THE UTAH BIOPROSPECTING ACT OF 2010: (UNINTENTIONAL) STATE-LEVEL IMPLEMENTATION OF THE UNITED NATIONS CONVENTION ON BIODIVERSITY

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> To stay experimentation in things social and economic is a grave responsibility. Denial of the right to experiment may be fraught with serious consequences to the nation. It is one of the happy incidents of the federal system that a single courageous state may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country.[1]

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1. New State Ice Co. v. Liebmann, 285 U.S. 262, 311 (1932) (Brandeis, J., dissenting).

INTRODUCTION

Human beings have looked to nature for valuable products for millennia. Our ability to exploit biological resources has accelerated along with our fundamental understanding of the life sciences. Populations have similarly expanded exponentially along with demand for such products in markets of ever-increasing size and variety. Whether harvested directly from nature, or cultivated, living things are essential raw materials for biotechnology.[2] For example, "[a]ccording to . . . [the National Institutes of Health], more than [half] of the most prescribed medicines in the United States contain compounds derived from natural products."[3] Demand for biotechnology products comes mainly from the industrialized world. Corporations and governments alike have reaped the bounty of such advances, and as these markets have matured, inevitable conflicts have arisen. Among these disputes are assertions of inequitable resource exploitation by industrialized nations who fail to compensate less developed, yet biodiversity-rich nations where raw materials used to produce valuable biotechnology goods were first found.

Analogies between biological material extraction and other more traditional resources like minerals and fossil fuels have been made, but they fail to recognize the fundamentally different nature between the two. Likewise, intellectual property-based perspectives alone fail to recognize the desire of sovereign states to assert control over both physical resources and information derived from them. This lack of congruence among governing legal theories is just one example of many similar paradigmatic shifts that "occurred at the time of transition from an industrial to a post-industrial, or information . . . era . . . ."[4]

The United Nations (UN) seeks to holistically resolve bioprospecting disputes through the Convention on Biological Diversity (CBD). When a single plant sample, for example, taken from a remote habitat to a distant laboratory, results in a valuable biotechnology product, the CBD encourages the provision of some level of compensation to the source nation to recognize its sovereign rights over all of its resources and to encourage the conservation of biodiversity-rich regions. Inherent in this principal is a recognition that, but for the sovereign nation's permission to allow bioprospecting research in its territory, such important

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2. Chidi Oguamanam, *Beyond Theories: Intellectual Property Dynamics in the Global Knowledge Economy*, 9 WAKE FOREST INTELL. PROP. L.J. 104, 136 (2008-2009), *available at* http://ipjournal.law.wfu.edu/files/2009/09/article.9.104.pdf.

3. Corliss Karasov, *Who Reaps the Benefits of Biodiversity?*, ENVIRONMENTAL HEALTH PERSPECTIVES, Dec. 2001, at A582, *available at* http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.109-a582 ("And an even larger percentage of the world's people rely on natural products for their primary medicinal needs.").

4. Oguamanam, *supra* note 2, at 138.

biotechnology discoveries and subsequent profits would not be possible. The CBD does not dictate what form such compensation shall take, nor for how long, leaving it to contracting parties to enter into "equitable benefits sharing" agreements that further the goals of the treaty. "The hope of the drafters of the CBD is that, in the future, bioprospecting will also pay off for the source countries of natural products, the people who may one day benefit from as-yet undeveloped drugs, and the Earth itself, as agreements are put into place to protect its fragile and treasured resources."[5]

2010 was the "International Year of Biodiversity."[6] As concern over the health of the environment and its relation to the economy and climate change remains a pressing issue, leaders in industry and government increasingly recognize the value of preserving biodiversity. A biological resource whose potential goes untapped because of extinction risks great loss to all who might one day directly or indirectly benefit from it. Under the non-binding CBD, individual nations and bioprospecting research entities are free to develop contractual relations in their best interests, which have resulted in a number of long-term success stories. Although the United States has not yet ratified the CBD,[7] it has responded to concerns of bioprospecting-related issues on federal National Park lands through a well-developed system of laws and regulations providing for equitable benefits sharing Cooperative Research and Development Agreements (CRADA) that accomplish similar ends as the CBD.[8]

There are only two examples of state-level responses to perceived gaps in federal CBD treaty non-adoption. Hawaii attempted to enact a statute that draws more from the CBD than the National Park system regulations,[9] including the CBD's focus on respect for traditional knowledge of indigenous people.[10] The Hawaiian statute failed, in part

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5. Karasov, *supra* note 3, at A587.

6. 2010 International Year of Biodiversity, CONVENTION ON BIOLOGICAL DIVERSITY, http://www.cbd.int/2010/welcome/ (last visited Nov. 23, 2011).

7. List of Parties, CONVENTION ON BIOLOGICAL DIVERSITY, http://www.cbd.int/information/parties.shtml (last visited Nov. 23, 2011).

8. *See generally* KERRY TEN KATE ET AL., BENEFIT-SHARING CASE STUDY: YELLOWSTONE NATIONAL PARK AND THE DIVERSA CORPORATION (1998), *available at* http://www.cbd.int/doc/case-studies/abs/cs-abs-yellowstone.pdf.

9. *See* Kenneth R. Conklin, Ph.D, *Kahana Valley Giveaway - Just More of the Same*, HAWAII REPORTER (Feb. 5, 2009), http://www.angelfire.com/big09a/KahanaGiveawayToEvilEmpire.html (describing reintroduction of similar bill in Hawaii's legislature in 2009); Paul Elias, *Bioprospecting: Piracy in Paradise?*, THE SEATTLE TIMES (Jan. 23, 2006), http://community.seattletimes.nwsource.com/archive/?date=20060123&slug=btbiotech23; *Hawaii's Bold Bid For a Bioprospecting Bill*, SEEDLING, July 2004, at 23, *available at* http://www.grain.org/article/entries/428-hawaii-s-bold-bid-for-a-bioprospecting-bill.

10. Art. 8(j) - Traditional Knowledge, Innovations and Practices, CONVENTION ON BIOLOGICAL DIVERSITY, http://www.cbd.int/traditional/ (last visited Nov. 23, 2011).

due to its lack of sufficiently stringent benefits-sharing arrangements with the Hawaiian people.[11] Utah passed a similar law addressing bioprospecting on its state lands. The state saw an opportunity to proactively exert control over unique biological resources found in its territory, and in so doing, ensure that benefits of their present or future exploitation remain, at least in substantial part, with the state and its citizens. Both Utah's and Hawaii's efforts seem analogous to California's enactment of more stringent emissions standards that resemble the UN Kyoto Protocol, which, like the CBD, the U.S. has not adopted.[12]

The Utah Bioprospecting Act of 2010 is the first state law of its kind, and arose through the lobbying efforts of scientific experts within the state's universities and biotechnology industry. The legislative history of the Act reveals few, if any, considerations of the international bioprospecting experience under the CBD. The Act's history also does not consider the failed attempt by Hawaii to enact a similar statute. The Utah legislature does, however, recognize the related experiences of the federal government with bioprospecting agreements on National Park lands, which have resulted in a comprehensive body of law and regulations that accomplishes goals similar to those Utah seeks for its state lands. Unlike the CBD and Hawaii's failed statute, Utah's admittedly immature new statute strikes a purely economic tone and takes a simple and straightforward approach. It relies on a single administrative agency to enact rules and regulations pursuant to the statute. Given the global nature of biotechnology research and commerce, and the intangible characteristics of biotechnology information, Utah should give more consideration to the legal and policy landscape of the international bioprospecting experience, including the CBD, as it reshapes the statute and related rules through amendments.

I. THE UTAH BIOPROSPECTING ACT OF 2010

A. Overview of the Statutory Provisions

The Utah Bioprospecting Act passed with virtually no opposition on May 11, 2010.[13] It is the first state law of its kind in the United States, although it resembles other federal laws and international treaties in a

11. *See, e.g.*, *Bioprospectors Feel Backlash in Hawaii*, MSNBC.COM (Jan. 21, 2006), http://www.msnbc.msn.com/id/10945323/ns/technology_and_science-science.

12. *E.g.*, Robert Collier, *State Bypasses Kyoto, Fights Global Warming / California Tries To Cut Emissions on Its Own*, SAN FRANCISCO CHRONICLE, Feb. 17, 2005, at A1, *available at* http://articles.sfgate.com/2005-02-17/news/17362037_1_kyoto-protocol-warming-climate-change.

13. UTAH CODE ANN. §§ 65A-14-101, 201, 202, 301 (Supp. 7A 2011), *available at* http://le.utah.gov/~code/TITLE65A/65A14.htm.

number of ways. The law requires registration prior to state land bioprospecting activities, defined as "the removal from a natural environment for research or commercial use of a naturally occurring microorganism, plant, or fungus, or information concerning a naturally occurring microorganism's, plant's, or fungus' physical or genetic properties."[14] Registration grants bioprospectors a license and requires those parties to enter into a contract with the state of Utah.[15] In addition to the payment of a registration fee, bioprospectors provide identifying information, as well as a list of specific sites upon which the activity shall occur.[16] The license, if granted, lasts for a period of twelve months, and is renewable.[17]

The registration form stipulates that upon signing, and in consideration for a license to bioprospect on Utah state public lands, the registrant agrees "to negotiate in good faith," and acknowledges that Utah reserves rights to economic benefits derived from the registrant's current and future activities related to discoveries made on the subject lands listed in the contract.[18] The statute further provides that failure to register bioprospecting activities on lands falling within the jurisdiction of the Act, or, presumably, not abiding by the contractual registration terms, subjects a violator to civil and criminal penalties, including payment of restitution "proportional to the economic interests the state may have under [the Act]."[19]

Economic benefits reserved by the state of Utah under the Act are not explicitly defined in the language of the statute, and, instead, are left to administrative rulemaking by the Utah Department of Natural Resources (DNR).[20] The legislative history, however, is illustrative, and shows two main types of economic benefits that Utah seeks to "reserve" through the Bioprospecting Act.[21] In the event a valuable product or process derived from an organism found on Utah state public lands is commercialized, the state shall receive a reasonable royalty, determined from "good faith negotiations."[22]

The legislature readily analogized to extraction of minerals, fossil

14. § 65A-14-102.
15. *See* § 65A-14-202.
16. § 65A-14-201.
17. *Id.*
18. § 65A-14-202.
19. § 65A-14-301.
20. § 65A-14-104; *see* UTAH ADMIN. CODE r. 652-150 (2011), *available at* http://www.rules.utah.gov/publicat/code/r652/r652-150.htm (published May 15, 2011, the DNR bioprospecting regulations largely restate the statute).
21. *See, e.g.*, Lyle W. Hillyard, Part I, SB 51s1, audio, UTAH STATE LEGISLATURE (Mar. 1, 2010), http://le.utah.gov/asp/audio/index.asp?Sess=2010GS&Day=35& House=S (last visited Nov. 23, 2011).
22. UTAH CODE ANN. § 65A-14-202 (Supp. 7A 2011).

fuels, and many valuable products from the Great Salt Lake for bioprospecting royalties. Utah receives royalties from mineral extraction from all of its territory, including federally managed land.[23] In this regard, "Utah owns these resources" and the rationale for payment of royalties readily applies to products derived from living organisms.[24] Utah lawmakers thus saw an important opportunity to extend the long-established royalty system for traditional natural resources to biota-derived products in an analogous way.[25]

The second class of economic benefit that Utah seeks to "reserve" through the requirements of the Act is to ensure, to the extent possible, that research, development and commercialization of products derived from Utah organisms are carried out in the state of Utah, such that benefits thereof flow primarily to its citizens.[26] Reservation of such benefits derives from the assertion that Utah owns all of its unique resources, whether they are living or not.[27] The legislators acknowledged that their new statute is merely a framework to build upon through administrative rulemaking by the DNR and by subsequent amendments to the Act, which they anticipate within just one year.[28] Despite the admitted vagueness and skeletal nature of the bill, the legislature dubbed the Act "pioneering legislation," and "ahead of the game."[29]

B. Lobbying Activity Behind the Utah Bioprospecting Act

Just over a year before the enactment of the Utah Bioprospecting Act on May 11, 2010, the U.S. Department of the Interior canceled nearly one-hundred oil and gas leases on seven million acres of federal land issued via auction in the twilight of the Bush administration.[30] The new presidential administration in 2009 brought a "strong message that the

23. Utah Senate Natural Resources, Agriculture, and Environment Committee, Fri. Feb 12, 8:00 AM, audio, Agenda Item 1 - SB0051, UTAH STATE LEGISLATURE (Feb. 12, 2010), http://le.utah.gov/asp/Interim/Commit.asp?Year=2010&Com=SSTNAE (last visited Nov. 23, 2011) [hereinafter Agenda Item 1 - SB0051].

24. *Id.*

25. SB051S01, House day 42, audio, UTAH STATE LEGISLATURE, http://le.utah.gov/jsp/jdisplay/billaudio.jsp?sess=2010GS&bill=sb0051s01&Headers=true (last visited Nov. 23, 2011) (comparing bioprospecting in Utah to the gold rush).

26. Agenda Item 1 - SB0051, *supra* note 23.

27. *Id.*

28. *Id.*

29. *Id.*; Audio Recordings of Debates, Utah House Natural Resources, Agriculture, and Environment Committee, UTAH STATE LEGISLATURE (Mar. 2, 2010), http://le.utah.gov/~2010/htmdoc/sbillhtm/SB0051S01.htm (last visited Nov. 23, 2011) [hereinafter Mar. 2 House Debate] (praising in the face of faint concerns that the Act would stifle rather than encourage growth in target industry sectors consisted of a statement that the royalty requirement brings notoriety to Utah's already thriving biotechnology industry).

30. *Utah Wilderness Leases Halted*, ENVIRONMENTAL ENTREPRENEURS (Feb. 26, 2009), http://www.e2.org/jsp/controller?docId=17861&anchorName=UtahLeasesHalted.

management of the nation's public lands . . . will reflect a more balanced approach than was witnessed over the past eight years."[31] Thus, the legislative and lobbying activity leading up to the passage of the Act came on the heels of renewed regulation of federal lands on Utah territory, as well as during a relative boom in the biotechnology industry in the state.[32]

Amidst this political and economic climate, a consortium of Utah universities were making remarkable advances in understanding the commercial potential of various microorganisms from the Great Salt Lake and other "extreme" natural habitats.[33] Funded in substantial part by Utah taxpayers, this alternative energy and fossil fuel extraction research showed that organisms unique to Utah had great potential for profitable products and processes.[34] Although the policy rationale behind the Act is meant to extend in a general way to bioprospecting activities on Utah state lands,[35] the impetus behind the legislation derived from these research findings and was likely also driven by what many lawmakers viewed as the unfavorable cancellation of fossil fuel extraction leases in the recent past.[36]

This biofuel and fossil fuel extraction-related microbiology research took place on state lands including the Great Salt Lake, the desert salt flats, and arid basins rich in oil shale.[37] Several strains of salt lake algae were found to produce high levels of oils that may be more efficiently converted to biofuels.[38] These findings had already attracted a great deal of attention from the international scientific community, including biotechnology corporations.[39] Parallel discoveries of bacteria that thrive in high-salt habitats made the algae research even more exciting to concerns in Utah and elsewhere. According to the Committee findings, these organisms are also unique to Utah, and they can be integrated into industrial processes to aid in the efficient extraction of oil-based fuels from the algae by eating the plant material, thus releasing the valuable biofuel

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31. *Id.*; Juliet Eilperin, *Salazar Voids Drilling Leases On Public Lands in Utah*, WASH. POST., Feb. 5, 2009, at A2, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2009/02/04/AR2009020401785.html.

32. *Utah Wilderness Leases Halted*, *supra* note 30; EdcUTAH, *Another Biotech Company Expands to Utah*, UTAHPULSE.COM (Dec. 1, 2009), http://utahpulse.com/view/full_story/15736772/article-Another-Biotech-Company-Expands-to-Utah?.

33. Mar. 2 House Debate, *supra* note 29.

34. *Id.*; Hillyard, *supra* note 21.

35. Agenda Item 1 - SB0051, *supra* note 23 (pointing to past research activities within the state aimed at discovery of pharmaceutical compounds, which is a traditional goal of bioprospecting).

36. *Id.*; Mar. 2 House Debate, *supra* note 29; Hillyard, *supra* note 21; SB051S01, House day 42, audio, *supra* note 25; *Utah Wilderness Leases Halted*, *supra* note 30.

37. Mar. 2 House Debate, *supra* note 29; SB051S01, House day 42, audio, *supra* note 25.

38. Agenda Item 1 - SB0051, *supra* note 23.

39. *Id.*

components.[40] Another bacterium was discovered that feeds on oil shale deposits, liberating natural gas in the process and facilitating *in situ* extraction of fossil fuel.[41] These remarkable examples are not meant to exhaust the scope of the Utah Bioprospecting Act, but their timely relevance, given the recent federal lease cancellations and the high level of interest in alternative energy sources, undoubtedly contributed to the ease with which the bill passed and provided the legislature a renewed sense of pride and awe at the previously unknown natural wonders of oft-ignored expanses of their state.[42]

Another strong voice in support of the Act was the Utah Technology Council (UTC),[43] whose mission is to play "a transformative leadership role in the development and passage of legislation impacting Utah's life science economy."[44] In doing so, UTC points to the job creation, and tax and revenue contributions of Utah's technological industries, which not only benefit the state from within, but "also raise Utah's stature and competitive strength in the nation."[45] UTC boasts that it achieved all fifteen of its lobbying goals for 2010, and summarized the Act as follows after it was signed into law by the governor: The Act is "[d]esigned to strike an enlightened balance between research access to Utah's micro-organisms with protecting/preserving the value of the state's natural resources."[46]

UTC's summary of the Act comports, for the most part, with the legislative history. The licensing process is meant to be simple and non-burdensome, and the goal is "not to impede access, but to protect and utilize" the state's resources.[47] The bill's crafters were careful to point out their awareness of the need to "fine-tune" the Act through administrative rulemaking and statutory amendments.[48] They were wise to do so—although not clearly cited in the legislative history of the Act, a large body of federal and international law exists that addresses the subject matter of Utah's new law, as does extensive scholarly legal discourse.

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40. Mar. 2 House Debate, *supra* note 29.

41. Hillyard, *supra* note 21.

42. Agenda Item 1 - SB0051, *supra* note 23 ("[these] assets belong to the people of the State of Utah," and it "would be sad if others capitalized on Utah's research.").

43. UTAH TECHNOLOGY COUNCIL, UTC IN REVIEW (2010), *available at* http://74.63.134.79/getmedia/e404202d-f4fb-401e-96cc-d7e84aebee33/2010_annualreport.aspx.

44. Advocacy, UTAH TECHNOLOGY COUNCIL, http://utahtech.org/LifeScience/Advocacy.aspx (last visited Nov. 23, 2011).

45. Richard R. Nelson, *Legislative Priorities for Technology Industries–Achieving Utah's Most Critical Goals*, UTAH TECHNOLOGY COUNCIL (Apr. 1, 2010, 8:35 AM), http://utahtech.org/CleanTech/ArticleList/Articles/SingleArticle/Legislative-Priorities-for-Technology-Industries—.aspx.

46. UTAH TECHNOLOGY COUNCIL, *supra* note 43.

47. Agenda Item 1 - SB0051, *supra* note 23.

48. *Id.*

Given the uniqueness of the Act, Utah will be well-served to consider the successes and failures of such analogous laws. In addition to continuing such pioneering state lawmaking, Utah can and should draw valuable lessons from prior experiences of the federal and foreign governments, and the UN, in sovereign regulation and dispute resolution related to bioprospecting.

II. LESSONS TO BE DRAWN FROM NATIONAL AND INTERNATIONAL MODELS OF BIOPROSPECTING REGULATION

The Federal Technology Transfer Act of 1986[49] formed the basis of the Yellowstone-Diversa CRADA of 1998,[50] and the Utah Bioprospecting Act of 2010 seems to be modeled after it, rather than on Hawaii's failed 2004 effort to enact a similar statute.[51] Hawaii's bill drew much from the rationales behind the UN CBD[52] and Trade-Related Aspects of Intellectual Property Rights (TRIPS)[53] agreements.[54] The Utah approach, on the other hand, appears to be more narrowly tailored to the specific needs of the state, and unlike the Hawaii legislation and UN treaties, is based primarily on economic rationales.

Among the important factors that may account for the successful enactment of the Utah Bioprospecting Act, in contrast to the failed Hawaiian legislation, are that the biotechnology industry is well established in Utah.[55] Additionally, Utah's indigenous peoples are not as numerous relative to the overall state population compared to Hawaii,[56] and, alt-

49. 15 U.S.C. §§ 3701-3717 (1986); *see also* 16 U.S.C. § 5935 (1998).

50. KATE, *supra* note 8; Scott T. Preston, *The United States of America: The National Park Experience*, *in* ACCESSING BIODIVERSITY AND SHARING THE BENEFITS: LESSONS FROM IMPLEMENTING THE CONVENTION ON BIOLOGICAL DIVERSITY 177, 186 (Carrizosa, S. et al. eds., 2004).

51. PETER G. PAN, HAW. LEG. REF. BUR., BIOPROSPECTING: ISSUES AND POLICY CONSIDERATIONS (2006), *available at* http://hawaii.gov/lrb/rpts06/biocon.pdf; Eric Goldman, *Utah Passes Nation's First (?) Bioprospecting Regulation*, TECHNOLOGY & MARKETING LAW BLOG (Mar. 10, 2010, 10:50 AM), http://blog.ericgoldman.org/archives/2010/03/utah_passes_nat.htm.

52. *Id.*

53. Agreement on Trade-Related Aspects of Intellectual Property Rights, WORLD TRADE ORGANIZATION, *available at* http://www.wto.org/english/docs_e/legal_e/27-trips.pdf (last visited Nov. 23, 2011).

54. PAN, *supra* note 51.

55. BIOTECHNOLOGY INDUSTRY ORGANIZATION, BIO STATE BIOSCIENCES INITIATIVES 2010, UTAH PROFILE (2010), *available at* http://www.bio.org/sites/default/files/battelle2010/UTAH_profile.pdf.

56. *Compare* HAW. STATE DEPT. OF HEALTH, SPECIAL TABULATION FROM THE HAW. HEALTH SURVEY (2010), *available at* http://hawaii.gov/dbedt/info/economic/databook/2008-individual/01/ (24% of the overall population of HI are indigenous peoples), *with* U.S. CENSUS BUREAU, UTAH QUICK FACTS (2010), *available at* http://quickfacts.census.gov/qfd/states/49000.html (only 1-2% of Utah's population consists of indigenous peoples).

hough Hawaii is more biodiverse[57] and includes marine environments, Utah possesses a number of "extreme" environments which have historically been the focus of bioprospecting research. Although the Utah Act clearly excludes any consideration of indigenous peoples' rights regarding traditional knowledge, its general tone with respect to "equitable benefits sharing" and case-by-case contractual relations and informed consent closely tracks the framework of the CBD.

A. International Bioprospecting Regulatory Framework

International bioprospecting regulation frames the issue in a broad way, and aids in understanding the implications and policy rationales, as well as potential drawbacks, behind the Utah Bioprospecting Act. Just as nations around the world vary on so many levels, so too do the various circumstances in which bioprospecting activities, agreements, and disputes arise, which makes it difficult to formulate a one-size-fits-all set of policies.[58] Agreements made within the framework of the CBD recognize this, and attempt to balance the respective needs of contracting parties with their often imbalanced bargaining positions.[59]

More often than not, a commercial research concern from an industrialized nation enters into an agreement with a less developed, but more richly biodiverse nation's[60] government to bioprospect within its borders. Given the imbalance in target nations' ability to commercialize their own biodiversity into potentially highly valuable products, bioprospecting activities have been often viewed as constituting "biopiracy[,] . . . a unidirectional transfer of wealth and knowledge."[61] These concerns have been voiced through various international bodies, including the UN and its World Intellectual Property Organization (WIPO) and World Trade Organization (WTO), and the pressure exerted by mainly developing nations has resulted in at once a fairer and more equitable system, and a somewhat tattered set of alliances, regional pacts, and dispute-resolution authorities.[62] Given the general lack of harmonization, and the varied nature of disputes arising from case-specific agreements, bioprospecting regulations "remain an evolving and unsettled issue at the international level."[63]

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57. Goldman, *supra* note 51.

58. *See* Daniel Rettig, *In Search of Pirate's Treasure: The Control and Ownership of Genetic Resources in the Mesoamerican Barrier Reef System*, 37 U. MIAMI INTER-AM. L. REV. 261, 276 (2006).

59. *See id.* at 276-77.

60. *See* CHIDI OGUAMANAM, INTERNATIONAL LAW AND INDIGENOUS KNOWLEDGE: INTELLECTUAL PROPERTY, PLANT BIODIVERSITY, AND TRADITIONAL MEDICINE 6-12 (2006).

61. Oguamanam, *supra* note 2, at 136.

62. *See id.* at 147-48, 152.

63. Philippe Cullet & Jawahar Raja, *Intellectual Property Rights and Biodiversity Man-*

The CBD of 1992 was one of the first quasi-legal international frameworks to seek to balance commercial research access with responsible and incentivized[64] management and conservation, and provide fair remedies for bioprospecting disputes.[65] The CBD instructs leaders of nations that biodiversity possesses potentially more valuable and sustainable resources than timber and other raw materials, and that their interests, as well as those of all humanity who inhabit the "global ecology," are best served by avoiding "quick gains through [its] destruction."[66] Developing nations' concerns directly or tangentially addressed by the CBD include the perceived exploitation of biological resources by industrialized nations (i.e. biopiracy), "the propriety of granting intellectual property rights over living organisms, and technology transfer questions regarding technologies necessary to utilize biological resources."[67]

The CBD provides for informed consent of the nations targeted for bioprospecting, with the consent-granting authority arising from all nations' declared ability to assert sovereign property rights, and thus access control, over biological resources within their territorial borders.[68] In declaring and redefining such sovereign property rights, the CBD seeks to impart on nations engaged in bioprospecting agreements "equitable benefits sharing" in valid and enforceable contractual relations that encourage both access and responsible use, and the return to the country of origin of some fair measure of the subsequent value, if any, derived from the fruits of such research and commercialization.[69] In return, the product commercializer receives substantial value in the form of technology transfer, and intellectual property rights, if any.[70]

The CBD acknowledges the existence of well-developed international laws and governing bodies like WIPO for the granting of intellectual property rights, and related dispute resolution.[71] Although the treaty carries no enforcement authority, it urges signatories to comport the grant of such rights with core CBD objectives.[72] The gaps within provisions of the CBD with regard to details of the administration and regula-

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agement: The Case of India, *in* BIODIVERSITY AND CONSERVATION: INTERNATIONAL PERSPECTIVES 166, 167 (A Usha ed., 2007).

64. *See* Keith Aoki & Kennedy Luvai, *Reclaiming "Common Heritage" Treatment in the International Plant Genetic Resources Regime Complex*, 2007 MICH. ST. L. REV. 35, 47 (2007), *available at* http://www.msulawreview.org/PDFS/2007/1/Aoki.pdf.

65. *See* Cullet & Raja, *supra* note 63, at 169.

66. *See* Aoki & Luvai, *supra* note 64, at 47-48.

67. *Id.* at 48.

68. *See* Cullet & Raja, *supra* note 63, at 168-69.

69. *See id.* at 169.

70. *See* Graham Dutfield, *TRIPS-Related Aspects of Traditional Knowledge*, 33 CASE W. RES. J. INT'L L. 233, 260 (2001).

71. *See* Aoki & Luvai, *supra* note 64, at 49-50.

72. *See* Cullet & Raja, *supra* note 63, at 169 (CBD relies on WIPO for IP-policy-making and on WTO for enforcing IP rights).

tion of intellectual property rights derived from bioprospecting agreements were addressed by TRIPS in 1994.[73] Frustrated by a perceived inadequate level of protection of their economic interests by WIPO, the formerly primary international intellectual property rights policy maker, many industrialized nations led by the United States and the European Community heeded the call of their concerned industries to move such "negotiations . . . from WIPO to the GATT [(General Agreement on Tariffs and Trade)], leading to the adoption of the TRIPS."[74]

Intellectual property-dependent industries, particularly in the U.S., favored the stricter protection potentially available via GATT, as opposed to WIPO, which they believed would not address the negative impact on their global competitiveness due, in part, to patent infringement.[75] GATT conditioned membership in the WTO, with its attendant full access to industrialized markets, on acceptance of TRIPS and agreement to conform to international intellectual property law.[76] Since patent rights ensure fair competition, reasoned the GATT, under TRIPS, the general WTO goals of maintaining and enhancing global trade will be advanced.[77]

Since the Utah Bioprospecting Act of 2010 does not anticipate well-studied intellectual property-related disputes either in the U.S. or amongst nations, it suffers from many of the same drawbacks as does TRIPS in light of the CBD. Like those experiences, the Act in its current form relies on a case-by-case approach through specific contract and license drafting, and administrative rulemaking. The straightforward simplicity of the Act is desirable, however, and seems reliant on administrative rulemaking to fill in the gaps. Yet, considering the varied experiences resulting from this approach on the international stage, the lack of harmonization and unified statutory guidance may lead to more, not fewer, disputes. The apparently intentional vagueness of the Utah statute may lead to what are perceived as inequitable benefits sharing agreements as the state applies the new law in an ever more complex

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73. *See id.*

74. Laurence R. Helfer, *Regime Shifting: The TRIPs Agreement and New Dynamics of International Intellectual Property Lawmaking*, 29 YALE J. INT'L L. 1, 9 (2004), *available at* http://law.vanderbilt.edu/facultyresources/research/702full.pdf.

75. *See id.* at 19. *But see* Oguamanam, *supra* note 2, at 148 ("Akin to the connection which the United States made between intellectual property and trade which resulted in the co-optation of the WTO into the intellectual property equation, many developing countries have made similar connections between intellectual property and other sites and subject-matters of their collective socio-economic interests.").

76. *See* Helfer, *supra* note 74, at 19 (GATT 1994 also provided that WTO dispute resolution rulings, including TRIPS, shall be binding on all member states).

77. *See* Sergio Peña-Neira, *Balancing Rights and Obligations in Sharing Benefits from Natural Genetic Resources: International Legal Rules*, *in* BIODIVERSITY AND CONSERVATION: INTERNATIONAL PERSPECTIVES 15, 25 (A Usha ed., 2007).

global biotechnology economy. As it begins to revamp what is admittedly an immature and skeletal regulatory framework, Utah lawmakers should carefully consider the immense body of both positive and negative practical experiences, and how those experiences interact with the existing body of federal and international law.

B. Instructive International Bioprospecting Experiences

Prior to CBD, developing nations' genetic resources were collected "without compensating the communities and governments of the source countries where the products were found."[78] Many important pharmaceuticals, for example, developed from raw material collected in this way have yielded multi-million dollar drug products with little, if any, compensation or recognition of the source countries in the developing world.[79] Many nations have responded to such concerns with their own uniquely-tailored laws, and their experiences have been complicated as the international legal landscape has evolved over time.

The Indian Biological Diversity Act, for example, enacted after India ratified the CBD, needed to be amended following the WTO's imposition of TRIPS.[80] Like the new Utah statute, India's Act requires a licensing-like procedure predicated on disclosure of intent to engage in commercial bioprospecting research.[81] Likewise, the Indian Biodiversity Authority may contractually impose fees or royalties upon any commercial products derived from bioprospecting activities in India.[82] Unlike Utah's new law, however, the Indian Biological Diversity Act reserves for India the right to assert joint ownership over any Indian patents issued on the fruits of bioprospecting research.[83] The Indian Act, like Utah's statute, also seeks to reserve less direct, yet long-term, financial benefits such as technology transfer.[84] Although India conceded the ability to assert full patent ownership over bioprospecting-derived commercialization in order to maintain its WTO membership, it crafted regulations that attempt to balance the various interests involved while fulfilling the mandates of the CBD to the fullest extent possible.[85]

The WTO and the Indian government's responses to seemingly "irreconcilable objectives [within] . . . the global intellectual property rights regime . . . attempt[] to not upset the global legal order while simultane-

78. Karasov, *supra* note 3, at A582.
79. *Id.*
80. Cullet & Raja, *supra* note 63, at 173-74.
81. *Id.* at 174; Biological Diversity Act, 2002, No. 18, § 7, Acts of Parliament, 2003 (India) [hereinafter India Biological Diversity Act].
82. India Biological Diversity Act, § 6; Cullet & Raja, *supra* note 63, at 174.
83. Cullet & Raja, *supra* note 63, at 175.
84. *Id.* at 174; India Biological Diversity Act, § 21.
85. *Cf.* Cullet & Raja, *supra* note 63, at 181.

ously refusing to surrender the domestically significant currency of national interest."[86] Cases like India's successful nullification of a U.S. Patent on a widely used traditional turmeric remedy[87] illustrate problems arising from the lack of international harmonization of bioprospecting and related intellectual property regulations, and represent the aggressive new stances of foreign governments asserting obscure traditional knowledge as prior art.[88] This was also an early example of how the interests of sovereign states are accommodated by WTO arbitration under various national laws and the CBD in the global economy context.[89]

Given the global nature of the biotechnology economy, it is only a matter of time before such disputes arise over Utah's assertion of its new Bioprospecting Act, and their resolution will obligatorily involve application of TRIPS and WTO-mediation, as well as possible federal preemption-based challenges to the validity of the law itself.[90] Future amendments to the Act should anticipate and address these considerations so as to prevent anti-competitive consequences that may tend to work the reverse of the Utah legislature's asserted policy goals.

Commentators argue that bioprospecting benefits-sharing arrangements between researchers and governments should seek to harmonize the often competing provisions of national-level law, TRIPS, and the CBD.[91] The relation of this view to Utah's approach on the subject is readily apparent. Through such contractual, and informed consent-based approaches, all interests that have contributed to a successfully launched bioprospecting product may be recognized, either through direct payment, or through other intangible forms of reward.[92] By understanding the interplay amongst competing laws and policies in an increasingly intertwined global economy, disputes such as the Indian-US turmeric patent case may be avoided.[93] Such an approach will help ensure the survival and influence of the new Utah Act.

Not all bioprospecting issues have been as contentious as the Indian turmeric experience, and via the CBD, a number of innovative and mutually beneficial bioprospecting agreements have been struck.[94] One nota-

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86. *Id.* at 184.

87. *Id.* at 183.

88. *Contra* Vandana Shiva, *The Turmeric Patent Is Just the First Step In Stopping Biopiracy*, THIRD WORLD NETWORK, No. 86, Oct. 1997, *available at* http://www.twnside.org.sg/title/tur-cn.htm.

89. *Id.*

90. *See, e.g.*, Compco Corp. v. Day-Brite Lighting, Inc., 376 U.S. 234, 237-38 (1964) (Utah's attempt to make exclusive license-like contracts for bioprospecting-derived technology may be problematic, especially where the technology is not patent-eligible); *see also infra* Part IV.

91. *See, e.g.*, Peña-Neira, *supra* note 77, at 19.

92. *Id.* at 15.

93. *Cf. id.* at 20.

94. Karasov, *supra* note 3, at A584.

ble success story that carried out the goals of the CBD was a collaboration between the pharmaceutical firm Merck & Co. and the private, nonprofit Instituto Nacional de Biodiversidad (INBio) in Costa Rica.[95] The agreement provided that, in exchange for access to Costa Rican habitat for commercial bioprospecting research, Merck would follow INBio-prescribed non-invasive collection methods, and provide funding for local initiatives, including conservation, educational and technology transfer projects.[96] "Merck also agreed to pay royalties to INBio for any commercial products that might result from the arrangement."[97] The Costa Rican government's cooperation was crucial to enact the necessary laws to effect the goals of the arrangement and ensure the realization of benefits by the local community.[98]

Similar themes are found in various balanced, responsible, and forward-thinking bioprospecting agreements under the International Cooperative Biodiversity Groups Program (ICBG).[99] The goals of these U.S.-funded industry partnerships echo, in part, the CBD:

> [T]o improve human health through the discovery of new pharmaceutical[s] . . . to treat diseases of importance in both developed and developing countries[,] . . . to promote scientific and economic activity in less-developed countries by sharing the benefits of drug discovery and conservation, research processes and products[; a]nd . . . to conserve [bio]diversity through the understanding and valuation of diverse biologic organisms and the development of local capacity to manage these resources.[100]

Although some local factions expressed dismay over the patenting of a product derived from one of their staple crops,[101] the Peruvian ICBG project addressed "all of the salient points listed above, and provide[d] for equitable benefit sharing through monetary and technological transfer as well as the retaining of local ownership through jointly owned patents on

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95. *Id.*

96. *Id.*

97. *Id.*

98. *Id.* ("[T]he willingness and ability of a host country to implement bioprospecting agreements is a central factor in the success or failure of any such agreement.").

99. Rettig, *supra* note 58, at 278.

100. Karasov, *supra* note 3, at A584-A585; *see also* INTERNATIONAL COOPERATIVE BIODIVERSITY GROUPS (ICBG), http://www.icbg.org.

101. *See* Sivashree Sundaram, Comment, *Battling Bills, Beans, and Biopiracy*, 15 ALB. L.J. SCI. & TECH. 545, 557, 563 (2005) (citing *Peruvian Farmers and Indigenous People Denounce Maca Patents*, ETC GROUP (July 3, 2002), http://www.etcgroup.org/upload/publication/194/01/macafinal1.pdf); *see also* Camila Carneiro Dias Rigolin, *North-South, Public-Private Partnerships for Biodiversity Protection: Two Cases From Peru*, at 5, 2010 CONGRESS OF THE LATIN AMERICAN STUDIES ASSOCIATION (Oct. 8, 2010), *available at* http://lasa.international.pitt.edu/members/congress-papers/lasa2010/files/3404.pdf.

newly discovered compounds."[102] Initially, the Peru-ICBG agreement provided for up to 75% of royalties on any commercialized products to be paid to the Peruvian people,[103] but following the patenting of an extraction method of the purported aphrodisiac maca by a U.S. company, this promise remains to be fulfilled.[104]

Indigenous groups may also fear loss of access to their own traditional knowledge if drug companies are allowed to take out patents on it.[105] One highly publicized dispute in Mexico derailed an ICBG team researching traditional Mayan healer remedies.[106] "Such rights continue to be a major obstacle to resolving bioprospecting conflicts,"[107] but should not pose an immediate problem for the implementation of the new Utah Bioprospecting Act.

A non-ICBG mediated bioprospecting project in Panama was headed up by a team of scientists from the University of Utah,[108] one of the major lobbying forces behind the Utah Bioprospecting Act of 2010. Panama achieved multi-tiered retention of commercialization benefits while preventing overly protective and anti-competitive practices.[109] Panama's policies recognize that, although a small percentage of bioprospecting research results in valuable products, meaningful and lasting benefits materialize through intelligent policy-making, including education, conservation, and recognition of the local expertise which is often key to any important discovery.[110] Such success in highly biodiverse tropical nations can shed light on additional policy considerations for Utah to consider for amendments and rulemaking under the Bioprospecting Act. Like Panama, Utah can formulate regulations in specific ways to best suit its unique circumstances, and incentivize interested parties spanning businesses to environmental activists.

Furthermore, such successful policies incentivize preservation of biodiversity-rich lands, and legitimize the activism of the developed world by impressing upon governments and peoples of developing nations that working "to conserve [biodiversity for] . . . nondestructive industries such as bioprospecting, ecotourism and watershed protection

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102. Rettig, *supra* note 58, at 278.

103. *Id.*

104. *See* Carneiro Dias Rigolin, *supra* note 101, at 6.

105. Karasov, *supra* note 3, at A586.

106. *Id.*

107. *Id.*

108. *A Realistic Way to Save Rain Forests*, UNIV. OF UTAH NEWS CENTER (Oct. 1, 2003), http://www.web.utah.edu/news/releases/03/sep/medplant.html (Surprisingly, these scientists' experiences in Panama were not explicitly cited in the legislative history of the new Utah Act.).

109. Don Winner, *Bioprospecting Not Biopiracy*, PANAMA-GUIDE.COM (Dec. 7, 2006, 8;10 PM), http://panama-guide.com/article.php/20061207201056808.

110. *Id.*

provide[s] greater economic benefits than logging and ranching."[111] The local experts understand the slow process of discovery to commercialization, and through relatively modest investments, a sustainable local industry may grow which provides jobs and a renewed sense of national pride.[112] Panama's policies, for example, also eliminated uncertainties over royalties from any commercialization resulting from bioprospecting research.[113] The stable partnerships and international collaborations lend certainty in this context to what have often been unsettled practices under the regimes of the UN and WIPO.[114]

Another ongoing success story is the Natural Products Unit of the University of the South Pacific in Fiji. Close collaboration with universities and scientific agencies enables advanced training, bioprospecting research, and defined intellectual property sharing arrangements of commercialized products.[115] The University succeeded in patenting a chemical extract and entering a compound in registered clinical trials in the U.S. for the important antibiotic resistant bacterial infection indication.[116] Other Southern Pacific nations have followed Fiji's lead.[117] As regional pacts, such nations may develop policies that are more customized to their socioeconomic needs, yet keep to the spirit of multinational cooperation under the auspices of WIPO and the WTO.[118] Through "careful attention . . . to crafting solutions to problems within the context they will operate, instead of merely copying a foreign system," they seek to formulate better-suited policies that are not "predicated upon a highly developed, literate and bureaucratic society with a strong State to administer and enforce law."[119] This spirit is evident in the legislative history behind the Utah Bioprospecting Act, but the state must proceed with care from a more informed perspective to ensure the ultimate success of the new statute.

C. TRIPS Falls Short of Its Goals in Combination with the CBD

While TRIPS seeks to standardize the scope of patent protection

111. UNIV. OF UTAH NEWS CENTER, *supra* note 108.

112. *Id.*

113. *Id.*

114. *Id.*

115. Overseas Collaboration, UNIV. OF THE SOUTH PACIFIC, INST. OF APPLIED SCIENCE, http://www.usp.ac.fj/index.php?id=4851 (last visited Nov. 23, 2011); Drug Discovery Unit, UNIV. OF THE SOUTH PACIFIC, INST. OF APPLIED SCIENCE, http://www.usp.ac.fj/index.php?id=2781 (last visited Nov. 23, 2011).

116. *Id.*; Maneesha Karan, *Chemical Discovery*, THE FIJI TIMES ONLINE (Aug. 14, 2009), http://www.fijitimes.com/story.aspx?ref=archive&id=127328.

117. *See* Miranda Forsyth, *Intellectual Property Laws in the South Pacific: Friend or Foe?*, 7 J. S. PAC. L. 1 (2003), *available at* http://www.paclii.org/journals/fJSPL/vol07no1/8.shtml.

118. *See id.*

119. *See id.*

over products of bioprospecting research to WTO nations, it does not directly address the CBD's core purpose of sustainable development, and thus has generated substantial controversy and conflict.[120] Nevertheless, "TRIPS is the single most authoritative international instrument on intellectual property."[121] Yet, despite widespread adoption of the CBD, tensions between the developing world and industrialized nations have continued.[122] One point of fault cited in these debates is the lack of a comprehensive intellectual property framework in the CBD.[123] The lack of harmonization has resulted in a widely disparate and inefficient array of interpretations by individual nations, yet has also forced intelligent debate and led to efficient multinational collaborative efforts,[124] as in the aforementioned examples.

Many in the international community criticize the U.S.'s continued influence over enforcement of TRIPS in light of its continued refusal to adopt the CBD.[125] The non-binding Bonn Guidelines of 2002 have urged CBD signatories to resolve tensions between their regimes with TRIPS by harmonizing equitable benefits sharing with private patent rights to comply with the standards of WTO membership.[126] Although not explicitly stated in the legislative history, Utah's Bioprospecting Act seeks to accomplish this via informed consent licensure and case-specific contracts. In this respect, the Utah statute resembles those aspects of the CBD that are purely economic in scope, in keeping with the spirit of the Bonn Guidelines.

The continued debate illustrates how the imposition of a universal set of intellectual property and related trade regulations required for WTO membership fails to take into account the peculiar needs and specific interests of particular nations.[127] Analogous concerns seem to undergird state lawmaking initiatives such as California's Kyoto Protocol-like emissions standards and Utah's Bioprospecting Act. Although the Utah Bioprospecting Act and California's initiative are based on very different policy rationales than developing countries' issues, they both seek to provide narrowly tailored regulatory solutions to what the two states see as important problems that remain under-addressed at the fed-

120. *See* Cullet & Raja, *supra* note 63, at 171-72.

121. Oguamanam, *supra* note 2, at 138.

122. *See id.* at 140 (citing Peter Drahos & John Braithwaite, *Hegemony Based on Knowledge, The Role of Intellectual Property*, 21 LAW IN CONTEXT 204, 214 (2004)); *see also* Tshimanga Kongolo & Folarin Shyllon, *Panorama of the Most Controversial IP Issues in Developing Countries*, 26 EUR. INTELL. PROP. REV. 258, 259 (2004).

123. Peña-Neira, *supra* note 77, at 20-21.

124. *See* Cullet & Raja, *supra* note 63, at 167.

125. Oguamanam, *supra* note 2, at 147 (what some call the U.S.'s "hegemony over the operation of the GKE [(global knowledge economy)]").

126. Peña-Neira, *supra* note 77, at 21.

127. Oguamanam, *supra* note 2, at 150.

eral level. In this regard, Utah appears to have unintentionally engaged in back door implementation of the CBD.

D. History and Current State of Bioprospecting Regulations in the United States

Besides not adopting the CBD,[128] the lack of comprehensive bioprospecting regulation in the U.S. has been criticized as being "even more in arrears, with virtually no program to determine either access or uses beyond that found in traditional food and drug laws."[129] This statement is now at least partly inaccurate as a number of federal statutes and regulations exist which address bioprospecting issues, and two states have taken similar measures, albeit with limited success.

For-profit commercialization of bioprospecting research is encouraged by the U.S. government, yet the lack of uniformity amongst state and federal regulations in this sphere contributes to significant opposition.[130] Beginning with the passage of the Bayh-Dole Act of 1980,[131] which enabled private researchers to maintain full ownership and licensing authority of publically-funded commercialization, tensions arose between those who believed privatization of state-funded research would lead to accelerated innovation and those concerned with the impact of intellectual property licensing and ownership rights on free knowledge sharing.[132] Such concerns have largely dissipated since the passage of the Bayh-Dole Act, and the consensus in the U.S. is that such privatization has blossomed into a more collaborative environment that has enhanced innovation in general.[133]

In the context of bioprospecting research commercialization, the concerns voiced after the Bayh-Dole Act have matured as the law of patentable subject matter has developed along with the underlying understanding of genetic science.[134] Unlike the scientific community, whose expertise enables commercialization of biosprospecting research, regulations operate in the more multifaceted public sphere and consider a wider

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128. Emily Holding, *While the World Waits: The United States' 18-Year Saga Toward Addressing Biodiversity Loss*, SAN DIEGO NEWS ROOM (Mar. 24, 2010), http://www.sandiegonewsroom.org/news/index.php?option=com_content&view=article&id=42095:emily-holding-&catid=43:wildlife&Itemid=59.

129. Oliver A. Houck, *Environmental Law in Cuba*, 16 J. LAND USE & ENVT'L L. 1, 48 (2000), *available at* http://www.law.fsu.edu/journals/landuse/vol161/houck.pdf.

130. Meghan M. Overgaard, Note, *Balancing the Interests of Researchers and Donors in the Commercial Scientific Research Marketplace*, 74 BROOK. L. REV. 1473, 1472-74 (2009).

131. Bayh-Dole Act of 1980, Pub. L. No. 96-517, 94 Stat. 3015-28 (codified as amended at 35 U.S.C. §§ 200-212 (2000 & Supp. II 2002).

132. Overgaard, *supra* note 130, at 1474-76.

133. *Id.* at 1477.

134. *Cf. id.* at 1479-80.

array of viewpoints in their development.[135] Patenting genes and useful natural products discovered from preexisting life forms through bioprospecting research seems unfair to many on a variety of grounds, and, as discussed above in the context of the CBD and TRIPS, regulations and the courts have not adequately addressed many of these remaining concerns.[136] The current state of affairs may be due to the prevailing view that commercialization of bioprospecting research has been validated since the Bayh-Doyle Act, and so commercialization-hindering concerns should be tabled unless absolutely necessary.[137]

Hawaii commissioned an extensive study, and introduced legislation that would mimic the CBD, whose policy initiative was to promote the conservation, and responsible use of natural resources in the interest of the collective peoples of the oceanic state.[138] Even if the U.S. eventually adopted the CBD, Hawaii reasoned, that treaty's reliance on voluntary compliance would likely be insufficient to promote the asserted policy goals of the proposed law.[139] The thought process of the Hawaii Legislature echoes that which led to the UN CBD:

> The Legislature is faced with the decision whether to regulate bioprospecting in Hawaii and who, including native Hawaiians, should share in the benefits. At present, it is the opinion of the Attorney General that the State does not automatically hold title to the genetic material derived from biodiversity taken from public lands. The Attorney General further opines that, at present, revenues from the sale of that genetic material do not qualify for transfer into the Ceded Lands Trust Account to be distributed by the Office of Hawaiian Affairs for the benefit of native Hawaiians. Thus, if the Legislature desires to regulate bioprospecting, it needs to ensure that the State retains title to share in benefits. It must also decide whether native Hawaiians should share in benefits, how, and how much.[140]

Among the primary purposes behind the commissioning of the aforementioned study was to formulate responsible policies, laws, and regulations to effect the "fair and equitable sharing of benefits arising from the research, indigenous knowledge, intellectual property, or application of biological resources . . . in a way that will be environmentally sustainable, culturally sensitive, economically feasible, and mutually beneficial to all the People of the state."[141]

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135. *Id.*
136. *Cf. id.*
137. *Id.* at 1480.
138. PAN, *supra* note 51.
139. *Id.*
140. *Id.* at iv.
141. H.R. Con. Res. 146 H.D. 1, 23d Leg. (Haw. 2005).

Much like the Utah Bioprospecting Act of 2010, the policy goals were to be applicable to public land "resources held in trust by the State."[142] But, the Hawaiian bill and the Utah Act differ in important ways. For Hawaii, the policy tone places more weight on fiduciary trust obligations and duties more than on assertion of sovereign control over its territory. These differences are, at least in part, due to the Hawaii state constitution's consideration of indigenous peoples' rights more than any other state's.[143]

On the federal level, bioprospecting regulations are in place for National Park lands. Prior to the biotechnology age, Yellowstone National Park fascinated scientists with its astounding biodiversity, with little, if any, interest in extracting and commercializing valuable products from its varied habitats.[144] The CRADA with Diversa[145] stipulates that commercialization of research discoveries from within Yellowstone shall be shared with park managers and augment other funding for park conservation.[146] The CRADA was challenged by environmental groups, but was upheld as a legitimate federal mandate.[147] The *Edmonds Institute* court also cited the Congressional intent behind related National Park System "equitable, efficient benefits-sharing arrangement[s],"[148] using language that unmistakably mimics core principles of the CBD. Like many of the success stories on the international stage, the Yellowstone-Diversa CRADA was praised as an intelligent and well-reasoned solution to balancing the competing interests involved and prompted additional policy-centered inquiry on the feasibility of such agreements throughout the National Parks.[149]

There is an emerging trend whereby individual states, most notably California in the context of the Kyoto protocol, have effectively adopted the standards of un-ratified UN treaties into their own regulatory structures. In doing so, states may chart what they deem to be a better course in a race toward efficiency rather than a race to the bottom.[150] Like Ha-

142. *Id.*; *see* HAW. CONST., art. XI, § 1.

143. *See, e.g.*, HAW. CONST., art. XVI, § 7, art. XII, § 4.

144. *See generally* Holly Doremus, *Nature, Knowledge and Profit: The Yellowstone Bioprospecting Controversy and the Core Purposes of America's National Parks*, 26 ECOLOGY L.Q. 401 (1999), *available at* http://www.nationalaglawcenter.org/assets/bibarticles/doremus_nature1.pdf.

145. Diversa (now Verenium) is a U.S.-based biotechnology corporation engaged in bioprospecting research across the globe. *See* VERENIUM, http://www.verenium.com (last visited Nov. 23, 2011).

146. *See* Bruce Gourley, *Protecting Yellowstone*, YELLOWSTONE NET NEWSPAPER (Apr. 24, 2000), http://www.yellowstone.net/newspaper/2000/news042400.htm.

147. *See* Edmonds Inst. v. Babbitt, 93 F. Supp. 2d 63 (D.C. Cir. 2000); *see also id.*

148. *See Edmonds Inst.*, 93 F. Supp. 2d at 69; *see also* Gourley, *supra* note 146.

149. Gourley, *supra* note 146.

150. *Cf.* Peter P. Swire, *The Race to Laxity, The Race to Efficiency, and the Central Role of Public Choice in Justifying Federal Minimum Standards in Environmental Law*, 14 YALE J.

waii's attempt, Utah appears to be following this trend with its Bioprospecting Act of 2010, whose equitable benefits-sharing and informed consent licensing regimes mimic much of the CBD.

III. RELATIONSHIPS AND POTENTIAL CONFLICTS BETWEEN THE UTAH BIOPROSPECTING ACT, PREEMPTION BY FEDERAL LAW, AND THE U.S. CONSTITUTION

The legislative history behind the Utah Bioprospecting Act of 2010 is silent on potential constitutional difficulties and preemption by federal laws. Such issues will be born out in time, but the Utah Legislature should proactively consider such relationships and potential conflicts between its new statute and various federal laws as it continues to fine-tune the new law.

State laws are subject to invalidation under the Dormant Commerce Clause if they directly regulate interstate commerce, discriminate against interstate commerce, or favor in-state over out-of-state economic interests.[151] Such facially discriminatory statutes face strict "scrutiny of any purported legitimate local purpose and of the absence of nondiscriminatory alternatives."[152] If the statute is deemed not facially discriminatory to interstate commerce, the *Pike* balancing test applies, which analyzes whether the law "regulates even-handedly to effectuate a legitimate local public interest," and only incidentally affects interstate commerce, with no clearly excessive burden on such commerce given the asserted local interest furthered.[153]

The Utah Act seeks to preserve for the benefit of its citizens a portion of the tangible or intangible rewards of any commercialization of bioprospecting research on its state lands. Utah can expect that researchers may come from both within and outside the state, or from other nations. As is often the case, after the bioprospecting samples are taken from the environment, the bulk of the commercialization activities may take place outside the state. This is just one example of where potential Dormant Commerce Clause issues loom, which seem to be wholly unaddressed in the Utah Bioprospecting Act and its legislative history.

In the face of a Dormant Commerce Clause challenge on this issue, for example, Utah may assert that, but for bioprospecting access on its sovereign lands, the extraterritorial commerce activities would not be possible. The Act's licensing and contractual equitable benefits sharing provisions may themselves possibly be considered as embodying a form of interstate commerce, especially if the licensing contract specifies that

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ON REG. 67, 94-104 (1996).

151. *See, e.g.*, Oregon Waste Sys., Inc. v. Dep't of Envtl. Quality, 511 U.S. 93, 99 (1994).

152. Hughes v. Oklahoma, 441 U.S. 322, 337 (1979).

153. Pike v. Bruce Church, Inc., 397 U.S. 137, 142 (1970).

a portion of the commercialization must occur in the state of Utah. Where the licensed commercializing entity is within Utah or in another state, and entities in other states are not provided a license on a similar research project, the Act may arguably be said to facially discriminate against interstate commerce. The new law is silent on whether bioprospecting licenses will be exclusive or not, which is an important consideration regarding preemption by federal patent law.[154]

Concerns like these need to be addressed to assure the Act's success, for the regime is largely silent on such issues. Furthermore, although the Utah Bioprospecting Act has a general sweep, the legislative history makes clear that it is largely a protectionist measure intended to help Utah's academic and industry interests capitalize on fledging biotechnologies related to advancing alternative energy production. This is both a local and a national/interstate interest.[155] The same rationale arguably applies when considering bioprospecting research's application to medicine, food, and other areas of pervasively national import.

If Utah intends that bioprospecting licenses be exclusive to a given species or area, then the Act may also face challenges under the *Pike* balancing test since it could be said that the law does not "regulate[] evenhandedly to effectuate a legitimate local public interest," and thus has more than an incidental effect on interstate commerce.[156] However, the licensing scheme controls conduct on state land, much like states control campfires, logging, fishing, and archeological excavation on their lands. Thus, preemption by federal law may not be strongly implicated on the level of controlling removal of bioprospecting samples from state lands. Like ensuring sustainable local economic growth, these are "legitimate local concern[s]" that are within states' police powers to regulate, despite incidental effects on interstate commerce.[157] However, the Utah Bioprospecting Act's asserted control over removal of "information" about biological resources on its state lands will likely face preemption problems absent further fine-tuning of the statute.

A recent Federal Circuit decision collected and applied various U.S.

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154. *See supra* note 90 and accompanying text.

155. *See, e.g.*, Stephanie Dreyer, *Military Leaders Say Biofuels Key to Strengthening National Security*, RENEWABLEENERGYWORLD.COM (Nov. 8, 2011), http://www.renewableenergyworld.com/rea/blog/post/2011/11/military-leaders-say-biofuels-key-to-strengthening-national-security; Aaron Smith, *United Enters the Biofuel Age*, CNNMONEY (Nov. 7, 2011), http://money.cnn.com/2011/11/07/news/companies/airline_united_biofuel/index.htm; Alex Morales & Louise Downing, *Military Eyes Biofuels, But Wants to See Prices Drop*, KANSAS.COM (Oct. 30, 2011), http://www.kansas.com/2011/10/30/2083166/military-eyes-biofuels-but-wants.html; *Military Biofuel Use Takes Another Step*, WESTERNFARMPRESS (Aug. 31, 2011), http://westernfarmpress.com/government/military-biofuel-use-takes-another-step.

156. *Pike*, 397 U.S. at 142.

157. Lewis v. BT Inv. Managers, Inc., 447 U.S. 27, 36 (1980).

Supreme Court precedents on preemption of state statutes by the federal patent laws in the context of the District of Columbia's attempt to closely regulate the price of patented prescription drugs in its territory.[158] In keeping with established precedent,[159] the court invalidated the District's Excessive Pricing Act as preempted by federal law because it was not generally applicable to all drugs, patented or not,[160] and upset the balance of federal patent protection:[161]

> It is unquestioned that the [states] ha[ve] general police power within [their] borders and that '[w]hatever rights are secured to inventors must be enjoyed in subordination to this general authority of the State over all property within its limits,'[162] But general state power must yield to specific Congressional enactment: 'any state law, however clearly within a State's acknowledged power, which interferes with or is contrary to federal law, must yield.'[163]

Like the Excessive Pricing Act, the Utah Bioprospecting Act asserts the state interest of internal economic well-being, along with unstated goals of understanding, harnessing, and conserving biodiversity. Utah should elevate those latter concerns to the level of the former, like the CBD does, to address both Dormant Commerce Clause and federal preemption concerns.

Utah's asserted control over "information" derived from bioprospecting research on its state lands poses perhaps the most problematic constitutional and preemption concerns. "Information" sounds much more like intellectual property than does "access" to bioprospecting samples. The statute only vaguely defines what "information" means for purposes of the Act, stating it covers "naturally occurring microorganism's, plant's, or fungus' physical or genetic proper-

158. Biotechnology Indus. Org. v. District of Columbia, 496 F.3d 1362, 1366 (Fed. Cir. 2007).

159. *See, e.g.*, Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141 (1989); Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470 (1974); Compco Corp. v. Day-Brite Lighting, Inc., 376 U.S. 234 (1964); Sears, Roebuck & Co. v. Stiffel Co., 376 U.S. 225 (1964); *see also* Christopher Lea Lockwood, *Biotechnology Industry Organization v. District of Columbia: A Preemptive Strike Against State Price Restrictions on Prescription Pharmaceuticals*, 19 ALB. L.J. SCI. & TECH. 143 (2009), *available at* http://www.albanylawjournal.org/articles/Lockwood_Format_DPL.pdf (synthesizing these and other important decisions, and concluding that most, if not all cases of preemption of state laws like the Excessive Pricing Act will arise out of conflict preemption).

160. *Biotechnology Indus. Org.*, 496 F.3d at 1373.

161. *Id.* at 1373-74; *Bonito Boats*, 489 U.S. at 152; *see also* Lockwood, *supra* note 159.

162. *Biotechnology Indus. Org.*, 496 F.3d at 1373 (quoting Webber v. Virginia, 103 U.S. 344, 348 (1880)).

163. *Id.* (citing Felder v. Casey, 487 U.S. 131, 138 (1988) (quoting Free v. Bland, 369 U.S. 663, 666 (1962))).

ties."[164] States are not forbidden to regulate intellectual property,[165] but may do so only in "a manner not inconsistent with [f]ederal law."[166] A state law preventing copying what is already in the public domain "interfere[s] with the federal policy . . . of allowing free access to copy whatever the federal patent [] laws leave in the public domain."[167] This begs the question of how much, from whom, and for how long Utah may contractually reserve benefits of any commercialized bioprospecting research conducted under a license, which in turn depends partly on how such "information" shall be treated by the parties to the licensing contract, and whether the bioprospecting licenses are exclusive or nonexclusive.

Aronson v. Quick Point Pencil Co. provides some support for the licensing provisions of the Utah Bioprospecting Act in that the state may contract for a royalty-like benefits sharing arrangement prior to the patenting of the commercialized bioprospecting research, and maintain that royalty if a product materializes yet does not gain patent protection.[168] Should a patent issue on a product of such research, however, Utah's reservation of royalties could not survive the patent term expiration and subsequent return of the invention to the public domain.[169] In the interim, the consideration for the license, apart from access to state land to sample the environment, appears to be the maintenance of trade secrecy under state law.[170]

This scenario assumes that the "information" license is exclusive, but the "access" license may not have to be since any organism could conceivably give rise to a variety of unrelated products. Furthermore, a given organism found on Utah state lands may be found on neighboring private or federal lands, upon which a researcher could shop around for more favorable licensing terms. Thus, it seems that Utah's Act will function as intended only in those instances where an organism is truly found only on state lands, and nowhere else. This is not inconceivable considering bioprospecting discoveries in Yellowstone and the Great Salt Lake,

164. UTAH CODE ANN. §§ 65A-14-102(1)(a)(ii) (Supp. 7A 2011); *see* Goldman, *supra* note 51 (noting that a literal reading of the statute would prevent one from selling a photograph taken of a plant on Utah state lands).

165. Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 479 (1974).

166. Aronson v. Quick Point Pencil Co., 440 U.S. 257, 262 (1979) (citing *id.*).

167. Compco Corp. v. Day-Brite Lighting, Inc., 376 U.S. 234, 237 (1964).

168. *See Aronson*, 440 U.S. at 263-66.

169. *See id.* (that portion of *Aronson* may not apply to reserved "intangible" benefits, however); *see also* Mark A. Lemley, *Beyond Preemption: The Law and Policy of Intellectual Property Licensing*, 87 CAL. L. REV. 111, 162 (1999) ("[O]nce an invention is patented, trade secret protection . . . is lost," and if a licensor "tried to require that a licensee to continue to treat the patented invention as a trade secret, that agreement might well be invalid on federal public policy grounds.").

170. *Kewanee*, 417 U.S. at 491 ("[T]he extension of trade secret protection to clearly patentable inventions does not conflict with the patent policy of disclosure.").

each under the sole domain of federal and state land management authorities, respectively.[171]

Further complicating the issues discussed above are Government Records Access and Management Act disclosure requirements attendant to state regulatory affairs.[172] If a company like Diversa was granted a bioprospecting license by the state of Utah, and interested parties could obtain a copy of it along with location and target species details, this could greatly jeopardize the secrecy of the "information" as required for trade secret protection. Once a competitor knew this information, it could narrow down the possible research applications and, using available technology like DNA sequencing and other screening methods, reverse engineer the trade secret.[173] Likewise, part of the benefits Utah presumably wishes to reserve are for academic research uses of bioprospecting "information," which provide yet another risk conduit for public disclosure and destruction of trade secrecy.[174] Similar risks exist with export and cultivation of Utah organisms to other states or countries, where the reach of the Utah Bioprospecting Act is as questionable as proving a life form exists nowhere else but on Utah state lands.

Viewing the vague "information" provisions of the Utah Bioprospecting Act as providing intellectual property licenses may or may not be the intent of the statute, but could attract bioprospecting researchers to the state to obtain "technological protection without having to meet any of the substantive requirements of intellectual property law, simply by contracting for it."[175] Not only should the language of the Act be made more concrete in this respect, Utah lawmakers should also consider the many possible negative externalities[176] of entering into and enforcing such contracts. This is especially so given the difficulty and costs associated with enforcing the Act on such large expanses of wild lands. With proper attention to statutory revision and rulemaking, however, these problems can be overcome to assure the future success of Act.

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171. Great Salt Lake Planning – 2010, Sovereign Lands at the Great Salt Lake, UTAH DIV. OF FORESTRY, FIRE & STATE LANDS, http://forestry.utah.gov/sovlands/gsl.php (last visited Nov. 23, 2011).

172. UTAH CODE ANN. § 63G-2-101 *et seq.* (2010), *available at* http://le.utah.gov/~code/TITLE63G/63G02.htm.

173. *Contra* Dan L. Burk, *Misappropriation of Trade Secrets in Biotechnology Licensing*, 4 ALB. L.J. SCI. & TECH. 121, 148 (1994), *available at* http://www.nationalaglawcenter.org/assets/bibarticles/burk_misappropriation.pdf ("[T]he trial and error nature of biotechnology may lend itself to satisfying important factors in the [trade secret] subject matter evaluation.").

174. *Id.* at 149-50.

175. Lemley, *supra* note 169, at 150.

176. *See, e.g.*, *id.* at 149.

IV. KEYS TO SUCCESS FOR THE UTAH BIOPROSPECTING ACT

The financial rationales of the CBD and the failed Hawaii statute are diminished in importance in light of additional goals such as environmental conservation and human rights. While those rationales have been extensively studied and borne out in international policies and treaties such as the CBD and TRIPS, their relevance to bioprospecting within the U.S. is much less clear. Concerns over benefits sharing and informed consent of indigenous peoples are highly relevant in a state like Hawaii, with a pervasive presence of such cultures, but it is much less clear how such concerns apply to the U.S. as a whole. However, states facing increasing budgetary crises may well seek to reap financial rewards from bioprospecting research. Financial considerations thus appear to be Utah's main motivating factor behind passing this new statute aimed at regulating bioprospecting activities on state lands.

Utah's new law resembles the failed Hawaiian proposal in many ways, but given that Utah is mainly a desert state with comparatively little biodiversity, the new measure seems misplaced. The Yellowstone-Diversa CRADA was even more reactionary than the Utah Bioprospecting Act of 2010. Prior to those federal measures, a foreign biotechnology corporation discovered in the National Park's hot springs a bacterial enzyme that led to the polymerase chain reaction (PCR) technology now pervasive in the biomedical industry.[177] Pre-commercialization benefits sharing agreements and related regulations may have benefited the federal government, and perhaps Wyoming, in ways such as those sought by Hawaii in their failed 2004 legislation. The financial rationale behind bioprospecting regulation in U.S. states appears to be a response to such concerns, and appears to act as a protectionist measure against corporations, particularly foreign interests, pilfering public lands in a manner which, although initially innocent and non-intrusive, result in potentially windfall profits without any corresponding stimulus of local domestic economies.

Utah is home to many hot springs, and similarly extreme environments. By enacting such protectionist regulations upon bioprospecting, the new law creates an abundance of tensions with commercial interests, and illustrates the perceived desire of states to assert sovereignty over their lands and whatever valuable genetic secrets they hold. Utah's Act exemplifies a recognition that states should be enriched in some way, just like corporations who often come from far afield to only transiently benefit local economies, and thereafter patent, sell, and profit on what was, in effect, given to them by the state where the enabling discovery was

177. *E.g.*, *'Extremophiles' Prove Their Worth*, WIRED.COM (June 25, 2004), http://www.wired.com/medtech/health/news/2004/06/63993.

made. Studies of these tensions on the international stage shed light on such concerns of U.S. states, but additional unique issues come into play which have received scant attention by other than a few scholars, and by those interests, like the UTC, who pushed for the passage of the Utah Bioprospecting Act.

This "porous jurisprudence of gene patents" encourages researchers to "patent-first-ask-questions-later," a practice they believe advantageous to commercialization under a first to market rationale.[178] The lack of consideration to broader policy issues by researchers and regulators in this race to the bottom is illustrated by the state of affairs in bioprospecting, and may contribute to a net loss in efficiency to the commercialization of science.[179] Citing old arguments with renewed vigor, critics call for more balanced regulatory approaches to account for the new "global knowledge economic order" in which bioprospecting, and biotechnology in general, operate.[180] Such globalization calls for a more sustainable and multi-disciplinary approach to intellectual property regulations that integrate as many stakeholders as possible.[181]

Humans have always engaged in bioprospecting, but, as global populations rise exponentially, managing these resources responsibly and sustainably has become increasingly difficult.[182] There will always be competing interests, with the need to incentivize research activities that yield important commercial products balanced with the need to preserve and protect other aspects of the environment.[183] While other nations have addressed such concerns to their respective benefit, the U.S. still grapples with these debates, and has largely avoided intelligent and engaged analysis of these important concerns within its own borders.[184] Yellowstone has become a policy laboratory in this regard, and its managers now realize that such resources "hold benefits for humanity beyond recreation [and] aesthetics, and . . . should be shared [with] the private sector to explore and develop [], while maintaining the parks' integrity, [to] assure[] the greatest good for the greatest number."[185] In this regard, Utah's Bioprospecting Act of 2010 follows in the footsteps of the Yellowstone-Diversa CRADA and the subsequent federal lawmaking, but the state has

178. Oguamanam, *supra* note 2, at 145-46.

179. *Id.* at 146.

180. *Id.* at 104.

181. *Id.* ("The pivotal role of intellectual property in the GKE presents intellectual property as an increasingly multidisciplinary subject with complex issue linkages in virtually all fronts including public health, human rights, biodiversity, biotechnology, biopiracy, the environment, ethics, culture, indigenous knowledge, electronic commerce, and research ethos.").

182. John C. Downen, *Bioprospecting in Yellowstone,* BOZEMAN DAILY CHRONICLE, July 31, 2002, *available at* http://www.free-eco.org/articleDisplay.php?id=96.

183. *Id.*

184. *Id.*

185. *Id.*

a unique opportunity to formulate its regulations in a way that is more narrowly tailored to its particular needs.

A more unified policy formula, encompassing relevant national and international law, and related experiences thus far since CBD, TRIPS, and the National Park legislation and rulemaking, will ensure the future effectiveness of the Utah Bioprospecting Act. Most important is education and public affairs within the state, nationally, and internationally. The resulting goodwill and informed debate will make it far more likely for Utah to achieve the policy goals behind the statute, and also for the Act to become highly influential on the federal, state and world stages.

CONCLUSION

The U.S. was instrumental in bringing about the CBD, participating in the six-year drafting phase, but is now one of only two countries that have not ratified it, the other being Andorra.[186] Ironically, the CBD was even modeled after conservation laws in the U.S.[187] By not ratifying the Convention, the U.S. weakens its ability to affect global conservation and sustainability,[188] thus risking the storehouses of biological resources that serve as raw materials for many of the most successful pharmaceutical and other biotechnology products. Analogous state lawmaking such as the Utah Bioprospecting Act may accelerate the process of CBD ratification, but such a desirable result is ultimately dependent on the success of the Act.

Utah, like all U.S. states in the federalist system of government, must consider its own unique socioeconomic circumstances when formulating such laws. For Hawaii, respect for indigenous people's rights to traditional knowledge was mandated by that state's constitution. For Utah, the continued success of its growing biotechnology industry was a primary driver. Simultaneously, states enacting bioprospecting regulations must not exert overly-protective measures that may hinder their own, or neighboring states', economic well being, or restrict free trade in contravention of WTO requirements. Like the international experience played out through the CBD and TRIPS framework, states like Utah should expect bioprospecting-related disputes in a variety of public and private contexts. They should view such conflicts as further opportunities to incorporate the many lessons to be drawn from bioprospecting-related issues in both national and international fora.

The Utah Bioprospecting Act of 2010 should be a success and be very influential in time. To assure such success, the state must leverage

186. Holding, *supra* note 128.
187. *Id.*
188. *Id.*

best-practices in management and enforcement, as through advances in geospatial technology,[189] and by continued gene sequencing and cataloguing of unique life forms within its borders.[190] By taking a simple and straightforward tack, the Utah legislature draws appropriate initial lessons for the statute in its current form, but the state needs to continue to study related issues on a national and international level, and consider downstream consequences that may tend to work the opposite of the Act's asserted policy goals.

Given Utah's relative economic health,[191] and thriving biotech industry in particular,[192] it is likely that this statute, and subsequent commentary and study, will provide a model for other states' initiatives, and perhaps the federal government's continued deliberation toward adopting the CBD. Drumming up such interest from the federal government holds promise for reform of the TRIPS regime, in addition to the CBD, given the U.S.'s influence in the WTO. Utah's new bioprospecting statute is truly revolutionary, but only time will tell if its pioneering status will be contagious on the national and international stages.

189. *See, e.g.*, Robert P. Guralnick et al., *Towards a Collaborative, Global Infrastructure for Biodiversity Assessment*, ECOLOGY LETTERS, June 10, 2007, at 663-72, *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2040220/.

190. *Cf. India Partners with US and UK to Protect Its Traditional Knowledge and Prevent Bio-Piracy*, PRESS INFO. BUR., GOV'T OF INDIA (Apr. 28, 2010), http://pib.nic.in/release/release.asp?relid=61122; Traditional Knowledge Digital Library, GOV'T OF INDIA, http://www.tkdl.res.in/tkdl/langdefault/common/ (last visited Nov. 23, 2011) (following the resolution of the Indian-US Patent dispute, India created an expansive traditional knowledge database that is now cited by numerous international patent authorities, including the U.S. Patent & Trademark Office).

191. Tony Dokoupil, *Promised Land: How Utah Became an Economic Zion*, NEWSWEEK, Nov. 15, 2010, at 33, *available at* http://www.newsweek.com/2010/11/08/how-utah-became-an-economic-zion.html.

192. EdcUTAH, *supra* note 32.