





decisions are made, though, will depend on the system of values endorsed by each society.

Ecosystem services have certainly encouraged people to think about societal dependence on nature and the importance of protecting it. Indeed, scholars now share a sense of urgency for developing an analytical and institutional framework able to ensure the protection of earth's life-support systems. However, whether in practice ecosystem services might provide a more positive agenda for environmental conservation is still uncertain.

Implementing the theoretical concepts of ecosystem services is very challenging due to science and economics limitations. Just as difficult is addressing the moral implications and the problematic consequences of treating nature as a commodity. Whether the drive for profits that has caused so much harm to nature can possibly be used to save it is also an open question. Even though many scholars believe that translating the worth of nature into economics is the best way to meaningfully engage with policy and decision-makers, other scholars have noted that this argument is similar to saying that "civil rights advocates would have been more effective if they provided economic justifications for racial integration".<sup>68</sup> Regardless, ecosystem services should not be the foundation of our efforts to achieve long-term goals in sustainability because, as noted in the literature, this approach is subject to the unpredictable shifting of human preferences or needs and will not assist when economic growth and conservation are mutually exclusive goals.

There is no doubt that in some circumstances markets and incentives may be useful in our general efforts to protect nature or to achieve short-term goals. However, there are other ways, particularly education, to influence individual or societal behavior.

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## Notes

1. Gretchen C Daily, *Nature's Services: Societal Dependence on Natural Ecosystems* (Washington, DC: Island Press, 1997) at 3, provides the most common definition for ecosystem services. According to the scholar, "ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life. They maintain biodiversity and the production of ecosystem goods, such as seafood, forage, timber, biomass fuels, natural fiber, and many pharmaceuticals, industrial products, and their precursors".
2. *Convention on Biological Diversity*, online: <<http://www.cbd.int/convention/>>.
3. Daily, *supra* note 1 at 3.
4. Robert Costanza et al, "The Value of the World's Ecosystem Services and Natural Capital" (1997) 387 *Nature* 253 at 253-259. The scholars note that this value is tremendous and it is almost twice the gross national product (GNP) of all the global economies combined. The global gross national product total is approximately

- US \$18 trillion per year).
5. See Millennium Ecosystem Assessment, *Ecosystems and Human Well-Being, A Framework for Assessment* (Washington: Island Press, 2003) at X-XII [MEA Framework].
  6. *Ibid* at 49-70.
  7. *Ibid* at 56-57.
  8. *Ibid* at 57-58.
  9. *Ibid* at 58-59.
  10. *Ibid* at 59-60.
  11. Daily, *supra* note 2 at 365; Sandy Irvine, "The Cornucopia Scam: Contradictions of Sustainable Development" (1994) 4 *Wild Earth* 72.
  12. See Richard B Norgaard, "Ecosystem Services: From Eye-Opening Metaphor to Complexity Binder" (2010) 69 *Ecological Economics* 1219 (stating that "[o]ver a period of about 15 years, an eye-opening metaphor intended to awaken society to think more deeply about the importance of nature and its destruction through excessive energy and material consumption transformed into a dominant model for environmental policy and management in developing countries and for the globe as a whole).
  13. See e.g. Costanza et al, *supra* note 4 at 253.
  14. *Ibid*.
  15. *Ibid*; Geoffrey Heal et al, "Protecting Natural Capital Through Ecosystem Service Districts" (2001) 20 *Stan Envtl LJ* 333 at 341; International Institute for Sustainable Development (IISD), "Markets for Ecosystem Services" (2006) at 1 [IISD], online: <<http://www.iisd.org>>.
  16. *Ibid*.
  17. See Gretchen C Daily & Katherine Ellison *The New Economy of Nature* (Washington, DC: Island Press, 2002) at 12 (noting that a tax on consumption of fossil fuel makes users reduce their consumption and the damage it causes); Erik Gomez-Baggethun & Manuel Ruiz-Perez "Economic Valuation and the Commodification of Ecosystem Services" (2011) 35:5 *Progress in Physical Geography* 613 at 618; A C Pigou, *The Economics of Welfare* (London: Macmillan, 1932).
  18. See Gomez-Baggethun & Ruiz-Perez, *ibid* at 618; Daily & Ellison, *ibid* at 13; Ronald Coase "The Problem of Social Cost" (1960) 3 *Journal of Law and Economics* 1.
  19. Gomez-Baggethun & Ruiz-Perez, *ibid* at 618.
  20. IISD, *supra* note 15 at 4-5.
  21. Sylvia S Tognetti, Bruce Aylward, & Guillermo F Mendoza, "Markets for Watershed Services" (2005) at 8, online: <[http://www.sylviatognetti.org/data/Tognetti\\_MWS.pdf](http://www.sylviatognetti.org/data/Tognetti_MWS.pdf)>; Gomez-Baggethun & Ruiz-Perez, *supra* note 17 at 618; IISD, *ibid* at 9.
  22. Other examples include the 1990 US *Clean Air Act* that promoted cap and trade mechanisms for sulphur dioxide, the *Greenhouse Gas Abatement Scheme* of New South Wales established in 2003 in Australia, and the wetland banking system put into practice in the US through the *Clean Water Act*. See Gomez-Baggethun & Ruiz-Perez, *ibid* at 618; IISD, *ibid* note 15 at 9; Tognetti, Aylward & Mendoza, *supra* note 21 at 8.
  23. IISD, *ibid* at 5.
  24. IISD, *ibid* at 5; Gomez-Baggethun & Ruiz-Perez, *supra* note 17 at 618.
  25. Gomez-Baggethun & Ruiz-Perez, *ibid* at 618. (Noting that the rationale for PES is the "steward earns principle", according to which the beneficiaries of ecosystem services should make payments to the landowners and users in return for practices that implement ecosystem conservation and restoration.) See also Sven Wunder, "Payment for Environmental Services: Some Nuts and Bolts" (2005) Center for International Forestry Research, Occasional Paper #42 at 1-3, online: <[http://www.cifor.org/publications/pdf\\_files/OccPapers/OP-42.pdf](http://www.cifor.org/publications/pdf_files/OccPapers/OP-42.pdf)>.
  26. Norgaard, *supra* note 12 at 1220.
  27. Daily, *supra* note 1 at 109; Norgaard, *ibid* at 1222.
  28. *Ibid*.
  29. WJ Sutherland et al, "One Hundred Questions of Importance to the Conservation of Global Biological Diversity" (2009) 23 *Conservation Biology* 557. The list of questions was identified by





- 761 conservationists representative of the world's leading conservation bodies and 12 academics.
30. *Ibid* at 557-561.
  31. *Ibid* at 557.
  32. Morgan M Robertson, "The Nature That Capital Can See: Science, State, and Market in the Commodification of Ecosystem Services" (2006) 24:3 *Environment and Planning D: Society and Space* 367 at 382; Sutherland et al, *supra* note 29 at 557; Norgaard, *supra* note 12 at 1220.
  33. Gomez-Baggethun & Ruiz-Perez, *supra* note 17 at 621.
  34. *Ibid*.
  35. Nicolas Kosoy & Esteve Corbera, "Payments for Ecosystem Services as Commodity Fetishism" (2010) 69:1 *Ecological Economics* 1228 at 1231.
  36. Robertson, *supra* note 32 at 368-369; Whitten et al, "Markets for Ecosystem Services: Applying the Concepts" CSIRO Sustainable Ecosystems at 12; online: <[http://www.ecosystemsproject.org/html/publications/docs/Markets\\_AARES2003.pdf](http://www.ecosystemsproject.org/html/publications/docs/Markets_AARES2003.pdf)> (wondering whether in paying farmers for the services of evapotranspiration, i.e. for planting trees to lower the water table and reduce salinity, should the proper measure for payment be the trees planted, water released by the vegetation, reduction in water table level, or soil salinity?).
  37. See Robertson, *supra* note 32 at 373 (describing some of the problems in the development of wetland banking); Whitten, *supra* note 36 at 11.
  38. Noorgard, *supra* note 12 at 1221-1222.
  39. *Ibid* at 1222.
  40. See in general Robertson, *supra* note 32; See also Douglas J. McCauley "Selling Out On Nature" (2006) 44:3 *Nature* 27 (arguing that the implicit assumption behind ecosystem services that the biosphere is benevolent ignores basic ecology because "environments don't act for the benefit of any single species").
  41. MEA Framework, *supra* note 2 at 132. See in general Lawrence H. Goulder & Donald Kennedy "Interpreting and Estimating the Value of Ecosystem Services" 2009 at 26, online: <<http://www.stanford.edu/~goulder/Goulder%20and%20Kennedy%20-%20Ecosystem%20Service%20Values.pdf>>.
  42. *Ibid*.
  43. *Ibid* at 132-133.
  44. *Ibid* at 133.
  45. *Ibid*.
  46. *Ibid* at 133-134.
  47. These methods are called stated-preference or indirect observed behavior methods since, in the absence of actual market behavior regarding that particular service, they use observations on actual behavior in a surrogate market, which is hypothesized to have a direct relationship with the ecosystem service value. Examples in this category include the hedonic pricing method (that uses statistical techniques to break down the price paid for a service into the implicit prices for each of its attributes, including environmental attributes such as access to recreation or clean air), the travel cost method (that uses observed costs to travel to a destination to derive demand functions for that destination), the cost-based methods (that values services at the cost of replacing, for example, a water purification service provided by an ecosystem with a new water treatment plant) and the contingent valuation method (that asks people how much they are WTP/WTA contingent on the existence of a hypothetical situation). See MEA Framework, *supra* note 2 at 135; see also the *System of Integrated Environmental and Economic Accounting* (SEEA) at 14, online: <<http://unstats.un.org/unsd/envaccounting/seea.asp>>.
  48. See Mark Sagoff, *The Economy of the Earth* (New York: Cambridge University Press, 2008) at 67-86 (discussing willingness to pay, values and preferences); See also Kosoy & Corbera *supra* note 35 at 1234.
  49. SEEA, *supra* note 47 at 21.
  50. Goulder & Kennedy, *supra* note 41 at 21; Daily, *supra* note 1 at 368.
  51. *Ibid*.
  52. *Ibid*.
  53. *Ibid*.
  54. See Josh Hurd "Economic Benefits of Watershed Restoration" (2009) *The Political Economy of Watershed Restoration Series*, Missoula, MT, Wildlands CPR, online: <[http://www.wildlandscpr.org/files/Economic\\_Benefits.pdf](http://www.wildlandscpr.org/files/Economic_Benefits.pdf)>; Dan L Perlman & Jeffrey C Milder, *Practical Ecology* (Washington, DC: Island Press, 2005) at 27-29; G Chichilnisky & G Heal, "Economic Returns From The Biosphere" (1998) 39:1 *Nature* at 629. As previously discussed, the other main reason is that human welfare is strictly related to the functioning of ecosystems.
  55. See e.g. Perlman & Milder, *ibid* at 2, 27. Since in 1996 the quality of drinking water had fallen below standards required by the U.S. *Environmental Protection Agency*, the authorities of New York City had to decide whether to restore the polluted Catskill Watershed that had previously provided the city with the ecosystem service of water purification or whether to build a water filtration plant. The cost of restoration was estimated between \$1-1.5 billion, as opposed to the estimated \$6-8 billion cost of constructing a water filtration plant plus the \$300 million annual running costs. Therefore, New York City invested in the restoration and conservation of the watershed since it would filter the water as effectively as a filtration plant but more cheaply.
  56. Perlman & Milder, *ibid* at 28-29; Hurd, *supra* note 54 at 17. See in general L Hunter Lovins & Boyd Cohen, *Climate Capitalism: Capitalism in the Age of Climate Change*, 2011 (Presenting stories and examples of how profit-seeking companies are investing in energy efficiency and renewable energy resources).
  57. McCauley, *supra* note 40 at 27. The scholar refers to "the case of Africa's Lake Victoria, where the introduction of the invasive Nile perch (*Lates niloticus*) contributed significantly to the decimation of local biodiversity while dramatically boosting the economic value of the lake. Local people profiting from trade in the fish hail its introduction as a success, whereas biologists have condemned the event to be the most catastrophic extinction episode of recent history". See also Patrick Curry, *Ecological Ethics* 2nd ed (Malden: Polity Press, 2011) at 221-224.
  58. *Ibid*.
  59. *Ibid*. Using incentives and markets to promote conservation ignores the intrinsic value of nature, and the intense respect and stewardship that different cultures have for nature. See Sian Sullivan, "Ecosystem Service Commodity – A New Imperial Ecology?" (2010) 69 *New Formations* 111 at 116-118.
  60. McCauley, *supra* note 40 at 28.
  61. *Ibid* at 27-28.
  62. *Ibid* at 28.
  63. *Ibid*.
  64. *Ibid*.
  65. See e.g. Eric T Freyfogle, *On Private Property: Finding Common Ground on the Ownership of Land* (Boston: Beacon Press, 2007) at 79-81 (advocating for a *stewardship conception of property rights* that is consistent with the public interest, and that does not grant the landowners the power to alter or destroy important wildlife habitat).
  66. Freyfogle, *ibid* at 128 (arguing that landowners "would seem to deserve payment, or some sort of reciprocal benefit, when regulations require them to incur out-of-pocket management expenses, unless the expenses are merely to keep property from slipping into harmful degradation. Many conservation measures today, particularly those related to wildlife habitat, require landowners to take affirmative steps to manage their lands, not just to let nature run its course. Compensation in such cases typically make sense").
  67. Sian Sullivan, "The Environmentality of 'Earth Incorporated': On Contemporary Primitive Accumulation and the Financialisation of Environmental Conservation" Paper presented at the conference, *An Environmental History of Neoliberalism*, Lund University, 6-8 May 2010 at 18; see also Sullivan, *supra* note 59 at 127.
  68. McCauley, *supra* note 40 at 28.





## LINKAGE: RECENT DEVELOPMENTS IN THE EU, AUSTRALIA, QUEBEC AND CALIFORNIA

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Emissions trading is not a new phenomenon. Emissions Trading Schemes (ETSs) have long been used as market-based environmental policy tools for combating climate change in a cost-effective way. Currently, the European Union (EU), Australia, Japan, some US states and Canadian provinces, New Zealand, South Korea and China, have established or are currently developing their ETSs. Considerations for establishing further ETSs are also in progress in Brazil, Chile, Mexico and Turkey.

Linking such ETSs can increase overall cost efficiency and provide for international cooperation in climate policy while allowing countries involved to preserve some national autonomy. The first linkages are beginning to take place at both the national and the regional levels. The European Emissions Trading Scheme (EU ETS) has been linked with ETSs in Norway, Iceland and Lichtenstein. Further, negotiations with Switzerland are in the final stages.<sup>1</sup>

On August 28, 2012, the European Commission and the Australian Federal Government jointly announced that they have agreed to link Australia Emissions Trading Scheme (Australian ETS) and the EU ETS. This linkage was to be the first intercontinental arrangement. The EU ETS allows linking through Article 25 of the EU Trading Directive<sup>2</sup> and the 2008 amendment<sup>3</sup> further specifies that linkages can be pursued with other ETSs that are mandatory and have absolute emissions caps in place.

At the time of the linkage announcement, Australia's central carbon pricing and emissions trading feature was a Carbon Pricing Mechanism (CPM) which was established on July 1, 2012 under the Labour party's rule. It allowed covered entities to purchase permits from the government at a fixed carbon price of AUD 23 (equal to EUR 16), rising at 2.5 percent per year in real terms.<sup>4</sup> It also provided for the use of domestic offset credits. The CPM was planned to be transformed into an ETS from July 1, 2015 onwards.<sup>5</sup> Once the CPM transformed into an ETS, it was intended to link with the EU ETS, initially partially on July 1, 2015, followed by a full two-way link in 2018.

However, two years later, after the Liberal-National Coalition won the Parliamentary elections in September 2013, Prime Minister Tony Abbott repealed the CPM and the planned ETS. The repeal was passed in the Senate in July 2014.

The new government introduced a new policy. The Emissions Reduction Fund (ERF) became the centrepiece of the Australian government policy to reduce emissions to 5% below 2000 levels by 2020 and to 26 to 28% below 2005 levels by 2030.<sup>6</sup>

The ERF contains three components: crediting, purchasing and safeguarding emissions reductions.<sup>7</sup> While the crediting and purchasing components provide a motivation for the businesses to reduce their emissions, the safeguard mechanism is intended

to ensure that emissions reductions purchased by the government are not offset by significant increases in emissions elsewhere in the economy.<sup>8</sup> The legislative framework for the safeguard mechanism is laid out in the National Greenhouse and Energy Reporting Act 2007.<sup>9</sup>

The safeguard mechanism will start on 1 July 2016 and will require Australia's largest emitters to keep their emissions at or below a baseline set by the Clean Energy Regulator. It will apply to the facilities that emit more than 100,000 tonnes of carbon dioxide equivalent a year, covering approximately half of Australia's emissions.<sup>10</sup> In effect, this is a "baseline and credit" ETS, whereas, the EU ETS is a cap-and-trade ETS.

Due to these new developments in Australia in 2014, the linking negotiations between the EU and Australia have been put on hold.

Another linkage that has been recently established is that between California's and Quebec's emissions trading schemes (California and Quebec ETSs). This is an example of a regional linkage. Both Québec and California are participating members of the Western Climate Initiative (WCI)<sup>11</sup> – a co-operation of the independent jurisdictions in Canada and the United States working together to implement ETSs at a regional level.

Québec enacted its cap-and-trade regulation on December 14, 2011.<sup>12</sup> Québec, thus, became the first Canadian WCI partner jurisdiction to enact its own regulation, placing it shoulder to shoulder with California, which enacted its cap-and-trade regulation on October 20, 2011.<sup>13</sup> To facilitate the linkage of the ETSs, on December 12, 2012, Quebec amended its cap-and-trade regulations to align certain ETS design features with California.<sup>14</sup> Because of the collaborative manner in which both ETSs were developed, they are very similar in structure.<sup>15</sup> Both ETSs have officially linked their respective ETSs on January 1, 2014. The first joint auctions of both California and Quebec allowances began on November 25, 2014.

On October 1, 2013, the California Air Resources Board (CARB) and the Government of Québec signed a linking agreement to harmonize and to integrate their respective ETSs.<sup>16</sup> Although each ETS's laws and regulations are in place and operating, it is expected that both jurisdictions will continue to make adjustments during the implementation of their ETSs that will affect the ETS operations. Consequently, a linking agreement provides the overall framework for this continuous co-operation.<sup>17</sup> Notable provisions in the linking agreement include the following:

- Ongoing regulatory harmonization of the regulations for the mandatory reporting of the carbon emissions and for the cap-and-trade programs.
- Creation of a consultation committee to monitor the coordination of the ETSs and to report at least annually.



- Mutual recognition of the compliance instruments such as emissions allowances and offsets from the other's ETS.

To sum up, there is a growing interest in linking. It is no longer a stalled issue, but rather a very alive one. Its potential, however, will depend on the willingness of the countries to establish their domestic ETSs and then sufficiently harmonize them to facilitate the linkages.

- ◆◆ Rolandas Vaiciulis is a Research Fellow at the Canadian Institute of Resources Law.

## Notes

1. "6. Verhandlungsrunde Schweiz – EU zur Verknüpfung der Emissionshandelssysteme", online: Federal Office for the Environment (FOEN) <<http://www.bafu.admin.ch/emissionshandel/10923/10926/13748/index.html?lang=en>> (last visited 23 February 2015).
2. See EC, *Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC*, [2003] OJ L 275/32 [EU Trading Directive].
3. EC, *Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community*, COM (2008) 16 final at Art 25 [2008 amendment].
4. Clean Energy Act 2011 (Cth) at s 100 [CEA 2011].
5. Explanatory Memorandum, Clean Energy Bill 2011 at 12 [CEB 2011 Explanatory Memorandum].
6. Australian Government Department of the Environment, "The Emissions Reduction Fund: The Safeguard Mechanism" (18

January 2016), online: Australian Government Department of the Environment <<https://www.environment.gov.au/climate-change/emissions-reduction-fund/publications/factsheet-erf-safeguard-mechanism>>.

7. *Ibid.*
8. *Ibid.*
9. National Greenhouse and Energy Reporting Act 2007 (Cth).
10. The Emissions Reduction Fund: The Safeguard Mechanism, *supra* note 6.
11. See for more details: <<http://www.westernclimateinitiative.org>>.
12. *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances*, RRO, c O-2, r 46.1.
13. US, AB, 32, An Act to add Division 25.5 to the Health and Safety Code, relating to air pollution, 2006, Reg Sess, Cal, 2006 at s 95810 [AB 32].
14. The Regulation respecting a cap-and-trade system of greenhouse gas emission allowances was enacted by Order in Council No 1297-2011 and published in the Québec Official Gazette, Part 2, No 50B on 16 December 2011 at 5519B (at 3655B of the English version). The current version of the regulation can be found online: <[http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/Q\\_2/Q2R46\\_1\\_A.HTM](http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/Q_2/Q2R46_1_A.HTM)>.
15. For more details see California Air Resources Board, "Discussion of Findings Required by Government Code section 12894" (January 2013), online: Air Resources Board <<http://www.arb.ca.gov/regact/2012/capandtrade12/2nd15dayatta6.pdf>>.
16. See California Air Resources Board, "Linkage", online: California Air Resources Board (CARB) <<http://www.arb.ca.gov/cc/capandtrade/linkage/linkage.htm>> (See California-Quebec Agreement to Integrate and Harmonize their Cap-and-Trade Programs.)
17. Notable provisions in the linking agreement include the following: the creation of a consultation committee to monitor the coordination of the ETSs, regulatory harmonization, and mutual recognition of the compliance instruments.

## NEW CIRL PUBLICATIONS

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by Rolandas Vaiciulis, 2015.  
63 pp. Occasional Paper #50. \$20.00 (softcover)  
([download available](#))

Since the introduction of international emissions trading by the Kyoto Protocol, the emissions trading mechanism used to reduce greenhouse gas (GHG) emissions appears to regain attention at both, the national and the regional levels. Currently, the European Union (EU), Australia, Japan, some US states and Canadian provinces, New Zealand, South Korea and China, have already established or are currently developing their emissions trading schemes (ETSs). Considerations for establishing further ETSs are also in progress in Brazil, Chile, Mexico, Ukraine and Turkey.



This paper aims at examining the following question: Will the EU-Australia and Quebec-California be able to achieve an effective linkage with each other? In addressing this question, the paper first discusses design elements that were identified in the literature review as crucial for the linking of different ETSs, then considers how each design feature is addressed by the potential linking partners, identifying potential incompatibilities, if any, and outlining what adjustments, if any, might be made to facilitate effective linkages.

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The Canadian Institute of Resources Law (CIRL), the University of Ottawa Faculty of Law and the Ontario Bar Association are organizing the national symposium **Environment in the Courtroom: Inspections and Enforcement Issues: On-site and in Court**. This symposium, funded by Environment Canada, is free of charge and can be attended in person at the University of Ottawa on February 26 & 27, or alternatively viewed online as a live webcast on the symposium dates.

This is the fifth national environmental law symposium organized by CIRL. During the last four years, practitioners, judges and academics from across Canada have attended and contributed to the discussion of current important environmental law issues. Attendees at previous symposiums have reported that the sessions are both practical and useful. We encourage questions from the audience after the presentations. The session papers, translated into both of Canada's official languages, will be posted on the CIRL website.

There will be a series of speakers who will discuss topics such as:

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- Anatomy of Compliance Regime II: Collecting Evidence – Legal Strategy and Associated Issues with a Scientist's Perspective;
- Anatomy of Compliance Regime III: Investigations – Corporate and Government Perspectives;
- Anatomy of Compliance Regime IV: Recapitulation and Alternatives – Lessons from the United States;
- Special Problems: Contaminated Sites – A Practical Case Study.

Registration is free of charge. There will be networking opportunities with practitioners from throughout Canada to find out about recent developments and current issues in Canadian environmental law. Both days will include refreshment breaks and lunch, and following the first day of the symposium on Friday March 6, there will be a Networking Reception for attendees.

For more details, or to register, please visit the webpage at <https://www.eventbrite.ca/environment-in-the-courtroom-inspections-and-enforcement-issues-on-site-and-in-court-tickets-19304821240>.

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## RESOURCES

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