

American University Washington College of Law

Digital Commons @ American University Washington College of Law

PEEL Alumni Scholarship

Program on Environmental and Energy Law

2012

Recognition of Property Rights in Carbon Credits Under California's New Greenhouse Gas Cap-and-Trade Program

John Monterubio

Follow this and additional works at: https://digitalcommons.wcl.american.edu/peel_alumni

Recognition of Property Rights in Carbon Credits Under California's New Greenhouse Gas Cap-and-Trade Program

John Monterubio

American University Washington College of Law

Follow this and additional works at: <http://digitalcommons.wcl.american.edu/sdlp>

 Part of the [Environmental Law Commons](#)

Recommended Citation

Monterubio, John. "Recognition of Property Rights in Carbon Credits Under California's New Greenhouse Gas Cap-and-Trade Program." *Sustainable Development Law & Policy* 12, no. 2 (2012): 32, 64-65.

This Feature is brought to you for free and open access by the Washington College of Law Journals & Law Reviews at Digital Commons @ American University Washington College of Law. It has been accepted for inclusion in *Sustainable Development Law & Policy* by an authorized administrator of Digital Commons @ American University Washington College of Law. For more information, please contact fbrown@wcl.american.edu.

RECOGNITION OF PROPERTY RIGHTS IN CARBON CREDITS UNDER CALIFORNIA'S NEW GREENHOUSE GAS CAP-AND-TRADE PROGRAM

by John Monterubio*

Although the United States has not yet adopted a national greenhouse gas cap-and-trade program,¹ carbon trading is nonetheless an active industry.² Private companies continue to participate in voluntary carbon markets despite the closure of the Chicago Climate Exchange.³ On the east coast, the Regional Greenhouse Gas Initiative (“RGGI”) forges into its seventh year,⁴ while in the west, California, a pioneer of cap-and-trade,⁵ launched its own statewide greenhouse gas cap-and-trade program.⁶ While these state efforts to curb greenhouse gases are laudable, the disparate cap-and-trade programs have yielded inconsistent definitions of carbon credits. To promote efficiency in this new market, buyers and sellers must be assured of their rights over the carbon they trade.

Similar to most cap-and-trade markets, California authorizes the sale of carbon credits.⁷ Also referred to as carbon offsets, carbon credits are reductions in greenhouse gases sold to “offset” the purchaser’s greenhouse gas emissions.⁸ The voluntary⁹ and statutory cap-and-trade markets have different requirements regarding what activities qualify as carbon credits.¹⁰ California’s new program currently authorizes the sale of carbon credits generated via capturing methane produced from livestock, elimination of ozone, and reforestation of barren land or urban areas.¹¹ By reducing greenhouse gas emissions, these activities become valuable to their “owner” in the cap-and-trade market.

California law specifically states that a carbon credit is not a property right,¹² most likely to avoid implications of the Takings Clause under the cap-and-trade market.¹³ If a carbon credit were considered property, then California would have to compensate the owner if it ever revoked a carbon credit.¹⁴ As a result, the cost of revoking carbon credits may hamper California’s ability to achieve its goal of reducing greenhouse gas emissions¹⁵ through the cap-and-trade program.¹⁶

However, states that do not administer cap-and-trade programs have different views on carbon credits. In Louisiana, the U.S. district court held that the right to report, transfer, or sell carbon credits was enough to designate them as part of property’s “bundle of rights.”¹⁷ The fact that the carbon credits in question had not been registered in any exchange was irrelevant.¹⁸ In fact, no exchange even need exist for these rights to arise.¹⁹ The court compared the carbon credits to junk bonds, or low-grade investments with a low likelihood of return, but potential for a high yield.²⁰ Accordingly, the court implied that the potential value of carbon credits is what makes them part of property’s “bundle of rights.”²¹

Although the divergent definitions of carbon credits in California and Louisiana are irrelevant to carbon credit

transactions occurring within California, sellers of carbon credits outside the state may need to be wary. California’s cap-and-trade market accepts carbon credits generated from other U.S. states, Canada, and Mexico.²² Thus, if a carbon credit from Louisiana were accepted into California’s market, the credit would have two distinct legal statuses: as property in Louisiana, but as non-property in California. If a dispute were to arise, the owner’s rights over the allowance may be different depending on the state of adjudication.

This potential for disputes will only increase in the future as California anticipates linking its market with other cap-and-trade markets.²³ California and Quebec are currently in negotiations and hope to link their markets before the end of the year.²⁴ British Columbia and Ontario are also considering linked markets with California.²⁵ As this market for carbon credits grows, the number of transactions will arguably increase, raising the likelihood that disputes among traders will find their way into a court room. Different jurisdictions’ interpretations of ownership rights over carbon credit could make these disputes more contentious. For this reason, ensuring uniform ownership rights over carbon credits is important to the efficient functioning of the cap-and-trade market.²⁶

Private traders should clearly define the property rights assigned to carbon credits and name the relevant jurisdiction within the terms of a sales contract to avoid disputes. By addressing the issue contractually, traders will limit the risk arising from uncertain ownership definitions. While contractual provisions may quell disputes between private parties, they will not prevent disputes against the government. California can limit such disputes by adopting a regulation within its cap-and-trade system that requires any seller of a carbon credit generated outside of California to recognize that the carbon credit carries no property rights, regardless of the law in the state of origin. However, such a requirement may be unconstitutional under the commerce clause,²⁷ as it would require a seller to disaffirm a right to engage in interstate commerce with California.²⁸

Certainly, the ultimate resolution would be for Congress to adopt a national cap-and-trade program. Such a program would impose a uniform definition of carbon credits among all traders within the United States. But, until Congress adopts such a program, the issue, as with greenhouse gas reduction, will be left to the states and private parties.



Endnotes on page 64

* John Monterubio is a J.D./M.B.A. candidate, May 2014, at the American University Washington College of Law and Kogod School of Business.

- ⁷⁵ ALDRICH & CONNELL, *Id.*
- ⁷⁶ *New Caledonia Welcomes New Environmental Code*, INT'L UNION FOR CONSERVATION OF NATURE (IUCN) (Mar. 25, 2009), http://www.iucn.org/about/union/secretariat/offices/oceania/oro_newsarchive/?3509/New-Caledonia-Welcomes-Environmental-Code.
- ⁷⁷ United Nations Convention on the Law of the Sea (UNCLOS), Dec. 10, 1982, 1833 U.N.T.S. 3, 397 (1982).
- ⁷⁸ ALDRICH & CONNELL, *supra* note 70, at 89.
- ⁷⁹ WORLD COMM'N ON PROTECTED AREAS (WCPA), IUCN, SERIES NO. 3, GUIDELINES FOR MARINE PROTECTED AREAS (Graeme Kelleher & Adrian Phillips eds., 1999).
- ⁸⁰ François Feral, *L'extension récente de la taille des aires marines protégées: une progression des surfaces inversément proportionnelle à leur normativité ?* Internal report GRAMP, 1-16 (2011).
- ⁸¹ Bernard Salvat, Bertrand Cazalet, & François Féral, *La Représentation Internationale des Aires Marines Protégées Françaises: Définition et Affichage des Surfaces Protégées. Réflexions sur les AMP Ultramarines*, 239 COURRIER DE LA NATURE 34, 41 (2008).
- ⁸² Catherine Gabrié C, Amandine Eynaudi & Adrien Cheminée, *Les Recifs Coralliens Protèges De L'Outre-Mer Français*. IFRECOR- WWF -MINISTÈRE DE L'ÉCOLOGIE ET DU DÉVELOPPEMENT DURABLE ET MINISTÈRE DE L'OUTRE-MER, 1, 1- 103 (2007); *see also* Salvat, Cazalet, & Feral, *supra* note 81, at 37–41.
- ⁸³ *See* Conference Report, Bluebook Commitments of the Oceans Round Table, Grenelle De La Mer, July 14–15, 2009, http://www.legrenelle-environnement.fr/IMG/pdf/Livre_bleu_anglais_web.pdf.
- ⁸⁴ *Single Country Profile: France*, EUROPEAN SUSTAINABLE DEV. NETWORK, <http://www.sd-network.eu/?k=country%20profiles&s=single%20country%20profile&country=France> (last visited Feb 20, 2012).
- ⁸⁵ Conference Report, *supra* note 83, at 15.
- ⁸⁶ *See* REPUBLIC OF FRANCE, PREMIÈRE MINISTRE, BLUE BOOK: A NATIONAL STRATEGY FOR THE SEA AND OCEANS (Dec. 2009).
- ⁸⁷ *See* Delegation of the European Union to the Republic of Mauritius, http://eeas.europa.eu/delegations/mauritius/eu_mayotte/development_cooperation/environment/index_en.htm (last visited Feb. 20, 2012).
- ⁸⁸ Conference Report, *supra* note 83, at 15.
- ⁸⁹ Conference Report, *Id.*
- ⁹⁰ *See* Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising From their Utilization to the Convention on Biological Diversity, Oct. 29, 2010, <http://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf>.
- ⁹¹ WORLD WILDLIFE FUND, TOWARDS GOOD ENVIRONMENTAL STATUS: A NETWORK OF MARINE PROTECTED AREAS FOR THE NORTH SEA 51 (2009).
- ⁹² CENTRE D'ANALYSE STRATEGIQUE—SECRETARIAT GENERAL DE LA MER (2006), UNE AMBITION MARITIME POUR LA FRANCE, RAPPORT DU GROUPE POSEIDON POLITIQUE MARITIME DE LA FRANCE, Paris: CAS-SGM (2006).
- ⁹³ CENTRE D'ANALYSE STRATEGIQUE, *Id.*
- ⁹⁴ CENTRE D'ANALYSE STRATEGIQUE, *Id.*
- ⁹⁵ *See* Laurence J. McCook et al., *Marine Reserves Special Feature: Adaptive Management of the Great Barrier Reef*, PNAS (Oct. 2010), <http://www.pnas.org/content/107/43/18278.full.pdf>.
- ⁹⁶ Said Ahamed et al., *Status of the Coral Reefs of the South-West Indian Ocean Island States: Comoros, Madagascar, Mauritius, Reunion, Seychelles*, in STATUS OF THE CORAL REEFS OF THE WORLD: 2008, at 265, 279 (Clive Wilkenson, ed., 2008).
- ⁹⁷ ALDRICH & CONNELL, *supra* note 70, at 6.
- ⁹⁸ ALDRICH & CONNELL, *supra* note 70, at 6.
- ⁹⁹ *See generally* AUST. STATE OF THE ENV'T COMM., INDEPENDENT REPORT TO THE AUSTRALIAN GOVERNMENT MINISTER FOR SUSTAINABILITY, ENVIRONMENT, WATER, POPULATION AND COMMUNITIES (2011), <http://www.environment.gov.au/soe/2011/report/marine-environment/pubs/soe2011-report-marine-environment-keyfindings.pdf> (last visited Feb 20, 2012).
- ¹⁰⁰ AUST. STATE OF THE ENV'T COMM., *Id.*
- ¹⁰¹ AUST. STATE OF THE ENV'T COMM., *Id.*
- ¹⁰² Kurt Derbyshire et al., *Can We Minimize the Impact of Vessel Moorings on Coastal Habitats? An Interagency Management Approach in Queensland*, 2nd Queensland Coastal Conference, Gold Coast, Australia (May 2009).
- ¹⁰³ *See Coral Reefs & Global Climate Change*, CORAL REEF ALLIANCE, <http://www.coral.org/node/126> (last visited Feb. 20, 2012).
- ¹⁰⁴ *See 12th Int'l Coral Reef Symposium*, ARC CENTER FOR CORAL REEF STUDIES, <http://www.coralcoe.org.au/index.html> (last visited Feb. 26, 2012).
- ¹⁰⁵ *Laboratoires d'Excellence, Projet Corail*, UNIVERSITE DE LA NOUVELLE-CALEDONIE, http://portail-scientifique.univ-nc.nc/index.php?option=com_content&view=article&id=103&lang=en, (last visited Feb. 26, 2012).
- ¹⁰⁶ Pedro Fidelman et al., *Governing Large-Scale Marine Commons: Contextual Challenges in the Coral Triangle*, 36 MAR. POL. NO. 1 42 (2012).
- ¹⁰⁷ *See Background Note: the Philippines*, CIA FACTBOOK, <https://www.cia.gov/library/publications/the-world-factbook/geos/rp.html> (last visited Feb. 20, 2012).
- ¹⁰⁸ Bernard Salvat & Clive Wilkinson, *Uninhabited Islands Should be Focus of Conservation Efforts*, MPA NEWS, Nov. 2008, at 2.
- ¹⁰⁹ *See generally* AUSTRALIAN GOV'T DEP'T OF ENV'T, FACT SHEET: CORAL REEF CONSERVATION ZONE (2009).
- ¹¹⁰ *See generally* AUST. GOV'T DEP'T OF ENV'T, PROPOSED CORAL SEA COMMONWEALTH MARINE RESERVE: DRAFT FOR COMMENT/PUBLIC CONSULTATION, <http://www.environment.gov.au/coasts/mbp/coralsea/consultation/index.html> (last visited Apr. 6, 2012).
- ¹¹¹ AUST. GOV'T DEP'T OF ENV'T, *Id.*
- ¹¹² *See EEZ Waters of France*, SEA AROUND US PROJECT, <http://www.searoundsus.org/eez/250.aspx> (discussing the overall area of France's exclusive economic zone ("EEZ")) (last visited Feb. 26, 2012).
- ¹¹³ *Marine Protected Area Effectiveness and Marine Spatial Planning*, SECOND ANNUAL MARINE CONSERVATION CONGRESS (2011), <http://birenheide.com/scbmarine2011/program/singlesession.php?sessid=C29> (indicating that Bertrand Cazalet will present on Off-shore Extension of Marine Protected Areas to Further Strengthen Coastal State's Hold Over Sea Spaces).
- ¹¹⁴ INTERNATIONAL UNION OF CONSERVATION OF NATURE (IUCN), DURBAN ACTION PLAN (rev'd 2004), <http://cmsdata.iucn.org/downloads/durbanactionen.pdf>.
- ¹¹⁵ *See generally* ANDERS JÄGERSKOG ET AL., GETTING TRANSBOUNDARY WATER RIGHT: THEORY AND PRACTICE FOR EFFECTIVE COOPERATION 7 (2009), http://www.siwi.org/documents/Resources/Reports/Report25_Transboundary_Waters_with_WWW.pdf.
- ¹¹⁶ *See Minutes of the 26th ICRI General Meeting La Réunion, 12-15 December 2011*, INT'L CORAL REEF INITIATIVE, <http://www.icriforum.org/sites/default/files/ICRIGM26-minutes-final.pdf> (last visited Mar. 28, 2012).
- ¹¹⁷ *ICRI Secretariat*, INT'L CORAL REEF INITIATIVE, <http://www.icriforum.org/icri-secretariat> (last visited Mar. 28, 2012).

Endnotes: RECOGNITION OF PROPERTY RIGHTS IN CARBON CREDITS UNDER CALIFORNIA'S NEW GREENHOUSE GAS CAP-AND-TRADE PROGRAM

continued from page 32

¹ Endnotes: RECOGNITION OF PROPERTY RIGHTS IN CARBON CREDITS UNDER CALIFORNIA'S NEW GREENHOUSE GAS CAP-AND-TRADE PROGRAM
 See Elisa Wood, *Is Cap-and-Trade Kaput?*, RENEWABLEENERGYWORLD.COM (Mar. 11, 2011), <http://www.renewableenergyworld.com/rea/news/article/2011/03/is-the-cap-kaput> (discussing the U.S. federal government's aversion to adopting a nationwide cap-and-trade system); *see also* AMERICAN CLEAN ENERGY AND SECURITY ACT OF 2009, H.R. 2454, 111th Cong. § 1–553 (2009) (proposing a robust cap-and-trade market for carbon dioxide). *But see* H.R. 2454: *American Clean Energy and Security Act of 2009*, GOVTRACK.US, <http://www.govtrack.us/congress/bill.xpd?bill=h111-2454> (last visited Feb. 2, 2012)

(listing the status of H.R. 2454 as having passed the Senate but failing in the House).

² *See* ECOSYSTEM MARKETPLACE, BACK TO THE FUTURE: STATE OF THE VOLUNTARY CARBON MARKETS 2011 9 (2011) (finding that the voluntary carbon market in the United States has grown thirty-four percent in 2010 after a downturn with the recession in 2011).

³ *Id.*

⁴ *See Memorandum of Understanding*, Regional Greenhouse Gas Initiative, (last visited Mar. 8, 2012), <http://rggi.org/design/history/mou> (stating that seven states first announce their moratorium of understanding that outlines the framework for the RGGI's model rule on Dec. 20, 2005).

⁵ Although the Clean Air Act Amendments of 1990 authorized the creation of the Acid Rain Program, a cap-and-trade program to reduce the amount of sulfur and nitrous dioxide, the first cap-and-trade program in the United States was California's Regional Clean Air Incentives Market that began in 1993. Compare U.S. ENVTL. PROT. AGENCY, AN OVERVIEW OF THE REGIONAL CLEAN AIR INCENTIVES MARKET (RECLAIM) 1 (2006) (stating that RECLAIM was started in 1993) with *Acid Rain Program*, EPA.GOV (Mar. 2, 2011), <http://www.epa.gov/airmarkets/progsregs/arp/basic.html> (stating that the Acid Rain Program began in 1995). See also CLEAN AIR ACT AMENDMENTS OF 1990, 42 U.S.C. §§ 7651-51o (1990) (authorizing the use of a cap-and-trade scheme to limit sulfur dioxide and nitrogen dioxide); Justin Gerdes, *Cap and Trade Curbed Acid Rain: 7 Reasons Why It Can Do The Same For Climate Change*, FORBES (Feb. 13, 2012), <http://www.forbes.com/sites/justingerdes/2012/02/13/cap-and-trade-curbed-acid-rain-7-reasons-why-it-can-do-the-same-for-climate-change/> (discussing the history of the Acid Rain Program).

⁶ See *Cap and Trade Program*, CALIFORNIA ENVTL. PROT. AGENCY AIR RES. Bd., <http://arb.ca.gov/cc/capandtrade/capandtrade.htm> (last visited Feb. 2, 2012) (describing California's cap-and-trade program which started on Jan. 1, 2012).

⁷ See CAL. CODE REGS. tit. 17 § 95981 (West 2012) (listing the requirements for offset credits); CAL. CODE REGS. tit. 17 § 95994 (listing the sector-based offset requirements).

⁸ See Rob Curran, *Carbon Offsets: Q&A*, WALL ST. J. (Sept. 21, 2001), <http://online.wsj.com/article/SB10001424052970204683204574356303122443192.html>.

⁹ Voluntary markets do not have a single set of requirements, but use various industry standards to assure the quality of the carbon credits. See *Voluntary Over-the-Counter (OTC) Offset Market*, ECOSYSTEM MARKETPLACE, http://www.ecosystemmarketplace.com/pages/dynamic/web.page.php?section=carbon_market&page_name=otc_market (last visited Mar. 8, 2012).

¹⁰ Compare REGIONAL GREENHOUSE GAS INITIATIVE MODEL RULE Subpart XX-10 (Dec. 31, 2008) (listing the requirements for offsets in the RGGI) with CAL. CODE REGS. tit. 17 §§ 95981-94 (listing the requirements for offsets in California's cap-and-trade market).

¹¹ See *Compliance Offset Program*, CALIFORNIA ENVTL. PROT. AGENCY AIR RES. Bd., <http://www.arb.ca.gov/cc/capandtrade/offsets/offsets.htm> (last visited Mar. 9, 2012) (listing California's offset programs).

¹² See CAL. CODE REGS. tit. 17 § 95802(a)(12) (West 2012) (defining an offset credit as a compliance instrument); CAL. CODE REGS. tit. 17 § 95820(c) (stating that a compliance instrument "does not constitute property or a property right").

¹³ See Markus W. Gehring & Charlotte Streck, *Emissions Trading: Lessons From SO_x and NO_x Emissions Allowance and Credit Systems Legal Nature, Title, Transfer, and Taxation of Emission Allowances and Credits*, 35 E.L.R. 10,221-22 (2005) (analyzing how the Fifth Amendment will require the

government to compensate regulated companies whose sulfur dioxide allowances are revoked under the cap-and-trade Acid Rain Program); see also 136 CONG. REC. S16,980 (1990) (statement of Sen. Baucus) ("[T]he reason for characterizing the legal or property status of allowances in this title is to make clear that regulatory actions taken subsequent to the issuance of allowances are not subject to the 'takings clause' of the U.S. Constitution."). Compare CLEAN AIR ACT AMENDMENTS OF 1990, 42 U.S.C. § 7651b(f) (1990) (stating that a emissions allowance used in the Acid Rain Program "does not constitute property right") with CAL. CODE REGS. tit. 17 § 95820(c) (stating that a compliance instrument "does not constitute property or a property right").

¹⁴ C.f. Gehring, *supra* note 13, at 10,222 (arguing that if an emissions allowance under the Acid Rain Program is revoked, then the owner could be entitled to compensation under the Takings Clause).

¹⁵ CAL. CODE REGS. tit. 17 § 95801.

¹⁶ C.f. Gehring, *supra* note 13, at 10,222 (arguing that compensation for revocation of emission allowances in the Acid Rain Program will impede the government's ability to achieve the goal of reducing emissions); Travis Allan & Kathy Baylis, *Who Owns Carbon? Property Rights Issues in a Market for Greenhouse Gases*, 7 CURRENT ARGU., FOOD & RES. ISSUES 104, 106 (2006) (stating that the Acid Rain Program does not recognize sulfur dioxide emissions allowances as property because the United States is afraid of compensating regulated companies when the allowances are revoked).

¹⁷ *Roseland Plantation, LLC v. U.S. Fish & Wildlife Serv.*, 2006 U.S. Dist. LEXIS 29334, 9-10 (W.D. La. 2006).

¹⁸ *Roseland*, 2006 U.S. Dist. LEXIS 29334 at 9.

¹⁹ *Roseland*, 2006 U.S. Dist. LEXIS 29334 at 8.

²⁰ *Roseland*, 2006 U.S. Dist. LEXIS 29334 at 9.

²¹ *Roseland*, 2006 U.S. Dist. LEXIS 29334 at 7-8.

²² CAL. CODE REGS. tit. 17 § 95973.

²³ CAL. CODE REGS. tit. 17 §§ 95940-42.

²⁴ *California, Quebec To Link CO₂ Markets This Year*, THOMSON REUTERS POINT CARBON (Jan. 13, 2013), <http://www.pointcarbon.com/news/1.1716584>.

²⁵ *Id.*

²⁶ *C.f. Ormet Corp. v. Ohio Power Co.*, 98 F.3d 799, 807 (4th Cir. 1996) (holding that emissions allowances under the Acid Rain Program should be treated like economic commodities and such treatment requires that their nature and interest holders be treated the same throughout the entire market).

²⁷ See U.S. CONST. art. I, § 8, cl. 3 ("[Congress shall have power] [t]o regulate Commerce with foreign Nations, and among the several States").

²⁸ See *Dennis v. Higgins*, 498 U.S. 439, 447 (1991) (stating that the Commerce Clause limits state laws which interfere with interstate commerce).

Endnotes: THE ABCS OF GOVERNING THE HIMALAYAS IN RESPONSE TO GLACIAL MELT: ATMOSPHERIC BROWN CLOUDS, BLACK CARBON, AND REGIONAL COOPERATION

continued from page 37

¹ MATS ERIKSSON ET AL., THE CHANGING HIMALAYAS – IMPACT OF CLIMATE CHANGE ON WATER RESOURCES AND LIVELIHOODS IN THE GREATER HIMALAYAS, INTERNATIONAL CENTER FOR INTEGRATED MOUNTAIN DEVELOPMENT 1-3 (2009), http://books.icimod.org/uploads/tmp/icimod-the_changing_himalayas.pdf.

² The terms "Greater Himalaya" and "Hindu Kush-Himalaya region" are often used interchangeably but somewhat inconsistently in various studies. The list of countries here includes all of those that fall within river basins whose sources originate in the mountains referenced above. MADHAV KARKI ET AL., REGIONAL ASSESSMENT FOR RIO+20: HINDU KUSH HIMALAYA AND SE ASIA PACIFIC MOUNTAINS, DRAFT FOR DISCUSSION, FROM RIO 1992 TO 2012 AND BEYOND: SUSTAINABLE MOUNTAIN DEVELOPMENT, HINDU KUSH HIMALAYA (HKH) REGION 9-10 (SEPT. 2011), [www.uncsd2012.org/rio20/content/documents/HKH_30_9_2011_0\[1\].pdf](http://www.uncsd2012.org/rio20/content/documents/HKH_30_9_2011_0[1].pdf).

³ AON BENFIELD, UCL HAZARD RESEARCH CENTRE, UNIVERSITY COLLEGE LONDON ET AL., THE WATERS OF THE THIRD POLE: SOURCES OF THREAT, SOURCES OF SURVIVAL 5 (Nina Behrman ed., 2010), <http://www.humanitarianfutures.org/sites/default/files/Waters%20of%20the%20Third%20Pole.pdf>.

⁴ MINISTRY OF ENV'T AND FORESTS, GOV'T OF INDIA, GOVERNANCE FOR SUSTAINING HIMALAYAN ECOSYSTEM: GUIDELINES AND BEST PRACTICES 10 (undated), http://gbpihed.gov.in/G-SHE_Book.pdf (last visited Apr. 26, 2012).

⁵ Shichang Kang et al., *Review of Climate and Cryospheric Change in the Tibetan Plateau*, 5 015101 ENVTL. RES. LETTERS 3 (2010), http://m.iopscience.iop.org/1748-9326/5/1/015101/pdf/1748-9326_5_1_015101.pdf.

⁶ ERIKSSON, *supra* note 1, at 2-3.

⁷ BENFIELD, *supra* note 3, at 8.

⁸ *Id.* at 5-7, 10. See also Eriksson, *supra* note 1, at 3-4.

⁹ *Id.* at 7-10.

¹⁰ *Id.* at 10-13.

¹¹ See, e.g., INSTITUTIONS AND ENVIRONMENTAL CHANGE: PRINCIPAL FINDINGS, APPLICATIONS, AND RESEARCH FRONTIERS, at xviii, xxi, 3-45 (Oran R. Young et al. eds., 2008) (defining "governance" as "[t]he process of steering or guiding societies toward collective outcomes that are socially desirable and away from those that are socially undesirable").

¹² R.V. Cruz et al., *Asia in CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY, CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE* 493 (M.L. Parry et al., eds., 2007) http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch10.html; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, IPCC STATEMENT ON THE MELTING OF HIMALAYAN GLACIERS (2010), <http://www.ipcc.ch/pdf/presentations/himalaya-statement-20january2010.pdf>.

¹³ Kang et al., *supra* note 5, at 3.

¹⁴ VEERABHADRAN RAMANATHAN ET AL., U.N. ENV'T PROGRAMME, ATMOSPHERIC BROWN CLOUDS: REGIONAL ASSESSMENT REPORT WITH FOCUS ON ASIA 26-27 (2008), <http://www.unep.org/pdf/ABCsummaryFinal.pdf>.