

# Remembering the “Big Five”: Hawai‘i’s Constitutional Obligation to Regulate the Genetic Engineering Industry

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## I. INTRODUCTION

With the end of over a century of plantation rule in Hawai'i,<sup>1</sup> a new agricultural era is beginning.<sup>2</sup> Instead of growing food to eat, a majority of the genetic engineering<sup>3</sup> ("GE") operations in Hawai'i specialize in cultivating seed corn and testing new GE crops<sup>4</sup> for future commercialization.<sup>5</sup> In 2010, Hawai'i became the world's leading

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<sup>1</sup> Andrew Gomes, *HC&S, last of sugar cane plantations, on track toward more financial losses*, THE HONOLULU ADVERTISER (Nov. 15, 2009), <http://the.honoluluadvertiser.com/article/2009/Nov/15/ln/Hawaii911150370.html>.

<sup>2</sup> See Paul Voosen, *King Corn Takes Root in Hawai'i*, N.Y. TIMES (Aug. 22, 2011), <http://www.nytimes.com/gwire/2011/08/22/22greenwire-king-corn-takes-root-in-hawaii-28466.html?pagewanted=all> (stating that "[o]ver the past decade, the five major companies that dominate the world seed industry have starkly increased their operations in Hawai'i, where they have long tested experimental biotech crops"). Note: The author intentionally adds 'okina and kahakō to Hawaiian words where appropriate in respect of the Hawaiian language, which is an official language of the State of Hawai'i.

<sup>3</sup> For this paper, the author uses the term "genetic engineering" or "GE" to refer to the transgenic process in which crops with GE traits, commonly known as genetically modified organisms (GMOs), are created. See Ania Wieczorek, Univ. of Hawai'i Department of Tropical Plant and Soil Sciences, *Six Questions about Agricultural Biotechnology* 1 (2007) [hereinafter, Wieczorek, *Six Questions*] (stating that "the acronym GE stands for genetic engineering (or genetically engineered) and when applied to crops means *transgenic crops* that are initially created in a research laboratory using transgenic technology").

<sup>4</sup> To steer the discourse of the paper away from both negative and positive connotations associated with the term "GMO," crops that are created through the transgenic, genetic engineering process are referred to as "GE crops" or "GE plants." The new genes that are imputed into the crop or plant through genetic engineering are referred to as "transgenes." Wieczorek, *Six Questions*, *supra* note 3, at 2 (stating that "in the eyes of general public, GMO crops, GE crops, and transgenic crops are all the same, and in most cases if a lay person is using the term 'GMO' they probably are referring to a genetically engineered, transgenic crop. However, genetic engineering is just one form of genetic modification that is used to 'at 2 (' crops)").

<sup>5</sup> See Voosen, *supra* note 2 (stating that "[w]hile the rest of the farm sector has flatlined, the seed companies have grown at double-digit rates, testing their corn, conventional and biotech, in a cluster of fields northwest of the Honolulu airport").

producer of seed corn.<sup>6</sup> While the GE Industry<sup>7</sup> is lucrative, little is known about the environmental and health consequences of these crops, their field tests, and the agricultural practices that dominate Hawai‘i’s GE Industry. Many residents oppose the GE Industry’s presence in Hawai‘i,<sup>8</sup> but the industry’s secretive nature leaves many unanswered questions about what is really being grown in these islands, and how the industry’s practices will affect the health of Hawai‘i’s natural environment and people in the short and long term future.<sup>9</sup>

The fear surrounding the GE Industry is not unlike the archetypal small town versus big corporation drama.<sup>10</sup> There is secrecy,<sup>11</sup> inexplicable health and environmental damage,<sup>12</sup> potential conflicts of interest,<sup>13</sup> and

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<sup>6</sup> UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, STATE REPORT: HAWAI‘I 1 (2010), *available at* [http://www.aphis.usda.gov/wildlife\\_damage/state\\_report\\_pdfs/2010/12-hawaii\\_report.pdf](http://www.aphis.usda.gov/wildlife_damage/state_report_pdfs/2010/12-hawaii_report.pdf) (stating that in 2010 “Hawai‘i [was] the world’s leading producer of seed corn, which account[ed] for 96% of the state’s \$176 million agricultural biotechnology industry”).

<sup>7</sup> For this paper, the terms “GE Industry” and “Industry” refer to both the commercial seed corn industry and the open-air field trials that are conducted throughout the Hawaiian islands.

<sup>8</sup> Nana Ohkawa, *Hundreds march against GMOs in Hawai‘i*, KITV NEWS (Mar. 2, 2013, 4:23 PM), <http://www.kitv.com/news/hawaii/Hundreds-march-against-GMOs-in-Hawaii/-/8905354/19154866/-/na3u16z/-/index.html> (reporting on the first of a series of marches against the GE Industry that occurred throughout the State of Hawai‘i in the month of March 2013).

<sup>9</sup> *See* Press Release, Ctr. For Food Safety, CFS Sues State of Hawai‘i for Refusing to Disclose Information on Field Tests of Genetically Engineered Crops in Hawai‘i, <http://www.centerforfoodsafety.org/issues/311/ge-foods/press-releases/928/cfs-sues-state-of-hawai-i-for-refusing-to-disclose-information-on-field-tests-of-genetically-engineered-crops-in-hawai-i> (last visited Apr. 7, 2013). The Center for Food Safety brought a lawsuit against the State of Hawai‘i for failing to disclose information about GE field tests to residents. Joseph Mendelson, the Center for Food Safety’s legal director, stated that “[t]he shroud of secrecy surrounding biopharming is unacceptable.” He is also quoted saying that “[t]he public has the right to know about these potentially harmful substances being grown in our backyard. The state has become a willful accomplice in depriving Hawaiians [of] this right.” *Id.*

<sup>10</sup> *See* ERIN BROCKOVICH (Jersey Films 2000).

<sup>11</sup> *See* CFS Sues State of Hawai‘i, *supra* note 9 (stating that very little information is provided to the public about the potentially harmful biopharmaceutical field tests in Hawai‘i).

<sup>12</sup> *See* Mercy Ritte, *Monsanto/Mycogen Losing Containment (extended version)*, YOU TUBE (Feb. 8, 2013), <http://www.youtube.com/watch?v=M4c8Tf2of6E>. *See also* Vanessa Van Voorhis, *Waimea residents sue Pioneer: GMO seed company facing ‘substantial’ lawsuit*, THE GARDEN ISLAND (Dec. 13, 2011, 11:45 PM), [http://thegardenisland.com/news/local/article\\_82ff2c3e-2632-11e1-9ca7-001871e3ce6c.html](http://thegardenisland.com/news/local/article_82ff2c3e-2632-11e1-9ca7-001871e3ce6c.html).

large sums of money changing hands.<sup>14</sup> In addition, the science is inconclusive as to whether GE crops are harmful to the environment, which means that those for and those against GE crops are able to claim that science is on their side.<sup>15</sup> Taken altogether, these factors create the perfect stage for distrust and fear.<sup>16</sup> The Genetically Modified Organism (“GMO”) debate has become so contentious that there is little room for productive conversation.<sup>17</sup>

To date, there has been no state-commissioned research published about the GE Industry’s impact on the health of Hawai‘i’s environment and people.<sup>18</sup> Without this necessary information about the long-term environmental impacts of the GE Industry, the State cannot responsibly fulfill its mandate under article XI, section 1 of the Hawai‘i Constitution, to determine whether there is substance to the claims that GE crops cause environmental damage or whether the lure of economic gains outweighs the costs to Hawai‘i’s residents and communities. After over twenty years of genetic engineering in Hawai‘i, the time has long passed for the State to gather more information and reexamine its relationship with the GE

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<sup>13</sup> See Sophie Cocke, *Why Is A Monsanto Lobbyist Serving On A Water Resource Panel?*, CIVIL BEAT (Feb. 12, 2013), <http://www.civilbeat.com/articles/2013/02/12/18318-why-is-a-monsanto-lobbyist-serving-on-a-water-resource-panel/>.

<sup>14</sup> See Chad Blair, *Monsanto Notches Another Victory in GMO Fight*, CIVIL BEAT (Mar. 25, 2013), <http://www.civilbeat.com/reg/articles/2013/03/25/18659-monsanto-notches-another-victory-in-gmo-fight/> (reporting that according to Follow The Money, an organization that tracks political donations, “Monsanto contributed \$70,650 to candidates for state office in Hawai‘i between 2003 and 2012”).

<sup>15</sup> Much like the debate surrounding climate change, both supporters and opponents of GE are “able to claim science as an ally while simultaneously accusing their opponents of ignoring or misusing it.” Guy R. Knudsen, *Where’s The Beef? How Science Informs GMO Regulation And Litigation*, 48 IDAHO L. REV. 225, 227 (2012) [hereinafter Knudsen, *Where’s The Beef*]. Yet, scientific uncertainty is a concept that plagues every discipline of study. Dale Jamieson, the Director of Environmental Studies at New York University, believes that “scientific uncertainty is not simply an objective value that can be reduced by science alone.” Instead, uncertainty is a product of both science and society. See generally, Dale Jamieson, *Scientific Uncertainty and the Political Process*, 545 ANNALS AM. ACAD. POL. & SOC. SCI. 35 (1996).

<sup>16</sup> Ohkawa, *supra* note 8.

<sup>17</sup> See Chad Blair, *GMO Sparks Shoving Match At Hawai‘i Capitol*, CIVIL BEAT (Mar. 28, 2013 2:48pm), <http://hawaii.news.blogs.civilbeat.com/post/46550472629/gmo-sparks-shoving-match-at-hawaii-capitol/>; see also Chad Blair, *Hawai‘i Fight Over GMO Labeling Turns Ugly*, CIVIL BEAT (Mar. 19, 2013, 2:48 PM), <http://www.civilbeat.com/articles/2013/03/19/18624-hawaii-fight-over-gmo-labeling-turns-ugly/>.

<sup>18</sup> Interview with Russell Kokubun, Chair, Haw. Dep’t. of Agric. (Mar. 1, 2013).

industry.<sup>19</sup> Without the necessary information and regulations, the State will continue to shirk its public trust responsibilities.<sup>20</sup> Given the State's plantation history and the detrimental effects of the plantation era's "Big Five,"<sup>21</sup> the State has a duty to its citizens to examine potential harms<sup>22</sup> from the "New Big Five" and mitigate where necessary.<sup>23</sup>

This paper deconstructs the State's obligation to more closely examine the GE Industry's environmental impacts, and suggests a review process for the release of all GE crops. Section II highlights the emergence of the GE Industry and reviews the history of the State's role as trustee over Hawai'i's natural resources. Section III examines the current regulatory regimes that regulate the GE Industry and the criticisms that surround the status quo. Section IV highlights the GE Industry's potential impact on Hawai'i's natural resources. Section V discusses the constitutional frameworks that protect Hawai'i's natural resources and clean environment. Section VI suggests ways that these constitutional mandates can be used to achieve increased protection of Hawai'i's natural resources. Section VII offers recommendations as to how the State can fulfill its public trust obligations while still supporting the lucrative GE Industry.

## II. GENETIC ENGINEERING

### A. *What is Genetic Engineering?*

GE technology is the newest form of crop genetic modification,

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<sup>19</sup> The one state law regulating genetic engineered crops in Hawai'i has not been amended since 1988. *See* HAW. REV. STAT. § 321-11.6 (1988). Although several bills have been introduced at the state legislature to require heightened regulation of the GE Industry in Hawai'i, none have been successful. *See* S.B. 712 (2012) (requiring that DOA be notified before a GE crop is grown or tested in Hawai'i); H.B. 1048 (2007) (banning the testing of biopharmaceuticals); H.B. 1024 (2005) (requiring GE companies to disclose the location and nature of GE test trials in Hawai'i); S.B. 1857 (2005) (requiring GE companies to disclose the location and nature of GE test trials in Hawai'i).

<sup>20</sup> *See generally* D. Kapua'ala Sproat & Isaac H. Moriwake, *Ke Kalo Pa'a O Waiāhole: Use of the Public Trust as a Tool for Environmental Advocacy*, in CREATIVE COMMON LAW STRATEGIES FOR PROTECTING THE ENVIRONMENT 247 (Clifford Rechtschaffen & Denise Antolini eds., 2007) (reviewing the State of Hawai'i's public trust doctrine).

<sup>21</sup> *See* CAROL WILCOX, SUGAR WATER 20 (1996) (referring to the "Big Five" sugar factories, Alexander & Baldwin, Castle & Cooke, Theo Davies, Amfac, and C. Brewer & Company, that exercised considerable financial and political control over the State of Hawai'i during the early 1900s).

<sup>22</sup> *See infra* Section IV.

<sup>23</sup> Similar to the original "Big Five," there are now five major GE companies in Hawai'i: BASF, Dow AgroSciences, Monsanto, Dupont Pioneer, and Syngenta. These companies comprise a nonprofit trade association called the Hawai'i Crop Improvement Association. HAWAI'I CROP IMPROVEMENT ASSOCIATION, VIEWS FROM THE FARM (on file with author).

which allows scientists to create new crop varieties with desirable traits, such as drought resistance, virus resistance, or pesticide resistance.<sup>24</sup> Instead of selecting parent crops with specific traits to cross breed, genetic engineering allows breeders to change a plant's trait by directly altering that plant's DNA.<sup>25</sup> Today, scientists can create crop varieties that would be impossible to produce naturally.<sup>26</sup> GE technology requires that a scientist "take one or more specific genes from nearly any organism, including plants, animals, bacteria, or viruses, and introduce those genes into the genome of another organism."<sup>27</sup> This technique—called transgenic genetic engineering<sup>28</sup>—creates an organism with modified or novel genes.<sup>29</sup>

Unlike classical selective breeding, GE technology does not require that the two "DNA donor parents" be reproductively compatible.<sup>30</sup> Because the chemical nature of DNA is universal in its structure, scientists are now able to isolate fragments of DNA from any organism and join it with DNA from a completely different organism to develop DNA combinations that were not previously possible, such as "tomatoes with fish genes, potatoes with mouse genes, apples with chicken genes, and

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<sup>24</sup> See generally Ania Wieczorek & Wright Mark, *History of Agricultural Biotechnology: How Crop Development has Evolved*, NATURE EDUCATION KNOWLEDGE 3(10):9 (2012), <http://www.nature.com/scitable/knowledge/library/history-of-agricultural-biotechnology-how-crop-development-25885295> (describing the evolution of crop genetic modification from traditional crossbreeding to modern genetic engineering).

<sup>25</sup> *Id.*

<sup>26</sup> See generally, DESMOND S.T. NICHOLL, AN INTRODUCTION TO GENETIC ENGINEERING 6 (1994).

<sup>27</sup> Wieczorek & Mark, *supra* note 24.

<sup>28</sup> Wieczorek, *Six Questions*, *supra* note 3, at 2. Transgenic genetic engineering or rDNA genetic engineering is also referred to as biotechnology. Luke Anderson, *What is Genetic Engineering? Basic Definitions and Concepts*, in *FACING HAWAII'S FUTURE* 8, 11 (Catherine Mariko Black ed., 2006); Ania Wieczorek, COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES, USE OF BIOTECHNOLOGY IN AGRICULTURE – BENEFITS AND RISKS 1 (May 2003). The term "biotechnology" is very broad and refers to the many different ways that humans work with living organisms, such as using yeast to make bread or beer. Anderson, *supra*, at 11.

<sup>29</sup> Debdata Dobe & Rohini Sen, *Genetically Modified Organism Trade Route and Biosafety—Is it a Failing Synthesis?*, 1 AM. J. OF ECON. & BUS. ADMIN. 206 (2009), available at <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDUQFjAA&url=http%3A%2F%2Fthescipub.com%2Fpdf%2F10.3844%2Fajebasp.2009.206.212&ei=IE1iUZeiGqaJjAKZt4CoDQ&usg=AFQjCNEWasOiyTfLqrSuuU9CXEMbKfQhSw&sig2=QBDlizxmBbEkPAWJDreELA&bvm=bv.44770516,d.cGE&cad=rja>.

<sup>30</sup> Wieczorek, *Six Questions*, *supra* note 3, at 1 (stating that traditional breeding "involves the transfer of pollen containing the gene for a desired trait from one crop variety to another" in the hopes that the desired trait will eventually appear in the resulting plant progeny).

even pigs with human genes.”<sup>31</sup> This new technology ultimately eliminates species barriers and opens the door to both endless potential and endless risk.<sup>32</sup>

Molecular biologists and others in the molecular biology field see the discovery of modern GE technology as a major scientific breakthrough.<sup>33</sup> Many citizens, scientists, and policymakers, however, view GE as a cause for concern.<sup>34</sup> In many ways, GE is more precise than conventional breeding because breeders are able to work at a molecular level.<sup>35</sup> However, in other ways, the technology is “crude” because it is not possible to insert a new gene into a crop with accuracy.<sup>36</sup> For instance, scientists are unable to predict how the new gene imputed into an organism will alter the chemical reactions within the cell of the organism, disturb the organism’s cell functions, or create new toxins or allergens within the crop.<sup>37</sup> Given how difficult it is to produce a successful new GE crop, scientists take several years to develop a new GE crop variety.<sup>38</sup>

### B. *Growth of the GE Industry in the United States*

The lure of a patent monopoly over GE crops created further incentive for scientists and GE companies to develop new crop varieties.<sup>39</sup>

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<sup>31</sup> TEXPIRG EDUCATION FUND, RAISING RISK: FIELD TESTING OF GENETICALLY ENGINEERED CROPS IN THE UNITED STATES 6 (2005) (stating that the characteristics of all organisms are determined by the sequence of their DNA). *See generally* NICHOLL, *supra* note 26.

<sup>32</sup> *See* Wieczorek, *Six Questions*, *supra* note 3, at 2 (reviewing both the risks and benefits of GE crops).

<sup>33</sup> *See* NICHOLL, *supra* note 26, at 6. By the late 1960s, technical constraint stalled further development of gene technology and research. In 1972, scientists at Stanford University generated the first recombinant deoxyribonucleic acid (rDNA) molecule that was seen as a breakthrough in the field of molecular biology. NICHOLL, *supra* note 26, at 6.

<sup>34</sup> *See Genetic Engineering Risks and Impacts*, UNION OF CONCERNED SCIENTISTS (Oct. 20, 2002), [http://www.ucsusa.org/food\\_and\\_agriculture/our-failing-food-system/genetic-engineering/risks-of-genetic-engineering.html](http://www.ucsusa.org/food_and_agriculture/our-failing-food-system/genetic-engineering/risks-of-genetic-engineering.html).

<sup>35</sup> *See* Wieczorek, *Six Questions*, *supra* note 3, at 2.

<sup>36</sup> Anderson, *supra* note 28, at 10.

<sup>37</sup> Anderson, *supra* note 28, at 10; *see also* Wieczorek, *Six Questions*, *supra* note 3, at 2.

<sup>38</sup> *See generally* Wieczorek & Mark, *supra* note 24.

<sup>39</sup> Jorge Fernandez-Cornejo & David Schimmelpennig, Econ. Research Serv., U.S. Dep’t of Agric., *Have Seed Industry Changes Affected Research Effort?*, 2 AMBER WAVES 14, 18 (2004) (stating that greater intellectual property rights helped to cause an increase in the amount of private capitol devoted to the GE seed industry and creation of new crops). Some argue that without the promise of a limited monopoly on the product, many large corporations would not spend the time to creating new GE varieties. Interview with Paul Achitoff, Attorney, Earthjustice (Feb. 15, 2013).

In 1980, the U.S. Supreme Court decided a landmark intellectual property case, *Diamond v. Chakrabarty*.<sup>40</sup> In this case, the Supreme Court expanded the scope of patentable subject matter to include “anything under the sun that is made by man.”<sup>41</sup> As a result of *Chakrabarty*, GE crops became patentable subject matter, and GE companies were able to monopolize those GE crop varieties.<sup>42</sup>

The United States’ reliance on GE crops is growing at a rapid pace. By 1995, nearly 200 seed producers had merged to form some of the largest GE seed companies today:<sup>43</sup> BASF;<sup>44</sup> Dow AgroSciences;<sup>45</sup> Monsanto;<sup>46</sup> Pioneer Hi-Bred International;<sup>47</sup> and Syngenta.<sup>48</sup> By 2012, 94% of all soybean, 94% of all cotton, and 88% of all corn planted in the United States were genetically engineered.<sup>49</sup> The United States is now the

<sup>40</sup> 447 U.S. 303 (1980).

<sup>41</sup> *Id.* at 309 (citing to S. REP. NO. 82-1979, at 5 (1952); H.R. REP. NO. 82-1923, at 6 (1952)) (stating that Congress intended patentable subject matter to extend to “include anything under the sun that is made by man”).

<sup>42</sup> See Margaret Sova McCabe, *Superweeds and Suspect Seeds: Does the Genetically-Engineered Crop Deregulation Process Put American Agriculture at Risk?*, 1 U. BALT. J. LAND & DEV. 109, 116-17 (2012); Alison Peck, *Leveling the Playing Field in GMO Risk Assessment: Importers, Exporters and the Limits of Science*, 28 B.U. INT’L L.J. 241, 267 (2010).

<sup>43</sup> By 1997, “the share of U.S. seed sales controlled by the four largest firms providing seed of each crop reached 92 percent for cotton, 69 percent for corn, and 47 percent for soybeans in 1997[.]” Fernandez-Cornejo & Schimmelpfennig, *supra* note 39, at 18. The USDA article does not mention the names of the four firms, but in Hawai‘i, some of the most prominent GE companies are BASF, Dow AgroSciences, Monsanto, Dupont Pioneer, and Syngenta—the same five companies that make up the Hawai‘i Crop Improvement Agency. HAWAI‘I CROP IMPROVEMENT ASSOCIATION, VIEWS FROM THE FARM (on file with author).

<sup>44</sup> BASF is a transnational chemical company with its headquarters in Germany. Phoebe Eng, *From Plantations to GMOs: The Struggle for the Farming Future of West Kaua‘i*, in *FACING HAWAI‘I’S FUTURE* 55, 57 (Catherine Mariko Black ed., 2006).

<sup>45</sup> Dow Agrosciences is a subsidiary of the multinational chemical company, Dow Chemical Company. *About Us*, DOW AGROSCIENCES, <http://www.dowagro.com/about/> (last visited Apr. 7, 2013).

<sup>46</sup> Monsanto is a multi-national chemical company that produced the pesticide, Agent Orange. *Agent Orange: Background on Monsanto’s Involvement*, MONSANTO, <http://www.monsanto.com/newsviews/Pages/agent-orange-background-monsanto-involvement.aspx> (last visited Apr. 7, 2013).

<sup>47</sup> Pioneer Hi-Bred International is a subsidiary of the chemical company, Dupont. Eng, *supra* note 44, at 57.

<sup>48</sup> Syngenta is a Swiss chemical company that created the herbicide, Atrazine. Eng, *supra* note 44, at 57.

<sup>49</sup> *Adoption of Genetically Engineered Crops in the U.S.*, USDA ECON. RESEARCH SERV. (Jul. 9, 2013), <http://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx>.



world's largest producer and exporter of GE crops.<sup>50</sup> The United States cultivates 69 million hectares (170.5 million acres) of GE crops.<sup>51</sup> This is staggering when one considers that the second largest producer, Brazil, grows only 30.3 million hectares (74.87 million acres) of GE soybean, maize, and cotton.<sup>52</sup>

The commercial success of many GE crops has placed more pressure on GE companies to develop crop varieties that meet consumer expectations.<sup>53</sup> It has also increased the demand for companies to maintain seed productions.<sup>54</sup> Two traits dominate the crop varieties that have succeeded on the market thus far: herbicide tolerance and insect resistance.<sup>55</sup> These traits are genetically engineered into three main commodity crops: corn, cotton, and soybeans.<sup>56</sup> Over 90 varieties of GE

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<sup>50</sup> See *ISAAA Brief 43-2011: Executive Summary*, INT'L. SERV. FOR THE ACQUISITION OF AGRI-BIOTECH APPLICATIONS, <http://www.isaaa.org/resources/publications/briefs/43/executivesummary/default.asp> (last visited Apr. 18, 2013).

<sup>51</sup> *Id.*

<sup>52</sup> *Id.*

<sup>53</sup> See Andrew Pollack, *Down Corn, Resistant to a Weed Killer, Runs Into Opposition*, N.Y. TIMES (Apr. 25, 2012), <http://www.nytimes.com/2012/04/26/business/energy-environment/dow-weed-killer-runs-into-opposition.html?pagewanted=all&r=0> (reporting on the controversy surrounding Dow AgroSciences's potential commercialization of new 2,4-D resistant crops). See also Tom Philpott, *Dow and Monsanto Team Up on the Mother of All Herbicide Marketing Plans*, MOTHER JONES (Jan. 25, 2012), <http://www.motherjones.com/tom-philpott/2012/01/dows-new-gmo-seed-puts-us-agriculture-crossroads> (reporting on a "stacked" GE crop that Monsanto and Dow AgroScience are working together to create. This crop would contain both Monsanto's glyphosate resistant trait and Dow AgroSciences's 2,4-D resistant trait).

<sup>54</sup> See Melodie Warner, *Monsanto 2nd-Quarter Net Up 22% on Strong Corn Seed Demands; Lifes Year View*, WALL ST. J. (Apr. 3, 2013 9:41 AM), <http://online.wsj.com/article/BT-CO-20130403-705955.html> ("Monsanto Co.'s . . . fiscal second-quarter earnings rose 22% as increased demand for corn seed and genetically modified seed traits drove the world's largest seed company's stronger-than-expected sales growth").

<sup>55</sup> See MARGARET MELLON ET AL., UNION OF CONCERNED SCIENTISTS, ENVIRONMENTAL EFFECTS OF GENETICALLY MODIFIED FOOD CROPS – RECENT EXPERIENCES (2003), available at [http://www.ucsusa.org/food\\_and\\_agriculture/our-failing-food-system/genetic-engineering/environmental-effects-of.html](http://www.ucsusa.org/food_and_agriculture/our-failing-food-system/genetic-engineering/environmental-effects-of.html). See also *Adoption of Genetically Engineered Crops in the U.S.*, USDA ECON. RESEARCH SERV. (Jul. 9, 2013), <http://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx>.

<sup>56</sup> See *Petitions for Determination of Nonregulated Status*, ANIMAL & PLANT HEALTH INSPECTION SERV., U.S. DEP'T OF AGRIC. [hereinafter *Petitions for Determination of Nonregulated Status*], [http://www.aphis.usda.gov/biotechnology/not\\_reg.html](http://www.aphis.usda.gov/biotechnology/not_reg.html) (last visited Apr. 19, 2013). These crops represent only a fraction of the GE crops that are currently being sold commercially and being tested in field trials. MELLON ET AL., *supra* note 55.

crops have been approved for commercialization in the United States.<sup>57</sup> According to GE Industry representatives, Hawai‘i plays a pivotal role in the success of GE agriculture in the continental United States.<sup>58</sup>

### C. *Emergence of the GE Industry in Hawai‘i*

#### 1. Hawai‘i’s Agricultural History

The GE Industry’s presence in Hawai‘i raises questions about the State’s responsibility as trustee over all natural resources.<sup>59</sup> Since Hawai‘i’s first contact with westerners, the agricultural climate in Hawai‘i has changed drastically.<sup>60</sup> The arrival of foreigners introduced a system of industrial agriculture that significantly departed from Native Hawaiians’<sup>61</sup> traditional land cultivation methods.<sup>62</sup> Hawai‘i has since enshrined resource protection in its constitution,<sup>63</sup> but the emergence of the GE Industry is tempting the State to ignore its environmental protection mandate in hopes of securing immediate gains.<sup>64</sup>

#### *The Ahupua‘a System: Native Hawaiians’ Relationship with*

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<sup>57</sup> See *Petitions for Determination of Nonregulated Status*, *supra* note 55.

<sup>58</sup> Interview with Alan Takemoto, Community Affairs Manager, Monsanto (Apr. 3, 2013) (notes on file with author).

<sup>59</sup> See generally *FACING HAWAI‘I’S FUTURE* (Catherine Mariko Black ed., 2006).

<sup>60</sup> See generally E.S. CRAIGHILL HANDY & ELIZABETH GREEN HANDY, *NATIVE PLANTERS IN OLD HAWAI‘I: THEIR LIFE, LORE, AND ENVIRONMENT* (Bernice Pauahi Bishop Museum ed. 1972) (stating that “[t]he operations of the Hawaiian planter involved an intimate firsthand relationship to the plants and to soil and water comparable to that of a modern flower or vegetable gardener”).

<sup>61</sup> The term “Native Hawaiian” refers to all descendants of individuals who inhabited the Hawaiian Islands prior to 1778, regardless of blood quantum. For a legislatively or judicially created definition of individuals who qualify as a “Native Hawaiian,” see e.g., HAW. CONST. art. XII, § 7; *Pub. Access Shoreline Haw. v. Haw. Cnty. Planning Comm’n*, 79 Hawai‘i 425, 449 (1995) [hereinafter *PASH*].

<sup>62</sup> “The new system, although well understood by the foreigners, was strange and chaotic to Hawaiians. Each person was to stand alone in the world and was to do whatever he decided with his own piece of ‘Āina—never mind what might benefit the whole community.” LILIKALĀ KAME‘ELEIHIWA, *NATIVE LAND AND FOREIGN DESIRES—PEHEA LĀ E PONO AI? HOW SHALL WE LIVE IN HARMONY?* 10 (Bishop Museum Press 1992).

<sup>63</sup> See HAW. CONST. art. XI, §§ 1 and 9.

<sup>64</sup> The GE Industry contributes to the diversification of Hawai‘i’s agricultural sector, contributes nearly \$239 million in annual expenditures in the state of Hawaii, and creates nearly 20.2% of all statewide agricultural jobs. THOMAS LOUDAT & PRAHLAD KASTURI, *HAWAI‘I CROP IMPROVEMENT ASSOCIATION & HAWAI‘I FARM BUREAU FEDERATION, HAWAI‘I’S SEED CROP INDUSTRY: CURRENT AND POTENTIAL ECONOMIC AND FISCAL CONTRIBUTIONS* 4, 5, & 7 (2013), available at <http://www.hciaonline.com/wp-content/uploads/2013/04/HawaiiSeedCropIndustry2012.pdf>.

*Hawai'i's Natural Resources*

When the original Polynesian settlers came to Hawai'i, they brought with them plants, such as *niu*,<sup>65</sup> *mai'a*,<sup>66</sup> *'ulu*,<sup>67</sup> *kalo*,<sup>68</sup> *uhi*,<sup>69</sup> *'uala*,<sup>70</sup> *kō*,<sup>71</sup> *pia*,<sup>72</sup> and *'awa*,<sup>73</sup> which helped to create a self-sufficient society in the islands for many centuries.<sup>74</sup> The relationship that Native Hawaiians had and continue to have with the land went far beyond mere knowledge of natural occurrences around them.<sup>75</sup> That relationship incorporated a spiritual connection that goes back to Native Hawaiians' creation and origin from Papa and Wākea.<sup>76</sup> Native Hawaiian life and culture were intimately tied to the land.<sup>77</sup> Native Hawaiians had a complex

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<sup>65</sup> *Niu* means "coconut." MARY KAWENA PUKUI & SAMUEL H. ELBERT, HAWAIIAN DICTIONARY 267 (1986).

<sup>66</sup> *Mai'a* means "[a]ll kinds of bananas and plantains." *Id.* at 221.

<sup>67</sup> *'Ulu* means "breadfruit." *Id.* at 369.

<sup>68</sup> *Kalo* means "taro." *Id.* at 123.

<sup>69</sup> *Uhi* means "yam." *Id.* at 364.

<sup>70</sup> *'Uala* means "sweet potato." *Id.* at 362.

<sup>71</sup> *Kō* means "[s]ugar cane." *Id.* at 156.

<sup>72</sup> *Pia* means "arrowroot." *Id.* at 326.

<sup>73</sup> *'Awa* means "kava." *Id.* at 33.

<sup>74</sup> HANDY & HANDY, *supra* note 60, at 12-14. "The whole list of plants and animals that the native planters were raising at the time of discovery in the late 18th century is in itself sufficient to indicate that the subsistence economy was not primitive at all." HANDY & HANDY, *supra* note 60, at 14.

<sup>75</sup> HANDY & HANDY, *supra* note 60, at 44. Native Hawaiians showed in-depth knowledge regarding horticultural practices, cross-pollination techniques, and engineering. *See* HANDY & HANDY, *supra* note 60, at 21-41.

<sup>76</sup> *See* KAME'ELEIHIWA, *supra* note 62, at 25. Modern customs of *Aloha 'Āina*, which means "love of the land," and *Mālama 'Āina*, which means "caring for the land," stem from a traditional belief that *kalo* is the elder brother of the Native Hawaiian people. Papa and Wākea are the sky-father and earth-mother. Their first human child was Ho'ohōkūlani. Ho'ohōkūlani and Wākea had a stillborn child named Hāloa-naka (meaning the "quivering long stalk"). They buried Hāloa-naka and from the earth grew the first *kalo* plant. Ho'ohōkūlani and Wākea had a second child that they named Hāloa in honor of his elder brother. Hāloa became the first Hawaiian ali'i nui and ancestor to all Native Hawaiian people. In that way, "the *kalo* plant, which was the main staple of the people of old, is also the elder brother of the Hawaiian race, and as such deserves great respect." They are the parents of the islands, Hawai'i, Māui, Kaua'i, Ni'ihau, Lehua, and Ka'ula. As such, Native Hawaiians have a close connection to the land and a responsibility to take care of the land. KAME'ELEIHIWA, *supra* note 62, at 23-25.

<sup>77</sup> *See* Melody MacKenzie, *Historical Background*, in NATIVE HAWAIIAN RIGHTS HANDBOOK 3 (Melody Kapilialoha MacKenzie ed., 1991). The word *'āina* literally means "land." Yet, "[i]n relationship to birth and family, *'āina* conveys the sense of homeland, birthplace, and one's country." HANDY & HANDY, *supra* note 60, at 44.

culture and stable land tenure system that sustained a population of over 800,000 to one million people.<sup>78</sup> Native Hawaiians thrived on an agricultural system that was based on the traditional ahupua‘a system.<sup>79</sup> Maka‘āinana<sup>80</sup> had the right to use the natural resources within the ahupua‘a,<sup>81</sup> but were regulated by a system of rules that conserved natural resources to provide for all those living in the ahupua‘a.<sup>82</sup> Conversely, the ali‘i had a responsibility to the maka‘āinana as well.<sup>83</sup> Ultimately, the maka‘āinana and ali‘i<sup>84</sup> “shared a mutual dependence in sustaining their subsistence way of life.”<sup>85</sup> Maka‘āinana had the freedom to move to a different ahupua‘a of their choosing,<sup>86</sup> and the ali‘i could also be replaced if he or she did not make the land productive, or failed to treat the maka‘āinana well.<sup>87</sup> The ali‘i were trustees of the natural resources within an ahupua‘a.<sup>88</sup>

### *The Plantation Era: Exploitation of Hawai‘i’s Natural Resources*

The State of Hawai‘i has a history of being exploited by private commercial interests.<sup>89</sup> Around the mid-1800s, agriculture in Hawai‘i

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<sup>78</sup> See generally DAVID E. STANNARD, BEFORE THE HORROR: THE POPULATION OF HAWAII ON THE EVE OF WESTERN CONTACT (1989) (arguing that the population of Hawai‘i before Western contact was between 800,000 to one million). One scholar wrote that “given the total absence of metals for tools, the level of technological skills achieved by the Hawaiians was remarkable, arguably beyond that developed by Stone Age societies in other parts of the world.” THOMAS KEMPER HITCH, ISLANDS IN TRANSITION: THE PAST, PRESENT, AND FUTURE OF HAWAII’S ECONOMY 10 (Robert M. Kamins ed., 1993).

<sup>79</sup> Mackenzie, *supra* note 77, at 3. The *ahupua‘a* is ideally a pie-shaped, economically self-sufficient division of land that ran from the mountaintops to the shore of the ocean. Mackenzie, *supra* note 77, at 3. An *ahupua‘a* could range from anywhere between 100 and 100,000 acres and was administered by either an *ali‘i ai ahupua‘a* (ahupua‘a chief) or *konohiki* (land agent). Mackenzie, *supra* note 77, at 3.

<sup>80</sup> Maka‘āinana means “[c]ommoner, populate, people in general; citizen, subject.” PUKUI & ELBERT, *supra* note 65, at 224.

<sup>81</sup> This included the right to hunt, gather wild plants and herbs, fish, use the land and water for taro cultivation, etc. Mackenzie, *supra* note 77, at 4.

<sup>82</sup> Mackenzie, *supra* note 77, at 4.

<sup>83</sup> See KAME‘ELEIHIWA, *supra* note 62, at 26.

<sup>84</sup> Ali‘i means “[c]hief, chiefess, officer, ruler, monarch, peer, headman, noble, aristocrat, king, queen, commander[.]” PUKUI & ELBERT, *supra* note 65, at 20.

<sup>85</sup> Mackenzie, *supra* note 77, at 4.

<sup>86</sup> Mackenzie, *supra* note 77, at 4.

<sup>87</sup> Mackenzie, *supra* note 77, at 4.

<sup>88</sup> Mackenzie, *supra* note 77, at 4.

<sup>89</sup> See generally WILCOX, *supra* note 21.

centered around mono-crop<sup>90</sup> sugarcane plantations.<sup>91</sup> For over two centuries, the five largest plantation owners—known as the “Big Five”<sup>92</sup>—utilized Hawai‘i’s natural resources and exercised considerable economic, political, and cultural influence in Hawai‘i.<sup>93</sup>

During the plantation era, public resources were viewed as a way to facilitate private commercial gains.<sup>94</sup> While the “Big Five” ruled Hawai‘i, the nation, territory, and later the State, allowed them to use natural resources, such as water, without sufficient consideration of the long-term effects or the public’s interest in those natural resources.<sup>95</sup> As a result, the “Big Five” exploited Hawai‘i’s natural resources for immediate financial gain until they eventually found a more profitable location for their plantation operations.<sup>96</sup>

The agricultural practices utilized by the plantations had significant negative impacts on Hawai‘i’s natural resources.<sup>97</sup> The “Big Five” acquired large tracts of prime agricultural land and diverted water from streams and communities to maintain its plantations.<sup>98</sup> This diversion of water caused considerable environmental and cultural damage to streams

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<sup>90</sup> “Monocropping, or monoculture, describes the homogenous planting of a single genetic strain of a crop. A widespread homogenous crop is more susceptible to disease, weeds, and pests because a single virus or infection capable of hurting the particular strain can damage the entire crop.” Joseph Kiefer, *Turning Over a New Sprout: Promoting Agricultural Health by Fostering the Coexistence of Organic and Genetically Modified Crops in the Wake of Monsanto Co. v. Geertson Seed Farms and the Deregulation of Modified Alfalfa*, 61 EMORY L.J. 1241, 1250 (2012).

<sup>91</sup> See WILCOX, *supra* note 21, at 2.

<sup>92</sup> WILCOX, *supra* note 21, at 20.

<sup>93</sup> See WILCOX, *supra* note 21, at 20 (“[‘The Big Five’] owned or controlled the land, plantations, water, power production, mills, labor, transportation, refineries. They controlled banks, insurance, marketing, and, some would argue, the local government”).

<sup>94</sup> D. Kapua‘ala Sproat, *Where Justice Flows Like Water: The Moon Court’s Role in Illuminating Hawai‘i Water Law*, 33 U. HAW. L. REV. 537, 542-43 (2011) [hereinafter Sproat, *Where Justice Flows*]. “Management practices and even court decisions during the Hawaiian Kingdom and the territorial period reflected increasingly Western notions of private property.” *Id.* at 543-44.

<sup>95</sup> See *id.* at 542-44 (stating that “[w]here once Hawai‘i’s people respected water as a physical embodiment of Akua Kāne and a fundamental requirement for a balanced and healthy environment, plantation interests reduced water to a mere commodity, sold to the highest bidder with no regard for impacts to the streams or other needs”).

<sup>96</sup> WILCOX, *supra* note 21, at 20.

<sup>97</sup> Sproat, *Where Justice Flows*, *supra* note 94, at 543 (describing how the diversions of water from its natural flow caused long-lasting negative impacts to both natural and human communities).

<sup>98</sup> See Sproat, *Where Justice Flows*, *supra* note 94, at 542-43

and lo‘i kalo.<sup>99</sup> The plantation industry also relied heavily on the use of pesticides to facilitate its industrial agricultural practices.<sup>100</sup> The significant amounts of pesticides polluted Hawai‘i’s soil and ground water.<sup>101</sup> The full extent of the contamination is yet to be revealed as pesticides are still being found in the groundwater near former plantation locations.<sup>102</sup> Notably, when the sugar and pineapple companies left Hawai‘i, the State did not require the companies to clean up the pesticides and other contaminations that their industry caused.<sup>103</sup> Although it was too late for Hawai‘i to protect its natural resources from the plantation industry’s pesticide contamination, individuals throughout the state utilized other judicial and legislative means to protect Hawai‘i’s natural resources from future misuse and exploitation.<sup>104</sup>

*1978 Constitutional Convention: Increased Protection for  
Hawai‘i’s Natural Resources*

Community members in Hawai‘i used the decline of the plantation

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<sup>99</sup> *Lo‘i kalo* means “wetland kalo cultivation.” Sproat, *Where Justice Flows*, *supra* note 94, at 552-53.

<sup>100</sup> See William G. Cutler et al., *Supplemental Information for Bioaccessible Arsenic in Soils of Former Sugar Cane Plantations, Island of Hawai‘i*, SCIENCE OF THE TOTAL ENVIRONMENT 178 (2013).

<sup>101</sup> See *id.* See also Sophie Cocke, *Pesticide Contamination Of Drinking Water Worries State Health Officials*, CIVIL BEAT (Mar. 11, 2013), <http://www.civilbeat.com/sub/articles/2013/03/11/18548-pesticide-contamination-of-drinking-water-worries-state-health-officials/> (reporting on Atrazine found in the Hilo ground water as a result of pineapple and sugarcane’s pesticide use). See also HAZARD EVALUATION AND EMERGENCY RESPONSE OFFICE, HAW. DEP’T. OF HEALTH, SUMMARY OF PESTICIDE AND DIOXIN CONTAMINATION ASSOCIATED WITH FORMER SUGARCANE OPERATIONS 3-4 (2011) (finding soil of former sugarcane plantations and pesticide mixing sites contaminated with arsenic, dioxin, ametryn, and atrazine pesticides).

<sup>102</sup> See Cocke, *supra* note 101 (reporting on the pesticide, atrazine, that was found in Hilo’s groundwater possibly from former plantations that were operating in the area).

<sup>103</sup> Interview with Thomas Matsuda, Pesticide Program Manager, Haw. Dep’t. of Agric. (Mar. 18, 2013). It is important to note, however, that the DOA’s pesticide branch is not responsible for soil remediation. The branch merely enforces the sale, distribution, and use of pesticides. The pesticide branch “does not conduct soil testing for pesticide residue when a company is no longer farming.” E-mail from Thomas Matsuda, Pesticide Program Manager, Haw. Dep’t of Agric. to author (May 12, 2014) (on file with author).

<sup>104</sup> See *Robinson v. Ariyoshi*, 65 Hawai‘i 641, 658 P.2d 287 (1982). Chief Justice Richardson opined that “we find the public interest in the waters of the kingdom was understood to necessitate a retention of authority and the imposition of a concomitant duty to maintain the purity and flow of our waters for future generations and to assure that the waters of our land are put to reasonable and beneficial uses.” *Id.* at 674, 658 P.2d at 310.

industry as an opportunity to recognize the public's interest in Hawai'i's natural resources and clean environment.<sup>105</sup> An increase in cultural and environmental awareness led community members to call for the enactment of constitutional provisions designed to protect Hawai'i's natural resources for future generations.<sup>106</sup> By the late 1970s, cheaper labor options emerged in other countries and the sugar industry started to leave.<sup>107</sup> Communities in Hawai'i used the industry's decline to reassess the State's approach to resource management.<sup>108</sup> The fights over water and other resources were significant catalysts for the 1978 Hawai'i Constitutional Convention ("ConCon").<sup>109</sup>

During the ConCon, delegates established the public trust and other environmental safeguards as a constitutional mandate, and sought to prevent future exploitation of Hawai'i's natural and cultural resources.<sup>110</sup> By incorporating heightened environmental protections, Hawai'i's constitution precluded the State or any state agency from using natural resources solely for economic gain.<sup>111</sup> The State was no longer legally allowed to disregard the public's interest in protecting natural resources within the trust.<sup>112</sup> The State's trust responsibilities over Hawai'i's natural resources is also consistent with Native Hawaiian systems of land tenure, the public trust doctrine, and judicial opinions issued by the Hawai'i Supreme Court around that time.<sup>113</sup>

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<sup>105</sup> See Sproat, *Where Justice Flows*, *supra* note 94, at 547 (stating that when sugar plantations began to close and lose their economic dominance, communities around Hawai'i sought to manage their natural resources more proactively "for the benefit of the larger community, rather than for the profit of a handful of private interests").

<sup>106</sup> See Sproat, *Where Justice Flows*, *supra* note 94, at 547.

<sup>107</sup> See Voosen, *supra* note 2.

<sup>108</sup> Sproat, *Where Justice Flows*, *supra* note 94, at 547. In the 1960s and 1970s, statehood sparked a Hawaiian movement that sought to reaffirm the public's right to water and other natural resources. Sproat, *Where Justice Flows*, *supra* note 94, at 545. The movement occurred after Hawai'i became the 50th state in the United States in 1959. At that time, Hawai'i began to select its own judges as opposed to being appointed by officials in Washington D.C., as was the practice when Hawai'i was a territory. WILCOX, *supra* note 21, at 29. The newly-selected judges had a better understanding of Hawai'i laws and issues, including native custom and tradition, and thus, were able to use that understanding to create a solid foundation for Hawai'i's common law. Sproat, *Where Justice Flows*, *supra* note 94, at 545.

<sup>109</sup> See generally Sproat, *Where Justice Flows*, *supra* note 94.

<sup>110</sup> See HAW. CONST. art. XI, § 1. See also HAW. CONST. art. XI, §§ 3, 6, 7, 9.

<sup>111</sup> See generally *In re Water Use Permit Applications*, 94 Hawai'i 97, 9 P.3d 409 (2000) [hereinafter *Wāiahole I*] (clarifying the state's responsibilities under article XI, section 1 of the Hawai'i Constitution).

<sup>112</sup> See *id.* at 140, 9 P.3d at 452.

<sup>113</sup> See Sproat, *Where Justice Flows*, *supra* note 94, at 541-42.

## 2. Emergence of the GE Industry: Where Are We Now?

From 1980 to 2008, land in active agriculture cultivation on O‘ahu declined by 36,900 acres (77%).<sup>114</sup> This was largely due to redirection in or the closure of sugarcane and pineapple plantations.<sup>115</sup> After the plantations closed, the Hawai‘i agriculture industry floundered for some time.<sup>116</sup> Hawai‘i was left with large acres of available lands, an agricultural workforce, and a new constitution that established the ways in which the State would promote diversified agriculture and manage natural resources, but with no tenants to steward the land.<sup>117</sup>

Many view the GE Industry as having saved Hawai‘i’s agricultural lands from development.<sup>118</sup> During the 1980s, seed companies slowly began to fill the void left by the sugar and pineapple industries.<sup>119</sup> Given their financial resources, seed companies are typically the highest bidders for farmland in the market, giving them access to some of the best agricultural lands in Hawai‘i.<sup>120</sup>

In 1994, the Hawai‘i State Legislature passed Senate Bill No. 3045, which created the Agribusiness Development Corporation

<sup>114</sup> DEPARTMENT OF PLANNING AND PERMITTING, CITY AND COUNTY OF HONOLULU, O‘AHU AGRICULTURE: SITUATIONS, OUTLOOK, AND ISSUES 20 (2011) [hereinafter O‘AHU AGRICULTURE].

<sup>115</sup> O‘AHU AGRICULTURE, *supra* note 114, at 20.

<sup>116</sup> OFFICE OF PLANNING, DEP‘T OF BUSINESS ECONOMIC DEVELOPMENT & TOURISM, INCREASED FOOD SECURITY AND FOOD SELF-SUFFICIENCY STRATEGY, VOLUME II: A HISTORY OF AGRICULTURE IN HAWAII AND TECHNICAL REFERENCE DOCUMENT 7 (Oct. 2012), *available at* [http://files.hawaii.gov/dbedt/op/spb/Volume\\_II\\_History\\_of\\_Agriculture\\_in\\_Hawaii\\_and\\_Technical\\_Reference\\_Document\\_FINAL.pdf](http://files.hawaii.gov/dbedt/op/spb/Volume_II_History_of_Agriculture_in_Hawaii_and_Technical_Reference_Document_FINAL.pdf) (stating that the State experienced financial loss and hardship when the sugar industry began to close). *See also* Andrew Gomes, *HC&S, last of sugar cane plantations, on track toward more financial losses*, THE HONOLULU ADVERTISER (Nov. 15, 2009), <http://the.honoluluadvertiser.com/article/2009/Nov/15/ln/Hawaii911150370.html>.

<sup>117</sup> *See* HAW. CONST. art. XI, §§ 1, 3, 9. *See also* Interview with Russell Kokubun, *supra* note 18.

<sup>118</sup> Voosen, *supra* note 2; *see* HAWAII‘I CROP IMPROVEMENT ASSOCIATION, AGRICULTURAL BIOTECHNOLOGY, BENEFITS FOR HAWAII‘I, *available at* <http://www.hciaonline.com/wp-content/uploads/2012/12/HCIA-factsht2F-lores.pdf>. “Many in Hawaiian agriculture see the seed companies as saviors. The firms have spared farmland that would otherwise be lost to development.” Voosen, *supra* note 2. It is also worth noting that under article XI, section 3 of Hawai‘i’s constitution, the State is obligated to designate a portion of its lands as “important agricultural lands.” HAW. CONST. art. XI, §3; *see also* HAW. REV. STAT. § 205-44 (2008).

<sup>119</sup> O‘AHU AGRICULTURE, *supra* note 114, at 15. Seed companies are both buying and leasing agricultural lands in the state of Hawai‘i. *See* O‘AHU AGRICULTURE, *supra* note 114, at 15 (reviewing land that was purchased by Monsanto, Pioneer Hi-Bred, and Syngenta).

<sup>120</sup> O‘AHU AGRICULTURE, *supra* note 114, at 15.



(“ADC”).<sup>121</sup> Through this bill, the legislature found that “the downsizing of the sugar and pineapple industries [was] presenting an unprecedented opportunity for the conversion of agriculture into a dynamic growth industry.”<sup>122</sup> The State intended to use these former plantation lands to promote diversified agriculture.<sup>123</sup> “Diversified agriculture” appears to include any crop other than sugarcane or pineapple.<sup>124</sup> To achieve this goal, the State re-entered into its relationship with industrial agriculture, but instead of growing conventional crops, the State embraced the newest agricultural innovation: GE technology.<sup>125</sup>

Hawai‘i’s GE Industry consists of two operations: (1) cultivating GE crop seeds for export and commercial distribution in North and South America; and (2) conducting field trials of new GE crops that have not yet been approved for commercial distribution.<sup>126</sup> Hawai‘i’s year-round growing season and the availability of large tracts of land make it an ideal

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<sup>121</sup> S.B. 3045, 14th Leg., Reg. Sess. (Haw. 1994). *See also* ERIC MAEHARA, LEGISLATIVE REFERENCE BUREAU, AGRIBUSINESS DEVELOPMENT CORPORATION: REVISITED, REPORT NO. 3 4 (2007), available at <http://lrbhawaii.info/lrbbrpts/06/agri.pdf>.

<sup>122</sup> HAW. REV. STAT. § 163D-1 (1994). The legislature predicted that “[t]he downsizing of the sugar and pineapple industries will idle a valuable inventory of supporting infrastructure including irrigation systems, roads, drainage systems, processing facilities, workshops, and warehouses.” HAW. REV. STAT. § 163D-1.

<sup>123</sup> HAW. REV. STAT. § 163D-5 (1994). This statute states that the Agribusiness Development Corporation “shall prepare the Hawaii agribusiness plan which shall define the and establish its agribusiness development strategy.” HAW. REV. STAT. § 163D-5(a). The statute goes on to state that “[t]he plan shall include but not be limited to . . . [a]lternatives in the establishments of sound financial programs to promote the development of diversified agriculture.” HAW. REV. STAT. § 163D-5(1)(4).

<sup>124</sup> *See* E-mail from Hector Valenzuela, Crop Specialist, Coll. of Tropical Agric. and Human Res., Univ. of Haw. at Mānoa, to author (May 1, 2014) (on file with author) (stating that “[b]y definition in Hawaii diversified ag[riculture] is anything that is not ‘sugarcane or pineapples’”). *See also* NATIONAL AGRICULTURAL STATISTICS SERVICES, HAWAII AGRICULTURE 2011 2 (Dec. 10, 2012), available at [http://www.nass.usda.gov/Statistics\\_by\\_State/Hawaii/Publications/Miscellaneous/hiag.pdf](http://www.nass.usda.gov/Statistics_by_State/Hawaii/Publications/Miscellaneous/hiag.pdf) (calculating farm values for “diversified agriculture” separately from the farm values for “sugar (unprocessed cane)” and “pineapple (fresh equivalent).” *Id.*

<sup>125</sup> Voosen, *supra* note 2. *See also* O‘AHU AGRICULTURE, *supra* note 114, at 45-48 (highlighting the food security risks that the state faces if it continues to rely on imported crops).

<sup>126</sup> By 2008, there was a total of 4,800 acres (1,940 hectares) of seed crops grown throughout the state: 3,500 acres (1,415 hectares) of corn and soybeans, 1,000 acres (405 hectares) for papaya, and the remaining 10% of lands are used for field trials for new potential GE crops. Robynne Boyd, *Genetically Modified Hawai‘i*, SCIENTIFIC AMERICAN (Dec. 8, 2008), <http://www.scientificamerican.com/article.cfm?id=genetically-modified-hawaii>. This number has since grown exponentially. LOUDAT & KASTURI, *supra* note 64, at 2.

location for the GE Industry.<sup>127</sup> Moreover, one report noted that Hawai‘i’s “stable political and economic environment” also makes it a good choice.<sup>128</sup>

Today, Hawai‘i faces a “new Big Five” and a second era of industrial agriculture.<sup>129</sup> While the former plantations cultivated sugarcane and pineapples for human consumption, the new seed corporations that descended on Hawai‘i do not grow food for immediate consumption.<sup>130</sup> Some argue that using prime agricultural lands for non-foods (i.e., seed corn and GE testing) undercuts efforts towards Hawai‘i’s food self-sufficiency.<sup>131</sup> This is particularly significant given that in 2008, Hawai‘i’s agriculture was dominated by exports (85% of sales in Hawai‘i); however,

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<sup>127</sup> Boyd, *supra* note 126. Seed companies can harvest three to four yields of corn per year in Hawai‘i, which is significant compared to the continental United States where one can only harvest one crop each year. According to a spokesperson for Pioneer Hi-Bred International in Waimea, Kaua‘i, Cindy Goldstein, “Hawai‘i is ideally suited for field trials and seed production, because of the climate and the ability to grow corn and soybeans 52 weeks a year.” Boyd, *supra* note 126. In addition, “Hawaii has the added advantage of extensive amounts of available land due to the downturn in sugar and pineapple over the past decade[.]” Boyd, *supra* note 126.

<sup>128</sup> LOUDAT & KASTURI, *supra* note 64, at iii.

<sup>129</sup> The presence of the “Big Five” seed companies in Hawai‘i is eerily reminiscent of the “Big Five” sugar companies that dominated Hawai‘i during the 1800s and early 1900s. Like the original plantation “Big Five,” many believe that the “New Big Five” is beginning to exercise increasing political influence, control over natural resources, and economic dominance in the State of Hawai‘i as well. *See e.g.*, Sophie Cocke, *Why Is A Monsanto Lobbyist Serving On A Water Resource Panel?*, CIVIL BEAT (Feb. 12, 2013), <http://www.civilbeat.com/articles/2013/02/12/18318-why-is-a-monsanto-lobbyist-serving-on-a-water-resource-panel/>.

<sup>130</sup> *See* Voosen, *supra* note 2. Al Santoro, a retired naval intelligence officer who owns a small organic farm on Oahu’s northern shore, is quoted in the New York Times saying that “[GE Companies] are using vacant land and creating jobs, but their seed, flowing back to research centers on the mainland or South America, is not feeding Hawaiians[.]” *Id.*

<sup>131</sup> Interview with Hector Valenzuela, Crop Specialist, Coll. of Tropical Agric. and Human Res., Univ. of Haw. at Mānoa (Feb. 11, 2013); O‘AHU AGRICULTURE, *supra* note 114, at 45-48; Voosen, *supra* note 2. The New York Times stated that for a state that imports nearly 90 percent of its food, the trend of using agricultural land to produce exported seeds is “unsettling.” Voosen, *supra* note 2. There appears to be some effort, however, to support small farmers while also supporting the larger seed industry. *See HAF Ag Park at Kunia*, HAWAIIAGFOUNDATION.ORG, <http://www.hawaiiagfoundation.org/haf-ag-park-kunia> (reporting on alternative efforts to support small, diversified farms, while also promoting the seed corn industry’s presence in Hawai‘i) (last visited Apr. 18, 2014). *See also* Andrew Gomes, *Nonprofit plans agricultural park for local farmers*, STAR ADVERTISER (Mar. 23, 2011 1:30 AM), [http://www.staradvertiser.com/business/20110323\\_Nonprofit\\_plans\\_agricultural\\_park\\_for\\_local\\_farmers.html](http://www.staradvertiser.com/business/20110323_Nonprofit_plans_agricultural_park_for_local_farmers.html) (reporting on how the Army and its private development partner leased 1, 675 acres of land to Monsanto to grow seed corn in Kunia, but also required that 10% of the land be used as an agricultural park for small farmers).

most of the food consumed in Hawai‘i was imported (almost 66% of the fresh fruits and vegetables consumed).<sup>132</sup>

*Seed Crop Operations as an Economic Boom*

The GE companies in Hawai‘i specialize in the cultivation of crop seeds.<sup>133</sup> Local operations produce seeds that are exported to both North and South America for further development and worldwide distribution.<sup>134</sup> The GE Industry is growing quickly. In 2013, GE companies utilized nearly 25,000 acres of land<sup>135</sup> across ten farms on the islands of O‘ahu, Maui, Kaua‘i, and Moloka‘i.<sup>136</sup> GE seed corn is now Hawai‘i’s top crop,<sup>137</sup> comprising roughly 80-85% of the GE seed nurseries in Hawai‘i.<sup>138</sup> Soybeans represent 14-19% of the Industry, while the last 1% of the industry represents other types of GE seeds.<sup>139</sup> The GE seed corn industry brought in nearly \$243 million in revenue to the State of Hawai‘i in 2011 alone.<sup>140</sup> The seed crop industry benefits Hawai‘i by contributing tax revenue, creating job opportunities, and diversifying the local economy.<sup>141</sup> Despite these benefits, the environmental risks associated with the Industry’s presence have incited harsh criticisms and protests from the local communities that are forced to host this industry.<sup>142</sup> According to a

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<sup>132</sup> O‘AHU AGRICULTURE, *supra* note 114, at 45-48.

<sup>133</sup> Voosen, *supra* note 2.

<sup>134</sup> LOUDAT & KASTURI, *supra* note 64, at 2.

<sup>135</sup> Andrew Pollack, *Unease in Hawaii’s Cornfields*, NY TIMES (Oct. 7, 2013), [http://www.nytimes.com/2013/10/08/business/fight-over-genetically-altered-crops-flares-in-hawaii.html?pagewanted=1&\\_r=0](http://www.nytimes.com/2013/10/08/business/fight-over-genetically-altered-crops-flares-in-hawaii.html?pagewanted=1&_r=0).

<sup>136</sup> LOUDAT & KASTURI, *supra* note 64, at 2. Hawai‘i’s seed crop operations cultivate 5,625 acres of land across the ten farms. LOUDAT & KASTURI, *supra* note 64, at 2.

<sup>137</sup> LOUDAT & KASTURI, *supra* note 64, at 3.

<sup>138</sup> Interview with Mark Phillipson, President of the Hawai‘i Crop Improvement Association and Lead Corporate/External Relations for Syngenta (Mar. 13, 2013) [hereinafter Interview with Mark Phillipson (Mar. 2013)].

<sup>139</sup> Interview with Mark Phillipson (Mar. 2013), *supra* note 138. Some GE companies, such as Monsanto, also grow conventional crops that may be used for future transgene incorporation. Interview with Alan Takemoto, *supra* note 58.

<sup>140</sup> NATIONAL AGRICULTURAL STATISTICS SERVICES, *supra* note 124, at 2 (summarizing the top 20 agricultural commodities in the State of Hawai‘i for 2010-2011). The report cites the demand for ethanol production as a possible factor for the continued expansion of seed corn operations in Hawai‘i. NATIONAL AGRICULTURAL STATISTICS SERVICES, *supra* note 124, at 1.

<sup>141</sup> LOUDAT & KASTURI, *supra* note 64, at 3.

<sup>142</sup> See Ohkawa, *supra* note 8.

2012 report from the Agricultural Liaison, the biggest barrier to the success of the seed companies in Hawai‘i is the controversy surrounding GE technology.<sup>143</sup>

*GE Industry’s Field Trials and Veil of Secrecy*

In addition to the production of GE seeds, Hawai‘i is also one of the nation’s leading locations for open-air field trials of new GE crops.<sup>144</sup> The field trials are a necessary step to perfect a new GE crop before commercialization.<sup>145</sup> Typically, GE scientists start by testing a crop in a laboratory, then in a green house, and finally in trials conducted in open-air fields.<sup>146</sup> The results of the field trials give regulatory agencies the necessary information to evaluate whether the crop poses a plant pest risk—the only criteria used to regulate the release of GE organisms<sup>147</sup>—and also to determine the conditions under which the crop can be grown successfully.<sup>148</sup>

To date, Hawai‘i has been subjected to more than 2,230 GE crop field trials, including corn, soybean, cotton, potatoes wheat, alfalfa, beets, rice, sunflower, and sorghum—all of which contain transgenic traits.<sup>149</sup> Field trials are a particularly worrisome threat to Hawai‘i’s natural resources because there is relatively little information detailing the Industry’s open-air field trials in the islands. Most of the information surrounding the field trials in Hawai‘i is considered “confidential business information” (“CBI”),<sup>150</sup> and is thus protected as trade secrets.<sup>151</sup> This lack

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<sup>143</sup> OFFICE OF THE MAYOR, CITY AND COUNTY OF HONOLULU, AGRICULTURAL LIAISON REPORT ON INITIAL OUTREACH PROVIDED TO MEMBERS OF THE CITY COUNCIL 7 (2012), *available at* <http://www.laurathielen.com/wp-content/uploads/2012/11/CityAgPriorities1-11-12.pdf>.

<sup>144</sup> Statistics on Number of Issued Field Trial Notifications and Permits Issued, INFORMATION SYSTEMS FOR BIOTECHNOLOGY, [www.isb.vt.edu](http://www.isb.vt.edu) (follow “View Charts from GE Crop Data” hyperlink; then follow “Charts Demonstrating Location Distribution of Releases and Notifications by Year(s)” hyperlink; select “2012” and “Locations”; follow “Retrieve Charts” hyperlink).

<sup>145</sup> Interview with Mark Phillipson (Mar. 2013), *supra* note 138.

<sup>146</sup> However, a representative for Syngenta stated that the greenhouse was not a necessary phase of new crop production. Interview with Mark Phillipson (Mar. 2013), *supra* note 138.

<sup>147</sup> *See* Plant Protection Act, 7 U.S.C. §§ 7701-7721 (2000); 7 C.F.R. § 340 (2005).

<sup>148</sup> MICHAEL R. TAYLOR, JODY S. TICK, & DIANE M. SHERMAN, PEW INITIATIVE, TENDING THE FIELDS: STATE & FEDERAL ROLES IN THE OVERSIGHT OF GENETICALLY MODIFIED CROPS 44 (2004).

<sup>149</sup> Boyd, *supra* note 126.

<sup>150</sup> The State of Hawai‘i attempted to receive information regarding the GE test

of information was a topic in at least one lawsuit brought by the non-profit environmental law firm Earthjustice.<sup>152</sup>

### III. REGULATION OF THE GE INDUSTRY

Since scientists first invented GE technology, the United States has viewed it as having enormous potential benefits and relatively minor (or at most, manageable) risks.<sup>153</sup> As a result, the United States established regulations that encouraged the development of GE technology.<sup>154</sup> Because the United States felt that the existing statutory schemes “seem adequate” and “appear to accommodate [the] new products,”<sup>155</sup> the U.S. government decided that no new laws or agencies were necessary to regulate the GE Industry.<sup>156</sup> Instead, the Coordinated Framework for Regulation of Biotechnology of 1987 (“Coordinated Framework”) utilized at least twelve existing federal laws to regulate all aspects of new GE

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location through official avenues when Monsanto wanted to conduct a field trial in Hawai‘i in 2001. Amendment/Extension of an Experimental Use Permit, 66 FR 39163-02 (2001). In reply, Monsanto “claimed the participant and cooperator information as confidential business information” and that the State’s request must be processed through the Freedom of Information Act. *Id.* The United States District Court of Hawai‘i later determined that the location of a GE field trial is not considered a trade secret. *See* Center for Food Safety v. Ann Veneman, No. 03-00621 (June 29, 2004) (Magistrate Judge Kurren’s order finding that “a field test site location is not a trade secret”).

<sup>151</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 80. CBI is information that is protected as a trade secret. 7 C.F.R. 340.4 (2005). As a result, CBI status means that the information is exempt from the Freedom of Information Act and need not be disclosed to the public. *See* 5 U.S.C. § 552(b)(4) (2009). Both federal and state laws do not require companies growing GE crops or conducting field trials of regulated crops to disclose to the State or to the public the whereabouts of their activities. HAW. REV. STAT. § 321-11.6 (1988); 7 C.F.R. 340.4 (2007). Such information is protected as “Confidential Business Information” (CBI). *See* 7 C.F.R. 340.4 (2007). *See also* John S. Applegate, *The Prometheus Principle: Using the Precautionary Principle to Harmonize the Regulation of Genetically Modified Organisms*, 9 INDIANA J. OF GLOBAL LEGAL STUDIES 207, 208 (2001).

<sup>152</sup> *See* Ctr. For Food Safety v. Johanns, 451 F. Supp. 2d 1165, 1170 (D. Haw. 2006). Earthjustice is a nonprofit environmental law firm. Earthjustice’s “Mid-Pacific office protects the [Hawaiian] islands’ native species from the threats of habitat destruction, overfishing, and harmful sonar use, and . . . work[s] with local Hawaiian organizations to restore the islands’ waterways.” *Mid-Pacific*, EARTHJUSTICE, <http://earthjustice.org/about/offices/mid-pacific> (last visited Apr. 19, 2013).

<sup>153</sup> John S. Applegate, *The Prometheus Principle: Using the Precautionary Principle to Harmonize the Regulation of Genetically Modified Organisms*, 9 IND. J. GLOBAL LEGAL STUD. 207, 208 (2001).

<sup>154</sup> *Id.*

<sup>155</sup> Proposal for a Coordinated Framework for Regulation of Biotechnology, 49 Fed. Reg. 50856-01 (Dec. 31, 1984).

<sup>156</sup> *Id.*

technology.<sup>157</sup> The Coordinated Framework divides power and oversight of the GE Industry among three federal agencies: the Food and Drug Administration (“FDA”),<sup>158</sup> the Environmental Protection Agency (“EPA”),<sup>159</sup> and the U.S. Department of Agriculture (“USDA”).<sup>160</sup>

A. *Federal and State Regulation of Hawai‘i’s GE Industry*

1. The Release of GE Crops: Who is Watching?

The USDA is tasked with overseeing the field testing of GE crops and determining when a GE crop is ready for commercial distribution.<sup>161</sup>

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<sup>157</sup> PEW INITIATIVE ON FOOD & BIOTECHNOLOGY, ISSUES IN THE REGULATION OF GENETICALLY ENGINEERED PLANTS AND ANIMALS, 7 tbl 1.1 (2005) (identifying the twelve federal laws as the following: The Federal Insecticide, Fungicide, and Rodenticide Act; the Toxic Substances Control Act; the Food, Drug, and Cosmetic Act; the Plant Protection Act; the Virus Serum Toxin Act; the Animal Health Protection Act; the Federal Meat Inspection Act; the Poultry Products Inspection Act; the Egg Products Inspection Act; the Animal Damage Control Act; the Animal Welfare Act; and the National Environmental Protection Act). *See generally*, Coordinated Framework for Regulation of Biotechnology, 51 Fed. Reg. 23302-01 (June 26, 1986).

<sup>158</sup> The FDA is responsible for the safety of all food products and animal feeds in the United States under the Federal Food, Drug, and Cosmetic Act (“FFDCA”). However, meat and poultry are regulated by the USDA. The Center for Food Safety and Applied Nutrition within the FDA, presides over the safety of food created from GE crops. The FDA does not treat GE crops any differently than coventionally-modified crops. The FDA determined that “[i]n most cases, the substances expected to become components of food as a result of genetic modification of a plant will be the same as or substantially similar to substances commonly found in food, such as proteins, fats and oils, and carbohydrates.” As a result, the FDA determined that food created from GE crops will be generally recognized as safe by experts. Alarmingly, this determination was made with no risk assessments or safety reviews and “no biological, toxicological, or immunological data to back up the assumption of safety.” It is left to the manufacturer— not the FDA—to determine whether a food or food additive is generally recognized as safe by experts. Because the FDA does not believe that GE foods differ significantly from conventional food, the agency does not require labeling of GE foods. Manufacturers of GE food have little incentive to investigate possible risks of GE food or to collect information that would enable a complete risk assessment. Maria R. Lee-Muramoto, *Reforming the “Uncoordinated” Framework for Regulation of Biotechnology*, 17 DRAKE J. AGRIC. L. 311, 320-21 (2012).

<sup>159</sup> The EPA has the authority to set allowable tolerances for pesticide residue in food products, Federal Food, Drug, and Cosmetic Act, 21 U.S.C. § 346a(b)(1), ensure safe pesticide use through pesticide labeling, Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 136-136y, and regulate plants that produce their own pesticide as “plant-incorporated protectants” (“PIPs”), 40 C.F.R. §§ 174.1, 174.3 (2011).

<sup>160</sup> Coordinated Framework for Regulation of Biotechnology, 51 Fed. Reg. 23302-01, 23303 (June 26, 1986).

<sup>161</sup> USDA, STRATEGIC PLAN FY 2010-2015 23 (2010), *available at* <http://www.ocfo.usda.gov/usdasp/sp2010/sp2010.pdf> (stating that one of the USDA’s objectives is to “[e]nhance America’s ability to develop and trade agricultural products derived from new technologies[,]” which includes GE technology).

The USDA also protects and promotes American agriculture,<sup>162</sup> and follows a philosophy of “substantial equivalence” so to “not . . . regulate an organism or product merely because of the process by which it was produced.”<sup>163</sup> The agency’s authority to regulate the release of GE crops comes from the Plant Protection Act (“PPA”).<sup>164</sup> Under the PPA, the USDA is responsible for regulating potentially noxious weeds and plant pests that may harm the agriculture industry.<sup>165</sup> During the trial phase, GE crops are classified as a plant pest or potential plant pest, placing them under the PPA’s authority.<sup>166</sup> The Animal and Plant Health Inspection Service (“APHIS”), an agency within the USDA, is responsible for regulating field trials of GE crops deemed plant pests or potential plant pests.<sup>167</sup> Before a “regulated article” (i.e., a GE crop that is still in its testing phase) is introduced or released into the environment, APHIS must first authorize the introduction.<sup>168</sup> APHIS can authorize the introduction of GE organisms through a notification process or a more stringent permitting process.<sup>169</sup>

Only 1% of new GE crops approved for field trials go through the permitting process.<sup>170</sup> If utilized, the permitting process requires APHIS to conduct an Environmental Impact Statement (“EIS”) or an Environmental

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<sup>162</sup> *Id.*

<sup>163</sup> Introduction of Organisms and Products Altered or Produced Through Genetic Engineering Which Are Plant Pests or Which There is Reason to Believe Are Plant Pests, 51 Fed. Reg. 23352-01, 23352 (June 26, 1986). The USDA proposed that it should regulate

only genetically engineered organisms or products which are plant pests or for which there is reason to believe are plant pests, and not to regulate an organism or product merely because of the process by which it was produced. The USDA believes that an organism or product is a plant pest if the donor, recipient, vector, or vector agent of the genetically engineered organism or product comes from a member of one of the groups listed in § 340.2.

*Id.*

<sup>164</sup> Plant Protection Act, 7 U.S.C. § 7714 (2002). *See also* Lee-Muramoto, *supra* note 158, at 318.

<sup>165</sup> 7 C.F.R. § 340.2 (2005).

<sup>166</sup> 7 C.F.R. § 340.2.

<sup>167</sup> 7 C.F.R. § 340.2; *see also* Lee-Muramoto, *supra* note 158, at 318.

<sup>168</sup> Plant Protection Act, 7 U.S.C. § 7711(a) (2000); 7 C.F.R. § 340.0 (2005).

<sup>169</sup> 7 C.F.R. §§ 340.3-.4.

<sup>170</sup> Lee-Muramoto, *supra* note 158, at 318; *see also* COUNCIL ON ENVIRONMENTAL QUALITY & OFFICE OF SCI. & TECH. POLICY, CASE STUDY NO. III: HERBICIDE-TOLERANT SOYBEAN 4 (2001), available at [http://www.whitehouse.gov/files/documents/ostp/Issues/ceq\\_ostp\\_study4.pdf](http://www.whitehouse.gov/files/documents/ostp/Issues/ceq_ostp_study4.pdf) (stating that nearly 99% of GE field trials are conducted under the notification process).

Assessment (“EA”) to determine the potential environmental risks associated with the release of the GE crop.<sup>171</sup> The permitting process focuses on confinement in the field site to prevent the plant, or its progeny, from cross contaminating with other plants.<sup>172</sup> With the increase in GE experimentation, however, there has been a noticeable lack of new crops that go through the more stringent permitting process.<sup>173</sup>

An overwhelming majority of field trials are conducted without an EIS or EA. Nearly 99% of all “field tests, imports, and interstate movement of GE plants take place under the notification process, rather than the permitting process of the PPA.”<sup>174</sup> The notification process is less stringent than the permitting process, and typically only requires GE companies to notify APHIS prior to the release of the GE plant.<sup>175</sup> It does not require APHIS to conduct an EIS or EA before approving the release of GE organisms.<sup>176</sup> Instead, the notification process allows GE companies to perform their own risk evaluation on the crops they want to release during field trials.<sup>177</sup> Under this notification process, the GE developers and APHIS do not have to consider all risks, such as whether the plant is hazardous to human health or the environment.<sup>178</sup> Instead, the notification process focuses on specific concerns, such as whether the GE plant is a considered a weed.<sup>179</sup> Overall, release of crops through the notification process means that GE companies are releasing most test crops without assessing all risks that the crop’s traits may pose to the natural

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<sup>171</sup> 7 C.F.R. § 340.4. See Gregory N. Mandel, *Gaps, Inexperience, Inconsistencies, and Overlaps: Crisis in the Regulation of Genetically Modified Plants and Animals*, 45 WM. & MARY L. REV. 2167, 2231-32 (2004).

<sup>172</sup> See 7 C.F.R. § 340.4.

<sup>173</sup> Lee-Muramoto, *supra* note 158, at 318.

<sup>174</sup> Lee-Muramoto, *supra* note 158, at 318. See also COUNCIL ON ENVTL QUALITY & OFFICE OF SCI. & TECH. POLICY, CASE STUDY NO. III: HERBICIDE-TOLERANT SOYBEAN 4 (2001), available at [http://www.whitehouse.gov/files/documents/ostp/Issues/ceq\\_ostp\\_study4.pdf](http://www.whitehouse.gov/files/documents/ostp/Issues/ceq_ostp_study4.pdf) (stating that nearly 99% of GE field trials are conducted under the notification process).

<sup>175</sup> 7 C.F.R. § 340.3.

<sup>176</sup> 7 C.F.R. § 340.3.

<sup>177</sup> See 7 C.F.R. § 340.3. See also Gregory N. Mandel, *Toward Rational Regulation of Genetically Modified Food*, 4 SANTA CLARA J. INT’L L. 21, 21 (2006).

<sup>178</sup> 7 C.F.R. § 340.3(b).

<sup>179</sup> 7 C.F.R. § 340.3(b). 7 C.F.R. § 340.3(b)(1) specifically provides that the regulated GE plant does not require a permit under 7 C.F.R. § 340.4 if the plant “is not listed as a noxious weed in regulations at 7 C.F.R. part 360 under the Plant Protection Act (7 U.S.C. 7712), and, when being considered for release into the environment, the regulated article is not considered by the Administrator to be a weed in the area of release into the environment.” 7 C.F.R. § 340.3(b)(1).



environment.<sup>180</sup>

GE companies are also able to protect sensitive information about the field trials as a trade secret.<sup>181</sup> GE developers who submit field test applications that contain CBI, such as the type of trait being tested, can protect that information by submitting two applications: one with the CBI and another with the CBI redacted.<sup>182</sup> Often, state governments are not privy to the CBI because the information is protected as a trade secret.<sup>183</sup> There has been an increase in the classification of information as CBI over the years as well.<sup>184</sup> As a result, the federal government is conducting less research regarding the potential environmental risks associated with the release of new GE crops, while also providing the states and the public with less information about the nature and location of those field trials.<sup>185</sup> Without state regulations, the current framework leaves states open to unanticipated harm.<sup>186</sup>

Moreover, according to one report, “the USDA does not inspect all field trial sites where GE crops are tested; instead, it uses a risk-based approach to select sites for inspection.”<sup>187</sup> One GE company in Hawai‘i indicated that the USDA checks fields approximately once each month,

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<sup>180</sup> Mandel, *Toward Rational Regulation*, *supra* note 177, at 21.

<sup>181</sup> Mandel, *Toward Rational Regulation*, *supra* note 177, at 21.

<sup>182</sup> 7 C.F.R. § 340.4 (2005). *See also* TAYLOR, TICK, & SHERMAN, *supra* note 148, at 46.

<sup>183</sup> 7 C.F.R. § 340.4 (stating that “[w]hen it is determined that an application is complete, APHIS shall submit to the State department of agriculture of the State where the release is planned, a copy of the initial review and a copy of the application marked, ‘CBI Deleted’, or ‘No CBI’ for State notification and review”). *See also* TAYLOR, TICK, & SHERMAN, *supra* note 148, at 46. States may request CBI directly from the GE companies, but they are not privy to the CBI through the USDA. Hawai‘i’s DOA purports to stay in communication with the GE companies, but the GE companies are not required to disclose CBI, such as what types of GE crops they are growing or where they are growing such crops, under the current state of the law. *See infra* Section VIII (providing recommendations for how Hawai‘i may obtain relevant CBI from the GE companies).

<sup>184</sup> Lee-Muramoto, *supra* note 158, at 318.

<sup>185</sup> Lee-Muramoto, *supra* note 158, at 318.

<sup>186</sup> *See* TAYLOR, TICK, & SHERMAN, *supra* note 148, at 46 (highlighting some risks associated with GE crops).

<sup>187</sup> U.S. GOVERNMENT ACCOUNTABILITY OFFICE, REPORT TO THE COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY, U.S. SENATE, GENETICALLY ENGINEERED CROPS, AGENCIES ARE PROPOSING CHANGES TO IMPROVE OVERSIGHT, BUT COULD TAKE ADDITIONAL STEPS TO ENHANCE COORDINATION AND MONITORING 18 (2008) [hereinafter GAO REPORT].

but the fields that the USDA inspects vary from month to month.<sup>188</sup> Another company stated that their trials are inspected annually.<sup>189</sup> The USDA takes enforcement action by issuing enforcement letters and assessing financial penalties.<sup>190</sup> “During inspections, USDA officials check records, make visual or photographic observations, and conduct interviews to determine regulatory compliance, including whether regulated material might have been inadvertently released.”<sup>191</sup> According to USDA officials, the agency does not have adequate resources to develop the methods necessary to determine whether regulated GE material has escaped the control of the GE developer.<sup>192</sup> However, a 2008 Government Accountability Office (“GAO”) report indicates that given the nature of the crop, escape is likely.<sup>193</sup> In lieu of a more stringent oversight of the field trials, developers are required to self-report

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<sup>188</sup> E-mail from Mark Phillipson, President of the Hawai‘i Crop Improvement Association and Lead Corporate/External Relations for Syngenta, to author (Apr. 18, 2013) (on file with author).

The USDA generally do[es] monthly inspections. They do not inspect every trial every month, but choose random trials each time. An inspection consists of the official checking our USDA notification to be sure we have followed all regulations for the trial being inspected, then we take them to the field to see the specific trial. They will take GPS coordinates at the four corners of the trial and compare those to the GPS coordinates that we have reported to them, they take pictures of the trial and walk through the trial taking notes for their reports.

*Id.*

<sup>189</sup> E-mail from Alan Takemoto, Community Affairs Manager, Monsanto, to author (May 5, 2014) (on file with author).

<sup>190</sup> GAO REPORT, *supra* note 187, at 18.

<sup>191</sup> GAO REPORT, *supra* note 187, at 19. A representative from Monsanto Hawai‘i stated that the USDA inspects Monsanto’s operations “to ensure proper hygiene is followed in handling of the seed, verification of isolation distance when growing a regulated crop and ensuring vs. a conventional crop [sic], and to review [their] planting and harvesting records.” E-mail from Alan Takemoto, *supra* note 189.

<sup>192</sup> GAO REPORT, *supra* note 187, at 19

<sup>193</sup> GAO REPORT, *supra* note 187, at 19 (reporting that “the ease with which genetic material from crops can be spread makes future releases likely”). *See, e.g.*, The Associated Press, *Japan Suspends Some Imports of U.S. Wheat*, N.Y. TIMES (May 31, 2013), <http://www.nytimes.com/2013/05/31/business/global/japan-suspends-some-imports-of-us-wheat.html?ref=geneticallymodifiedfood&gwh=A46671EEE8B0B3CCAA27F489C354CA89>.

compliance failures, which has occurred in the past.<sup>194</sup>

Once the crop has gone through the testing phase and APHIS determines that the crop is not a plant pest, APHIS will deregulate the new GE crop.<sup>195</sup> When deciding whether to deregulate a GE crop variety, APHIS must comply with the National Environmental Policy Act (“NEPA”).<sup>196</sup> This requires “federal agencies ‘to the fullest extent possible’ to prepare an EIS for ‘every recommendation or report on proposals for legislation and other major Federal actio[n] significantly affecting the quality of the human environment.’”<sup>197</sup> NEPA “speaks solely in terms of *proposed* actions; it does not require an agency to consider the possible environmental impacts of less imminent actions when preparing the impact statement on proposed actions.”<sup>198</sup> Moreover, “[a]n agency need not complete an EIS for a particular proposal if it finds, on the basis of a shorter ‘environmental assessment’, that the proposed action will not have a significant impact on the environment.”<sup>199</sup> To date, of the 90 crops deregulated, APHIS has conducted only two EIS as a result of court orders.<sup>200</sup> When a crop receives “non-regulated status,” APHIS no longer has the authority to oversee the use of the crop and there is “no post-market surveillance to monitor how the GE plant will fare over time.”<sup>201</sup>

Hawai‘i has been the site of more field trials than any other state in the nation.<sup>202</sup> In addition, Hawai‘i is a world leader in the production of GE crop seeds.<sup>203</sup> Yet, even with Hawai‘i’s importance to the GE

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<sup>194</sup> GAO REPORT, *supra* note 187, at 19. Notably, the GAO reports state that “[a]lthough USDA’s inspection program has detected some violations of regulations, it generally has found a high rate of compliance.” GAO REPORT, *supra* note 187, at 19. The report goes on to state that field trial permitted under notification also had a high rate of compliance. GAO REPORT, *supra* note 187, at 19. From 2005-2007, USDA found eighteen permit violations of 489 inspections (about 4% were out of compliance) and seventeen notification violations of 754 inspections (about 2% out of compliance). GAO REPORT, *supra* note 187, at 19.

<sup>195</sup> 7 C.F.R. § 340.6 (2005).

<sup>196</sup> *Monsanto Co. v. Geertson Seed Farms*, 130 S. Ct. 2743, 2750 (2010) (citing to 42 U.S.C. § 4332(2)(C)).

<sup>197</sup> *Id.*

<sup>198</sup> *Id.* (quoting *Kleppe v. Sierra Club*, 427 U.S. 390, 410, n. 20 (1976)).

<sup>199</sup> 40 C.F.R. §§ 1508.9(a), 1508.13 (2009).

<sup>200</sup> Emily Montgomery, *Genetically Modified Plants and Regulatory Loopholes and Weaknesses Under the Plant Protection Act*, 37 VT. L. REV. 351, 369 (2012).

<sup>201</sup> Lee-Muramoto, *supra* note 158, at 319; 7 C.F.R. § 340.6.

<sup>202</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 48.

<sup>203</sup> USDA, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, STATE REPORT: HAWAI‘I 1 (2010), available at [http://www.aphis.usda.gov/wildlife\\_damage/state\\_report\\_pdfs/2010/12-Hawaii\\_report.pdf](http://www.aphis.usda.gov/wildlife_damage/state_report_pdfs/2010/12-Hawaii_report.pdf).

Industry's continental and worldwide production, Hawai'i does not regulate the import or release of GE crops.<sup>204</sup> Currently, four agencies are responsible for the inspection of all plant goods arriving in Hawai'i, and each agency has its own responsibilities.<sup>205</sup>

The DOA inspects imported GE crop seeds for the presence of pests and viruses, too, but it does not conduct any further investigations into the traits contained within the imported GE seeds.<sup>206</sup> Instead, the DOA is tasked with ensuring that the seeds that leave Hawai'i are pest-free and are of the correct variety.<sup>207</sup>

Although the PPA contains a preemption provision,<sup>208</sup> “[s]tates are clearly free to act to address local plant pest concerns if no interstate or foreign commerce is involved, and they can regulate movements ‘in

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<sup>204</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 48.

<sup>205</sup> Endangered and Threatened Wildlife and Plants; Listing 15 Species on Hawai'i Island as Endangered and Designating Critical Habitat for 3 Species, 77 Fed. Reg. 63928-01 (Oct. 17, 2012) (the four agencies responsible for inspecting certain arriving goods are the Hawai'i Department of Agriculture, the U.S. Department of Homeland Security-Customs and Border Protection, the USDA, and the USDA-APHIS).

<sup>206</sup> Interview with Russell Kokubun, *supra* note 18. According to a representative from Monsanto, the DOA

inspects for several different items. When shipping seed to other countries there are certifications in the seed industry that ensure purity, that the seed tag on the bag properly identifies what is actually in the bag. There is a standard in the seed production industry that all states follow. An inspection may occur 3-4 times per season (not year) if the seed has been requested to be certified by the country of origin for sale into that country.

E-mail from Alan Takemoto, *supra* note 189.

<sup>207</sup> Interview with Russell Kokubun, *supra* note 18 (“In a very simplistic way, I think one way to consider this is that whatever seed corn comes into Hawai'i, the ‘Feds’ regulate. Whatever goes out though, that is the state’s kuleana”).

<sup>208</sup> 7 C.F.R. § 301.1 (2005). 7 C.F.R. § 301.1 states that

a State or political subdivision of a State may not impose prohibitions or restrictions upon the movement in interstate commerce of articles, means of conveyance, plants, plant products, biological control organisms, plant pests, or noxious weeds if the Secretary has issued a regulation or order to prevent the dissemination of the biological control organism, plant pest, or noxious weed within the United States.

*Id.*

interstate commerce' if APHIS has not acted.”<sup>209</sup> Even if APHIS has acted, such as issuing a permit defining the conditions under which a GE crop can be planted so as not to pose a plant pest risk, a state could presumably still have its own statutory permit requirement and issue its own permit establishing conditions that “are consistent with and do not exceed” APHIS’s conditions.<sup>210</sup>

In addition, states have the authority to review a GE developer’s federal permit application and suggest whether APHIS should grant the permit or impose additional conditions.<sup>211</sup> As such, this informal consultation gives each respective state 30 days to review an application.<sup>212</sup> At the end of the state’s review, it may suggest additional restrictions to protect local interests, but it cannot block a field trial from occurring.<sup>213</sup> The State may not be able to provide sufficient recommendations during this consultation period, however, because it is not privy to the protected CBI.<sup>214</sup> This means that any review the state conducts may be without significant information about the nature of the crops being tested.<sup>215</sup>

Currently, the State of Hawai‘i requires only that a copy of the federal notification or permit application be submitted to the Hawai‘i Department of Health (“DOH”).<sup>216</sup> Hawai‘i Revised Statute section 321-11.6 is the only law that comes close to regulating the introduction of GE crops.<sup>217</sup> This law was enacted in 1988 through House Bill 2201.<sup>218</sup> The bill’s legislative history indicates that policymakers passed the bill to

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<sup>209</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 113. *See generally* Doug Farquhar & Liz Meyer, *State Authority to Regulate Biotechnology Under the Federal Coordinated Framework*, 12 DRAKE J. AGRIC. L. 439 (2007) (arguing that until Congress acts to give states greater or lesser power to regulate GE crops differently from conventional crops, states are likely not preempted from instituting their own GE regulatory scheme).

<sup>210</sup> 7 C.F.R. § 301.1(a)(2); *See* 7 U.S.C. § 7756 (2000).

<sup>211</sup> 7 C.F.R. § 301.1. *See* TAYLOR, TICK, & SHERMAN, *supra* note 148, at 47. To request that APHIS impose additional prohibitions or restrictions, the state must file a special needs request. 7 C.F.R. § 301.1(b).

<sup>212</sup> *See* 7 C.F.R. 340.4(b) (stating that “[a]n initial review shall be completed by APHIS within 30 days of the receipt of the application”).

<sup>213</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 113.

<sup>214</sup> *See* 7 C.F.R. 340.4(b). *See also* TAYLOR, TICK, & SHERMAN, *supra* note 148, at 113.

<sup>215</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 113.

<sup>216</sup> *See* HAW. REV. STAT. § 321-11.6 (1988).

<sup>217</sup> *See* HAW. REV. STAT. § 321-11.6 (1988).

<sup>218</sup> H.B. 2201, 14th Leg., Reg. Sess. (Haw. 1988).

protect Hawai'i's "diversity of species" and "fragil[e] ecosystem."<sup>219</sup> Legislators at the time were compelled to regulate the introduction of all genetically modified organisms into Hawai'i because they felt that genetically modified organisms, including GE crops, "pose a number of threats, including but not limited to, deleterious impacts on the environment, displacement of species, increased opportunities for disease, and hazards to agricultural livestock and crops."<sup>220</sup> The legislature believed that it was important for the State to be "cognizant of research and development activities which may release genetically modified organisms into Hawaii's environment" because "[o]nce released, it may be costly or impossible to remove the organisms from the environment."<sup>221</sup>

Even with the law in place, neither the DOH nor the DOA has a formal procedure to acquire industry CBI.<sup>222</sup> The application does not need to include CBI.<sup>223</sup> Information about the whereabouts of field trials and the nature of the trait being tested may be shared with the DOA directly by the GE developer, but there are no regulations in place that require this disclosure.<sup>224</sup> The decision to not formally receive field trial CBI may be intentional.<sup>225</sup> One source argues that if the State was to receive CBI through official means, it would be required to disclose that information through the federal Freedom of Information Act ("FOIA"), which may harm GE business in Hawai'i.<sup>226</sup> According to one local attorney, the DOA acts as a mere rubber stamp regarding any federal decision about the safety of imported GE crops.<sup>227</sup>

## 2. Plant Incorporated Pesticides As The Next Frontier

When in the field trial phase, Plant Incorporated Protectant ("PIPs")<sup>228</sup> are regulated by both the USDA and the EPA.<sup>229</sup> The EPA

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<sup>219</sup> *Id.*

<sup>220</sup> *Id.*

<sup>221</sup> *Id.*

<sup>222</sup> See TAYLOR, TICK, & SHERMAN, *supra* note 148, at 80.

<sup>223</sup> See TAYLOR, TICK, & SHERMAN, *supra* note 148, at 46.

<sup>224</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 46.

<sup>225</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 80.

<sup>226</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 80; see U.I.P.A., HAW. REV. STAT. §§ 92F-1 to -43 (1988).

<sup>227</sup> Interview with Paul Achitoff, *supra* note 39.

<sup>228</sup> "Plant incorporated protectant" is a "a pesticidal substance that is intended to be produced and used in a living plant, or in the produce thereof, and the genetic material necessary for production of such a pesticidal substance. It also includes any inert ingredient contained in the plant, or produce thereof." 40 C.F.R. § 152.3.

regulates GE products through its authority to regulate pesticide<sup>230</sup> use under the Federal Insecticide, Fungicide, and Rodenticide Act (“FIFRA”).<sup>231</sup> Most EPA-approved PIPs promote insect resistance in crops through the use of *Bacillus thuringiensis* (“Bt”), a toxin that kills insects.<sup>232</sup> PIPs, such as Bt crops, have pesticide produced in the tissues of the growing plant.<sup>233</sup> To field test a PIP, an applicant must apply to the EPA for an Experimental Use Permit (“EUP”).<sup>234</sup>

In the case of conventional pesticides, the “label is the law.”<sup>235</sup> Using a pesticide in a manner inconsistent with its label is a violation of FIFRA.<sup>236</sup> This creates a “direct line of legal accountability between the user of the pesticide, such as a farmer, and the government.”<sup>237</sup> This accountability allows federal and state regulators to inspect the farmer’s use of the pesticide, enforce compliance with the FIFRA label, or penalize violations. PIPs, however, do not have a pesticide label; therefore, farmers are not legally obligated to comply with any use restrictions that the EPA imposes.<sup>238</sup>

Instead of federal regulation of PIP use, registrants are tasked with enforcing planting restrictions through private contractual remedies.<sup>239</sup> The EPA recognizes the environmental concern that use of Bt crops may

<sup>229</sup> 40 C.F.R. §§ 174.1, .3 (2011).

<sup>230</sup> The definition of “pesticide” includes “any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest[.]” 7 U.S.C. § 136(u) (2013). The term “pest” includes “(1) any insect, rodent, nematode, fungus, weed.” 7 U.S.C. § 136(t).

<sup>231</sup> Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 136-136y (2013).

<sup>232</sup> PEW INITIATIVE ON FOOD & BIOTECHNOLOGY, ISSUES IN REGULATION, *supra* note 157, at 41.

<sup>233</sup> Lee-Muramoto, *supra* note 158, at 317.

<sup>234</sup> 40 C.F.R. § 174.1 (2001). See TAYLOR, TICK, & SHERMAN, *supra* note 148, at 50.

<sup>235</sup> Interview with Thomas Matsuda, *supra* note 103. See also *Pesticides: Regulating Pesticides*, EPA.GOV (last updated March 25, 2014), [http://www.epa.gov/opp00001/regulating/labels/label\\_review.htm](http://www.epa.gov/opp00001/regulating/labels/label_review.htm) (stating that “It has been said that, ‘The label is the law.’ This means that using a pesticide in a manner that is inconsistent with the use directions on the label is a violation of [FIFRA] and can result in enforcement actions to correct the violations.”). “‘The label is the law’ also applies to Organic Materials Review Institute (“OMRI”) pesticide products used in the production of organic produce.” E-mail from Thomas Matsuda, *supra* note 103.

<sup>236</sup> 7 U.S.C. § 136j(a)(2)(G) (“It shall be unlawful for any person . . . to use any registered pesticide in a manner inconsistent with its labeling”).

<sup>237</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 51.

<sup>238</sup> Lee-Muramoto, *supra* note 158, at 317.

<sup>239</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 52.

develop insect pests that are resistant to Bt, which in turn may cause Bt to be ineffective as a PIP or as a topical pesticide for organic agriculture.<sup>240</sup> However, because the Bt pesticide is not present in the seeds that are distributed and sold,<sup>241</sup> there is no requirement for the labeling of Bt seed bags to give notice about any FIFRA-enforceable restrictions.<sup>242</sup> As a result, growers who plant the Bt seeds are not legally obligated to comply with any federal planting restrictions.<sup>243</sup> Instead, the EPA requires that all registrants contractually require growers to comply with an Insect Resistance Management (“IRM”) plan.<sup>244</sup> The IRM plan requires growers to include non-Bt refuges in their fields and to limit the amount of Bt crops that can be planted in the field so as to slow the development of Bt resistance in pests.<sup>245</sup> This limitation, however, is enforced contractually between the GE developer and the farmer, not through the EPA or any other regulatory entity or legal mechanism.<sup>246</sup>

In addition to the minimal state regulation over GE crops as a whole, there are also a lack of state regulations regarding use or testing of PIPs, even though states have the authority to regulate the use of

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<sup>240</sup> See *EPA’s Regulation of Bacillus Thuringiensis (Bt) Crops*, EPA.GOV (last updated May 9, 2012), <http://www.epa.gov/pesticides/biopesticides/pips/regofbt crops.htm> (stating that “[t]he potential for insects to develop resistance to the Bt protein poses a threat to the future use of Bt plant-incorporated protectants.”)

<sup>241</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 37 (“Because EPA regulates only the pesticidal substance itself (called a ‘plant incorporated protectant,’ or PIP), and not the seed or plants producing the pesticide, the biotech seeds and plants distributed for use on farms do not bear an enforceable pesticide label”).

<sup>242</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 43.

<sup>243</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 51.

<sup>244</sup> U.S. ENV’T’L. PROT. AGENCY, BIOPESTICIDES REGISTRATION ACTION DOCUMENT: BACILLUS THURINGIENSIS (BT) PLANT-INCORPORATED PROTECTANTS, 17-19 (Oct. 15, 2001) [hereinafter BT INSECT RESISTANCE MANAGEMENT], *available at* [http://www.epa.gov/oppbppd1/biopesticides/pips/bt\\_brad2/1-overview.pdf](http://www.epa.gov/oppbppd1/biopesticides/pips/bt_brad2/1-overview.pdf) (“In order to delay the development of insect resistance to *Bt* corn and cotton plant-incorporated protectants, EPA has mandated specific IRM requirements to strengthen the existing IRM programs as part of the terms and conditions of the registrations”). See *EPA’s Regulation of Bacillus Thuringiensis (Bt) Crops*, EPA.GOV (last updated May 9, 2012), <http://www.epa.gov/pesticides/biopesticides/pips/regofbt crops.htm>.

<sup>245</sup> BT INSECT RESISTANCE MANAGEMENT, *supra* note 244, at 17-19. See also TAYLOR, TICK, & SHERMAN, *supra* note 148, at 51.

<sup>246</sup> BT INSECT RESISTANCE MANAGEMENT, *supra* note 244, at 17-19. See also TAYLOR, TICK, & SHERMAN, *supra* note 148, at 51.



pesticides.<sup>247</sup> FIFRA allows states to “regulate the sale or use of any federally registered pesticide or device in the State.”<sup>248</sup> Federal law preempts state law only on issues relating to the pesticide’s label, which PIPs do not have.<sup>249</sup>

In Hawai‘i, however, the DOA treats PIP crops—such as Bt crops—like any other unregulated GE crop, even though they have pesticide components.<sup>250</sup> Bt crop seeds are one example of a GE crop falling through the cracks because it does not fit neatly within either the federal or

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<sup>247</sup> The “Hawaii Pesticides Law” governs the licensing, sale, and use of pesticides in the State of Hawai‘i. *See generally* HAW. REV. STAT. §§ 149A-1 to -53. The law is silent, however, as to whether PIPs falls within the DOA’s regulatory scope. *See generally* HAW. REV. STAT. §§ 149A-1 to -53. The DOA’s administrative rules are also silent as to PIPs. *See generally* HAW. ADMIN. RULES §§ 4-66-1 to -67.

<sup>248</sup> 7 U.S.C. § 136v(a)(1988). The State, however, cannot allow the sale or use of any pesticide that is prohibited under FIFRA. *Id.*

<sup>249</sup> *Akee v. Dow Chem. Co.*, 272 F. Supp. 2d 1112 (D. Haw. 2003); *see also* *Wisconsin Pub. Intervenor v. Mortier*, 501 U.S. 597, 615 (1991). *See supra* section III(A)(2)(a).

<sup>250</sup> Currently, the DOH is the only agency whose administrative rules mention PIPs, although the DOH’s regulation of PIPs is limited. *See* HAW. AMIN. RULES § 11-55-01; *see also* HAW. AMIN. RULES § Appendix M. The DOH defines “biological pesticides” as including “microbial pesticides, biochemical pesticides, and plant-incorporated protectants (PIP)”. HAW. AMIN. RULES § 11-55-01. Under the DOH’s administrative rules, discharge of biological pesticides, including PIPs, into state waters is prohibited unless the discharge meets the requirements for a “NPDES General Permit Authorizing Point Source Discharges from the Application of Pesticides.” HAW. REV. STAT. § 342D-50(a) (“No person, including any public body, shall discharge any water pollutant into state waters, or cause or allow any water pollutant to enter state waters except in compliance with this chapter, rules adopted pursuant to this chapter, or a permit or variance issued by the director”); HAW. ADMIN. RULES § 11-55-04(a) (“Before discharging any pollutant . . . a person shall submit a complete NPDES permit application . . . , submit a complete notice of intent, except for the point source discharges from the application, if not required (refer to Appendix M)[.]”); HAW. AMIN. RULES § 11-55-34.02 (incorporating Appendix M by reference); HAW. AMIN. RULES § Appendix M (specifying the requirements to obtain a NPDES General Permit Authorizing Point Source Discharges from the Application of Pesticides). Unlike the DOH, the DOA’s rules and regulations do not mention PIPs. *See generally* HAW. REV. STAT. §§ 149A-1 to -53; *see also* HAW. ADMIN. RULES §§ 4-66-1 to -67.

The Hawaii Pesticides Law does not list the transportation or propagation of PIPs as a prohibited act under the law. *See* HAW. REV. STAT. § 149A-11. To date, the author is unaware of any administrative rule interpreting the law as applicable to PIPs or any action taken by the DOA to assert regulatory jurisdiction over PIPs. The author has made multiple attempts to confirm the DOA’s position on regulatory jurisdiction over PIPs but could not confirm an official DOA response at time of publication.

state regulatory scheme.<sup>251</sup> The DOA's pesticide division regulates the use of conventional pesticides on Bt crops and other GE crops, but it does not regulate the Bt crop itself.<sup>252</sup>

### B. *Fallibility of Federal Regulations*

Many criticize the Federal Coordinated Framework as insufficient to meet the needs of either the GE Industry or the public's concerns.<sup>253</sup> In many ways, the Coordinated Framework has "led to a regulatory approach that is passive rather than proactive about risks, has difficulty adapting to biotechnology advances, and is highly fractured."<sup>254</sup> The fractured nature of industry regulation leaves many aspects of the GE industry unregulated or underregulated.<sup>255</sup>

Furthermore, even GE supporters complain that current regulations create uncertainties that deter investment and discourage research.<sup>256</sup> Others also argue that the use of pre-existing laws to regulate a new and novel technology is like trying to shove a square peg into a round hole; it simply does not fit.<sup>257</sup> As of September 2008, the GAO reported at least "six unauthorized releases of GE crops into the food and feed supply or into crops meant for the food or feed supply and additional releases into the environment."<sup>258</sup> The report indicated that given the ease with which genetic material from crops can spread, it is likely that future unauthorized releases will occur again.<sup>259</sup>

The USDA has also been riddled with lawsuits that shine a spotlight on its failure to investigate the environmental impacts of GE

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<sup>251</sup> See Lee-Muramoto, *supra* note 158, at 322. (stating that "the regulatory scheme under FIFRA is inadequate in addressing some of the key environmental concerns" associated with the use of PIPs).

<sup>252</sup> See generally HAW. REV. STAT. §§ 149A-1 to -53.

<sup>253</sup> See e.g., Lee-Muramoto, *supra* note 158, at 315.

<sup>254</sup> See Mandel, *Inconsistencies and Overlaps*, *supra* note 171, at 2172. See generally *In re StarLink Corn Products Liab. Litig.*, 212 F. Supp. 2d 828 (N.D. Ill. 2002) (holding that torts remedy are not available for Bt corn contamination of food sources).

<sup>255</sup> See Lee-Muramoto, *supra* note 158, at 315.

<sup>256</sup> Steven H. Strauss et al., *Far-reaching Deleterious Impacts of Regulations on Research and Environmental Studies of Recombinant DNA-modified Perennial Biofuel Crops in the United States*, in *BIOSCIENCE* 729 (Oct. 2010), available at [http://cfpub.epa.gov/ncer\\_abstracts/index.cfm/fuseaction/display.pubfulltext/publication\\_id/55632](http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.pubfulltext/publication_id/55632). See also Lee-Muramoto, *supra* note 158, at 315.

<sup>257</sup> See Lee-Muramoto, *supra* note 158, at 316.

<sup>258</sup> GAO REPORT, *supra* note 187, at 3.

<sup>259</sup> GAO REPORT, *supra* note 187, at 3.

crops.<sup>260</sup> The flawed Federal Coordinated System, the insufficient regulatory implementation, and scientific uncertainty that surrounds the environmental effects of GE crops highlight the shortcomings of the current federal regulation. Overall, many argue that the current federal regulations fail to adequately protect consumers or safeguard the environment and ecosystems from the dangers associated with the release of GE crops.<sup>261</sup> These criticisms, while directed at the federal government's regulation of GE crops, mirror criticisms of the federal government's approach to invasive species in general.<sup>262</sup> The federal government alone cannot prevent all harms associated with the introduction of invasive species.<sup>263</sup> Similarly, the federal government alone lacks the capacity to address the needs and concerns that arise from the introduction of GE crops.

#### IV. GE CROPS ON THE LOOSE: GE CROP RELEASE AND ITS POTENTIAL HARM TO HAWAI'I'S NATURAL RESOURCES

Many Hawai'i communities located near seed crop operations and potential field trial sites are now speaking out against the GE Industry's agricultural practices and the use of GE crops.<sup>264</sup> Much of this community opposition includes criticism of industrial agriculture as a whole;<sup>265</sup>

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<sup>260</sup> See *Geertson Seed Farms v. Johanns*, 570 F.3d 1130 (9th Cir. 2009) (holding that APHIS failed to conduct an EIS before deregulating Monsanto's Roundup Ready Alfalfa) *rev'd and remanded sub nom. Monsanto Co. v. Geertson Seed Farms*, 130 S. Ct. 2743, 177 L. Ed. 2d 461 (U.S. 2010) (holding that the district court abused its discretion in enjoining APHIS from affecting partial deregulation and in prohibiting the planting of the Roundup Ready Alfalfa while the APHIS conducted an EIS); see also *Ctr. For Food Safety v. Johanns*, 451 F.Supp.2d 1165, 1170 (D. Haw. 2006) (holding that APHIS violated NEPA when it issued permits for the field testing of biopharmaceuticals without an EA, an EIS, or explanation as to why neither an EA nor EIS was required). The court in *Johanns* held that "APHIS's utter disregard for this simple investigation requirement, especially given the extraordinary number of endangered and threatened plants and animals in Hawaii, constitutes an unequivocal violation of a clear congressional mandate." *Id.* at 1182.

<sup>261</sup> Lee-Muramoto, *supra* note 158, at 315.

<sup>262</sup> See Endangered and Threatened Wildlife and Plants; Listing 15 Species on Hawai'i Island as Endangered and Designating Critical Habitat for 3 Species, 77 Fed. Reg. 63928-01 (Oct. 17, 2012).

<sup>263</sup> See *id.*

<sup>264</sup> See Vanessa Van Voorhis, *Waimea residents sue Pioneer: GMO Seed Company Facing 'Substantial' Lawsuit*, THE GARDEN ISLAND (Dec. 13, 2011, 11:45 PM), [http://thegardenisland.com/news/local/article\\_82ff2c3e-2632-11e1-9ca7-001871e3ce6c.html](http://thegardenisland.com/news/local/article_82ff2c3e-2632-11e1-9ca7-001871e3ce6c.html). In 2007, DOA received a complaint about pesticides that were being sprayed onto a seed corn field next to the Waimea Canyon Elementary School on the Island of Kaua'i. Hawai'i Department of Agriculture, Plant Industry Division 28 (2007), available at <http://hdoa.hawaii.gov/wp-content/uploads/2013/01/AR07-Narrative.pdf>.

<sup>265</sup> See *id.*

however, the community's response also includes larger concerns about how the GE Industry and the use of GE crops will affect Hawai'i's future self-sufficiency, cultural integrity, and overall ecological biodiversity.<sup>266</sup>

Crops with a GE trait threaten Hawai'i's fragile ecosystem and endangered species in the same way traditional invasive species do.<sup>267</sup> Invasive species are "alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health."<sup>268</sup> As with invasive species, many scientists report that GE crops are a potential threat to local biodiversity and ecological systems.<sup>269</sup> If released prematurely, GE crops—like other invasive species—risk significant damage to Hawai'i's already fragile ecosystem.<sup>270</sup>

There are many examples of invasive organisms causing great harm in their newfound homes, including animal species, plants, and plant pathogens.<sup>271</sup> Some plant introductions were accidental, while other releases were intentional.<sup>272</sup> Invasive species have been categorized as one of the three most pressing environmental concerns, next to global climate change and habitat loss.<sup>273</sup> Any harm to Hawai'i's ecosystem is severe given the intimate relationship that Native Hawaiians have with the natural

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<sup>266</sup> See generally FACING HAWAII'S FUTURE (Catherine Mariko Black ed., 2006).

<sup>267</sup> See David Biello, *Genetically Modified Crop on the Loose and Evolving in U.S. Midwest*, SCIENTIFIC AMERICAN (Aug. 6, 2010), <http://www.scientificamerican.com/article.cfm?id=genetically-modified-crop>. In regards to the release of GE crops, Carol Mallory-Smith, a weed scientist from Oregon State University, believes that "[t]he big concern is traits that would increase invasiveness or weediness, traits such as drought tolerance, salt tolerance, heat or cold tolerance."

<sup>268</sup> See 64 Fed. Reg. 6,183 (Feb. 3, 1999).

<sup>269</sup> See Endangered and Threatened Wildlife and Plants; Listing 15 Species on Hawai'i Island as Endangered and Designating Critical Habitat for 3 Species, 77 Fed. Reg. 63,928 (Oct. 17, 2012).

<sup>270</sup> See David J. Earp, *The Regulation of Genetically Engineered Plants: Is Peter Rabbit Safe in Mr. McGregor's Transgenic Vegetable Patch?*, 24 ENV'T L. L. 1633, 1653-55 (1994); see also L. L. Wolfenbarger & P. R. Phifer, *The Ecological Risks and Benefits of Genetically Engineered Plants*, 290 SCIENCE'S COMPASS 2088, 2088 (2000), available at <http://zircote.forestry.oregonstate.edu/orb/pdf/wolfenbarger/2088.pdf>; Guy R. Knudsen, *Impacts of Agricultural GMOs on Wildlands: A New Frontier of Biotech Litigation*, 26-SUM NAT. RESOURCES & ENV'T 13, 14 (2011) [hereinafter Knudsen, *Impacts of GMOs on Wildlands*] (stating that no state or federal list treats GMO as invasive species, but invasive species "all represent genotypes that were novel to the community into which they were introduced, and, thus, exhibit a characteristic cited by many environmentalists as evidence of GMO-related risk").

<sup>271</sup> Knudsen, *Impacts of GMOs on Wildlands*, *supra* note 270, at 14.

<sup>272</sup> Knudsen, *Impacts of GMOs on Wildlands*, *supra* note 270, at 14.

<sup>273</sup> Wolfenbarger & Phifer, *supra* note 270, at 2088.

environment and the fragility of Hawai‘i’s biodiversity.<sup>274</sup> There are 402 endangered and threatened plant and animal species in Hawaii, including thirty-two types of birds.<sup>275</sup> Hawai‘i has more endangered and threatened species than any other state.<sup>276</sup> Furthermore, Hawai‘i’s 402 listed species represent approximately twenty-five percent of *all* listed species in the United States.<sup>277</sup> Several invasive species have replaced or destroyed indigenous plant species through competition, predation, or disease.<sup>278</sup> Invasive species and other exotic introductions are touted as significant threats to Hawai‘i’s ecosystem.<sup>279</sup> GE crops, as a truly exotic introduction, have the potential to be equally threatening to Hawai‘i’s fragile ecosystem.

A. *Gene Flow and Cross Pollination with Non-GE Plant Varieties*

The release of GE crops into the environment carries a risk of

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<sup>274</sup> See generally Punani O. Anderson-Fung & Kepā Maly, *Hawaiian Ecosystems and Culture: Why Growing Plants for Lei Helps to Preserve Hawai‘i’s Natural and Cultural Heritage*, COLL. OF TROPICAL AGRIC. & HUMAN RESOURCES, UNIV. OF HAW. (2009), available at <http://www.ctahr.hawaii.edu/oc/freepubs/pdf/RM-16.pdf> (explaining the importance of Hawai‘i’s biodiversity and how the introduction of non-native plants has harmed that biodiversity).

<sup>275</sup> See *Species Reports: Species Listed in Hawai‘i Based On Published Historical Range and Population*, U.S. FISH & WILDLIFE SERV., [http://ecos.fws.gov/tess\\_public/pub/stateListingIndividual.jsp?state=HI&status=listed](http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=HI&status=listed) (last visited Apr. 20, 2013) (listing 339 plants and 63 animals in Hawai‘i as endangered or threatened).

<sup>276</sup> *Ctr. For Food Safety v. Johanns*, 451 F. Supp.2d 1165, 1181 (D. Haw. 2006) (stating that “[a]lthough strict compliance with the [Endangered Species Act’s] procedural requirements is always critically important, these requirements are particularly crucial in Hawai‘i given Hawai‘i’s extensive number of threatened and endangered species”). Hawai‘i has 402 threatened and endangered plant and animal species out of a total of 1,310 in the United States. See U.S. FISH & WILDLIFE SERV., *supra* note 275.

<sup>277</sup> *Ctr. For Food Safety v. Johanns*, 451 F. Supp. 2d at 1181.

<sup>278</sup> Knudsen, *Impacts of GMOs on Wildlands*, *supra* note 270, at 14.

<sup>279</sup> In 2011, a group of Hawai‘i’s policymakers met at a field hearing on Safeguarding Hawai‘i’s Ecosystem and Agriculture Against Invasive Species. This hearing was held by Senator Daniel K. Akaka at Hawai‘i’s DOA Quarantine Office. Many policymakers at the hearing testified about the efforts and the importance of preventing the spread of invasive species. The late Senator Daniel K. Inouye explained that “our island ecosystem is a fragile one and invasive species continue to pose serious threats to our agriculture industry and our Native species.” Congresswoman Mazie Hirono noted that “Hawai‘i is so vulnerable to invasive species that it’s vital that we remain diligent in our efforts to protect our island state from alien plant and animal life.” Congresswoman Hirono was speaking about the invasive African fountain grass that overruns Queen Ka‘ahumanu road on the Big Island. Many other local legislators also attended the hearing in support of the initiative to protect Hawai‘i from invasive species. Press Release, Senator Colleen Hanabusa, Field Hearing On Preventing Invasive Species Held In Honolulu, Nov. 14, 2011, available at [hanabusa.house.gov/press-release/field-hearing-preventing-invasive-species-held-honolulu](http://hanabusa.house.gov/press-release/field-hearing-preventing-invasive-species-held-honolulu).

“gene flow.”<sup>280</sup> Gene flow occurs when pollen carries a GE plant’s engineered characteristics and spreads it to wild relatives.<sup>281</sup> When this occurs, the GE traits (e.g., insect resistance, herbicide tolerance, drought tolerances, etc.) can be transferred to a crop’s wild relatives.<sup>282</sup> This could give the weeds and other plants a “competitive advantage” over other plants within that ecosystem.<sup>283</sup> The EPA acknowledges that it “do[es] not know how exchange of engineered genes will affect wild plants, either increasing or decreasing their ability to compete within the natural plant community.”<sup>284</sup>

Gene flow was a primary concern in a 2007 case, *International Center for Technology Assessment v. Johanns*, which focused on the potential gene flows concerns associated with GE turfgrass, also known as “creeping bentgrass.”<sup>285</sup> In a field test site for the grass, evidence showed that the GE turfgrass used in the field test had pollinated wild grass relatives.<sup>286</sup> Several environmental organizations and individuals filed a lawsuit against the USDA for permitting field tests of GE turfgrass without adequately determining whether the crop was a plant pest that could spread to wild relatives.<sup>287</sup> In 2007, the court found that there was no evidence that the USDA considered whether the field tests had the potential to significantly affect the environment when it decided that an EIS or EA was not necessary.<sup>288</sup> The court noted that the USDA could not process permits without first considering whether the field tests involve either new species or organisms, or whether the field test involves novel

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<sup>280</sup> GAO REPORT, *supra* note 187, at 17.

<sup>281</sup> GAO REPORT, *supra* note 187, at 17.

<sup>282</sup> GAO REPORT, *supra* note 187, at 17.

<sup>283</sup> GAO REPORT, *supra* note 187, at 17. Some argue that hybrid plants (non-GE crops that acquire transgenic genes through gene flow) will not persist well outside of agricultural situations, however, there is not much information about the survival, fertility, and out-crossing potential of those hybrids plants.

<sup>284</sup> EPA, STUDIES OF GENETICALLY ENGINEERED PLANTS AT THE WESTERN ECOLOGY DIVISION: METHODS FOR MONITORING FREQUENCY AND EFFECTS OF GENE FLOW FROM CROPS TO NATIVE PLANTS (2005), *available at* <http://www.epa.gov/wed/pages/projects/GeneticallyEngineeredPlantsFlyer.pdf>.

<sup>285</sup> *See Int’l Ctr. For Tech. Assessment v. Johanns*, 473 F. Supp. 2d 9 (D.D.C. 2007).

<sup>286</sup> *Id.* at 15. In 2004, EPA’s National Health and Environmental Effects Research Laboratory published a study that “documented significant gene flow” from the field trial site to the “surrounding native and ‘sentinel’ (deliberately planted, for the purpose of the study) bentgrass and other plants.” *Id.*

<sup>287</sup> *See id.* at 9.

<sup>288</sup> *Id.* at 29. The developers of the GE turfgrass utilized the less stringent notification process under 7 C.F.R. § 340.3. *Id.* at 15.

modifications that raise new issues.<sup>289</sup> The court held that the record contained “substantial evidence that the field tests may have had the potential to affect significantly the quality of the human environment, and that the tests may have involved, at the least, novel modifications (if not “new organism) that raised new environmental issues.”<sup>290</sup>

In addition, there is a risk that GE crops will cross-pollinate with non-GE crops. Although Hawai‘i does not have large scale commercial or conventional crop production like that found on the continental United States,<sup>291</sup> cross-pollination already provides significant threats to Hawai‘i’s coffee, macadamia nut, and papaya industries.<sup>292</sup> GE papaya, which is not being grown in the large GE Industry, helps to highlight how quickly a GE crop can accidentally cross-pollinate with non-GE crops.<sup>293</sup> Cross-pollination can occur through transmission by wind, insects, or humans.<sup>294</sup>

In May 2013, another case of accidental cross-pollination was discovered in Oregon.<sup>295</sup> Monsanto’s glyphosate resistant wheat was found

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<sup>289</sup> *Id.*

<sup>290</sup> *Id.* at 30.

<sup>291</sup> See ALLEN VAN DEYNZE, JEANNETTE MARTINS, & KENT J. BRADFORD, AN ANALYSIS OF TRANSGENIC FIELD TRIALS IN THE UNITED STATES 9 (2007) (stating that Hawai‘i has potentially large areas of trials, but that “there is little opportunity for transmission of regulated materials into commercial conventional or organic production fields in these locations” when compared to other states with large commercial agriculture growing conventional and organic crops).

<sup>292</sup> Hawai‘i’s coffee, macadamia nut, and papaya agricultural industries may be directly threatened if the GE Industry chooses to genetically engineer those local crops. This is most significant to those growers who do not want to use the GE technology in their crops. See Melissa Alison, *Genetically Modified Coffee Company in Hawai‘i Sold*, SEATTLE TIMES (Sept. 20, 2010 1:41 PM), [http://seattletimes.com/html/coffeecity/2012950811\\_the\\_food\\_drug\\_administration.html](http://seattletimes.com/html/coffeecity/2012950811_the_food_drug_administration.html).

<sup>293</sup> See Melanie Bondera, *Papaya and Coffee*, in *FACING HAWAI‘I’S FUTURE* (Catherine Mariko Black ed., 2d ed. 2013). It is important to note, however, that the risk of cross-pollination and gene flow vary based on the crop being grown. See generally U.S. ENVTL. PROT. AGENCY, BIOPESTICIDES REGISTRATION ACTION DOCUMENT: BACILLUS THURINGIENSIS (BT) PLANT-INCORPORATED PROTECTANTS IIC1 – C16 (Oct. 15, 2001) [hereinafter BT ENVIRONMENTAL ASSESSMENT], available at, [http://www.epa.gov/pesticides/biopesticides/pips/bt\\_brad2/3-ecological.pdf](http://www.epa.gov/pesticides/biopesticides/pips/bt_brad2/3-ecological.pdf) (highlighting the varying risk of gene flow for different plants).

<sup>294</sup> The wind can transport corn pollen from 40-60 miles away from a field. Rain can also dislodge and transport pollen away from crops. Corn byproducts are left on the field after harvest and sometimes tilled back into the soil. Wind and rain may also transport the corn byproducts to adjacent streams and waterways. E.J. ROSE-MARSHALL ET AL., TOXINS IN TRANSGENIC CROP BYPRODUCTS MAY AFFECT HEADWATER STREAM ECOSYSTEMS (2007).

<sup>295</sup> The Associated Press, *Japan Suspends Some Imports of U.S. Wheat*, N.Y. TIMES (May 31, 2013), <http://www.nytimes.com/2013/05/31/business/global/japan-suspends-some-imports-of-us->

to have accidentally cross-pollinated with non-GE wheat that was grown on a farm in Oregon.<sup>296</sup> Monsanto had been conducting field tests of the GE wheat for nearly eight years before the GE wheat was found on the Oregon farm.<sup>297</sup> When the GE wheat was discovered, it was still in the testing phase and the USDA had not approved the GE wheat for commercial distribution.<sup>298</sup> Because of the GE contamination, Japan temporarily suspended importation of U.S. wheat for nearly two months.<sup>299</sup> A Monsanto representative claims that the GE wheat may have gotten onto the farm through an “accidental or purposeful act.”<sup>300</sup>

Because Hawai‘i does not regulate the importation of GE crops, there is no way for the State to prepare for potential gene flow or cross-pollination if it were to occur. For example, the EPA has recognized that Bt cotton has the potential to crossbreed with *ma‘o*,<sup>301</sup> an endemic variety of Hawaiian cotton.<sup>302</sup> Because of this potential, the EPA does not permit the commercial sale of Bt cotton in Hawai‘i.<sup>303</sup> The EPA does, however, permit field-testing of Bt cotton.<sup>304</sup> At least one GE company, Monsanto, has indicated that it does not plan to grow Bt cotton because of the EPA’s warning;<sup>305</sup> however, there are no local laws prohibiting the import of Bt cotton should Monsanto change its position to not to grow Bt cotton. The risk of gene flow from GE plants to native plants are an especially significant concern when one considers the delicate nature of Hawai‘i’s

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wheat.html?ref=geneticallymodifiedfood&gwh=A46671EEE8B0B3CCAA27F489C354CA89.

<sup>296</sup> The Associated Press, *supra* note 295.

<sup>297</sup> Aya Takada, *Japan Buys Oregon Wheat as Checks Begin for Modified Crops*, BLOOMBERG (Jul. 31, 2013), <http://www.bloomberg.com/news/2013-08-01/japan-buys-oregon-wheat-as-checks-begin-for-modified-crops-2-.html>.

<sup>298</sup> *Id.*

<sup>299</sup> The Associated Press, *supra* note 295. Japan resumed importation of U.S. wheat in July 2013 but developed increased screening measures. Takada, *supra* note 297.

<sup>300</sup> Takada, *supra* note 297 (quoting Robb Fraley, Monsanto’s Chief Technology Officer).

<sup>301</sup> Native Hawaiians have traditionally used *ma‘o* as dye. *Ma‘o* leaves were used to create a greenish color and the flower petals were used to create a yellow color. BEATRICE H. KRAUSS, *PLANTS IN HAWAIIAN CULTURE* 66 (1993).

<sup>302</sup> The EPA found that Hawai‘i has a wild, native species of cotton, known by its scientific name as *Gossypium tomentosum*, which grows on six islands: Kaho‘olawe, Lana‘i, Māui, Moloka‘i, Ni‘ihau, and O‘ahu. Gene flow can occur between this native plant and Bt cotton. BT ENVIRONMENTAL ASSESSMENT, *supra* note 293, at IIC9.

<sup>303</sup> BT ENVIRONMENTAL ASSESSMENT, *supra* note 293, at IIC1.

<sup>304</sup> BT ENVIRONMENTAL ASSESSMENT, *supra* note 293, at IIC1.

<sup>305</sup> Interview with Alan Takemoto, *supra* note 58.



ecosystems.<sup>306</sup>

### B. *Bt Crops: Impact on Non-Target Species*

The use of GE crops may also pose a threat to non-target species that play an integral role in Hawai‘i’s ecosystem.<sup>307</sup> Given the potential dangers associated with the use of conventional topical pesticides,<sup>308</sup> some have indicated that the only way to move away from those risks is through technological advancements, such as the use of PIPs.<sup>309</sup> An increased use of PIPs, however, creates major concerns regarding how non-target species will be affected and the overall impacts on Hawai‘i’s delicate ecosystems.<sup>310</sup> PIPs, such as the various Bt crops, produce insecticides through all parts of the plant at a consistent rate.<sup>311</sup> The use of Bt crops has significantly reduced the use of topical pesticides,<sup>312</sup> but raises new concerns about the crops’ ecological impact.<sup>313</sup>

The USDA acknowledges that the environmental effects of GE crops includes potential risks to birds, mammals, insects, worms, and other organisms, “especially in the case of insect or disease resistance traits.”<sup>314</sup>

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<sup>306</sup> See Peter M. Vitousek, *Effects of Alien Plants On Native Ecosystems*, in ALIEN PLANT INVASIONS IN NATIVE ECOSYSTEMS OF HAWAI‘I: MANAGEMENT AND RESEARCH 29 (Charles P. Stone et al. eds., 1992) (stating that biological invasions may represent a model for the consequences of releasing more highly modified organisms into Hawai‘i’s ecosystem in the future).

<sup>307</sup> See e.g., ROSE-MARSHALL ET AL., *supra* note 294.

<sup>308</sup> The nature of the GE crop informs the types of agricultural practices used. The use of GE crops has caused a 383 million pound increase in herbicide use in the United States in the first thirteen years of commercial use. See CHARLES BENBROOK, THE ORGANIC CENTER, IMPACTS OF GENETICALLY ENGINEERED CROPS ON PESTICIDE USE IN THE UNITED STATES: THE FIRST THIRTEEN YEARS i (2009). Some believe, however, that the increase in herbicide use “may be attributed to more corn, cotton, and other GE crops in production versus previous years.” E-mail from Thomas Matsuda, *supra* note 103.

<sup>309</sup> Interview with Thomas Matsuda, *supra* note 103.

<sup>310</sup> See generally, Gaber L. Lovei, Thomas Bohn, & Angelika Hilbeck, *Biodiversity, Ecosystem Services and Genetically Modified Organisms*, in BIOSAFETY FIRST—HOLISTIC APPROACHES TO RISK AND UNCERTAINTY IN GENETIC ENGINEERING AND GENETICALLY MODIFIED ORGANISMS (Terje Traavike & Lim Li Ching eds., 2007).

<sup>311</sup> Isik Icoz & Guenther Stotzky, *Fate and Effects of Insect-Resistant Bt Crops in Soil Ecosystems*, 40 SOIL BIOLOGY & BIOCHEMISTRY 559 (2008).

<sup>312</sup> While the use of herbicide resistant GE crops caused an increase in topical pesticide use, use of insect resistant crops, such as Bt crops, caused 64.2 million pound decrease in pesticide use. BENBROOK, *supra* note 308, at 3.

<sup>313</sup> See ROSE-MARSHALL ET AL., *supra* note 294, at 3.

<sup>314</sup> *Biotechnology Frequently Asked Questions (FAQs)*, USDA, [http://www.usda.gov/wps/portal/usda/usdahome?navid=BIOTECH\\_FAQ&navtype=RT&parentnav=BIOTECH](http://www.usda.gov/wps/portal/usda/usdahome?navid=BIOTECH_FAQ&navtype=RT&parentnav=BIOTECH) (last visited May 4, 2014) (answering the question “What are the safety considerations with Agricultural Biotechnology?”).

In fact, the USDA's APHIS and the EPA review Bt crops for environmental impacts prior to field-testing or commercial release because of the potential risks.<sup>315</sup> For example, some studies have shown that Bt corn pollen can negatively impact non-target species.<sup>316</sup> There are growing concerns that Bt crops will disrupt nature's delicate balance by killing "friendly pests," giving other pests an increased advantage through incorporation of the pesticide, or by creating Bt resistant pests.<sup>317</sup> One report has indicated that Bt corn pollen and other Bt corn byproducts may cause ecosystem-scale consequences.<sup>318</sup> Reports have shown that the use of Bt crops can affect both water ecosystems and soil ecosystems.<sup>319</sup> Bt corn pollen and other byproducts can travel to and be sustained in waterways near crop fields.<sup>320</sup> The report indicates that non-target stream insects that consume Bt corn byproducts have a higher mortality rate, and that this may disrupt the stream ecosystem as a whole.<sup>321</sup> The presence of Bt corn byproducts in waterways pose a threat to insects and other life forms found within these waterways if consumed.

Bt byproduct in the soil may also adversely impact soil ecosystems.<sup>322</sup> Crop residues are the primary source of carbon in soil, and the substance secreted by the roots govern which organisms reside in the rhizosphere.<sup>323</sup> As a result of this balance, any change to the quality of crop residues and the rhizosphere inputs could modify the dynamics of the composition and activity of organisms in the soil surrounding Bt plantings.<sup>324</sup> Consequently, Bt crops have the potential to change microbial dynamics, impede biodiversity, and harm essential ecosystem

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<sup>315</sup> *Id.*

<sup>316</sup> *Id.*

<sup>317</sup> Knudsen, *Impacts of GMOs on Wildlands*, *supra* note 270, at 14.

<sup>318</sup> *See* Icoz & Stotzky, *supra* note 311.

<sup>319</sup> *See generally* ROSE-MARSHALL ET AL., *supra* note 294.

<sup>320</sup> M. Douville et al., *Tracking the Source of Bacillus Thuringiensis Cry1Ab Endotoxin in the Environment*, 33 *BIOCHEMICAL SYSTEMATICS & ECOLOGY* 219 (2005). ROSE-MARSHALL ET AL., *supra* note 294, at 4.

<sup>321</sup> ROSE-MARSHALL ET AL., *supra* note 294, at 4.

<sup>322</sup> *See* Icoz & Stotzky, *supra* note 311. The rhizosphere is "the zone of soil surrounding a plant root where the biology and chemistry of the soil are influenced by the root." Rebecca Lines-Kelly, *Soil Biology Basis: The Rhizosphere*, STATE OF NEW SOUTH WALES DEPARTMENT OF PRIMARY INDUSTRIES (2005), [http://www.dpi.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0004/42259/Rhizosphere.pdf](http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0004/42259/Rhizosphere.pdf). This zone is typically 1 mm wide, but it has no distinct edge. *Id.* Instead, "it is an area of intense biological and chemical activity influenced by compounds exuded by the root, and by microorganisms feeding on the compounds." *Id.*

<sup>323</sup> *See* Icoz & Stotzky, *supra* note 311, at 566.

<sup>324</sup> Icoz & Stotzky, *supra* note 311, at 563.

functions in the soil.<sup>325</sup> Scientists have found that it is crucial that risk assessment studies on the commercial use of Bt crops consider the impacts on organisms in the soil.<sup>326</sup>

In addition, the use of Bt crops creates a risk that plant pests will acquire a resistance to Bt.<sup>327</sup> Recognizing the potential harms of Bt-resistant pests, the EPA created a mandatory system to minimize the rate at which pests develop Bt resistance through the use of refuge crops.<sup>328</sup> While there are systems in place to mitigate the potential harms of Bt crop use, enforcement of these systems are still largely left to the GE Industry itself.<sup>329</sup> In addition, there are lingering questions as to whether the refuge methods work as intended.<sup>330</sup> Ultimately, the science is inconclusive as to the extent of the risk that Bt corn pollen poses to the environment,<sup>331</sup> so Bt corn pollen data helps to highlight the need to adhere to the precautionary principle.<sup>332</sup>

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<sup>325</sup> Icoz & Stotzky, *supra* note 311, at 566.

<sup>326</sup> Icoz & Stotzky, *supra* note 311, at 563.

<sup>327</sup> Scott Kilman, *Monsanto Corn Plant Losing Bug Resistance*, WALL ST. J. (Aug. 29, 2011), <http://online.wsj.com/article/SB10001424053111904009304576532742267732046.html>.

<sup>328</sup> BT INSECT RESISTANCE MANAGEMENT, *supra* note 244, at 17-19. *See also* EPA's *Regulation of Bacillus Thuringiensis (Bt) Crops*, EPA (last updated May 9, 2012), <http://www.epa.gov/pesticides/biopesticides/pips/regofbt crops.htm>. "An example of a refuge is a block of non-Bt corn planted near a Bt corn field. EPA requires all farmers who use Bt crops to plant a portion of their crop with such a refuge." *Id.*

<sup>329</sup> *See* TAYLOR, TICK, & SHERMAN, *supra* note 148, at 51.

<sup>330</sup> One report has indicated that even if the management system is executed properly, gene flow may contaminate the refuge crops, thereby making the once conventional crops GE and undermining the system as a whole. *See* Charles F. Chilcutt et al., *Contamination of Refuges by Bacillus Thuringiensis Toxin Genes from Transgenic Maize*, 101 NAT'L ACADEMY OF SCIENCES 7526 (2004).

<sup>331</sup> Like many inquiries into the safety of GE crops, the science is currently inconclusive as to the extent of the environmental impacts Bt crops may pose. *But see* MINISTERS OF THE SCOTTISH EXECUTIVE, THE WELSH ASSEMBLY GOVERNMENT AND THE DEPARTMENT OF ENVIRONMENT (NORTHERN IRELAND), SECRETARY OF STATE FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS, ADVISE COMMITTEE ON RELEASE TO THE ENVIRONMENT, *ADVICE ON A RESEARCH PAPER: TOXINS IN TRANSGENIC CROP BYPRODUCTS MAY AFFECT HEADWATER STREAM ECOSYSTEMS (ROSE-MARSHALL ET AL., 2007)* (Jan. 12, 2008), *available at* <http://archive.defra.gov.uk/acre/pdf/advice/acre-advice-toxins-headwater-ecosystems.pdf> (arguing that the Rose-Marshall study of the effects of Bt toxins in aquatic habitats is of potential scientific interest, but that none of the results from this study alter the group's current view of the environmental risks posed by the Bt crop because the study does not account for other considerations).

<sup>332</sup> *See* Knudsen, *Where's The Beef*, *supra* note 17 (stating that much like the debate surrounding climate change, both supporters and opponents of GE are "able to claim science as an ally while simultaneously accusing their opponents of ignoring or misusing it"). "The precautionary principle instructs that "where there are present or potential threats of serious damage, lack of full scientific certainty should not be a basis

C. *The Risk of the Unknowns: Field Trials and Protected Traits*

In addition to the known risks, there are equally significant unknown risks. Many community members are worried about what the GE companies will try to develop next.<sup>333</sup> Given that Hawai‘i is an important field test location, it is home to many experimental test crops that have yet to be approved for commercial sale.<sup>334</sup>

In 2006, Earthjustice successfully brought a case against the USDA for the USDA’s failure to properly review the GE Industry’s testing of genetically modified crops that produced experimental pharmaceutical products (“biopharming”).<sup>335</sup> Earthjustice claimed that the USDA failed to comply with the Endangered Species Act and NEPA when the USDA granted permits for biopharming field tests.<sup>336</sup> Several companies were conducting field trials of biopharmaceutical crops in Hawai‘i during that time, including ProdiGene,<sup>337</sup> Monsanto, Hawai‘i Agriculture Research Center, and Garst Seed.<sup>338</sup>

During discovery, Judge David Ezra ordered the USDA to disclose the locations of the test sites to the plaintiff’s attorneys, but not to the

for postponing effective measures to prevent environmental degradation.” *Waiāhole I*, 94 Haw. at 154, 9 P.3d at 466 (quoting the Water Commission’s decision). In fact, “[a]waiting for certainty will often allow for only reactive, not preventive, regulatory action.” *Id.*

<sup>333</sup> *Ctr. For Food Safety v. Johanns*, 451 F. Supp.2d 1165 (D. Haw. 2006).

<sup>334</sup> *Id.*

<sup>335</sup> *Id.*

<sup>336</sup> *Id.* at 1170.

<sup>337</sup> ProdiGene, a private company based in Texas, has been one of the most aggressive companies in biopharming and already sells some industrial chemicals produced in GE corn. In 2002, ProdiGene was fined a total of \$3 million for two incidents of possible contamination. The government had to destroy soybean fields that contained Prodigene’s biopharm corn and corn fields that may have cross pollinated with the biopharm corn. Andrew Pollack, *Spread of Gene-Altered Pharmaceutical Corn Spurs \$3 Million Fine*, NY TIMES (Dec. 7, 2002), <http://www.nytimes.com/2002/12/07/us/spread-of-gene-altered-pharmaceutical-corn-spurs-3-million-fine.html?n=Top%2fReference%2fTimes%20Topics%2fSubjects%2fF%2fFood> (stating that ProdiGene “agreed to pay a civil fine of \$250,000 and to reimburse the government for buying and incinerating 500,000 bushels of soybeans contaminated with the genetically modified corn”). According to governmental officials, ProdiGene’s fine was “the first ever for violations of a permit for a field trial of a genetically engineered crop[.]” *Id.*

<sup>338</sup> *Ctr. For Food Safety v. Johanns*, 451 F.Supp. 2d at 1170. Garst seed is a subsidiary of Syngenta. *Garst Corn Seed*, SYNGENTA, <http://www.syngenta.com/country/us/en/agriculture/seeds/corn/garst/Pages/garst-corn.aspx> (last visited Apr. 15, 2013).

general public.<sup>339</sup> Earthjustice found that biopharming took place in Hawai‘i from 2001 to 2003.<sup>340</sup> Without alerting the public, the companies harvested corn and sugarcane that contained hormones, vaccines, and proteins to treat human illness.<sup>341</sup> At least one company was engineering corn to produce experimental vaccines for the Human Immunodeficiency Virus and Hepatitis B virus.<sup>342</sup> Another company was engineering corn and sugarcane to produce cancer-fighting agents.<sup>343</sup>

The biopharming case was a big win for Hawai‘i,<sup>344</sup> but it left the public feeling uneasy about the GE Industry’s activities in our island home.<sup>345</sup> GE companies are no longer conducting biopharming operations in Hawai‘i,<sup>346</sup> but it is only a matter of time before the next test crop is revealed.<sup>347</sup> Given the secretive nature of the GE Industry’s field trials and the potential for dangerous field tests, there is a fear about what the GE Industry will try to test next and how that will affect all of Hawai‘i’s natural resources.<sup>348</sup> The State, even though it is aware of the potential for the release of dangerous GE crops, has not enacted any legislation to regulate future GE release of biopharmaceuticals or open-air field testing.<sup>349</sup>

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<sup>339</sup> *Ctr. For Food Safety v. Johanns*, 2007 WL 3072860, at \*2 (D. Haw. Oct. 18, 2007) (reviewing Judge Ezra’s order).

<sup>340</sup> *Ctr. For Food Safety v. Johanns*, 451 F.Supp. 2d at 1170.

<sup>341</sup> *Id.*

<sup>342</sup> *Id.*

<sup>343</sup> *Id.*

<sup>344</sup> In *Ctr. For Food Safety v. Johanns*, the District Court of Hawai‘i found that APHIS granted a series of permits to field test GE crops-without obtaining information about endangered species, threatened species, and critical habitats in Hawai‘i and other locations. *Id.* at 1182. The court noted that “[e]ven if APHIS is ultimately correct in its assertion that no listed species or habitats have been harmed, APHIS’s actions are nevertheless tainted because APHIS failed to comply with a fundamental procedural requirement.” *Id.* The court continued to scold APHIS stating that “APHIS’s utter disregard for this simple investigation requirement, especially given the extraordinary number of endangered and threatened plants and animals in Hawaii, constitutes an unequivocal violation of a clear congressional mandate.” *Id.*

<sup>345</sup> Interview with Walter Ritte, Moloka‘i Resident and Community Activist (Feb. 7, 2013).

<sup>346</sup> Interview with Paul Achitoff, *supra* note 39.

<sup>347</sup> See Pollack, *supra* note 53 and accompanying text.

<sup>348</sup> Interview with Walter Ritte, *supra* note 345.

<sup>349</sup> See *supra* note 19 (summarizing GE legislation that has been introduced in Hawai‘i but that has not been enacted).

## V. LEGAL FRAMEWORK: CONSTITUTIONAL PROTECTIONS

## A. Article XI, Section 1: The Public Trust Doctrine

The public trust doctrine is a particularly useful tool that legally requires the State of Hawai‘i to consider and protect Hawai‘i’s natural resources.<sup>350</sup> As discussed *supra* section II(C)(1)(c), Hawai‘i’s public trust doctrine stems from both common law and Native Hawaiian custom and tradition.<sup>351</sup> Under U.S. common law, the public trust doctrine limits the government’s ability to alienate certain resources from public use.<sup>352</sup> In 1978, Hawai‘i elevated the public trust doctrine to a constitutional mandate.<sup>353</sup> The State now holds all public trust resources for the benefit of the people, and it has a duty to ensure that the resources are utilized in a manner that benefits the larger community.<sup>354</sup> In other words, the public trust holds the government accountable for carrying out its fiduciary responsibilities.<sup>355</sup> The doctrine “can sometimes give greater recognition to public interests at times when legislatures are under excessive pressure by special interest lobbyists.”<sup>356</sup> Overall, the public trust doctrine tells the State *how* it should make decisions, as opposed to *what* those decisions must be.<sup>357</sup>

## 1. The Scope of the Public Trust

Hawai‘i’s public trust, as set forth in the state constitution, requires broad protection of “all natural resources.”<sup>358</sup> Historically, the public trust applied only to navigable<sup>359</sup> and tidal waters,<sup>360</sup> but it has since grown

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<sup>350</sup> See generally Sproat & Moriwake, *supra* note 20.

<sup>351</sup> See *Waiāhole I*, 94 Haw. 97, 128-29, 9 P.3d 409, 440-41 (2000).

<sup>352</sup> Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471, 476 (1970).

<sup>353</sup> Sproat, *Where Justice Flows*, *supra* note 94, at 547.

<sup>354</sup> Sproat, *Where Justice Flows*, *supra* note 94, at 547.

<sup>355</sup> JACK H. ARCHER, ET AL., *THE PUBLIC TRUST DOCTRINE AND THE MANAGEMENT OF AMERICA’S COASTS* 3-4 (1994).

<sup>356</sup> Ralph W. Johnson, *Water Pollution and the Public Trust Doctrine*, 19 ENVTL. L. 485, 511 (1989) (explaining both the advantages and disadvantages of the public trust doctrine).

<sup>357</sup> Sproat & Moriwake, *supra* note 20, at 268.

<sup>358</sup> HAW. CONST. art. XI, § 1.

<sup>359</sup> *Illinois Central Railroad Co. v. Illinois*, 146 U.S. 387 (1892).

<sup>360</sup> *Phillips Petroleum Co. v. Mississippi*, 484 U.S. 469 (1988).

beyond those resources.<sup>361</sup> Moreover, the public trust doctrine has expanded “[c]oncurrent[ly] with the fostering of environmentally conscious legislation and the growing recognition that there are public rights and duties in natural resources.”<sup>362</sup>

In 1978, delegates to the Hawai‘i Constitutional Convention passed a constitutional amendment that expanded the scope of Hawai‘i’s public trust doctrine so to protect all natural resources.<sup>363</sup> The framers of the constitution explicitly established that under article XI, section 1, the public trust doctrine applies to “all natural resources, including land, water, air, minerals, and energy sources.”<sup>364</sup> In 2000, the Hawai‘i Supreme Court had the opportunity to use article XI, section 1 to protect Hawai‘i’s water resources.<sup>365</sup> In *Waiāhole I*, the court did not define the full scope of the public trust doctrine.<sup>366</sup> Instead, it reaffirmed the notion that “the public trust doctrine applies to all water resources without exception or distinction” and that it “need not define the full extent of Article XI, [section] 1’s reference to ‘all public resources’ at this juncture.”<sup>367</sup> The court did, however, allude to how it may interpret the scope of the public trust doctrine in the future when it recognized that “the public trust, by its very nature, does not remain fixed in time, but must conform to changing needs and circumstances.”<sup>368</sup>

## 2. The State’s Duty to Conserve Public Trust Resources

*Waiāhole I* held that under article XI, section 1 of the Hawai‘i Constitution, the State adopted the public trust doctrine as a “fundamental principle of constitutional law in Hawai‘i.”<sup>369</sup> The court in *Waiāhole I* held

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<sup>361</sup> Comment, *Hawai‘i Constitution, Article XI, Section 1*, 19 U. HAW. L. REV. 177, 185 (1997). States have used this authority to apply the public trust doctrine to such natural resources as non-navigable tributaries, dry sand beaches, oyster shells and other marine life. In addition, the public trust is not limited to water-related resources. Several courts have interpreted the public trust doctrine to apply to non-water-related resources to protect significant resources, such as archaeological remains, public parklands, public libraries, and air. *Id.*

<sup>362</sup> Anna R. C. Caspersen, Comment, *The Public Trust Doctrine and the Impossibility of “Takings” by Wildlife*, 23 B.C. ENVTL. AFF. L. REV. 357, 369 (1996). States have the authority to expand or limit the scope of the public trust doctrine to reflect their local priorities. ARCHER, ET AL., *supra* note 355, at 3-4.

<sup>363</sup> See HAW. CONST. art. XI, § 1.

<sup>364</sup> HAW. CONST. art. XI, § 1.

<sup>365</sup> See *Waiāhole I*, 94 Haw. 97, 9 P.3d 409 (2000).

<sup>366</sup> *Id.* at 133, 9 P.3d at 445.

<sup>367</sup> *Id.*

<sup>368</sup> *Id.* at 135, 9 P.3d at 447.

<sup>369</sup> *Id.* at 132, 9 P.3d at 444.

that article XI, section 1 establishes the permissible “outer limits” of regulatory codes and thus informs how a court interprets any state or agency regulation.<sup>370</sup>

Article XI, section 1 provides that the State “shall promote the development and utilization of [natural] resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State.”<sup>371</sup> The constitutional framers defined “conservation” as “the protection, improvement and use of natural resources according to principles that will assure their highest economic or social benefits.”<sup>372</sup> A comment from Delegate Charlene Hoe during the vigorous whole committee debates clarifies what the framers considered as an “economic benefit”: “[T]he [State’s] basic criteria for development and use of natural resources” must include consideration of “[t]he total concept of economics—that is, ‘careful and thrifty’ use of the resources which are necessities of life—rather than the narrow sense, that of immediate dollar return, and the total concept of social benefits.”<sup>373</sup> In addition, the framers agreed that the requirement to develop and use public trust resources in furtherance of self-sufficiency of the State “constitutionally recognized the growing concern and awareness of Hawai‘i as being overly dependent on outside sources for, among other resources, food and energy.”<sup>374</sup>

Moreover, the court in *Waiāhole I* held that conservation also includes the protection of natural resources.<sup>375</sup> Summarizing the objectives of the public trust doctrine in terms of water, the court ruled that “in short, the object is not maximum consumptive use, but rather the most equitable, reasonable, and beneficial allocation of state water resources, with full recognition that resource protection also constitutes ‘use.’”<sup>376</sup> While the court was speaking in the context of water, the same reasoning rings true for the conservation of other natural resources as well.<sup>377</sup> As previously indicated, this does not mean that natural resources cannot be impacted or developed. Instead, the public trust doctrine demands controlled

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<sup>370</sup> *Id.* at 133, 9 P.3d at 445.

<sup>371</sup> HAW. CONST. art. XI, § 1.

<sup>372</sup> *Waiāhole I*, 94 Haw. at 137, 9 P.3d at 451 (citing STANDING COMM. REP. NO. 77, reprinted in 1 PROCEEDINGS OF THE CONST. CONVENTION OF HAW. OF 1978 685-86 (State of Hawai‘i 1980)).

<sup>373</sup> COMM. OF THE WHOLE DEBATES, reprinted in 2 PROCEEDINGS OF THE CONST. CONVENTION OF HAW. OF 1978 857 (State of Hawai‘i 1980).

<sup>374</sup> STANDING COMM. REP. NO. 77, reprinted in 1 PROCEEDINGS OF THE CONST. CONVENTION OF HAW. OF 1978 686 (State of Hawai‘i 1980)).

<sup>375</sup> *Waiāhole I*, 94 Haw. at 133, 9 P.3d at 445.

<sup>376</sup> *See id.* at 140, 9 P.3d at 452.

<sup>377</sup> *Id.*



development.<sup>378</sup> Without regulations on the importation of GE crops, the GE Industry is unable to develop crop productions with the type of planned control that article XI, section 1 requires.

### 3. The State's Obligation to Weigh in Favor of Protected Public Trust Uses

The public trust doctrine includes a presumption in favor of protecting public use of the public trust resource.<sup>379</sup> Under the common law, protected trust uses included navigation, commerce, and fishing.<sup>380</sup> *Waiāhole I* established that the protection of public trust resources<sup>381</sup> and Native Hawaiian traditional and customary rights are also protected public trust uses in Hawaii.<sup>382</sup> The court in *Waiāhole I* did not list all other possible protected uses of the public trust resources, but the court did make clear that “private commercial use,” such as industrial agriculture, is not a protected public trust use.<sup>383</sup> This means that even though private, commercial uses of natural resources may offer benefits to the public, such as increasing tax revenues or providing job opportunities within the state, private commercial use is not a protected trust purpose that could benefit from protection under article XI, section 1.<sup>384</sup>

Additionally, the State also has a duty to weigh competing interests in public resources, always with a presumption in favor of a protected public use.<sup>385</sup> The court in *Waiāhole I* recognized that public and private interests in natural resources often conflict with each other.<sup>386</sup> To remedy this conflict, the court held that the State is constitutionally obligated to balance the public and private use of public trust resources on a case-by-case basis.<sup>387</sup> The court clarified, however, by holding that the State must

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<sup>378</sup> *Id.* at 141, 9 P.3d at 453.

<sup>379</sup> *Id.* at 142, 9 P.3d at 454.

<sup>380</sup> Sax, *supra* note 352, at 476.

<sup>381</sup> *Waiāhole I*, 94 Haw. at 136, 9 P.3d at 448 (stating that “we thus hold that the maintenance of waters in their natural state constitutes a distinct ‘use’ under the water resources trust. This disposes of any portrayal of retention of waters in their natural state as ‘waste’”); *see also* National Audubon Soc’y v. Superior Court, 33 Cal. 3d 419, 434, 658 P.2d 709, 719 (1983) (stating that a natural resource’s ecological use and recreational use are public trust uses).

<sup>382</sup> *Waiāhole I*, 94 Haw. at 137, 9 P.3d at 449.

<sup>383</sup> *Id.* at 138 (holding “that the public trust may allow grants to private interests in trust resources under certain circumstances” but that in no way does private commercial use a protected public purpose that is protected by the trust).

<sup>384</sup> *Id.*

<sup>385</sup> *Id.* at 142, 9 P.3d at 454.

<sup>386</sup> *Id.*

<sup>387</sup> *Id.* at 141, 9 P.3d at 453.

start with a presumption in favor of “public use, access, and enjoyment.”<sup>388</sup> As a result, public trust uses of natural resources are the “norm or default condition” while private commercial uses of natural resources undergo a “higher level of scrutiny.”<sup>389</sup>

The court in *Waiāhole I* also affirmed the Water Commission’s adoption of the precautionary principle as a developing principle of environmental law.<sup>390</sup> The precautionary principle is a principle of environmental law and states that “[w]here scientific evidence is preliminary and not yet conclusive regarding the management of [natural] resources which are part of the public trust, it is prudent to adopt ‘precautionary principles’ in protecting the resource.”<sup>391</sup> The “lack of scientific certainty does not extinguish the presumption in favor of public trust purposes or vitiate [an agency’s] affirmative duty to protect such purposes whenever feasible.”<sup>392</sup> Although the court in *Waiāhole I* acknowledged that the precautionary principle is developing over time, it stated that “at minimum, the absence of firm scientific proof should not tie the [Water] Commission’s hands in adopting reasonable measures designed to further the public interest.”<sup>393</sup>

Overall, even if there is a lack of scientific certainty, “[t]he burden ultimately lies with those seeking or approving such [private] uses to justify them in light of the purposes protected by the trust.”<sup>394</sup> This means that the party seeking to use the public trust resource for private, commercial uses bears the burden of demonstrating that the use is “not injurious to the rights of others.”<sup>395</sup> Also, “once adverse impact to the constitutional public trust is raised, the applicant’s burden is intensified, and the agency and reviewing court must be satisfied that the relevant constitutional test is met.”<sup>396</sup>

#### 4. The State’s Obligation to Plan

In *Waiāhole I*, the Hawai‘i Supreme Court clarified the State’s

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<sup>388</sup> *Id.* at 142, 9 P.3d at 454.

<sup>389</sup> *Id.*

<sup>390</sup> *Id.* at 154, 9 P.3d at 466.

<sup>391</sup> *Waiāhole I*, 94 Haw. at 154, 9 P.3d at 466 (quoting the Water Commission’s decision).

<sup>392</sup> *Id.*

<sup>393</sup> *Id.*

<sup>394</sup> *Id.* at 142, 9 P.3d at 454.

<sup>395</sup> *Id.* (quoting *Robinson v. Ariyoshi*, 65 Haw. 641, 649 n. 8, 658 P.2d 287, 295 n. 8 (1982)).

<sup>396</sup> *Id.* (citing *Commonwealth Dep’t of Env’tl. Resources v. Commonwealth Pub. Util. Comm’n*, 18 Pa. Cmmw. 558, 335 A.2d 850, 865 (1975)).

public trust obligations as trustee of Hawai‘i’s natural resources.<sup>397</sup> While the case specifically dealt with water use and allocation, the precedent that *Waiāhole I* set is applicable to all other natural resources within the public trust. *Waiāhole I* held that “if the public trust is to retain any meaning and effect, it must recognize enduring public rights to trust resources separate from, and superior to, the prevailing private interests in the resources at any given time.”<sup>398</sup>

The State, therefore, has an “affirmative duty to take the public trust into account in the planning and allocation of resources, and to protect public trust uses whenever feasible.”<sup>399</sup> Overall, “the [S]tate may compromise public rights in the resource pursuant only to a decision made with a level of openness, diligence, and foresight commensurate with the high priority these rights command under the laws of our state.”<sup>400</sup> Some have equated this requirement to that of a “NEPA-like” action in that before a state agency can decide to permit a use of the natural resource that is contrary to the public trust, it must consider and weigh all potential benefits and risks.<sup>401</sup> Unlike NEPA, however, “the trust duty is not limited to analyzing actions or proposals as they arise.”<sup>402</sup> Instead, the public trust doctrine must be considered at “every stage of the planning and decision making.”<sup>403</sup>

In 2006, *Kelly v. Oceanside* offered an example as to how the public trust doctrine should be applied to agency decisions.<sup>404</sup> *Kelly* held that the State has a duty to ensure that the conditions set by agency regulations are met.<sup>405</sup> Moreover, *Kelly* ruled that the agency’s “discretionary authority is circumscribed by the public trust doctrine.”<sup>406</sup> This means that in instances where a state agency is granted discretionary

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<sup>397</sup> *Id.*

<sup>398</sup> *Id.* at 132, 9 P.3d at 444.

<sup>399</sup> *Id.* at 141, 9 P.3d at 453.

<sup>400</sup> *Id.*

<sup>401</sup> See Scott W. Reed, *The Public Trust Doctrine: Is It Amphibious?*, 1 J. ENV’T L. & LITIG. 107, 108 (1986); see also Robert E. Holden & Tad Bartlett, *Leaving Communities Behind: The Evolving World of Environmental Justice*, 51 LA. B.J. 94, 97 (2003) (arguing that “[i]n Louisiana, the public trust doctrine establishes a ‘mini-NEPA’ for major projects”). See also 42 U.S.C. § 4332.

<sup>402</sup> Sproat & Moriwake, *supra* note 20, at 269.

<sup>403</sup> Sproat & Moriwake, *supra* note 20, at 269.

<sup>404</sup> *Kelly v. 1250 Oceanside*, 111 Haw. 205, 140 P.3d 985 (2006).

<sup>405</sup> *Id.* at 227, 140 P.3d at 1007 (stating that the County had “an affirmative duty” to ensure that a land developer complied with environmental protection conditions).

<sup>406</sup> *Id.* at 230, 140 P.3d at 1010 (stating that “although in some respect, exercise of DOH’s authority is discretionary in nature, such discretionary authority is circumscribed by the public trust doctrine”).

authority to exercise its power through a state statute, the agency cannot ignore its public trust duties, and decisions to exercise that authority must be informed by public trust principles.<sup>407</sup>

#### 5. The State's Duty to Conserve Public Trust Resources for Future Generations

The court in *Waiāhole I* also recognized that there is a constitutional requirement to protect and conserve Hawai'i's natural resources and that this requirement is based on a historical understanding that the trust is a public right.<sup>408</sup> The constitutional framers believed that it was important to expressly state that protection of natural resources is for the benefit of present and future generations "because it affirms the ethical obligations of this generation toward the next and is entirely consistent with the concept that the constitution should provide for the future."<sup>409</sup> Ultimately, the public trust doctrine advocates for "a controlled development of resources rather than no development."<sup>410</sup> Thus, the State is not obligated to never develop or never use trust resources for private, commercial gain, but rather, the public trust requires that the State develop the resources in a manner that ensures long-term protection and beneficial use of the resources.<sup>411</sup>

As such, the State assumes the role of trustee over trust resources, not just a "good business manager."<sup>412</sup> The legislative and executive branches of state government are "judicially accountable for the dispositions of the public trust," "just as private trustees are judicially accountable to their beneficiaries for dispositions of the res."<sup>413</sup> As an added measure, judicial review protects against thoughtless use of the public trust.<sup>414</sup>

#### B. *Article XI, Section 9: Private Right to a Clean and Healthful Environment*

In addition to the codification of the public trust doctrine, the 1978

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<sup>407</sup> *Id.* at 230-31, 140 P.3d at 1010-11.

<sup>408</sup> *Waiāhole I*, 94 Haw. at 142, 9 P.3d at 453.

<sup>409</sup> STANDING COMM. REP. NO. 77, *reprinted in* 1 PROCEEDINGS OF THE CONST. CONVENTION OF HAW. OF 1978 686 (State of Hawai'i 1980).

<sup>410</sup> *Waiāhole I*, 94 Haw. at 142, 9 P.3d at 453.

<sup>411</sup> *Id.*

<sup>412</sup> *In re Wai'ola O Moloka'i*, 103 Haw. 401, 422, 83 P.3d 664, 685 (2004) (quoting *Arizona Cent. for Law in Pub. Interest v. Hassell*, 837 P.2d 158, 168-69 (Ariz.Ct.App.1991), *review dismissed*, 837 P.2d 158 (1992)).

<sup>413</sup> *Id.* at 422-23, 83 P.3d at 684-85 (clarifying that beneficiaries include future generations, not just present generations).

<sup>414</sup> *Id.*

constitutional amendments created a new public right as articulated in Article XI, section 9. Article XI, section 9 mandates that “[e]ach person has the *right to a clean and healthful environment*, as defined by laws relating to environmental quality, including control of pollution and conservation, protection and enhancement of natural resources.”<sup>415</sup> This right can reasonably be limited by legislative action,<sup>416</sup> as was done with regard to Hawai‘i’s pesticide laws.<sup>417</sup> However, legislation is not necessary to enforce this provision.<sup>418</sup>

The Hawai‘i Supreme Court determined that article XI, section 9 provides individuals with standing to bring a lawsuit to enforce their right to a clean and healthful environment.<sup>419</sup> *County of Hawai‘i v. Ala Loop Homeowners* was the first case to interpret the boundaries of Article XI, section 9.<sup>420</sup> The court in *Ala Loop* held that what constitutes a “clean and healthful environment” is determined by the law, but that article XI, section 9 is ultimately “self-executing.”<sup>421</sup> This means that “although the provision preserves the ability of the legislature to impose reasonable limitations on the exercise of the right, the right exists and can be exercised, even in the absence of such limitations.”<sup>422</sup>

This interpretation of article XI, section 9’s plain language is consistent with the intent of its framers, which is reflected in the report of the 1978 ConCon’s Committee on Environment, Agriculture, Conservation and Land.<sup>423</sup> This report explicitly recognizes that under article XI, section 9, “individuals may directly sue public and private violators.”<sup>424</sup> Moreover, “while the report recognizes that the legislature retains the power to impose reasonable limits on the right to bring suit, such as statutes of limitations, it does not suggest that such limits must be

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<sup>415</sup> HAW. CONST. art. XI, § 9 (emphasis added).

<sup>416</sup> See *County of Hawai‘i v. Ala Loop Homeowners*, 123 Haw. 391, 413, 235 P.3d 1103, 1125 (2010).

<sup>417</sup> See HAW. REV. STAT. § 149A-13 (1996) (regulating the use of pesticides through state issued license).

<sup>418</sup> *Ala Loop*, 123 Haw. at 413, 235 P.3d at 1125.

<sup>419</sup> *Kahana Sunset Owners Ass’n v. Māui Cnty. Council*, 86 Haw. 132, 134, 948 P.2d 122, 124 (1997).

<sup>420</sup> See *Ala Loop*, 123 Haw. at 416, 235 P.3d at 1128 (stating that the court has not previously determined whether article XI, section 9 is self-executing).

<sup>421</sup> *Id.* at 413, 235 P.3d at 1125.

<sup>422</sup> *Id.*

<sup>423</sup> *Id.*

<sup>424</sup> *Id.* at 414, 235 P.3d at 1126 (citing STANDING COMM. REP. NO. 77, reprinted in 1 PROCEEDINGS OF THE CONST. CONVENTION OF HAW. OF 1978 689-90 (State of Hawai‘i 1980)).

in place before actions can be brought.”<sup>425</sup>

The framers of article XI, section 9 anticipated that establishing a right to sue could result in a “flood of frivolous lawsuits.”<sup>426</sup> The report countered these fears by explaining that the Committee “believes that if environmental law enforcement by government agencies is adequate in practice, then there should be few additional lawsuits, given the barriers that litigation costs present.”<sup>427</sup> Furthermore, the framers were “convinced that the safeguards of reasonable limitations and regulations as provided by law should serve to prevent abuses of the right to a clean and healthful environment.”<sup>428</sup>

#### VI. ANALYSIS: DOA’S PUBLIC TRUST OBLIGATIONS TO REGULATE THE GE INDUSTRY

Hawai‘i’s GE Industry is growing at a fast pace.<sup>429</sup> The “New Big Five” companies now own and lease more than 25,000 acres of land,<sup>430</sup> which accounts for only 5% of the available former plantation lands.<sup>431</sup> In addition to expanding seed crop operations, GE companies may be facing increased pressure to produce crops that live up to technological expectations.<sup>432</sup> These pressures invite exploration into novel traits and untested genetic combinations that may adversely impact Hawai‘i’s ecosystem and biodiversity.<sup>433</sup> The State was quick to support the rapid growth of the industry; its public trust obligations now demands that the State take a measured approach and determine the environmental impact of the GE Industry’s release of GE crops on a case-by-case basis.<sup>434</sup>

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<sup>425</sup> *Id.*

<sup>426</sup> *Id.* at 413, 235 P.3d at 1125.

<sup>427</sup> *Id.* at 414, 235 P.3d at 1126 (citing STANDING COMM. REP. NO. 77, *reprinted in* 1 PROCEEDINGS OF THE CONST. CONVENTION OF HAW. OF 1978 689-90 (State of Hawai‘i 1980)).

<sup>428</sup> *Id.* at 413, 235 P.3d at 1125 (citing STANDING COMM. REP. NO. 77, *reprinted in* 1 PROCEEDINGS OF THE CONST. CONVENTION OF HAW. OF 1978 689-90 (State of Hawai‘i 1980)).

<sup>429</sup> LOUDAT & KASTURI, *supra* note 64, at 1.

<sup>430</sup> Lara Yamada, *The GMO Debate, Food For Thought - Part 2: Hawai‘i Seed Industry Fuels Global Debate On Genetically Modified Foods*, KITV (Feb. 24, 2012), <http://www.kitv.com/The-GMO-Debate-Food-For-Thought-Part-2/-/8906042/9658314/-/kwamwr/-/index.html>.

<sup>431</sup> Interview with Alan Takemoto, *supra* note 58.

<sup>432</sup> *See supra* note 53 and accompanying text.

<sup>433</sup> *See supra* notes 53, 54 and accompanying text.

<sup>434</sup> *See Waiāhole I*, 94 Haw. 97, 141, 9 P.3d 409, 453 (2000).

A. *The Scope of Public Trust Includes Hawai‘i’s Ecosystem and Biodiversity*

1. Hawai‘i’s Constitution Provides Protection for Land, Water, Air, Minerals, and Energy Resources

Article XI, section 1’s plain language indicates that all of Hawai‘i’s natural resources are part of the public trust.<sup>435</sup> When interpreting the scope of article XI, section 1, one must first turn to the intent as “found in the instrument itself.”<sup>436</sup> Hawai‘i follows the rule that “if the words used in a constitutional provision are clear and unambiguous, they are to be construed as they are written.”<sup>437</sup> Hawai‘i’s constitution provides that article XI, section 1, applies to “all natural resources, including land, water, air, minerals, and energy resources.”<sup>438</sup> The plain meaning of the constitution supports the conclusion that the public trust includes, at the very least, “land, water, air, minerals, and energy sources.”<sup>439</sup>

2. The Public Trust Doctrine Also Applies to Hawai‘i’s Flora and Fauna

Article XI, section 1’s application, however, is not limited to those “natural resources” enumerated in the constitution.<sup>440</sup> Instead, the public trust also includes all flora and fauna that contribute to Hawai‘i’s delicate

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<sup>435</sup> See HAW. CONST. art. XI, § 1.

For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawaii’s natural beauty and all natural resources, including land, water, air, minerals and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State.

All public natural resources are held in trust by the State for the benefit of the people.

<sup>436</sup> *Save Sunset Beach Coalition v. City & County of Honolulu*, 102 Haw. 465, 474, 78 P.3d 10 (2003).

<sup>437</sup> *Waiāhole I*, 94 Haw. 97, 131, 9 P.3d 409, 443 (2000).

<sup>438</sup> HAW. CONST. art. XI, § 1.

<sup>439</sup> HAW. CONST. art. XI, § 1 explicitly provides that “the State and its political subdivisions shall conserve and protect Hawai‘i’s natural beauty and *all natural resources*, including *land, water, air*, minerals, and energy sources.” HAW. CONST. art. XI, § 1 (emphasis added).

<sup>440</sup> HAW. CONST. art. XI, § 1 states that the Hawai‘i public trust doctrine applies to “all natural resources, *including* land, water, air, minerals, and energy sources.” HAW. CONST. art. XI, § 1 (emphasis added). Furthermore, see *Waiāhole*, 94 Haw. at 135, 9 P.3d at 447 (stating that “the public trust, by its very nature, does not remain fixed in time, but must conform to changing needs and circumstances”).

ecosystem.<sup>441</sup> Flora and fauna (i.e., plants and animals) are invaluable natural resources that maintain Hawai‘i’s ecosystems and contribute to our unique biodiversity.<sup>442</sup>

Including Hawai‘i’s flora and fauna as part of the public trust is consistent with the historical circumstances under which the provision was adopted. A rule of the Hawai‘i Supreme Court states that “[a] constitutional provision must be construed in connection with other provisions of the instrument, and also in the light of the circumstances under which it was adopted and the history which preceded it.”<sup>443</sup> Article XI, section 1 was drafted after Hawai‘i had experienced the detrimental effects of private, commercial abuse of natural resources, such as the sugar plantation industry’s use of water.<sup>444</sup> The framers clarified that the State’s public trust responsibilities included not only the duty to conserve natural resources, but also to promote the use of natural resources in “furtherance of self-sufficiency of the state.”<sup>445</sup> The standing committee reports to the constitutional amendment indicate that “the consensus of [the] Committee with regard to self-sufficiency was to constitutionally recognize the growing concern and awareness of Hawai‘i being overly dependent on outside sources for, among other resources, food and energy.”<sup>446</sup> Native flora and fauna help to maintain a balanced ecosystem, which in turn ensures that Hawai‘i can remain self-sufficient.<sup>447</sup> Without balanced ecosystems, Hawai‘i’s biodiversity and ability to be self-sufficient is threatened.<sup>448</sup>

The California Supreme Court has already applied the public trust doctrine to an entire functioning ecosystem in *National Audubon Society v.*

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<sup>441</sup> See *National Audubon Soc’y v. Superior Court*, 33 Cal. 3d 419, 658 P.2d 709 (1983) (using the public trust doctrine to protect various natural resources, including salinity of the water, brine shrimp, California gulls, and rock formations).

<sup>442</sup> See generally Vitousek, *supra* note 306.

<sup>443</sup> *Hanabusa v. Lingle*, 105 Haw. 28, 32, 93 P.3d 670, 674 (2004).

<sup>444</sup> See generally Sproat, *Where Justice Flows*, *supra* note 94.

<sup>445</sup> HAW. CONST. art. XI, § 1.

<sup>446</sup> STANDING COMM. REP. NO. 77, reprinted in 1 PROCEEDINGS OF THE CONST. CONVENTION OF HAW. OF 1978 686 (State of Hawai‘i 1980).

<sup>447</sup> See Janet C. Lake & Michelle R. Leishman, *Invasion Success of Exotic plants in Natural Ecosystems: The Role of Disturbance, Plant Attributes and Freedom from Herbivores*, 117 BIOLOGICAL CONSERVATION 215, 215 (2003) (stating that “[t]he invasion of natural communities by introduced species constitutes a major threat to biodiversity globally”).

<sup>448</sup> See generally Knudsen, *Impacts of GMOs on Wildlands*, *supra* note 270.



*Superior Court of Alpine County*<sup>449</sup> and continued to protect ecological uses in *Marks v. Whitney*.<sup>450</sup> Ecosystem functions include “decomposition, water balance, nutrient cycling and loss, soil fertility, erosion, and disturbance frequency.”<sup>451</sup> All of these functions are important in maintaining a balanced ecosystem where life can flourish.<sup>452</sup> Native Hawaiians understood this balance, which is one reason they implemented rules to manage the use of natural resources.<sup>453</sup> In light of the importance of a thriving ecosystem to achieving true food self-sufficiency, including Hawai‘i’s various flora and fauna in the public trust would be consistent with the intent of the constitutional framers.<sup>454</sup>

B. *The DOA Needs to Gather Information to Fulfill Its Duty to Plan*

The Hawai‘i Supreme Court has held that the exercise of Native Hawaiian traditional and customary rights is a public trust purpose.<sup>455</sup> In *In re Kukui*, the Hawai‘i Supreme Court found that Hawai‘i’s Water Commission failed to sufficiently consider and weigh the harm to Native Hawaiian traditional and customary rights when it granted a water use permit to a private commercial entity.<sup>456</sup> The court considered how the increased water use could harm the ecosystem and then held that the Commission failed to adequately scrutinize the non-trust use of the water in light of those potential harms.<sup>457</sup>

Like in *In re Kukui*, Native Hawaiians and non-Native Hawaiians alike are asking the State to scrutinize the GE industry’s use of GE crops

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<sup>449</sup> 33 Cal. 3d 419, 434, 658 P.2d 709, 719 (1983). The court in *Waiāhole I* later relied upon this case to support its interpretations of the public trust. But the court notes that given Hawai‘i’s additional duty to protect Native Hawaiian traditional and customary rights under HAW. CONST. art. XII, § 7, *Nat’l Audubon* “appears to provide less, rather than more, protection than arguably justified in this case.” See *Waiāhole I*, 94 Hawai‘i 97, 140, 9 P.3d 409, 453 (2000).

<sup>450</sup> 6 Cal. 3d 251, 259-60, 491 P.2d 374, 380 (1971). The court states that it is important to preserve tidelands in its natural state “so that they may serve as ecological units for scientific study, as open space, and as environments which provide food and habitat for birds and marine life, and which favorably affect the scenery and climate of the area.” *Id.*

<sup>451</sup> Vitousek, *supra* note 306, at 29.

<sup>452</sup> Vitousek, *supra* note 306, at 29.

<sup>453</sup> See generally HANDY & HANDY, *supra* note 60.

<sup>454</sup> See *In re Contested Case Hearing on Water Use Permit Application Filed by Kukui (Moloka‘i), Inc.*, 116 Haw. 481, 507, 174 P.3d 320, 346 (2007).

<sup>455</sup> See *Waiāhole I*, 94 Haw. at 137, 9 P.3d at 449 (stating that *PASH*, 79 Hawai‘i 425, 903 P.2d 1246 (1995), *cert. denied*, 517 U.S. 1163 (1996); *Kalipi v. Hawaiian Trust Co.*, 66 Haw. 1, 656 P.2d 745 (1982)). See also HAW. CONST. art. XII, § 7.

<sup>456</sup> See *In re Kukui*, 116 Haw. 481, 174 P.3d 320 (2007).

<sup>457</sup> *Id.* at 492, 174 P.3d at 331.

more critically.<sup>458</sup> Much like the allocation of water, the DOA should determine the potential harms associated with the release of GE crops.

Moloka‘i is one location where its residents are speaking out about the release of GE crops. Moloka‘i is home to some of Monsanto’s GE operations.<sup>459</sup> Moloka‘i’s population is primarily Native Hawaiian,<sup>460</sup> many of whom “rely on the natural resources of the land and ocean” for subsistence activities, such as “gathering marine resources . . . to feed their ‘ohana [extended family].”<sup>461</sup> Hawai‘i’s Supreme Court held that “[g]athering . . . crab, fish, limu [seaweed], and octopus are traditional and customary practices that have persisted on Moloka‘i for generations.”<sup>462</sup> Many Moloka‘i residents also hunt as part of their subsistence lifestyles.<sup>463</sup> Like traditional Native Hawaiians, Moloka‘i residents who maintain a subsistent lifestyle rely on nature’s ecological balance.<sup>464</sup> Because of this reliance, any harm to Moloka‘i’s ecosystem would significantly impact their ability to be self-sufficient. The Hawai‘i Supreme Court in *In re Kukui* gave weight to the Water Commission report that found that fresh water is a “necessary and integral part of the live food pyramid” and that freshwater springs “create nursery habitat[s] of indeterminate size.”<sup>465</sup> In effect, the court determined that misallocation of water could disturb Moloka‘i’s ecological balance and therefore infringe on Moloka‘i residents’ traditional and customary rights.

GE crops also have the potential to disturb Hawai‘i’s ecological balance and thus infringe on Moloka‘i residents’ traditional and customary rights.<sup>466</sup> The full extent of these harms are unknown because there have been no state-commissioned reports on the environmental effects of GE

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<sup>458</sup> See Nancy Redfeather & Melanie Bondera, *Sustainable Agriculture*, HAWAI‘I SEED, <http://hawaiiseed.org/local-issues/sustainable-agriculture/> (last visited Apr. 20, 2013).

<sup>459</sup> *Hawai‘i*, MONSANTO, <http://www.monsanto.com/whoware/Pages/hawaii.aspx> (last visited Apr. 20, 2013) (identifying the locations of its operations on Māui, Moloka‘i, and O‘ahu).

<sup>460</sup> *In re Kukui*, 116 Haw. at 507, 174 P.3d at 346. One report found that Native Hawaiians comprise 72% of Moloka‘i’s population. LAHELA HAN, EMILLIA NOORDHOEK, HARMONEE WILLIAMS, & MALIA AKUTAGAWA, *SUSTAINABLE MOLOKA‘I: AGRICULTURE NEEDS ASSESSMENT 2* (2012).

<sup>461</sup> *In re Kukui*, 116 Haw. at 507, 174 P.3d at 346.

<sup>462</sup> *Id.* at 508, 174 P.3d at 347.

<sup>463</sup> Interview with Walter Ritte, *supra* note 345.

<sup>464</sup> See HAN ET AL., *supra* note 460, at 6.

<sup>465</sup> *In re Kukui*, 116 Haw. at 508, 174 P.3d at 347.

<sup>466</sup> *Id.* at 508, 174 P.3d at 347 (stating that “this court has upheld the exercise of Native Hawaiian and traditional and customary rights as a public trust purpose”) (internal quotations omitted).

crops in Hawai‘i.<sup>467</sup> The people of Moloka‘i use their natural resources to achieve self-sufficiency and exercise their traditional rights, both of which are protected public trust uses of Hawai‘i’s natural resources.<sup>468</sup> In many ways, the DOA’s failure to investigate potential harms of GE release, even after the Moloka‘i community expressed concerns, is a more flagrant disregard of its public trust responsibilities than the Water Commission in *In re Kukui*.<sup>469</sup> To fulfill its public trust obligations, the State is required to plan for the release of GE crops on a case-by-case basis.<sup>470</sup> Without information about the potential harms associated with the release of GE crops, the DOA is incapable of conducting the type of long-term planning required under the public trust doctrine. By not conducting even a cursory investigation into the potential harms of GE crop release, the DOA is ignoring its public trust obligation to protect Hawai‘i’s natural resources.

Without information about the risks that GE crops pose to public trust resources, the DOA cannot determine whether to restrict the introduction of the crops with the “level of openness, diligence, and foresight” required by the public trust.<sup>471</sup> This requires a consideration of “NEPA-like criteria to be examined, reported, and weighed.”<sup>472</sup> The DOA already has the authority and responsibility to conduct this type of review. It also has the authority to regulate the importation of plants that pose a risk to Hawai‘i’s agriculture and environment.<sup>473</sup> Under Hawai‘i Revised Statute section 150A-6.1,

the department [of agriculture] shall designate, by rule, as restricted plants, specific plants that may be detrimental or potentially harmful to agriculture, horticulture, the environment, or animal or public health, or that spread or may be likely to spread an infestation or infection of an insect, pest, or disease that is detrimental or potentially harmful to agriculture, horticulture, the environment, or animal or public health. In addition, plant species designated by rule as noxious weeds<sup>474</sup> are designated as

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<sup>467</sup> See Interview with Russell Kokubun, *supra* note 18 and accompanying text.

<sup>468</sup> See generally HAN ET AL., *supra* note 460.

<sup>469</sup> See *In re Kukui*, 116 Hawai‘i 481, 174 P.3d 320.

<sup>470</sup> See *Waiāhole I*, 94 Haw. 97, 141, 9 P.3d 409, 453 (2000).

<sup>471</sup> *Id.*

<sup>472</sup> Scott W. Reed, *The Public Trust Doctrine: Is It Amphibious?*, 1 J. ENV’T L. L. & LITIG. 107, 108 (1986) (stating that “full implementation of the public trust doctrine requires at a minimum an environmental assessment and, in most cases worth the effort of litigating, a full environmental impact statement”).

<sup>473</sup> HAW. REV. STAT. § 150A-6.1 (2008).

<sup>474</sup> To be defined as a noxious weed, the plant must meet the criteria established in HAW. ADMIN. RULES § 4-68-4 through § 4-68-8.

restricted plants.<sup>475</sup>

The DOA currently exercises that authority by requiring permits for the importation of certain non-GE crops and seeds, such as imported passionfruit<sup>476</sup> and coffee.<sup>477</sup> It does not, however, require permits for the importation of GE crops.<sup>478</sup> Instead, it provides a blanket exception permitting the importation of all corn and grass seeds, without distinction between the GE traits that the plant carries.<sup>479</sup>

While the DOA's decision not to restrict or prohibit the importation of GE crops under section 150A-6.1 is discretionary, that discretionary authority is "circumscribed by the public trust doctrine."<sup>480</sup> The Hawai'i Supreme Court has ruled that the State's public trust duties are more than just a restatement of its prerogatives.<sup>481</sup> Because of this, state agencies do not harbor "absolute discretion."<sup>482</sup> Instead, the State's public trust responsibilities set the boundaries of permissible discretion.<sup>483</sup>

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<sup>475</sup> HAW. REV. STAT. § 150A-6.1 (2008) (emphasis added).

<sup>476</sup> HAW. ADMIN. RULES § 4-70-33 (1981).

<sup>477</sup> See HAW. ADMIN. RULES § 4-70.

<sup>478</sup> HAW. ADMIN. RULES § 4-70-42.

<sup>479</sup> See HAW. ADMIN. RULES § 4-70-10.

(a) The introduction of any sugarcane plant (any species of the genus *saccharum*) or part thereof into Hawaii in any manner is prohibited except by approved permit issued in accordance with § 4-70-11.

(b) The introduction of plants of all other genus in the grass family and plant parts thereof is prohibited except:

- (1) Corn, sorghum, sudan grass, and broom corn which are regulated in subchapter 11;
- (2) Dried non-living plant materials;
- (3) Seeds; and
- (4) By approved permit issued in accordance with § 4-70-11.

HAW. ADMIN. RULES § 4-70-10 (1981).

<sup>480</sup> *Kelly v. 1250 Oceanside Partners*, 111 Haw. 205, 230, 140 P.3d 985, 1010 (2006).

<sup>481</sup> *Id.* (citing *Waiāhole I*, 94 Haw. at 144, 9 P.3d at 456) (stating that "it do[es] not suggest that the state's public trust duties amount to nothing more than a restatement of its prerogatives, nor do we ascribe to the constitutional framers the intent to enact laws devoid of any real substance and effect.")

<sup>482</sup> *Id.* at 231, 140 P.3d at 1011.

<sup>483</sup> See *id.*

By not establishing a procedure to receive CBI and to determine the larger impacts of the release of the GE crop, the DOA is violating its public trust responsibilities and is not fulfilling its role as trustee. There are still no official reports that the State is considering the full risk that GE crops pose to Hawai‘i’s trust resources. Instead, the DOA relies on unofficial conversations with GE industry representatives, EPA reports, and general opinions from the University of Hawai‘i’s College of Tropical Agriculture and Human Resources (“CTAHR.”).<sup>484</sup>

The DOA recognizes the economic benefits of the GE Industry’s presence in Hawai‘i, just as any good business manager would. However the DOA’s duties with respect to management of public trust resources are that “of a trustee and not simply the duties of a good business manager.”<sup>485</sup> For the DOA to discharge its duty as a trustee, it must begin to consider the potential impacts of GE crops and conduct the necessary inquiries into the risks posed by the GE crops. Without global, long-term research in regards to ways that the GE industry and each GE crop will impact public trust resources, the DOA cannot make an informed decision about whether the GE Industry’s benefits outweigh the risks.

“In sum, the [S]tate may compromise public rights in the resource pursuant only to a decision made with a level of openness, diligence, and foresight commensurate with the high priority these rights command under the laws of our state.”<sup>486</sup> Without the proper information about the full extent of the environmental risk associated with the release of GE crops, the DOA cannot fulfill its obligation as trustee of the public trust.<sup>487</sup>

### C. *The DOA Failed to Adequately Scrutinize the GE Industry’s Release of GE Crops*

Without the necessary information about how the GE Industry’s release of GE crops will impact public trust resources, the DOA cannot weigh the competing private and public trust interests as required under article XI, section 1.<sup>488</sup> There is a constitutional requirement that any balancing between public and private purposes start with a presumption in favor of “public use, access, and enjoyment.”<sup>489</sup> This places the burden on

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<sup>484</sup> See generally TAYLOR, TICK, & SHERMAN, *supra* note 148, at 80.

<sup>485</sup> *Kelly*, 111 Haw. at 231, 140 P.3d at 1011 (citing *Waiāhole I*, 94 Haw. at 144, 9 P.3d at 456).

<sup>486</sup> *Waiāhole I*, 94 Haw. at 143, 9 P.3d at 455.

<sup>487</sup> See *id.* The legislative and executive branches of the state are “judicially accountable for the disposition of the public trust.” *Id.* As a result, “the duties imposed upon the state are the duties of a trustee and not simply the duties of a good business manager.” *Id.*

<sup>488</sup> HAW. CONST. art. XI, § 1.

<sup>489</sup> HAW. CONST. art. XI, § 1.

the applicant to justify its use in light of those purposes that are protected by the public trust.<sup>490</sup> The DOA is required to weigh the competing public and private interests in trust resources, but it must start with a presumption in favor of public use.<sup>491</sup> Consequently, in the absence of information concerning the GE Industry's interest in releasing GE crops and the accompanying risks posed by such a release, preservation of Hawai'i's ecosystem and Native Hawaiian traditional and customary practices should take precedence.<sup>492</sup> This includes both the public's interest in protecting the natural resources and Native Hawaiians' interest in using natural resources to exercise traditional and customary rights.<sup>493</sup> *Waiāhole I* instructed state regulatory agencies to "weigh competing public and private uses on a case-by-case basis, according to any appropriate standards provided by law."<sup>494</sup> Before the DOA can "weigh competing public and private uses on a case-by-case basis," the State must first request, receive, and review all necessary information from the GE companies for each case of GE release.<sup>495</sup> Like its responsibility to plan, the DOA's responsibility to weigh requires the State to receive all CBI and determine the larger impacts of GE crop release. Without such information, the State cannot weigh competing interests in the trust resources.

Moreover, the State can no longer base its determination that the GE industry is "safe" on the fact that the public has been incapable of proving that Hawai'i's natural resources are being harmed by the release of GE crops. The public trust doctrine provides that "[t]he burden ultimately lies with those seeking or approving such [commercial] uses to justify them in light of the purposes protected by the trust."<sup>496</sup> This means that,

to the extent that harm to a public trust purpose . . . is alleged, the permit applicant must demonstrate that there is, in fact, no harm, or that any potential harm does not rise to a level that would preclude a finding that the requested use

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<sup>490</sup> *In re Kukui*, 116 Haw. 481, 506, 174 P.3d 320, 345 (2007).

<sup>491</sup> *See Waiāhole I*, 94 Haw. at 142, 9 P.3d at 454.

<sup>492</sup> *See In re Kukui*, 116 Haw. at 508, 174 P.3d at 347.

<sup>493</sup> *Waiāhole I*, 94 Haw. at 137, 9 P.3d at 449.

<sup>494</sup> *Id.* *See Save Ourselves, Inc. v. Louisiana Env'tl Control Comm'n*, 452 So. 2d 1152 (1984) ("[R]eading the constitution to establish a rule of reasonableness requiring the balancing of environmental costs and benefits against economic, social, and other factors.").

<sup>495</sup> *In re Kukui*, 116 Haw. at 506, 174 P.3d at 345.

<sup>496</sup> *Id.* at 142, 9 P.3d at 454.

is nevertheless reasonabl[y] beneficial.<sup>497</sup>

As a result, the GE Industry has the burden to prove that its use of natural resources in Hawai‘i is not injurious to the public’s interest in the resource, rather than the other way around.<sup>498</sup> Placing the burden on the GE Industry is consistent with the “higher level scrutiny” imposed upon private, commercial use of trust resources.<sup>499</sup> The GE Industry has the ultimate burden to prove that its use of the GE crops does not injure Hawai‘i’s natural resources.

VII. THE PEOPLE OF HAWAI‘I’S RIGHT TO SUE TO ENFORCE THEIR RIGHTS  
TO A CLEAN AND HEALTHFUL ENVIRONMENT

If the State continues to refuse to place reasonable regulations on the import and field-testing of new GE crops to ensure that the environment remains “clean and healthful,” then the people of Hawai‘i can bring a lawsuit to enforce that right. Article XI, section 9 provides that “[e]ach person has the *right to a clean and healthful environment*, as defined by laws relating to environmental quality, including control of pollution and conservation, protection and enhancement of natural resources.”<sup>500</sup> This right can reasonably be limited by legislative action,<sup>501</sup> but because article XI, section 9 is “self-executing,” legislation is not necessary to enforce this right.<sup>502</sup> Thus, individuals can bring suit to enforce this right, even when the legislature fails to act.<sup>503</sup> While the State is not obligated to create limitations on this right, it is within the State’s best interest to affirmatively establish regulations to clarify what a “clean and healthful environment” is in the particular context. Not establishing reasonable limitations would ultimately mean that the act is prohibited under article XI, section 9.

One example is the State’s ability to establish a statute of limitations or impose land use conditions in order to encourage controlled development.<sup>504</sup> All of these actions are ways in which the State has placed limitations on an individual’s right to sue for full enforcement of

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<sup>497</sup> *In re Kukui*, 116 Haw. at 498, 174 P.3d at 337.

<sup>498</sup> *Id.* at 508-09, 174 P.3d at 347-48.

<sup>499</sup> *Waiāhole I*, 94 Haw. at 142, 9 P.3d at 454.

<sup>500</sup> HAW. CONST. art. XI, § 9.

<sup>501</sup> *Cnty. of Haw. v. Ala Loop Homeowners*, 123 Haw. 391, 413, 235 P.3d 1103, 1125 (2010).

<sup>502</sup> *Id.*

<sup>503</sup> *See id.*

<sup>504</sup> *See* HAW. REV. STAT. § 205–6.

their right to a clean and healthful environment.<sup>505</sup> In practical terms, this means that the State's decision not to regulate the importation of GE organisms is not a bar to enforcement of the "right to a clean and healthful environment," but is instead an invitation to sue for the fullest enforcement of the right.<sup>506</sup>

The legislature has failed to provide any type of protection or regulation on the GE industry's use of GE crops, even though the public has demanded increased regulation.<sup>507</sup> As a result of the strong community interest in protecting the environment and the lack of response from Hawai'i's legislators, the GE case may be the perfect test case for article XI, section 9 when gene flow, cross-pollination, or other impacts to non-target species occur. Overall, given the potential for lawsuits to enforce an individual's right to a clean and healthful environment under article XI, section 9, it may be in the State's best interest to regulate the GE Industry to establish reasonable limitations on this right.

#### VIII. RECOMMENDATIONS TO BETTER FULFILL AGENCY RESPONSIBILITIES

Federal regulation is insufficient to protect Hawai'i's natural resources from the risk of GE contamination.<sup>508</sup> Some argue that the risks associated with the GE crop gaining a selective advantage are "akin to the selective advantage held by invasive non-indigenous species."<sup>509</sup> Overall, the introduction of pests and other invasive species pose a significant risk to Hawai'i's endangered and threatened species.<sup>510</sup> Moreover, it is no secret that federal oversight alone is insufficient to prevent the potential harms associated with invasive species, especially since federal regulation is focused on invasive species that are a threat to the continental United States, not Hawai'i.<sup>511</sup> As James J. Nakatani explains, "[t]hough not unsympathetic to State concerns, in practical terms, federal authorities favor protection of large mainland agricultural needs over the unique

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<sup>505</sup> See *Ala Loop*, 123 Haw. at 413, 235 P.3d at 1125.

<sup>506</sup> See *id.*

<sup>507</sup> See *supra* Section IV.

<sup>508</sup> See generally Lee-Muramoto, *supra* note 158 (criticizing the Federal Coordinated Framework).

<sup>509</sup> Mary Jane Angelo, *Regulating Evolution for Sale: An Evolutionary Biology Model for Regulating the Unnatural Selection of Genetically Modified Organisms*, 42 WAKE FOREST L. REV. 93, 162 (2007).

<sup>510</sup> Endangered and Threatened Wildlife and Plants; Listing 15 Species on Hawai'i Island as Endangered and Designating Critical Habitat for 3 Species, 77 Fed. Reg. 63,928 (Oct. 17, 2012).

<sup>511</sup> *Id.*



needs of Hawaii.”<sup>512</sup> The same rings true of USDA GE oversight.

The dangers associated with the introduction of GE crops are similar to the dangers associated with the introduction of other types of invasive species.<sup>513</sup> GE crops have the potential to harm indigenous plants through competition, as well as by affecting other ecological functions that contribute to the survival of the plant.<sup>514</sup> Given that GE plants are genetically engineered to have properties and traits that are different from their conventional counterparts, it is dangerous to forget that GE traits found within GE crops are unique and should not be ignored.<sup>515</sup> As a result, GE crops should be viewed like any other “exotic plant” and should be regulated accordingly.

The USDA’s focus on the promotion of the industry—not the safety of the environment or human health—has led some states to impose local regulations on GE operations.<sup>516</sup> These local regulations are tailored to the risks that their communities face and seek to strike a balance between the promotion of the industry and protection of local interests.<sup>517</sup> The State of Hawai‘i has a long-standing history of protecting its local biodiversity and its many agricultural interests.<sup>518</sup> Today, Hawai‘i is faced with an opportunity and a responsibility to continue that legacy. There are

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<sup>512</sup> Safeguarding Hawai‘i’s Ecosystem and Agriculture Against Invasive Species, Committee on Homeland Security and Gov’t Affairs, 112th Cong. 1 (2011) (statement of Lyle Wong, former DOA Plant Industry Administrator, on behalf of James Nakatani, former Deputy Director of the DOA).

<sup>513</sup> See Wolfenbarger & Phifer, *supra* note 270, at 2088.

<sup>514</sup> Wolfenbarger & Phifer, *supra* note 270, at 2088.

<sup>515</sup> David J. Earp, *The Regulation of Genetically Engineered Plants: Is Peter Rabbit Safe in Mr. Mcgregor’s Transgenic Vegetable Patch?*, 24 ENV’T L. L. 1633, 1653 (1994) (stating that the deliberate release of a GE crops can be viewed from two perspectives: (1) that releases resemble introductions of “exotic” species into a particular environment or (2) that a transgenic plant is simply an existing species with an altered gene).

<sup>516</sup> See generally TAYLOR, TICK, & SHERMAN, *supra* note 148 (summarizing how some states have decided to regulate the local GE Industry). At times, APHIS is conflicted. APHIS is tasked with both regulating and promoting agriculture in the United States, including the GE Industry. Some argue that this conflict of interest prevents APHIS from objectively assessing the safety of new GE products. See Lee-Muramoto, *supra* note 158, at 319 (citing BD. ON AGRIC. & NATURAL RES., NAT’L RESEARCH COUNCIL, ENVIRONMENTAL EFFECTS OF TRANSGENIC PLANTS: THE SCOPE AND ADEQUACY OF REGULATION 19 (2002)).

<sup>517</sup> While Hawai‘i’s GE Industry comprises mainly GE seed production, other GE operations on the continental United States include GE crop productions. See generally TAYLOR, TICK, & SHERMAN, *supra* note 148.

<sup>518</sup> DOA’s Plant Quarantine Program began more than a hundred years ago. In 1888, King David Kalakaua decreed that new coffee plants would not be allowed into the islands so to protect the coffee industry in Hawai‘i. *Plant Quarantine Branch*, HDOA, <http://hdoa.hawaii.gov/pi/pq/> (last visited Apr. 21, 2013).

laws in place that protect the GE Industry<sup>519</sup> and provide the Industry with incentives to be in Hawai‘i,<sup>520</sup> yet Hawai‘i lacks laws that protect the public’s interests in the natural environment from the GE Industry.<sup>521</sup> In order to fulfill its public trust obligations, the State of Hawai‘i must start to regulate the introduction and release of GE crops. Like claims relating to the peaceful co-existence of GE crops with organic crops,<sup>522</sup> the State’s support of the GE Industry can peacefully co-exist with thoughtful regulation.

Several states have realized this balance and have developed ways to address concerns within their communities<sup>523</sup> while still maintaining a successful relationship with the GE Industry. Some states prefer to regulate GE field trials by utilizing the consultation rights that APHIS

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<sup>519</sup> HAW. REV. STAT. § 141-8 (2001)

[A]ny person who willfully or knowingly damages or destroys any crop . . . that is known by the person to be intended for personal or commercial purposes, or for research and development purposes by any private or public research facility, federal, state, or local government agency, or university shall be liable for twice the value of the crop or commodity damaged or destroyed.

This legislation was enacted in response to vandalisms that occurred on Kaua‘i that were aimed against the GE research. STANDING COMM. REPORT, S.B. 1308, 21st Reg. Sess. (Haw. 2001) (stating that “[y]our Committee finds that destructive tactics used by some biotech activists in recent years are objectionable. The imposition of civil liability in this bill will deter those who resort to illegal acts to advance their opinions”).

<sup>520</sup> HAW. REV. STAT. § 209E-11 (2009) (exempting genetically engineered products from payment of general excise taxes).

<sup>521</sup> See HAW. REV. STAT. § 321-11.6 (1988) (the only state law pertaining to the introduction of GE crops).

<sup>522</sup> HAWAI‘I CROP IMPROVEMENT ASSOCIATION, AGRICULTURAL BIOTECHNOLOGY: COEXISTENCE WORKS, available at <http://www.hciaonline.com/wp-content/uploads/2012/12/HCIA-factsht3F-lores.pdf> (stating that “[t]he essence of coexistence is being a good neighbor”). One representative from the GE Industry further clarified that GE crops can co-exist with non-GE crops without cross-pollinating. Interview with Mark Phillipson, President of the Hawai‘i Crop Improvement Association and Lead Corporate/External Relations for Syngenta (May 1, 2014) [hereinafter Interview with Mark Phillipson (May 2014)]. For example, corn only pollinates for 10-12 day periods. To prevent cross-pollination with non-GE corn, the planting schedule is staggered so that the GE corn does not pollinate during the same period as the nearby non-GE corn. *Id.*

<sup>523</sup> See generally TAYLOR, TICK, & SHERMAN, *supra* note 148 (stating that while most states in the United States do not have laws that regulate the importation and use of GE crops, several U.S. states do regulate the introduction of GE plants).

provides;<sup>524</sup> however, other states have recognized the risk associated with GE crops and have opted for the drafting and passing of legislation to help affirmatively manage and prevent potential harms.<sup>525</sup> Those states also view regulations as necessary to protect their GE industry.<sup>526</sup> The spectrum of state regulation varies with the perceived risk, local interest, and the size of the GE industry within the state.<sup>527</sup> Because of the prevalence of the GE Industry in Hawai‘i, the State’s constitutional requirement to protect Hawai‘i’s natural resources, and the public’s right to a clean and healthful environment, the State of Hawai‘i must look for the best means to protect Hawai‘i’s environment from the growing presence of the GE industry and the possible risks of the industry’s use of GE crops.

A. *Administrative: The DOA’s Authority to Regulate*

The DOA currently has the authority to regulate the release of GE crops.<sup>528</sup> As such, the DOA is tasked with designating plants that “may be detrimental or potentially harmful to agriculture, horticulture, the environment, or animal or public health” as restricted plants.<sup>529</sup> All restricted plants are required to receive a permit from the DOA before they can be imported into the State.<sup>530</sup> The State already requires permits for the importation of sugarcane, pineapple, coffee, orchids, banana plants,

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<sup>524</sup> See TAYLOR, TICK, & SHERMAN, *supra* note 148, at 74. Like Hawai‘i, GE companies saw Colorado as a promising location for field trials of new biopharm crops and crops that contain industrial traits. In 2003, Colorado citizens expressed concerns about the crops contaminating soil, water, microorganisms in fields, as well as the potential impacts on other animals and insects. Colorado does not have any laws regulating the import or release of GE crops; instead, Colorado participates in the APHIS permit review process. To address local concerns, Colorado’s Department of Agriculture drafted procedures for evaluating biopharm crop field test permit applications that would occur in Colorado, including the creation of a technical advisory panel of third-party scientific experts and opportunities for public involvement in the process. The GE companies could not conduct field trials for the 2003 growing season, but many question the sufficiency of the state’s review given that the state does not have a GE statute that would grant them the legal right to receive CBI and the expert review panel’s reliance on interviews with the GE companies in lieu of conducting their own examination. TAYLOR, TICK, & SHERMAN, *supra* note 148, at 74.

<sup>525</sup> See TAYLOR, TICK, & SHERMAN, *supra* note 148, at 106.

<sup>526</sup> See 6 VT. STAT. ANN. § 611(c) (stating that the purpose of labeling GE seeds as such “is to help avoid adverse effects on the potential benefits of genetic engineering technologies and on the conservation and sustainable use of biological diversity through the use of such seeds”).

<sup>527</sup> See generally TAYLOR, TICK, & SHERMAN, *supra* note 148.

<sup>528</sup> HAW. REV. STAT. § 105A-6.1 (2008).

<sup>529</sup> HAW. REV. STAT. § 105A-6.1.

<sup>530</sup> HAW. REV. STAT. § 105A-6.1.

passion fruit, and taro.<sup>531</sup> While the DOA requires permits to protect against insects, diseases, and other pests that are found within the plant, it is also obligated to prevent potential harms that come from the plant itself.<sup>532</sup> Because of this, the DOA currently has the authority to create new rules to regulate the introduction of GE crops.

Further, the DOA can require GE companies to apply for a permit if they wish to import GE crops for commercial use or for field trials. To execute this permitting process, the DOA could begin reviewing the potential risks associated with the GE crop, including the trait that the GE crop carries. In doing so, the DOA must require receipt of the federal application with all CBI included in order to properly consider the potential harms posed by introduction of the GE crop. If there are risks, the State must impose conditions to mitigate these harms. This also requires that the DOA follow up with applicants to ensure that the GE companies are complying with the conditions imposed by the permit. To obtain authorization for the introduction of GE crops, the applicant should be required to provide reasonable assurances that the release of the GE crop will not cause adverse risks. The DOA could also declare that the GE company importing the GE crop is liable for any adverse effects to the environment that directly stem from the GE crop. Other states have a variation of this system, where they use existing statutory authority to create rules to regulate various aspects of GE crops. However, those states focus their regulations on the local concerns of the community.<sup>533</sup> Hawai'i can look to the systems that are already in place within these states for ideas in creating its own system in the near future so that Hawai'i can better protect its local and unique interests as well.

#### B. *Legislative: The State's Incentive to Enact Legislation*

The State can also fulfill its public trust responsibilities by clarifying the DOA's role in regulating the GE Industry under the current law. To do this, Hawai'i can pass legislation that clarifies the DOA's responsibilities as it pertains to the GE Industry. The State legislature can: (1) clarify the definition of "plant" in Hawai'i Revised Statutes section 150A-2 to include crops created through GE technology; or (2) enact a comprehensive statute that regulates all aspects of the GE Industry.

First, the State can encourage the DOA to fulfill its public trust obligations by clarifying what a "plant" consists of under Hawai'i Revised Statutes section 150A-2. Currently, there is no definition of what a plant is

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<sup>531</sup> See HAW. ADMIN. RULES § 4-70-1 (1981).

<sup>532</sup> See HAW. REV. STAT. § 105A-6.1 (stating that "[t]he department shall designate, by rule, as restricted plants, specific plants that may be detrimental or potentially harmful to agriculture, horticulture, the environment, or animal or public health").

<sup>533</sup> See generally TAYLOR, TICK, & SHERMAN, *supra* note 148.

or is not.<sup>534</sup> Although the DOA already has the authority to regulate GE crops, clarifying that “plants” includes GE plants, would encourage the DOA to exercise its discretionary authority and create rules to regulate the release of GE crops.

Second, Hawai‘i may also want to consider passing a comprehensive GE statute that clarifies the DOA’s role(s) in regulating GE crops. Hawai‘i can look to other states, like Minnesota, that have already passed a comprehensive GE statute to regulate their GE industries.<sup>535</sup> Under Hawai‘i Revised Statutes section 150A-6.1, the DOA is already vested with the authority to regulate crops that may be harmful to Hawai‘i’s agriculture, horticulture, or environment, such as GE crops.<sup>536</sup> The DOA can sufficiently regulate GE crop release under its current authority; however, an additional statute may help to clarify its responsibilities.<sup>537</sup> In 2004, Minnesota was the only state that had a comprehensive regulatory statute that created a separate state permitting system for GE crops.<sup>538</sup> Minnesota regulates the release of all GE crops in the state.<sup>539</sup> The statute giving the state this authority was established in 1991 “to protect humans and the environment from the potential for significant adverse effects of those releases.”<sup>540</sup> Minnesota’s GE statute was focused more on protecting the environment and human health than protecting the GE industry.<sup>541</sup> All those who wish to release GE crops in Minnesota must receive a permit from the Minnesota’s Department of Agriculture (“MDA”) before release.<sup>542</sup>

The application must provide the MDA with any decisions made by federal agencies pertaining to the proposed release, including protected CBI.<sup>543</sup> Before permitting the release of the crop, “the MDA considers the

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<sup>534</sup> See HAW. REV. STAT. § 150A-2 (2007).

<sup>535</sup> See TAYLOR, TICK, & SHERMAN, *supra* note 148, at 108-11.

<sup>536</sup> HAW. REV. STAT § 150A-6.1.

<sup>537</sup> HAW. REV. STAT § 150A-6.1

<sup>538</sup> See MINN. STAT. § 18F.01 et seq. (1994) (establishing regulations for “Genetically Engineered Organisms”).

<sup>539</sup> See MINN. STAT. § 18F.01 et seq. Release means the “placement or use of a genetically engineered organism outside a contained laboratory, greenhouse, building, structure, or other similar facility or under other conditions not specifically determined by the commissioner to be adequately contained.” MINN. STAT. § 18F.02.

<sup>540</sup> MINN. STAT. § 18F.01 et seq.

<sup>541</sup> See TAYLOR, TICK, & SHERMAN, *supra* note 148, at 108-11.

<sup>542</sup> MINN. STAT. § 18F.07 (1994) (stating that “[a] person may not conduct a release of a genetically engineered agriculturally related organism until a permit for the release has been obtained from the commissioner”).

<sup>543</sup> MDA also has ways to protect CBI that it feels is sensitive information that parallels the federal government’s review of CBI. See MINN. STAT. § 18F.07.

past performance of similar releases, the potential for the GEO's genetic material to transfer to other organisms, and the likelihood that the [crop] will harm non-target organisms or otherwise negatively affect the environment."<sup>544</sup> In addition, Minnesota requires a \$125 permitting fee to be paid to the Minnesota Commissioner of Agriculture.<sup>545</sup> The MDA Commissioner has the authority to issue permits with or without conditions.<sup>546</sup> The Commissioner also has the authority to revoke a permit or approval of commercial use and/or sale terms if conditions on the permit are violated or the terms or conditions are found to be inadequate to protect the environment.<sup>547</sup> In addition to regulating GE crops, Minnesota also regulates the release of PIPs through its pesticide laws and requires a registration of all PIPs before release.<sup>548</sup>

Hawai'i should consider creating a regulatory system similar to Minnesota's to help regulate all aspects of the GE Industry—from import to release. As with many state agencies, money is a barrier to heightened regulations. One solution to overcome this barrier is to require the GE Industry to bear some of the costs of doing business in Hawai'i. The GE Industry is benefiting financially from Hawai'i's year-round growing season and is taking advantage of the increased economic gain.<sup>549</sup> They are benefiting from Hawai'i, and many opine that they are not leaving any time soon.<sup>550</sup> Given how much the GE Industry benefits from being in Hawai'i, its members should have to pay to ensure that Hawai'i is not being harmed by their business.<sup>551</sup> Hawai'i can adopt a permitting system

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<sup>544</sup> COLBEY SULLIVAN, HOUSE RESEARCH: GENETICALLY ENGINEERED CROPS 2 (2007), <http://www.house.leg.state.mn.us/hrd/pubs/ss/ssgeocrop.pdf>.

<sup>545</sup> MINN. STAT. § 18F.07 (stating that “[a]n application for a permit for a genetically engineered agriculturally related organism must be accompanied by a nonrefundable application fee of \$125”).

<sup>546</sup> MINN. STAT. § 18F.01 et seq.

<sup>547</sup> MINN. STAT. § 18F.01 et seq.

<sup>548</sup> MINN. STAT. § 18B.285 (1991). Section 18B.285 specifically refers to the regulation and registration of “genetically engineered pesticides.” “Genetically engineered pesticides” refers to “an organism that has been modified through the use of genetic engineering, intended to prevent, destroy, repel, or mitigate a pest, and an organism that has been modified through the use of genetic engineering, intended for use as a plant regulator, defoliant, or desiccant.” MINN. STAT. § 18B.01 (2013).

<sup>549</sup> Boyd, *supra* note 126.

<sup>550</sup> Carol Okada, manager for DOA's Plant Quarantine Branch, is quoted saying that “[e]ven though it's controversial here, the [GE] seed industry is now the No. 1 industry for us and it is very important in terms of the economy, dealing with invasive species, and giving farmers choices.” As a result, Okada opines that the Industry is here to stay. Boyd, *supra* note 126.

<sup>551</sup> See *supra* Section II(C)(2).

similar to that used in Minnesota.<sup>552</sup> The DOA already charges a fee for pesticide registration<sup>553</sup> and has a permitting system in place for certain imported crops.<sup>554</sup> The State can also create a permitting system for the release of all GE crops and impose a permitting fee to be paid before release. The money gained from the permitting fees could be used to conduct a review of the crop being released and the permitting process would provide an opportunity for community comments.

Minnesota's laws provide for a notification process similar to that of the federal government.<sup>555</sup> Even under Minnesota's shortened notification process, GE companies are required to disclose the traits that that are being tested.<sup>556</sup> Before Minnesota's interdisciplinary review board can receive the protected information, members of the board must sign a non-disclosure statement.<sup>557</sup> Implementing a similar process in Hawai'i could help the State effectuate its public trust obligations while simultaneously balancing the Industry's need to protect valuable trade secrets.

#### IX. CONCLUSION

The use of GE crops comes with much potential: improved food quality, higher yields or growth in harsh environments, herbicide resistance, drought resistance, pest resistance, and so on. However, even though GE technology offers potential benefits, the State of Hawai'i cannot ignore its public trust responsibilities. In order for the State to fulfill its public trust obligations, it must enact regulations that require an assessment of GE crop release on a case-by-case basis. In doing so, the State can support the growth of the industry while fulfilling its obligations as trustee of Hawai'i's natural resources. It is not a zero-sum game, and failure to impose such safeguards makes the State vulnerable to a lawsuit. Ultimately, it is possible for the State of Hawai'i to support the lucrative GE Industry while also fulfilling its constitutional obligation to protect Hawai'i's natural resources. In order to accomplish this balance, the State must first gather more information about the release of GE crops to ensure that the "New Big Five" does not create unanticipated and irreversible environmental degradation in the Hawaiian islands.

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<sup>552</sup> See MINN. STAT. § 18F.07 (1994).

<sup>553</sup> See HAW. ADMIN. RULES § 4-66-66 (2006).

<sup>554</sup> See HAW. ADMIN. RULES § 4-70-1 (1981).

<sup>555</sup> See *Permit Applications for Release of Genetically Engineered Organisms - 1997*, MINNESOTA DEPARTMENT OF AGRICULTURE, <https://www.mda.state.mn.us/licensing/licensetypes/biotechnology.aspx> (last visited Apr. 22, 2013).

<sup>556</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 110.

<sup>557</sup> TAYLOR, TICK, & SHERMAN, *supra* note 148, at 110.