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Biotech Pollution: Assessing Liability for Genetically Modified Crop Production and Genetic Drift

by

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BIOTECH POLLUTION: ASSESSING LIABILITY FOR GENETICALLY MODIFIED CROP PRODUCTION AND GENETIC DRIFT

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I. INTRODUCTION

On November 23, 1999, over thirty farm groups across the nation issued a press release warning their members that farmers could be vulnerable to "massive liability" for damage caused by "genetic drift; the spreading of biologically modified pollens; and other environmental effects."[1] This warning marked one more development in the ongoing debate regarding the risks associated with biotechnology and genetically modified organisms.[2] Although the extent of any actual

1. William Claiborne, *US Family Farm Groups Warn Against Planting GE Crops*, WASH. POST, Nov. 24, 1999, at A1. *See also Farmers' Declaration on Genetic Engineering in Agriculture* (visited Apr. 4, 2000) <http://www.nffc.net/bio1.html>.

2. Biotechnology is a broad term that includes the use of genetic engineering to change cells and biological molecules for application in areas such as pharmaceuticals and species cloning. Genetically modified organisms are organisms that have been developed using biotechnology. *See* Washington State Dep't Agric., *Internal Policy Statement on Genetically Modified Organisms* [hereinafter *Policy Statement*]. The statement defines genetic engineering as:

risks is yet unknown, the debate can be expected to intensify over the next few years.

In anticipation of the changes biotechnology is expected to produce, many scientists, politicians and scholars have dubbed the 21st century the "Biotech Century."[3] Much of the earliest commercial focus has been on the development of new or modified plant species that are engineered to protect themselves from disease, insects, and toxic chemicals.[4] These genetically modified organisms, or "GMOs," have been heralded as the solution to the problems of hunger and malnutrition, environmental pollution, and the depletion of natural resources.[5] Early applications of biotechnology have promised benefits in many areas including: "(1) development of human therapeutics; (2) animal health care and development; (3) plant agriculture; (4) food production; and (5) environmental management."[6] The potential value of these developments has led the Department of Commerce to identify the biotech industry as an emerging technology of major economic importance to the United States.[7]

In spite of the abundant promises for alleviating human suffering and facilitating the management of the planet's resources, the bio-

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> techniques that alter the molecular or cell biology of an organism by means that are not possible under natural conditions or processes. Genetic engineering includes recombinant DNA [deoxyribonucleic acid], cell fusion, micro- and macro- encapsulation, gene deletion, and doubling, introducing a foreign gene, and changing the positions of genes. It does not include breeding, conjugation, fermentation, hybridization, in-vitro fertilization and tissue culture.

Id.

3. *See* Mike Roarke, *An easy cell?*, SPOKESMAN REV., Oct. 17, 1999, at D1 (discussing the predictions of The Center for the New West, a think tank based in Denver, Colorado).

4. *See* Sara M. Dunn, *From Flav'r Sav'r to Environmental Saver? Biotechnology and the Future of Agriculture, International Trade, and the Environment*, 9 COLO. J. INT'L ENVTL. L. & POL'Y 145, 154-55 (1998).

5. *See* Stephen Kelly Lewis, *"Attack of the Killer Tomatoes?" Corporate Liability for the International Propagation of Genetically Altered Agricultural Products*, 10 TRANSNAT'L LAW 153, 157 (1997) (discussing goals of transgenic crop production); *See also* Dunn, *supra* note 4, at 165-66. Dunn claims GMO's are the solution to production and environmental problems facing agriculture because:

> [g]enetically modified plants have an advantage over conventional hybrids, because the desirable traits are consistent generation to generation, and genetically desirable traits from one organism can be incorporated into the genetics of other organisms. Genetic engineering is also useful in enabling plants to protect themselves from insects, disease, and chemicals.

Id.

6. Diane Hoffman, *The Biotechnology Revolution and its Regulatory Evolution*, 38 DRAKE L. REV. 471, 474 (1988/1989).

7. *See* Dan L. Burk & Barbara A. Boczar, *Biotechnology and Tort Liability: A Strategic Industry at Risk*, 55 U. PITT. L. REV. 791, 800 (1994).

tech industry has drawn criticism from scientists, consumer activists, environmentalists, farmers, and the international political community because of the potential risks associated with GMOs.[8] Critics of the use of biotechnology in agriculture and food production have cited potential toxic and allergenic reactions in humans, the development of pesticide and antibiotic resistance in other plants and insects, and the loss of worldwide biodiversity as reasons for exercising caution in the development and use of GMOs.[9] Much of the criticism of biotechnology products has focused on the potential problems concerning such products, rather than proven problems, because the technology in many cases is so new that long term studies of a particular product's impact are unavailable. While critics of GMOs have viewed this lack of evidence as cause for concern, the biotech industry and government regulators respond that these biotech products have been tested, and there is no evidence that they are unsafe.[10]

This Comment does not seek to argue whether GMOs are safe and appropriate for commercial use. The reality is that genetically modified (GM) food is already pervasive within the market.[11] Instead, this Comment seeks to address the risks within the context of agricultural production and assess the potential liability for growing GM crops. The most significant of these risks is the spread of genetically engineered organisms beyond their intended location, also known as "genetic drift."[12]

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8. *See* Dunn, *supra* note 4, at 154-59 (discussing concerns of scientists, consumers, and activist organizations such as Greenpeace and the Pure Food Campaign).

9. *See id. See also* Complaint at 19-20, Pickett v. Monsanto (D. D.C. 1999) (No. 99CV03337) *available at* <http://www.cmht.com/seedcomplaint.html>.

10. *See, e.g., BIO Supports FDA Public Meetings On Biotech Foods*, (visited Apr. 2, 2000) <http://www.bio.org/food&ag/111699release.html> ("Foods derived from crops improved through biotechnology have been tested more than any other foods in history. Test data confirm they pose no greater threat to the environment or human health than plants modified by conventional breeding."). The Biotechnology Industry Organization (BIO) is an industry lobbying group based in Washington, D.C. *See also* Jeffrey L. Fox, *FDA Not Yet Moved by Biotech Food Critics*, 18 NATURE BIOTECHNOLOGY 15, (2000) (quoting FDA Commissioner Jane Henney as saying "'FDA's food regulatory system relies on the best science available to protect the public . . . [o]ur scientists are not aware of any reason to question the safety of currently marketed foods produced through bioengineering.'").

11. *See Seeds of Change*, CONSUMER REPORTS, Sept. 1999, at 41.

12. Genetic drift has traditionally referred to the natural process that occurs as gene frequencies of a particular species randomly change over time. *See, e.g.*, Michael C. Blumm, *Salmon and the Endangered Species Act: Lessons from the Columbia Basin*, 74 WASH. L. REV. 519, 604 n.288 (1999). Recently, the term genetic drift has also been used to describe the drift of GMO's from one farm onto another. *See, e.g., Remarks Prepared for Kathleen Merrigan, Administrator Agricultural Marketing Service* (visited Mar. 31, 2000) <http://www.ams.usda.gov/nop/nop2000/kathleensresponse1.html> (describing genetic drift as "primarily pollen drift from genetically engineered crop varieties").

Following a brief overview of the historical context and recent developments in the debate surrounding biotech products, this Comment will examine the potential liability scenarios that arise from these risks. Analogous tort cases will be discussed to identify how the judicial system has dealt with similar liability issues. Finally, some conclusions will be presented as to how the court system is likely to handle a property owner's damage claim for GMO contamination caused by genetic drift.

II. BACKGROUND

Agricultural products have long been genetically manipulated to achieve desired characteristics. Although pests and drought historically influenced genetic composition through natural selection, humans have also shaped natural selection by cultivating and breeding crops with desirable traits such as higher yields or drought resistance.[13] Following Gregor Johann Mendel's discovery of the basis of heredity in 1865, the science of genetics has developed hybrids to achieve desired characteristics in plants with more consistency and predictability than originally achieved through natural selection.[14]

Recently, the creation of GMOs has revolutionized genetic science by taking genetic manipulation to a mechanical level.[15] While traditional hybrids are created by crossing different varieties of the same species, GMOs are now being created by inserting genetic material from one species into another.[16] This new technology was first approved for agricultural commodities such as soybeans, potatoes, and cotton in 1995.[17] It has become pervasive within the United States.[18] By 1999, approximately one-fourth of U.S. cropland – more than ninety million acres – was planted with GM crops.[19] GMOs now account for more than thirty-five percent of all corn, almost fifty-five percent of all soybeans, and nearly half of all cotton produced in the United States.[20] The U.S. Department of Agriculture (USDA) has also approved over fifty other genetically engineered crop plants, although

13. *See* Dunn, *supra* note 4, at 148-49.
14. *See id.*
15. *See id.* (providing examples of genetic engineering applications).
16. *See id.*
17. *See* Tom Rhodes, *Bitter Harvest: The Real Story of Monsanto and GM Food*, SUNDAY TIMES (London), Aug. 22, 1999, at A1.
18. *See id.*
19. *See Seeds of Change*, *supra* note 11, at 41.
20. *See id.*

crops such as potatoes, tomatoes, melons and beets are not yet grown in large numbers.[21]

GMO products have generated lucrative sales for the biotech companies who developed them. Gross sales of GMO seeds rose in value from $75 million in 1995 to $1.5 billion in 1998, and the crops they produce are now found on produce shelves and in a variety of processed foods including cookies, potato chips and baby food.[22]

III. RECENT DEVELOPMENTS

Despite the warm welcome and rapid deployment GM crops experienced when they were first introduced,[23] a backlash erupted in 1999 when United States consumers took note of the European Union (EU) import ban on certain GM foods.[24] U.S. consumers began demanding that the Food and Drug Administration (FDA) reevaluate the policies for GM foods.[25] At the same time, farm groups across the country began to caution their members of decreased sales and potential liability for production of GM crops.[26] Major food producers, such as Archer Daniels Midland, have announced their decision to reduce their use of GM crops and segregate GM foods for their European markets.[27] Following the lead of organic and health food manufacturers, leading U.S. food companies, such as Frito-Lay, Gerber, and Heinz, also pledged not to include GM ingredients in their foods for the mainstream U.S. market.[28]

The FDA has steadfastly maintained that GM components in foods are mere additives that do not require FDA approval because

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21. *See id.* A number of other crops, including rice, wheat, cucumbers, strawberries, apples, sugarcane, and walnuts, are currently growing on test sites. *See id.*

22. *See* Jeffrey Kluger, *Food Fight: The Battle Heats Up Between the U.S. and Europe over Genetically Engineered Crops*, TIME, Sept. 13, 1999, at 43.

23. *See* Randy Fabi, *Poll-U.S. Farmers Plan Decline in Biotech Crops*, Reuters Wire Service, (Jan. 13, 2000) <http://www.purefood.org/ge/lessge2000.cfm>.

24. *See, e.g.*, Claiborne, *supra* note 1, at A1. ("'Export markets in Europe and Asia are saying 'no' to foods produced from genetically engineered crops [and] farmers know they have to respond to consumer demand if they are to survive.'") (quoting Gary Goldberg, head of the American Corn Growers' Association).

25. *See id.*

26. *See id.*

27. *See* Kristi Coale, *Anti-GE Lawsuit Against FDA Has Clinton Administration Worried*, (Jan. 12, 2000) <http://www.salon.com/news/features/2000/01/12/food>.

28. *See* Kellyn S. Bett, *Mounting Evidence of Genetic Pollution from GE Crops*, ENVTL SCI. & TECH., Dec. 1, 1999, at 484. *See also* Justin Gillis, *Frito-Lay's Halfway Measures Banning GE Corn Freak Out Their Competitors*, WASH. POST, Feb. 6, 2000, at H1 ("Frito-Lay Inc. of Plano Tex., asked farmers not to sell it genetically modified corn for use in Fritos corn chips or Doritos tortilla chips.").

they are "substantially the same" as traditionally grown foods.[29] Nonetheless, the FDA and USDA have begun to respond to consumer concerns.[30] In October 1999, Agriculture Secretary Dan Glickman admitted, for the first time, that U.S. government agencies had neither the staff nor the resources to carry out their own testing.[31] He announced plans to subject the agency's biotechnology regulatory system to outside scientific review.[32] Additionally, in December 1999, the FDA held three public hearings around the country to solicit comments on the need to label GM foods.[33]

IV. LIABILITY SCENARIOS/POTENTIAL DAMAGES

Are there legitimate concerns that producers may face potential liability? Early examples of actual damages resulting from production of GM crops reveal there is legitimate cause for concern. Losses have already been realized because of crop contamination, lost markets, and crop failure.[34] Studies have also shown that GMOs may kill beneficial insects, increase pesticide resistance of harmful pests, increase soil toxicity, and cause allergic reactions in humans.[35]

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29. *See* Fox, *supra* note 10, at 15. *See also* Kluger, *supra* note 22, at 44 (noting that the U.S. Government views GM ingredients as "mere additives" that do not need FDA approval).

30. *See US Does U-turn on Biotech Policy*, CHEM. BUS. NEWSBASE, Aug. 13, 1999.

31. *See id.* at 54 (reporting that Secretary Glickman admitted that no long term safety studies have been carried out because the U.S. Government did not have the staff or resources to conduct testing, but 12 new testing centers would now seek to do so); *See also* Ted McDonough, *Genetic Acceptance. Glickman: Overcome Fears With Testing, Research of New Crop Varieties*, MOSCOW-PULLMAN DAILY NEWS, Oct. 20, 1999 at A1. The article reported that during a meeting with regional agriculture producers in Spokane, Washington on Tuesday October 20, 1999, USDA director Dan Glickman expressed his opinion that "'the future of agriculture is genetics,'" but he acknowledged the concerns of critics who have demanded better preliminary research and testing when he stated that "'you can't force it down anybody's throat, either. Ag interests need to open their eyes and understand if consumers don't have confidence in the product, it doesn't matter what the company who developed the product thinks about it.'" *Id.*

32. *See id.*

33. *See* William Brand, *Genetically Altered Produce Sparks Protest on Labelling*, OAKLAND TRIB., Dec. 14, 1999.

34. *See, e.g.*, Bett, *supra* note 28, at 2 (crop contamination); *see also Seeds of Change*, *supra* note 11, at 41-42 (lost markets); *See* Brian Tokar *Monsanto: A Checkered History*, THE ECOLOGIST, Sept. 1, 1998, at 259 (crop failure).

35. *See, e.g.*, Susan Conova, *Picking at Gene-Altered Cotton*, (Aug. 4, 1999) <http:www.abcnews.go.com/sections/science/dailynews/cotton990804.html> (reporting on a study showing the failure of refuge pests to breed with GM pests in order to prevent Bt resistance, and also reporting on the death of Monarch caterpillars caused by GM pollen). *See also* Deepak Saxena, *Insecticidal Toxin in Root Exudates from Bt Corn*, 402 NATURE 480, (1999) (sharing research results from the Laboratory of Microbial Ecology at New

A. Crop Contamination

Perhaps the risk with the most far-reaching implications is the possibility of GM crops cross-pollinating with non-GM plants of the same or related species. Environmentalists have claimed that GM species may become pests that "displace existing plants and animals, disrupt the functioning of ecosystems, reduce biological diversity, alter the composition of species, and even threaten the extinction of various species and change climate patterns."[36] There is also concern that even if the GM species do not themselves become pests, their virus and pesticide resistant genes "may escape from transgenic crops to their weedy relatives and thus create a hardy race of weeds."[37]

The economic damage such unwanted cross-pollination may cause has already been demonstrated.[38] In 1998, the corn of a certified organic farmer in Texas was contaminated by cross-pollination from a neighboring field of GM corn.[39] Unfortunately, the contamination was not discovered until the corn had been processed and shipped to Europe as organic tortilla chips. When DNA testing revealed traces of GM corn in the chips, the entire shipment of 87,000 bags – valued at $500,000 – was rejected and destroyed.[40] The Hudson, Wisconsin tortilla chip manufacturer, Terra Prima, ultimately decided not to seek damages from the organic farmer, choosing instead to join Greenpeace and the Center for Food Safety as plaintiffs in a lawsuit filed against the EPA in February 1999.[41]

Other evidence of cross-contamination has been compiled by Genetic ID, a GMO testing laboratory in Fairfield, Iowa.[42] The laboratory has documented GMO contamination of conventionally grown crops by wind-blown pollen from neighboring GM corn and GM canola

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York University showing that GM corn roots exude poison into the soil); Kluger, *supra* note 22, at 42 (reporting on soybean that triggered nut allergies).

36. William H. Rodgers, Jr., *Pesticides and Toxic Substances*, ENVTL. L., § 6.12 n.3 (Supp. 1999) (quoting M. MELLON, BIOTECHNOLOGY AND THE ENVIRONMENT: A PRIMER ON THE ENVIRONMENTAL IMPLICATIONS OF GENETIC ENGINEERING 8 (1988)).

37. *Id.* at § 6.12 n.7 (quoting James Kling, *Could Transgenic Supercrops One Day Breed Superweeds*, 274 SCI. 180 (Oct. 11, 1996)).

38. *See, e.g.*, Bett, *supra* note 28, at 1.

39. *See id.* at 2.

40. *See* Brand, *supra* note 33, at A1.

41. Telephone Interview with Melodi Nelson, Vice President of Terra Prima (Jan. 18, 1999).

42. *See* Bett, *supra* note 28, at 2. Genetic ID, Inc. was founded by molecular biologist John Fagan, Ph.D, to provide testing services to the food industry. *See About Genetic ID* (visited Mar. 16, 2000) <http://www.genetic-id.com/about/rightside.html>. Genetic ID's tests allow detection of GMOs in food and provide a means to certify that food has not been contaminated by GMOs. *See id.*

fields.[43] Similar studies in Germany have also shown that crops from one field can cross-pollinate neighboring fields.[44]

Another example of crop contamination is the subject of a $10 million lawsuit pending against Monsanto[45] in Canada, where canola farmer Percy Schmeiser claims GM canola invaded his land.[46] Schmeiser's claim against Monsanto seeks, inter alia, punitive damages for environmental harm, contamination of his crops, and trespassing. [47] Schmeiser claims that a farm truck carrying GM seeds spilled some of its load on his property, and subsequent cross-pollination led to the contamination of his non-GM canola crop.[48]

Even if crops are not contaminated during growth, there is also evidence of cross-contamination or intermixing occurring after the crops have been harvested.[49] In October 1999, scientists in Thailand refused a shipment of wheat from Portland, Oregon because it tested positive for GMOs.[50] This alarmed export dependent Pacific Northwest wheat farmers because GM wheat had not yet been approved for commercial production and was not known to be grown outside of limited test plots.[51] Subsequent studies, however, revealed that the source of contamination was actually GM corn that became mixed with the wheat during shipment.[52] While this news may have relieved the wheat farmers, it reveals a larger problem arising from the lack of segregation between GM and non-GM crops in United States storage and handling facilities. This lack of segregation has contributed to

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43. *See* Bett, *supra* note 28, at 2.

44. *See id.* (citing DNA study by the British Broadcasting Company and Friends of the Earth that showed pollen from a GM canola field ended up in a bee hive 2.8 miles away, and other studies by Greenpeace demonstrating corn pollen drift).

45. Monsanto Company describes itself as a "life sciences company" dedicated to using science and technology to improve agriculture, nutrition and health. *See About Monsanto* (visited Apr. 7, 2000) <http://www.monsanto.com/monsanto/about.html>. Monsanto is one of the largest biotechnology companies in the industry and controls many of the largest seed companies in the United States. *See* Tokar, *supra* note 34, at 259 (reporting Monsanto has purchased, De Kalb Genetics, the second largest seed company in the United States, as well as, Delta and Pine Land, the largest US cotton seed company).

46. *See* Heather Scoffield, *Prairie Storm: A Little Flower, a Big Squabble*, THE GLOBE AND MAIL, Aug. 12, 1999, at A1.

47. *See id.* Schmeiser's primary claim is for defamation because Monsanto accused Schmeiser of seed piracy and patent infringement.

48. *See id.*

49. *See* Hannelore Sudermann, *Genetically Altered Wheat Flagged*, IDAHO SPOKESMAN-REVIEW, Oct. 14, 1999, at A1, A10.

50. *See id.*

51. *See id.*

52. *See* John K. Wiley, *Source of Wheat Shipment Genetic Contamination Located*, AP, Dec. 1, 1999, *available in* LEXIS, Nexis Library, AP File.

market restrictions, which have caused significant economic losses for the United States agriculture industry.[53]

B. Market Restrictions

The U.S. grain industry has lost virtually all of the $200 million annual export market for sale of corn to the EU during the past two years as a result of EU regulations restricting the import of GM corn, as well as the inability of the U.S. to prevent intermixing of GM corn with non-GM corn.[54] Similar restrictions and/or labeling requirements on GM foods have been passed or are under consideration in other countries including Japan, South Korea, Australia, and New Zealand.[55] Even countries which do not have restrictions on GM foods for their own citizens are now more likely to reject GM crops if the crops are intended to be processed for sale to the EU or other countries that restrict GM foods.[56]

Some U.S. food processors have responded with plans to segregate their purchasing and processing of GM grains from non-GM grains, which in turn has led to development of a two-tier market that provides a premium price for non-GM corn and soybeans.[57] In the commodities market, this premium effectively serves as a price penalty for any GM crops or contaminated non-GM crops. The economic loss to a farmer who is forced to sell his crop at a reduced price because it tests positive for GMOs can indeed be significant.[58]

One portion of the U.S. agriculture market that is particularly susceptible to damages caused by market restrictions, despite a rigor-

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53. *See Seeds of Change*, *supra* note 11, at 41-42.

54. *See id.*

55. *See* Bett, *supra* note 28, at 2.

56. *See, e.g.*, Sudermann, *supra* note 49, at A1 (showing that Thailand rejected wheat that tested positive for GMOs because it intended to process the wheat for sale to the EU).

57. *See, e.g.*, Coale, *supra* note 27. *See also* Martin Enserink, *Ag Biotech Moves to Mollify its Critics*, 286 Science 1666, 1667 (1999) ("[O]ne of the largest traders in corn and soybeans, Archer Daniels Midland . . . started offering farmers a premium of 18 cents per bushel for non-GM soybeans this spring.").

58. *See, e.g.*, Complaint at 202, Pickett v. Monsanto (D. D.C. 1999) (No. 1:99CV03337) *available at* http://www.cmht.com/seedcomplaint.html> (alleging, inter alia, that Monsanto has created a public nuisance by introducing GM crops). The complaint claims:

> U.S. GM and Non-GM farmers alike have suffered injury from Monsanto's public nuisance distinct from that suffered by the general public in that they suffer economic harm in the form of reduced or restricted demand for their crops caused by the public's rejection of intermixing of GM food products, and the costs of segregating their own products.

Id.

ous system of segregation for its products, is the organic food industry. Since organic food production standards prohibit foods labeled organic from containing GMOs, GM contamination of an organic crop or food product may result in total exclusion from the organic market.[59] Such exclusion can be devastating to an organic producer that depends upon the premium prices of the organic market to compensate for the higher production costs and lower yields common to organic production.[60]

Loss of "organic certification" due to GM contamination presents another unique economic harm to organic producers. Organic certification is the process by which an independent third party agency reviews production records and conducts onsite inspections to certify that an organic producer is conforming to the standards of the certification agency in order to make the marketing claim that their products are "certified organic" by the agency.[61] If a certification agency "decertifies" an organic producer, that producer is then prohibited from selling his products as organic.[62]

Certification requires a significant investment of time and money. Most certification programs require a "transition" period of one to three years during which no synthetic fertilizers or pesticides may be applied.[63] During this transition period a farmer will often experience significantly reduced yields as he begins to incorporate an organic management system, yet he will seldom be able to receive a premium for products which can only be labeled "transitional" rather than organic.[64] Consequently, many organic producers are forced to

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59. *See, e.g., Policy Statement, supra* note 2. The statement concludes that:

> Genetically engineered organisms and their derivatives are prohibited from being considered organic or transition to organic. Genetically engineered organisms must not be used as seeds, transplants, or sources of any crops used in organic or transition to organic food production. This policy is consistent with the National Organic Standards Board Final Recommendations to the [USDA].

Id.

60. *See, e.g.*, Brand, *supra* note 33 (stating that Terra Prima's entire output of organic tortilla chips had to be destroyed).

61. *See, e.g.*, CAROL A. MILES ET AL., ORGANIC FOOD PRODUCTION AND CERTIFICATION IN WASHINGTON STATE (1999), *available at* <http://www.caheinfo.wsu.edu.>.

62. *See id.*

63. Interview with Mary Jane Butters, Chief Executive Officer of Paradise Farm Organics, Inc. and former Chairperson of the Organic Advisory Board for the Idaho State Department of Agriculture (Feb. 28, 2000) [hereinafter Butters Interview]. Paradise Farm Organics, Inc., located in Moscow, Idaho, produces and markets organic foods including a line of organic backpacking meals sold throughout the United States and Canada.

64. *See id.*

incur a significant monetary loss as an investment, one which they later hope to regain from future sales of organic products.[65] Loss of certification can therefore be very costly to the organic producer, both in terms of lost future sales as well as the lost opportunity to recapture the initial investment in transition costs and certification fees.[66]

C. Crop Failure

If there is a risk that GM crops can cross pollinate with non-GM crops then there is also a risk that non-GM crops may subsequently be subjected to the problems that have plagued some GM crops. Test plots and regulatory approvals have not been able to prevent some severe crop failures for farmers who planted GM crops.[67]

For example, some cotton farmers in the southern United States experienced crop losses of up to fifty percent in 1997 due to spotty germination, poor yields, and deformed bolls that fell off the plant during the growing season.[68] Monsanto, the company responsible for the GM cottonseed, ultimately pulled five million pounds of the GM seed off the market and agreed to a multimillion dollar settlement with the farmers.[69] Three other farmers were awarded almost $2 million by the Mississippi Seed Arbitration Council after they refused to settle with Monsanto.[70]

Cotton is not the only crop that has been a disappointment outside of the laboratory. Potato farmers in New York have declared their GM potatoes to be "duds,"[71] and research at the University of Georgia indicates that GM soybeans may be especially susceptible to high temperatures.[72] The soybean research also presents troubling

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65. *See id.*

66. *See id. See also* Langan v. Valicopters, Inc., 567 P.2d 218, 222 (Wash. 1977). The court found substantial evidence that:

> once an organic farmer loses his certification, it is highly unlikely that he will be able to sell his crops on the regular commercial market due to his failure to enter into contracts with commercial produce buyers before the season begins, and, even if he could sell his crops to a commercial produce buyer, the farmer would be unable to command as high a price for his goods as he could on the organic market.

Id.

67. *See, e.g., infra* notes 68-73 and accompanying text.

68. *See* Tokar, *supra* note 34, at 259.

69. *See id.*

70. *See id.*

71. *See* Sylvia Carter, *One Potato, New Potato, Farmers and Biotech Companies are Battling for Control*, NEWSDAY, Mar. 28, 1999, at 51 (citing, as an example, farmers who planted GM potatoes on their 600-acre potato farm).

72. *See* Andy Coghlan, *Splitting Headache: Monsanto's Modified Soya Beans Are Cracking up in the Heat*, NEW SCIENTIST, Nov. 20, 1999, at 25.

evidence that crop damage originally attributed to fungal disease was actually caused by the GM soybean's tendency to split their stems in the heat of the sun.[73]

It is true these examples do not represent the majority of GM crops that have been planted so far, and it is reasonable to assume the consistency of GM crops will improve with further study and development. However, these examples do show that crop failures can occur. Although the biotech companies responsible for the GM seeds have been willing to settle with their customers out of court,[74] the possibility remains that crop failure may eventually be grounds for a civil action.

D. Other Potential Damages

In addition to these examples of actual damages, a number of scientific studies have presented evidence of other possible risks that could lead to property damage, economic harm, or even health problems.[75] Examples include increased pesticide resistance of harmful pests, destruction of beneficial insects, increased toxicity within the soil, and increased allergic reactions in humans.[76]

Monsanto has implicitly admitted the potential risk of pests developing resistance to pesticides such as *Bacillus thuriniensis* (Bt).[77] Bt is a bacterial protein toxic to some pests, that some GM plants have been engineered to internally produce in their stalk and leaves.[78] Monsanto, a primary developer of Bt plants, specifically requires farmers who purchase its GM seed to plant some non-Bt corn along with their Bt corn under the theory that pests consuming the Bt corn will mate with pests consuming the non-Bt corn and thus delay the evolution of any resistance to Bt.[79] The feasibility of this theory has been questioned by a study at the University of Arizona indicating

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73. *See id.*

74. *See, e.g.*, Tokar, *supra* note 34, at 259.

75. *See, e.g.*, Conova, *supra* note 35 (reporting on study showing failure of refuge pests to breed with GM pests in order to prevent Bt resistance, and also reporting on death of Monarch caterpillars). *See also* Saxena, *supra* note 35, at 480 (reporting that microbiologists at New York University have found that GM corn roots exude poison into the soil); Kluger, *supra* note 22, at 43 (reporting on soy bean that triggered nut allergies).

76. *See, e.g.*, Conova, *supra* note 35 (reporting on study showing failure of refuge pests to breed with GM pests in order to prevent Bt resistance, and also reporting on death of Monarch caterpillars). *See also* Saxena, *supra* note 35, at 480 (reporting that microbiologists at New York University have found that GM corn roots exude poison into the soil); Kluger, *supra* note 22, at 43 (reporting on soy bean that triggered nut allergies).

77. *See* Conova, *supra* note 35.

78. *See id.*

79. *See Seeds of Change*, *supra* note 11, at 44.

that since Bt-resistant pests may develop at different times than non-Bt resistant pests, they may not mate with each other.[80]

Organic farmers view pests developing Bt resistance as a serious threat to their economic viability because Bt spray is one of the few natural pesticide sprays permitted for organic production, and one of the most effective.[81] Consequently, a number of individual organic farmers joined Greenpeace and the Center for Food Safety in a lawsuit filed against the Environmental Protection Agency in March 1999.[82]

Organic farmers are equally concerned about evidence showing that Bt toxins produced by GM plants can be activated more readily and affect beneficial insects not susceptible to the original form of Bt toxin.[83] A widely publicized Cornell University study, published in May of 1999, revealed that pollen from Bt corn could be toxic to larvae of the Monarch butterfly.[84] These findings were later confirmed by a follow-up study at Iowa State University.[85]

Both organic producers and conventional producers employing integrated pest management rely upon beneficial insect populations to control harmful pests.[86] Beneficial insects include the ladybird beetle (ladybugs) and lacewings.[87] Other beneficial insects essential for cross-pollination of agricultural crops include honeybees and some varieties of wasps.[88] A loss of these beneficial insects represents a significant harm for a producer who relies on these beneficial insects to control harmful pests.[89]

GM corn production of Bt toxin has also been criticized in a New York University study showing that the roots of Bt corn can exude the poison into the soil where it may remain active for over seven months.[90] While long term studies are unavailable regarding the harm this may cause to the land, it does present another potential claim for property damage.

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80. *See* Conova, *supra* note 35.

81. *See Seeds of Change*, *supra* note 11, at 44.

82. *See* Complaint, Greenpeace v. Browner (D. D.C. 1999) (No. 99-389) *available at* <http://www.icta.org/legal/bt2.html>.

83. *See id.* at count 107.

84. *See* John E. Losey, *Transgenic Pollen Harms Monarch Larvae*, 399 NATURE 214 (1999).

85. *See* Marlin Rice, *Monarchs and Bt Corn: Questions and Answers*, (June 14, 1999) <http://www.ipm.iastate.edu/ipm/icm/1999/6-14-1999/monarchbt.html>.

86. Butters Interview, *supra* note 63.

87. *See id.*

88. *See id.*

89. *See id.*

90. *See* Saxena, *supra* note 35, at 15 (reporting that Bt poison binds to clay particles and humic acids within soil and remains active for at least 234 days).

Another potential risk associated with GM foods is their unknown allergenic properties. One study conducted in the mid-1990s by Pioneer Hi-Bred International (now a wholly-owned subsidiary of DuPont), demonstrated that introducing a Brazil nut gene into a soybean triggered nut allergies among test subjects who consumed the GM soybeans.[91] The company stopped development of that particular GM soybean, but the possibility remains that other GM foods may cause unexpected allergic reactions resulting in further regulation, market restrictions, and liability.[92]

V. LIABILITY THEORIES

How is the judicial system likely to handle a claim by plaintiffs who allege their property has been damaged by GMO contamination? At the time of this Comment's publication, the judicial system apparently has not decided any cases specifically addressing property damage caused by GMOs, but that is expected to change soon.[93] Significant class action suits have already been filed alleging damages as a result of the approval, sale, and production of GM crops.[94] Government officials have also acknowledged that state tort laws are expected to protect private citizens from GMO contamination where statutory regulations do not.[95]

The multitude of demonstrated injuries, the unknown potential injuries, and the unique nature of GMOs, make it difficult to predict how a GMO contamination suit may be decided. Where a specific statute does not dictate how a particular case should be handled, the courts have used the common law approach to reach conclusions based upon the guidance of analogous precedent.[96] While a GMO contamination case may be a case of first impression for a court, previous cases addressing airborne sources of property damage offer many

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91. *See* Kluger, *supra* note 22, at 43.

92. *See id.*

93. *See, e.g.*, Complaint at 76, Greenpeace v. Browner (D. D.C. 1999) (No. 99-389) *available at* <http://www.icta.org/legal/bt2.html> (providing example of litigation filed by a number of farmers alleging damages caused by release of GMOs).

94. *See id. See also* Pickett v. Monsanto (D. D.C. 1999) (No. 1:99CV03337) *available at* <http://www.cmht.com/seedcomplaint.html>.

95. *See, e.g., Remarks Prepared for Kathleen Merrigan, Administrator Agricultural Marketing Service* (visited Mar. 31, 2000) <http://www.ams.usda.gov/nop/nop2000/kathleensresponse1.html> (stating that creation of a Federal cause of action for GMO contamination would require a change in the law and is unnecessary because "[p]rivate citizens already have rights to sue under some State tort laws").

96. *See* W. PAGE KEETON ET AL., PROSSER AND KEETON ON THE LAW OF TORTS § 3, at 18-19 (5th ed. 1984) ("Most lawmaking by courts occurs in decisions of first impression that produce evolutionary accretions to the body of existing precedents . . . [t]ort law is overwhelmingly common law, developed in case-by-case decisionmaking by courts.").

similarities to a hypothetical genetic drift case.[97] Other sources of property damage, such as fire[98] and water damage or contamination,[99] may also provide instructive precedent for analyzing the liability potential for GMOs.

This Comment addresses some of these analogous cases to illustrate how the common law tort theories of trespass, nuisance, negligence and strict liability could be applied to a genetic drift case. Each of these theories has been used to hold parties liable for harm caused to their neighbors when an activity on one parcel of property caused damage to another parcel. Plaintiffs frequently assert more than one of these liability theories when seeking remedy for their property damage injuries.[100] While negligence and nuisance are two of the most common theories used in agricultural property damage cases,[101] trespass claims are also prevalent in cases involving airborne intrusions.[102]

Under each of these theories, a successful plaintiff may either recover monetary damages for the loss in value caused by the offending activities or may obtain a court ordered injunction forbidding continuation of the activity.[103] A short description of each of these theo-

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97. *See, e.g.*, Martin v. Reynolds Metals Co., 342 P.2d 790, 792 (Or. 1959) (finding that fluoride particulates invisible to the naked eye constituted a direct trespass). *See also* Reynolds Metals Co. v. Lampert, 324 F.2d 465 (9th Cir. 1963) (ruling that settling of fluorides constituted trespass as a matter of law); Maryland Heights Leasing, Inc. v. Mallinnckrodt, Inc., 706 S.W.2d 218 (Mo. Ct. App. 1985) (finding plaintiffs' complaints regarding radiation emissions sufficient to withstand defendant's motion for summary judgment).

98. *See, e.g.*, Koos v. Roth, 652 P.2d 1255 (Or. 1982).

99. *See, e.g.*, Furrer v. Talent Irrigation Dist., 466 P.2d 605 (Or. 1970).

100. *See, e.g.*, Exxon Corp. v. Yarema, 516 A.2d 990 (Md. Ct. Spec. App. 1986) (seeking compensatory and punitive damages for ground water contamination under nuisance, negligence and strict liability theories). *See also Maryland Heights*, 706 S.W.2d at 220 (stating claims for relief in nuisance, negligence, trespass and strict liability for property damage caused by low-level radiation emissions); Padilla v. Lawrence, 685 P.2d 964 (N.M. Ct. App. 1984) (requesting injunction and money damages from manure processing plant under theories of trespass, private nuisance, public nuisance, negligence and personal injury); *Koos*, 652 P.2d at 1257 (seeking remedy under trespass, negligence and strict liability theories for damage caused by field burning); McGregor v. Barton Sand & Gravel, Inc., 660 P.2d 175 (Or. Ct. App. 1983) (asserting trespass, nuisance, negligence and ultrahazardous activity claims for property damage caused by water spilling from defendant's artificial ponds).

101. *See* J.W. Looney, *Rylands v. Fletcher Revisited: A Comparison of English, Australian and American Approaches to Common Law Liability for Dangerous Agricultural Activities*, 1 DRAKE J. AGRIC. L. 149, 150 (1996) (stating that trespass is less common in agricultural cases, while negligence and nuisance remain important).

102. *See, e.g.*, *Martin*, 342 P.2d at 792. *See also* Borland v. Sanders Lead Co., 369 So. 2d 523 (Ala. 1979) (finding deposit of lead particulates on neighboring property constituted both a trespass and a nuisance); Ream v. Keen, 838 P.2d 1073 (Or. 1992) (finding smoke from field burning constituted a trespass).

103. *See* Looney, *supra* note 101, at 150.

ries, as well as the less common theory of strict liability, is provided for readers unfamiliar with tort theories. A section on the application of each theory follows the brief overview.

A. Trespass

1. Theory

A trespass is an actionable invasion of a possessor's interest in the exclusive possession of land.[104] In order for injured property owners to show a trespass has occurred, they must prove there has been a physical invasion of, or interference with, their exclusive possession of property.[105] The physical invasion may be the result of intentional, negligent, or ultra hazardous conduct by a defendant.[106] At least one court has also required that the defendant have "reasonable foreseeability that the act done could result in an invasion of plaintiff's possessory interest,"[107] and most courts require proof of "substantial damages" to a plaintiff's property.[108] Because of a historical view that indirect invasions should be classified as a nuisance, some courts have made a distinction between direct and indirect intrusions upon a plaintiff's property.[109] The modern view, however, holds that "[w]hether the invasion . . . is direct or indirect is immaterial in determining whether" a trespass has occurred.[110] Thus, the elements of a trespass claim can be summarized as: (1) invasion of a plaintiff's possessory interest in property; (2) caused by an act of a defendant; (3) resulting in damages to the plaintiff.[111]

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104. *See* Martin v. Reynolds Metals Co., 342 P.2d 790, 792 (Or. 1959).

105. *See, e.g.*, Borland v. Sanders Lead Co., 369 So. 2d 523, 530 (Ala. 1979) (explaining the elements necessary for an indirect invasion to amount to an actionable trespass); *see also* Looney, *supra* note 101, at 150.

106. *See* Lunda v. Matthews, 613 P.2d 63, 66 (Or. Ct. App. 1980) (citing Martin v. Union Pac. R.R., 474 P.2d 739 (Or. 1970)).

107. *Borland*, 369 So. 2d at 529 (listing modern trespass elements); *see also* Bradley v. American Smelting & Refining Co., 635 F. Supp. 1154, 1156 (W.D. Wash. 1986) (quoting and expressly adopting the *Borland* court's elements of trespass by airborne pollutants).

108. *See Bradley*, 635 F. Supp 1154 (finding plaintiffs unable to sustain a trespass claim because there was no evidence arsenic or cadmium deposited on the plaintiffs' soil had damaged the plaintiffs' property). *See also* Padilla v. Lawrence, 685 P.2d 964 (N.M. Ct. App. 1984) (ruling that blowing particulate matter from manure processing plant did not constitute a trespass without evidence that the particulates settled upon plaintiffs' property and damaged it).

109. *See, e.g.*, *Borland*, 369 So. 2d at 529 (discussing direct/indirect analysis and modern trespass theory).

110. *Lunda*, 613 P.2d at 66 (citing Martin v. Union Pac. R.R., 474 P.2d 739 (Or. 1970); and Davis v. Georgia-Pac., 445 P.2d 481 (Or. 1968)).

111. *See supra* notes 105-10 and accompanying text.

2. Application

Trespass claims have arisen in a number of airborne pollution cases where there has been an actual invasion of the plaintiffs' property by dust,[112] smoke,[113] or waste particles[114] from a neighboring defendant's property.[115] The nature of the intruding element does not appear to determine whether the courts will find the invasion element of a trespass claim has been met. Where there is evidence of actual damage to landowners' property, the size and magnitude of the invasive substance appears to be irrelevant.

For example, the Supreme Court of Oregon rejected the notion that a trespass must meet a minimum physical size requirement in *Martin v. Reynolds Metals Co.*, and ruled that even invisible fluoride compounds may constitute a trespass.[116] The *Martin* court defined a trespass as "any intrusion which invades the possessor's protected interest in exclusive possession, whether that intrusion is by visible or invisible pieces of matter or by energy which can be measured only by the mathematical language of the physicist."[117]

The plaintiffs in *Martin* sought money damages for the lost use of their land caused by fluoride compounds from the defendant's aluminum reduction plant.[118] The defendant claimed that his conduct did not meet the trespass standard and constituted no more than a nuisance.[119] The court disagreed with the defendant, but acknowledged that de minimis intrusions that cause no actual damage or interference with the possessor's interest will not be considered a trespass.[120] The court found that the intrusion of fluoride particulates in this case did interfere with the plaintiffs' possession, thus constituting a trespass, and the plaintiffs were awarded consequential damages.[121] The

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112. *See, e.g., Lunda*, 613 P.2d at 63 (alleging that cement dust, road dust and diesel fumes emanated from defendant's cement plant and invaded plaintiff's exclusive possession of their property).

113. *See, e.g.*, Ream v. Keen, 838 P.2d 1073 (Or. 1992) (holding that smoke drifting upon plaintiff's property constituted a trespass).

114. *See, e.g., Bradley*, 635 F. Supp at 1155 (alleging trespass for deposit of arsenic and cadmium particles from defendant's copper smelting plant). *See also Borland*, 369 So. 2d at 525 (alleging trespass of lead particulates and sulfoxide gases from defendant's smelting plant); Martin v. Reynolds Metals Co., 342 P.2d 790 (Or. 1959) (holding that invisible fluoride particulates from defendant's aluminum plant constituted a trespass).

115. *See* Looney, *supra* note 101, at 150.

116. 342 P.2d at 793 (recognizing differing views expressed in the RESTATEMENT OF TORTS § 158 cmt. h (1934) and WILLIAM L. PROSSER, THE LAW OF TORTS § 13 (2d ed. 1955)).

117. *Id.* at 794

118. *See id.* at 791.

119. *See id.*

120. *See id.* at 794.

121. *See id.* at 797.

Martin court's holding has subsequently been cited with approval in cases finding trespass for other imperceptible substances including lead particles[122] and low-level radiation emissions.[123]

Although the invasion element may be easy to meet, the key factor necessary to sustain a trespass claim seems to be whether or not an intrusion causes actual damage to the plaintiffs' property. For example, in the case of *Bradley v. American Smelting & Refining*, the Washington Supreme Court held that even imperceptible airborne pollutants might constitute trespass as long as there is proof of actual damages to the plaintiffs' land.[124] The trespass claim in *Bradley* was ultimately rejected, however, because the plaintiffs' evidence did not show any property damage caused by deposits of arsenic or cadmium from the defendant's copper smelter.[125] Similarly, the court in *Padilla v. Lawrence* upheld a trial court's finding that dust from a manure processing plant did not constitute a trespass because there was no evidence of the dust settling upon or damaging plaintiffs' property.[126]

At first impression, the general rule that "any intrusion which invades the possessor's protected interest in exclusive possession . . . ."[127] would seem to apply to GM pollen, plant seeds, or pests which are windblown from a neighboring landowner's property onto plaintiffs' property. The plaintiffs will have the burden, however, of showing that the presence of GMOs interferes with the exclusive possession of their property, that the defendant's acts caused the GMO's to invade their property, and that the GMOs have caused substantial damage to their property.[128]

While the technology currently exists to prove that plaintiffs' land has been invaded and contaminated by GMOs,[129] it may still be

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122. *See* Borland v. Sanders Lead Co., 369 So. 2d 523, 529 (Ala. 1979) (citing *Martin* with approval but cautioning that a de minimis intrusion must still be shown to constitute a "real and substantial invasion of a protected interest").

123. *See* Maryland Heights Leasing, Inc. v. Mallinckrodt, Inc., 706 S.W.2d 218, 224-26 (Mo. Ct. App. 1986) (citing *Martin* and *Borland* with approval and concluding that radioactive emissions may constitute trespass despite the difficulty in determining the extent of the interference).

124. 709 P.2d at 1156-57.

125. *Id.* at 1157.

126. 685 P.2d 964, 971 (N.M. Ct. App. 1984) (noting that plaintiffs' expert was unable to find a measurable quantity of dust from the defendant's plant on plaintiffs' property).

127. *Martin*, 342 P.2d at 794.

128. *See id. See also* Bradley v. American Smelting & Refining Co., 635 F. Supp. 1154, 1156 (W.D. Wash. 1986) (requiring "substantial damage to the res upon which the trespass occurs").

129. *See Genetic ID's Testing Methodology: An Introduction* (visited Apr. 6, 2000) <hpp://www.genetic-id.com/gmotest/intro.html>. The DNA of a GMO can be directly analyzed using polymerase chain reaction (PCR) testing. A PCR test is the same test used by law enforcement agencies to identify suspects based upon their DNA. *Id.*

difficult to meet the "causation" element and show that the contamination came from a particular defendant. The unique characteristics of GMOs will make this step particularly challenging, and the plaintiffs may first need to establish that they were not responsible for introducing the GMO contamination onto their own land inadvertently by planting contaminated seed, or otherwise introducing the GMO onto their property.[130]

In order to show the defendant caused the plaintiffs' damages, testing will likely be necessary to link the GMO contamination on the plaintiffs' property with the GMOs produced on the defendant's property. Modern testing methods for GMOs are precise enough to provide identification of the unique gene sequence in a specific variety of a GM crop.[131] Therefore, where there is only one neighbor within a couple of miles producing the specific variety of GMO found on the plaintiffs' land, GMO testing is accurate enough to identify that neighbor as the likely source of contamination.[132] In this situation, the plaintiffs may only need to show that: (1) the plaintiffs did not introduce the GMO onto their own land; (2) the defendant was producing the specific GMO variety during the time period when contamination occurred; (3) the GMO is a species that could cause the contamination; and (4) atmospheric conditions, such as wind patterns, would have permitted the contamination to occur.

However, where there are multiple neighbors producing the same variety of a GM crop within contamination range of the plaintiffs' property, GMO testing alone will be insufficient to identify the specific source of GMO contamination.[133] Therefore, the plaintiffs will need to support their proof of causation with circumstantial evidence, such as: testimony from expert witnesses who are able to show the potential drift range of the GMOs; evidence of the likely drift pattern in the given atmospheric conditions; and evidence of a defendant's

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130. Farmers who depend upon non-GM markets for their crops may want to consider regular testing of all inputs and/or third party GM-free certification in order to preserve their ability to maintain a future cause of action. *See Introduction to Cert ID Non-GMO Certification* (visited Apr. 9, 2000) <http://www.genetic-id.com/certidcert/rightside.html> (promoting third party certification program as a means of assuring customers and protecting producers/handlers from potential liability).

131. *See Genetic ID's Testing Methodology: An Introduction* (visited Apr. 6, 2000) <hpp://www.genetic-id.com/gmotest/intro.html>. The DNA of a GMO can be directly analyzed using polymerase chain reaction (PCR) testing. A PCR test is the same test used by law enforcement agencies to identify suspects based upon their DNA. *Id.*

132. Telephone Interview with Dr. R. James Cook, Endowed Chair in Wheat Research, Dep'ts of Plant Pathology and Crop and Soil Sciences, Washington State University (Apr. 7, 2000) (describing PCR testing of GMOs to be as accurate as taking a "fingerprint").

133. *See id.* (noting that each GM crop variety is uniquely identifiable, but seeds or pollen of the same variety cannot be distinguished from field to field).

growing practices or other conduct which would identify the defendant as the likely source of contamination. The inherent difficulty in proving a case with circumstantial evidence is one reason why plaintiff farmers who have already suffered losses from GMO contamination have been joining in class action lawsuits against Monsanto and the EPA rather than individually suing their neighbors.[134]

Assuming the invasion and causation elements have been met, the plaintiffs will also need to prove they have sustained damages.[135] The airborne pollen of a GM crop cited in a genetic drift case might be more visible than the fluoride compounds in *Martin*, but it may be more difficult to identify as the specific source of damage. Unless plaintiffs can show that GM contamination represents more than a "de minimis" intrusion and has caused actual damage or interference with their possession, a court will be unlikely to sustain a claim for trespass. If so, the defendant will not be liable for trespass, even if the defendant is shown to produce the GM crops whose pollen or seeds physically intrude on the plaintiffs' property.[136] Therefore, the plaintiffs will need to demonstrate that a measurable quantity of GM pollen, plant seeds or some other form of contamination produced by the defendant has settled on the plaintiffs' property,[137] and that the plaintiffs' property has been damaged as a result.[138]

One way for the plaintiffs to show their property has been damaged may be to show that the land has been made unfit for its prior purpose. In *Martin*, the court noted that there was "substantial evidence from which the trial court could have connected the emanation of the fluorides" with rendering the plaintiff's land unfit for grazing livestock.[139] If farmers document that the crops they have always raised on their land have been rendered unmarketable because of GMO contamination, they will have sufficient evidence that their land has been rendered unfit for its prior purpose. This would seem particularly likely for organic farmers who can demonstrate to the court that their land has lost its organic certification as a result of GMO contamination, but it may also extend to conventional farmers who can show that their crops have been rejected because of market re-

134. Telephone Interview with Melodi Nelson, Vice President of Terra Prima (Jan. 18, 1999).

135. *See Bradley*, 635 F. Supp. at 1156-57.

136. *See Martin*, 342 P.2d at 797.

137. *See* Padilla v. Lawrence, 685 P.2d 964, 971 (N.M. Ct. App. 1984) (citing Borland v. Sanders Lead Co., 369 So. 2d 523 (Ala. 1979), and finding "blowing particulate matter . . . is not actionable as trespass in the absence of a finding that the matter settled upon and damaged plaintiffs' property").

138. *See Bradley*, 635 F. Supp. at 1156 (requiring "substantial damage to the res upon which the trespass occurs").

139. 342 P.2d at 797.

strictions.[140] If a worse case scenario becomes reality, and GMO contamination results in crop damage or failure, the plaintiffs will have property damage and thus will have satisfied the key element of a trespass claim.

B. Nuisance

1. Theory

A nuisance is an actionable invasion of a possessor's interest in the use and enjoyment of his land.[141] If plaintiffs are unable to sustain a trespass claim, they may still be able to succeed with a nuisance claim.[142] Although trespass and nuisance sometimes overlap, one court has explained that a distinction may be found in the nature of the interest infringed upon.[143] When "the intrusion interferes with the right to exclusive possession of property, the law of trespass applies."[144] However, if the intrusion "is to the interest in use and enjoyment of property, the law of nuisance applies."[145]

Nuisance has been described as "[t]he most widely used common law remedy for activities that interfere with use and enjoyment of land,"[146] and is usually applied in cases where private rights have been interfered with by something offensive, noxious, inconvenient, annoying, or damaging.[147] Classic examples of nuisances include "the barking dog, the neighboring bawdy house, noise, smoke, fumes, or obnoxious odors."[148] In short, they are unwanted intrusions that affect an individual's ability to use and enjoy his property even if the intrusions do not cause any actionable property damage.[149]

Nuisance law distinguishes private nuisances from those that are considered public nuisances by focusing on the rights affected by the

140. *See supra* Part IV.B (discussing market restrictions).

141. *See Martin*, 342 P.2d at 792.

142. *See, e.g.*, Padilla v. Lawrence, 685 P.2d 964, 969 (N.M. Ct. App. 1984) (affirming trial court's finding of private nuisance despite insufficient evidence of property damage for plaintiff's trespass claim).

143. *See* Bradley v. American Smelting & Ref. Co., 635 F. Supp. 1154, 1156 (W.D. Wash 1986).

144. *Id.* (quoting Bradley v. American Smelting & Ref. Co., 709 P.2d 782, 790 (Wash. 1985)).

145. *Id.* (quoting *Bradley*, 709 P.2d at 790).

146. Looney, *supra* note 101, at 150.

147. *See id.*

148. Borland v. Sanders Lead Co., 369 So. 2d 523, 530 (Ala. 1979) (clarifying difference between nuisance and trespass).

149. *See id.* at 530.

interference of the nuisance.[150] While a public nuisance affects the health, welfare, or safety of multiple members of the public, and is typically enforced by an officer of the state,[151] a private nuisance "'affects a single individual or a definite number of persons in the enjoyment of some private right which is not common to the public.'"[152]

A private nuisance is defined as "an unreasonable interference with the use and enjoyment of another person's property."[153] The determination of "reasonableness" in some jurisdictions employs a balancing test that weighs the gravity of the harm against the utility of the conduct causing the harm.[154] In other jurisdictions, however, there has been less focus on the utility of the defendant's conduct and more consideration of ad hoc factors demonstrating a negative impact on the plaintiff's interest.[155] Unlike negligence theory, which evaluates the reasonableness of a defendant's conduct to determine whether liability exists, nuisance liability exists "regardless of the degree of care exercised to avoid injury."[156] This is because nuisance theory focuses on the plaintiff's interest invaded, not on the defendant's culpable conduct.[157] The elements of a private nuisance claim may be summarized as a cause of action that exists when: (1) a defendant has intentionally or negligently engaged in conduct; (2) that interferes with a plaintiff's use and enjoyment of his land; and (3) the interference is unreasonable.[158]

While private nuisance has traditionally been the strongest claim for plaintiffs seeking damages for air and water pollution, toxic waste

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150. *See, e.g.*, Padilla v. Lawrence, 685 P.2d 964, 967-71 (N.M. Ct. App. 1984) (analyzing liability for private nuisance claim separately from public nuisance claim).

151. *See id.* at 970 (citing Spur Indus., Inc. v. Del E. Webb Dev. Co., 494 P.2d 700 (Ariz. 1972)).

152. Daniel P. Larsen, *Combatting the Exotic Species Invasion: The Role of Tort Liability*, 5 DUKE ENVTL. L. & POL'Y F. 21, 41 (1995) (quoting City of Phoenix v. Johnson, 75 P.2d 30, 34 (Ariz. 1938)).

153. Looney, *supra* note 101, at 151. *See also* Bates v. Quality Ready-Mix Co., 154 N.W.2d 852, 857 (Iowa 1967) ("A fair test of whether the operation of a lawful trade or industry constitutes a nuisance has been said to be the reasonableness of conducting it in the manner, at the place and under the circumstances in question.").

154. *See* Looney, *supra* note 101, at 151.

155. *See, e.g.*, Lunda v. Matthews, 613 P.2d 63, 66-67 (Or. 1970) (considering defendant's arguments for the reasonability of their conduct and plaintiffs' alleged inconveniences). *See also* Jewett v. Deerhorn Enter., Inc., 575 P.2d 164, 167-68 (Or. 1977) (focusing on character of the neighborhood, priority of land ownership, frequency of intrusion and effect of intrusions on plaintiffs' use of their property).

156. Padilla v. Lawrence, 685 P.2d 964, 968 (N.M. Ct. App. 1984).

157. *See Lunda*, 613 P.2d at 66 (citing Mikan v. Valley Publ'g, Inc., 589 P.2d 1201 (Or. 1979)).

158. *See supra* notes 153-57 and accompanying text. *See also* KEETON ET AL., *supra* note 96, § 3, at 18-19 (discussing requirements for recovery under private nuisance theory).

disposal, and other environmental contamination, federal statutes and their regulatory programs have largely supplanted this claim.[159] Consequently, private nuisance law is now usually found only in smaller, local land-use conflicts.[160]

2. Application

Plaintiffs alleging a nuisance claim will still be required to meet the difficult causation element – to show that a defendant's conduct caused the interference with their use and enjoyment of their property. Unless there is sufficient scientific evidence and expert testimony to trace GMO contamination to a specific defendant, this issue will be just as problematic for a nuisance claim as it is under trespass theory.[161] It should be noted, though, that the difficulty in proving causation may not completely bar nuisance liability, even when there are multiple potential defendants within contamination range of the plaintiffs. At least one court has held that a remedy was not precluded in a nuisance claim just because a plaintiff's damages came from two different sources.[162] Even though the exact proportion of total damages caused by a particular defendant may be impossible to ascertain, a court would be "at liberty to estimate as best it could, from the evidence before it, how much of the total damage" was caused by each defendant.[163]

Therefore, where there is evidence of a defendant's GM crop causing contamination, a nuisance claim will likely be successful. This is because it should be relatively easy to prove that the plaintiffs' use and enjoyment of their property has been curtailed with evidence that they were forced to change the use of their land. Both conventional and organic farmers have already suffered economic losses as a result of their crops testing positive for GMOs.[164] If farmers are forced to grow different crops, cease growing organic crops, or stop farming altogether because their land has been contaminated by GMOs, then

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159. *See* Jeff L. Lewin, *Boomer and the American Law of Nuisance: Past, Present, and Future*, 54 ALB. L. REV. 189, 230 (1990).

160. *See id.*

161. *See supra* Part V.A.2 (discussing application of trespass theory and difficulty of meeting causation element).

162. *See* California Orange Co. v. Riverside Portland Cement Co., 195 P. 694, 695 (Cal. Dist. Ct. App. 1920) (holding that two separate cement plants were not joint tortfeasors but they were each liable for the proportion of damage their dust caused to a neighboring orange grove).

163. *Id.*

164. *See, e.g.*, Bett, *supra* note 28, at 385. (reporting on Terra Prima's loss of 87,000 bags of tortilla chips).

they would foreseeably have a strong case that their interest in the use and enjoyment of their land has been invaded.

However, even if plaintiffs are able to show that an invasion of their use and enjoyment of their property has occurred, they will still have to show that the interference with their use and enjoyment is unreasonable,[165] and that the social utility[166] of the GMOs do not outweigh the harm of contamination. An illustration of a court's analysis of nuisance unreasonability is demonstrated in the case of *Lunda v. Matthews*.[167]

In *Lunda*, the plaintiffs were landowners who had built their house in a residential area six years before defendants built a cement plant on industrial land about 180 feet north of the plaintiffs' house.[168] The plaintiffs sought both monetary damages and an injunction to prevent continued operation of the cement plant, based upon the "inconvenience, annoyance, physical discomfort and mental distress," caused by the cement plant's operation.[169]

The defendants claimed the invasion of the plaintiffs' use and enjoyment was reasonable because: (1) it was not intentional; (2) their plant was operated the same as any other cement plant; (3) their plant was in an area zoned for their type of business; and (4) they had complied with existing air pollution standards.[170] The *Lunda* court, however, disregarded each of the defendants' claims, ruling that: (1) nuisance liability is based on the interest invaded rather than the intentions or culpability of the defendant's conduct;[171] (2) prior case law had already rejected conformance with like businesses as an excuse for creating a nuisance;[172] (3) "[z]oning is not an approval" of nuisance causing conduct;[173] and (4) "[c]onformance with pollution standards does not preclude a suit in private nuisance."[174] The court also noted there was evidence the defendant plant owners were aware of the

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165. *See, e.g.*, *Lunda*, 613 P.2d at 66 (citing Jewett v. Deerhorn Enter., Inc., 575 P.2d 164 (1978) and holding that a private nuisance "must be both substantial and unreasonable").

166. *See, e.g.*, Carpenter v. Double R Cattle Co., 108 Idaho 602, 607, 701 P.2d 222, 227 (1985) ("[I]n a nuisance action seeking damages the interests of the community, which would include the utility of the conduct, should be considered in the determination of the existence of a nuisance.").

167. 613 P.2d at 66-67.

168. *See id.*

169. *Id.* at 65.

170. *See id.* at 66-67.

171. *Id.* at 66 (citing Mikan v. Valley Publ'g, Inc., 589 P.2d 1201 (Or. 1979)).

172. *Id.* (citing Kramer v. Sweet, 169 P.2d 892 (Or. 1946)).

173. *Id.* at 67 (citing a variety of cases including Richards v. Washington Terminal Co., 233 U.S. 546, (1914) and Turner v. Spokane, 235 P.2d 300, 302 (Wash. 1951)).

174. *Id.* (citing Renken v. Harvey Aluminum (Inc.), 226 F. Supp. 169, 175-76 (D. Or. 1963)).

"dust, debris, fumes and operational noise" that invaded the plaintiffs' property.[175] The court thus concluded that the operation of the cement plant was unreasonable.[176]

The *Lunda* court then cited such factors as the proximity to the plaintiffs' home,[177] the frequency of the intrusion,[178] the original character of the area in which the defendants' plant was located,[179] and the limitations the intrusion placed upon the plaintiffs' use of their property,[180] to conclude that there was sufficient evidence for the jury to find a private nuisance existed.[181]

A court following the *Lunda* court's analysis in a GMO contamination case will likely consider agricultural landowners' interest in raising marketable crops on their land, the proximity of plaintiffs' land to a defendant's GM cropland, as well as the foreseeability of GMOs in the form of seeds or pollen intruding on plaintiffs' land. The court will also consider whether the plaintiffs were growing crops susceptible to GM contamination before the defendant began growing GM crops and whether market restrictions and/or crop failure caused by GM contamination has forced the plaintiffs to suffer a detrimental change or limitation to their growing practices.[182] Based upon a *Lunda* analysis, the court will likely also disregard a defendant's conformance with established growing practices for GM crops, even if the defendant's land is zoned for agricultural use and even if no regulations restrict the growing of GM crops.[183] Although these last factors would provide a defendant with some protection from a negligence claim, they are irrelevant to a private nuisance claim.[184]

Assuming a court does find a defendant's production of GM crops to be an unreasonable interference with the plaintiffs' use and enjoyment of their property, the court may or may not grant plaintiffs' requested relief. The court's decision may instead depend on whether the plaintiffs seek only monetary damages or are also arguing for an

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175. *Id.* at 66.

176. *See id.* at 66-67.

177. *Id.* at 65 (recognizing the plant was about 180 feet north of plaintiff's house).

178. *Id.* at 67 (noting the intrusion occurred "on a daily basis").

179. *Id.* (noting the area south of the cement plant "was a residential neighborhood long before defendant located its plant there").

180. *Id.* (acknowledging plaintiff's inability to enjoy their retirement home, be outside, or open their house because of the cement dust).

181. *See id.*

182. *See supra* notes 171-81 and accompanying text.

183. *See supra* notes 173-74 and accompanying text.

184. *See Lunda*, 613 P.2d at 66 (citing Mikan v. Valley Publ'g, Inc., 589 P.2d 1201 (Or. 1979), and holding that "nuisance refers to the interest invaded and not to any type of culpable conduct"). *See also* Padilla v. Lawrence, 685 P.2d 964, 968 (N.M. Ct. App. 1984) (holding "liability for nuisance, unlike liability for negligence, exists regardless of the degree of care exercised to avoid injury").

injunction to prevent the defendant from growing GM crops. If the court is in a jurisdiction that has incorporated Section 826(b) of the *Restatement (Second) of Torts*,[185] and the plaintiffs seek only monetary damages for harm caused by GMO contamination, then the court may grant such damages solely upon an ad hoc finding that the defendant unreasonably invaded the plaintiffs' interest.[186] Other courts, however, have made an award of nuisance damages or an injunction contingent on the utility of the defendant's conduct being outweighed by the gravity of harm to the plaintiffs.[187]

The Idaho Supreme Court is one court that has refused to accept the *Restatement's* more lenient definition of a nuisance, and has insisted that the interests of the community, including the utility or value of a defendant's conduct "should be considered in the determination of the existence of a nuisance."[188] In *Carpenter v. Double R Cattle Company, Inc.*, the court reviewed a jury's finding that "the spread and accumulation of manure, pollution of river and ground water, odor, insect infestation, increased concentration of birds . . . dust and noise" from a cattle feedlot did not constitute a nuisance.[189] The court

185. RESTATEMENT (SECOND) OF TORTS § 826(b) (1979) ("[T]he harm caused by the conduct is serious and the financial burden of compensating for this and similar harm to others would not make the continuation of the conduct not feasible."). The *Restatement* is a compilation and synthesis of case law published by the American Law Institute. The *Restatement* serves both as a summary of how many courts have ruled on a particular question of law as well as a guide for individual courts who have not yet decided a particular issue. Whether a court chooses to incorporate a legal definition from the *Restatement* is a matter for the court's discretion.

186. *See, e.g.*, *Lunda*, 613 P.2d at 66-67 (considering defendants' arguments for the reasonability of their conduct and plaintiffs' alleged inconveniences). *See also* Jewett v. Deerhorn Enter., Inc., 575 P.2d 164, 167-68 (Or. 1978) (focusing on character of the neighborhood, priority of land ownership, frequency of intrusion and effect of intrusions on plaintiffs' use of their property); Carpenter v. Double R Cattle Co., 108 Idaho 602, 604, 701 P.2d 222, 224 (1985) (recognizing that Section 826(b) of the *Restatement (Second) of Torts* "allows for a finding of a nuisance even though the gravity of harm is outweighed by the utility of the conduct if the harm is 'serious' and the payment of damages is 'feasible' without forcing the business to discontinue"); *Padilla*, 685 P.2d at 968 (noting Section 826(b) of the *Restatement* "recognizes damages may be appropriate even if the utility of the activity outweighs the harm it causes").

187. *See, e.g.*, *Double R Cattle Co.*, 108 Idaho at 604, 701 P.2d at 224 (citing McNichols v. J.R. Simplot Co., 74 Idaho 321, 262 P.2d 1012 (1953) for conclusion that "subsection (b) of Section 826 of the *Second Restatement* . . . does not represent the law in the state of Idaho."). *See also* Boomer v. Atlantic Cement Co., Inc., 257 N.E.2d 870, 872 (N.Y. Ct. App. 1970) (overruling precedent that granted injunctions even when "the damage to the plaintiff may be slight as compared with the defendant's expense of abating the condition").

188. *Double R Cattle Co*, 108 Idaho at 607, 701 P.2d at 227 (reaffirming *McNichols* and citing numerous cases in support). *See, e.g.*, Nissan Motor Corp. v. Maryland Shipbuilding & Drydock Co., 544 F. Supp. 1104 (D. Md. 1982); Little Joseph Realty, Inc. v. Town of Babylon, 363 N.E.2d 1163 (N.Y. Ct. App. 1977).

189. 108 Idaho at 609, 701 P.2d at 229.

emphasized the important role the agriculture industry, among others, plays in supporting the state's economy and concluded that failing to require utility of conduct as a factor in determining the existence of a nuisance "would place an unreasonable burden upon these industries."[190]

Courts applying a social utility balancing test in a GM contamination case will probably first evaluate the gravity of harm to the plaintiffs. Factors relevant to the gravity of harm in the case of two neighboring farms would include the "extent and character of the harm" to the plaintiffs' farm, the social value recognized for the crops produced on the plaintiffs' land, the suitability of the plaintiffs' crops for that particular locality, and the burden on the plaintiffs of trying to prevent GM contamination from affecting their crops.[191] The court would then weigh these factors against the utility or social value of the defendant's production of a GM crop.[192]

Relevant factors in determining the utility of a GM crop producer's conduct will likely include the social value recognized for the potential of increased food production, the suitability of raising GM crops in the specific locality and the "impracticability of preventing or avoiding the invasion."[193] The court might also consider the defendant's investment in production of GM crops and the impact on the agriculture and biotech industries.[194]

A court's consideration of a defendant's investment in a nuisance causing activity was crucial in the case of *Boomer v. Atlantic Cement, Co.*[195] In *Boomer*, the court compared the expense of constructing a $40 million cement plant that employed over 300 people with the total cost of the damage to the plaintiffs' property. The court decided that granting the plaintiffs' request for a full injunction and halting operation of the cement plant would create a large disparity between the economic consequences of the nuisance and the injunction.[196] Because of this gross disparity, the court concluded that it was necessary to

190. *Id.* at 608, 701 P.2d at 228.

191. *See, e.g.*, Padilla v. Lawrence, 685 P.2d 964, 968 (N.M. Ct. App. 1984) (citing with approval factors for determining gravity of harm in *Restatement* Section 827).

192. *See, e.g., Double R Cattle Co.*, 108 Idaho at 607, 701 P.2d at 227 ("[T]he utility of the conduct, should be considered in the determination of the existence of a nuisance.").

193. *Padilla*, 685 P.2d at 968 n.2 (citing with approval factors for determining the utility of conduct in *Restatement* Section 828).

194. *See, e.g.*, Boomer v. Atlantic Cement Co., Inc., 257 N.E.2d 870 (N.Y. Ct. App. 1970).

195. *Id.* at 870.

196. *See id.* at 872.

overrule prior case law that had issued injunctions for nuisances, and instead award permanent damages to the plaintiffs.[197]

A balancing of the investment costs and consequential damages will also likely be crucial in a GM contamination case because the social value and suitability of the crops for their locality may not be helpful factors in a utility test. In a corn growing region, for instance, both non-GM and GM corn producers can claim their corn is valuable to society as a source of food, and is appropriately grown in their region because that is the only crop that thrives under their particular growing conditions. If the plaintiffs are able to document crop loss, substantially reduced marketability of their crops, or loss of organic certification, the court may face the challenging task of determining whether society has more of an interest in ensuring that non-GM corn is available for those consumers who do not wish to eat GM food, or whether society has a greater need for using every possible means to enhance food production in order to maintain inexpensive food sources and alleviate hunger. Since both GM and non-GM crop production are part of the agricultural industry, the court's desire to protect a needed industry will not provide a clear policy basis, like the one exhibited in *Double R Cattle Co.*, for protecting one form of production over another.[198]

Like the court in *Boomer*, a court in a GM case may also find that GM crop production represents a significant investment of money by the biotech industry, and that GM crop production is a source of employment for a large number of farmers. If the court only compares this investment with the losses of an individual organic farmer, for example, it may likely reach the *Boomer* court's conclusion that an injunction against GM crop production would create an inappropriately large disparity between the costs to the plaintiff and the costs to the defendant.[199] If, however, the court takes a broader policy view

197. *See id.* (overruling precedent that granted injunctions even when "the damage to the plaintiff may be slight as compared with the defendant's expense of abating the condition").

198. *See Double R Cattle Co.*, 108 Idaho at 608, 701 P.2d at 228 (emphasizing the important role the agriculture industry, among others, plays in supporting the state's economy).

199. 257 N.E.2d at 872. A sensibility analysis may also be appropriate in the case of an organic farmer, because the sensibility of a particular plaintiff is one factor courts consider when determining whether a nuisance exists. *See, e.g.*, Jewett v. Deerhorn Enter., Inc., 575 P.2d 164, 167-68 (Or. 1978) ("Whether a particular condition is sufficient to constitute a nuisance depends upon its effect on an ordinarily reasonable man, a normal person of ordinary habits and sensibilities."). A defendant could make a case that an organic farmer whose property is the only organic farm in an area dominated by GM crop production is not a plaintiff of ordinary sensibilities because his land's organic certification status makes him more vulnerable to GM contamination. If a court accepts this rationale, the organic farmer could be denied relief under nuisance theory. *See, e.g.*, Riblet

that GM crop production affects not just individual farmers, but the health and safety of a public dependant upon a viable food chain, then it may find no disparity and conclude that an injunction against GM production is the proper remedy.[200]

A favorable ruling for the plaintiffs will be least likely if the court adopts a view of GMOs similar to the Supreme Court of Wisconsin's view of pesticides.[201] In *Bennett v. Larsen*, the court found pesticides to be "necessary and beneficial" to ensure the production of adequate and healthy food for a hungry planet.[202] If a court should likewise find GM crops "necessary and beneficial" to ensure an adequate food supply, then the plaintiffs may be asked to suffer their losses for the benefit of the community, therefore denying their nuisance claim.

However, even if the court decides that the community needs the production attributes of a defendant's GM crop, the court could still decide that plaintiffs are due compensation, by following Justice Bistline's reasoning in *Double R Cattle Co.*[203] Justice Bistline's dissenting opinion in *Double R Cattle Co.* agreed that community interests should be protected but argued "those directly impacted by the serious nuisance deserve some compensation for the invasion they suffer as a result of the continuation of the nuisance."[204] If a court should agree with this rationale in a genetic drift case, then the defendant would be required to compensate the plaintiffs for their damages even though he was permitted to grow GM crops.

C. Negligence

1. Theory

Whenever a person fails to act reasonably under the circumstances and this failure causes harm to another, negligence is a potential basis for liability.[205] One commonly cited example is that of a

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v. Ideal Cement Co., 358 P.2d 975 (Wash. 1961) (denying nuisance relief because plaintiffs "were not of ordinary and normal sensibilities").

200. A concern for public health and safety would also provide possible grounds for a public nuisance complaint. The applicability of public nuisance is outside the scope of this Comment, but for an insightful discussion of public nuisance theory, see Daniel Larsen's article, *Combatting the Exotic Species Invasion: The Role of Tort Liability*. *See Larsen*, *supra* note 152, at 52 (suggesting that public nuisance tort liability may serve as a useful tool for protecting the environment from damage caused by exotic species).

201. *See* Bennett v. Larsen Co., 348 N.W.2d 540, 553 (Wis. 1984).

202. *Id.* at 553 (stating that "application of pesticides is a necessary and beneficial activity to ensure the production of adequate and healthy food . . . ").

203. 108 Idaho at 609, 701 P.2d at 229 (Bistline, J., dissenting).

204. *See id.* (Bistline, J., dissenting).

205. *See id.*

farmer collecting animal waste in a lagoon which subsequently overflows due to lack of attention and damages a neighbor's property.[206] Liability is based on the idea that the owner of the lagoon owed a duty to exercise reasonable care in maintaining the lagoon, and his action or inaction caused the harm to the neighbor's property.[207]

The essential elements a court will evaluate in determining whether a claim of negligence may be maintained are: "(1) the existence of a duty on the part of the defendant to protect plaintiff from injury; (2) failure of defendant to perform that duty; and (3) injury to plaintiff resulting from such failure."[208] Although it is one of the fundamental theories of modern tort law, negligence is most often used only when there is proof of a defendant's failure to act reasonably in performing his duty.[209]

2. Application

An example of negligence theory analysis may be seen in *Maryland Heights Leasing, Inc. v. Mallinckrodt, Inc.*[210] The plaintiffs were business owners who sought relief for property damage caused by low-level radiation emissions from the defendant's neighboring pharmaceutical plant.[211] The *Maryland Heights* court's first step in analyzing the plaintiffs' negligence claim was to determine if a duty of care existed.[212] The court stated generally that "a duty of care imposed by the law of negligence arises out of circumstances in which there is a foreseeable likelihood that particular acts or omissions will cause harm or injury."[213] The court determined that if the defendant was found to have committed the particular acts alleged by the plaintiffs, then a foreseeable likelihood of injury would have been created and the duty of care would exist.[214]

The *Maryland Heights* court next determined a breach of that duty had occurred, despite the defendant's compliance with federal emission limits, stating, "[m]ere compliance with statutory requirements . . . does not relieve a party from responsibility for negligence as a matter of law."[215] The court then concluded that the plaintiffs

206. *See id.*
207. *See id.*
208. Maryland Heights Leasing, Inc., v. Mallinckrodt, Inc. 706 S.W.2d 218, 223 (Mo. Ct. App. 1986).
209. *See* Looney, *supra* note 101, at 150.
210. 706 S.W.2d 218.
211. *See id.* at 223.
212. *Id.*
213. *Id.*
214. *See id.*
215. *Id.* at 224.

were injured as a direct and proximate result of the defendant's negligent acts and omissions.[216]

As demonstrated in the *Maryland Heights* case, plaintiffs seeking to sustain a negligence theory claim for damage caused by GMO contamination will first need to show that the defendant responsible for the contamination owed the plaintiffs a duty of care. In *Maryland Heights*, the court willingly recognized that the defendant had a duty of care in the handling of radioactive materials because a foreseeable likelihood of injury existed.[217] In a GMO case of first impression, a court may be less willing to recognize a "foreseeable likelihood of injury" unless the plaintiffs can provide evidence that the injury was in fact foreseeable.[218] The plaintiffs will therefore need to support allegations of negligence with evidence of scientific studies and/or expert testimony sufficient to show that GMO risks and injuries have been documented and are therefore foreseeably likely to cause damage to a neighboring landowner.

In evaluating whether a GM crop producer could foresee injury to the plaintiffs, the court is likely to consider that most GM production technology agreements require a buffer zone, to prevent, among other things, the spread and cross-pollination of GM crops and Bt resistant pests.[219] This implicit recognition of a GM crop's ability to spread beyond its original planting boundaries may be viewed as "reasonable foreseeability" or sufficient "reason to know" that producing GM crops could result in an invasion of a neighbor's property interest.[220] If this invasion is also foreseeably likely to injure the plaintiffs, then a court would be justified in finding a defendant has a duty to grow GM crops in a way that does not cause the injury.

If the plaintiffs can successfully show that a defendant did owe the plaintiffs a duty of care, then the plaintiffs must show that the defendant's conduct breached the duty.[221] A defendant who is growing a GM crop according to the directions of the GM seed suppliers and regulatory agencies may likely be found to have exercised the requisite duty of care. Although the *Maryland Heights* court points out that "[m]ere compliance with statutory requirements" is insufficient to re-

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216. *See id.*

217. *Id.*

218. *See id.* at 223.

219. *See Seeds of Change*, *supra* note 11, at 44.

220. *See, e.g.*, Borland v. Sanders Lead Co., 369 So. 2d 523, 529 (Ala. 1979) (listing "reasonable foreseeability that [an] act . . . could result in an invasion" among modern trespass elements). *See also Furrer*, 466 P.2d at 611 (recognizing water seeping onto plaintiff's land is sufficient evidence that defendant "knew or should have known" of an intrusion).

221. *See id.* at 223 (listing elements of a negligence claim).

lieve a party of responsibility,[222] a defendant who establishes buffer zones and maintains consistent harvesting and record keeping procedures, as required by the information technology contracts associated with GM seed purchases, will likely be able to meet the burden of reasonable care.[223] If, however, a GM producer is found to have failed to: (1) follow proper planting or harvesting procedures; (2) maintain adequate buffer zones; (3) or make an adequate and timely remedial response to complaints of genetic drift, then a court is likely to find that the producer's duty of care to neighboring landowners has been breached.[224]

Once a breach of duty has been shown, then plaintiffs will need to show "causation" by demonstrating that their injuries are a direct and proximate result of the defendant's acts.[225] The same difficulties in showing causation and damages for GM contamination, previously discussed in the application of trespass theory, will also apply under negligence theory.[226]

D. Strict Liability

1. Theory

The courts have applied strict liability for activities on land in a variety of contexts.[227] Some examples include cases of "storing and using explosives, spraying pesticides, spilling toxic substances, allowing the escape of sewage, and allowing the escape of noxious or poisonous gases, fumes or vapors."[228] If a court finds such an activity to be abnormally dangerous, then a defendant engaging in such an activity will be held liable without fault for any damages the activity causes.[229] A defendant is held liable for the "creation of an abnormal risk of harm whether that arises out of the activity itself or through the manner in which it is carried on."[230] Although the definition of

222. *Id.* at 224 (citing Silkwood v. Kerr-McGee Corp., 769 F.2d 1451, 1457 (10th Cir. 1985)).

223. *See Seeds of Change*, *supra* note 11, at 44.

224. *See, e.g.*, Exxon Corp. v. Yarema, 516 A.2d 990 (Md. Ct. Spec. App. 1986) (basing Exxon's negligence liability on their tardy remedial response to contain contamination of groundwater).

225. *See Maryland Heights*, 706 S.W.2d at 223 (listing elements of a negligence claim).

226. *See supra* Part V.A.2.

227. *See* Looney, *supra* note 101, at 160.

228. *Id.* at 160-61.

229. *See id.* at 161.

230. *Id.*

"abnormally dangerous activities" is inherently ambiguous,[231] many courts have adopted the factors listed in Section 520 of the *Restatement of Torts* to determine whether an activity is abnormally dangerous.[232] These factors include:

a) Whether the activity involves a high degree of risk of some harm to the person, land or chattels of others;

b) Whether the gravity of the harm which may result from it is likely to be great;

c) Whether the risk cannot be eliminated by the exercise of reasonable care;

d) Whether the activity is not a matter of common usage;

e) Whether the activity is inappropriate to the place where it is carried on; and

f) The value of the activity to the community.[233]

Because of the difficulty in showing that an activity meets the above criteria for an abnormally dangerous activity, "[s]trict liability has not been used as frequently [as other theories] as a basis for recovery. However, in situations where an activity is considered abnormally dangerous, it is unnecessary for plaintiffs to show fault if the court follows a strict liability concept."[234] A finding of strict liability, therefore, virtually ensures that the plaintiffs will be able to collect money damages from defendants who have caused the plaintiffs economic losses.

2. Application

An evaluation of each element of a strict liability claim reveals that GMO production may conform to a strict liability analysis. Activi-

231. *See* Langan v. Valicopters, Inc., 567 P.2d 221 (Wash. 1977) ("[I]t is not possible to reduce abnormally dangerous activities to any exact definition."). *See also* Koos v. Roth, 652 P.2d 1255, 1260 ("The change of phrasing from 'extra hazardous' or 'ultrahazardous' to 'abnormally dangerous,' though subtle, created an ambiguity.").

232. *See, e.g.*, *Langan*, 567 P.2d at 221. *See also* Maryland Heights Leasing, Inc. v. Mallinckrodt, Inc., 706 S.W.2d 218 (Mo. Ct. App. 1986) (adopting RESTATEMENT (SECOND) OF TORTS §§ 519, 520 (1977)).

233. Koos v. Roth, 652 P.2d 1255, 1260 n.3 (Or. 1982) (quoting RESTATEMENT (SECOND) OF TORTS, § 520).

234. Looney, *supra* note 101, at 152.

ties that have a high likelihood of causing uncontrollable damage generally qualify as abnormally dangerous activities,[235] therefore, planting GM crops may qualify as an abnormally dangerous activity.[236] Because a GM crop producer will have difficulty controlling pollen, wind blown seeds, and pests once they enter an ecosystem,[237] if the plaintiffs present sufficient evidence of the destructive capacity of the GMOs, a court may decide strict liability analysis is appropriate.

One case providing insight into how strict liability has been applied to agriculture cases is *Langan v. Valicopters, Inc.*[238] In *Langan*, organic farmers brought an action against the neighboring farmer for crop damage allegedly caused by the neighbor's aerial spraying of pesticides.[239] The damage included not only the value of the crops destroyed by pesticide drift, but also the financial harm of having the plaintiffs' farm decertified as an organic farm, which consequently decreased the value of their future crops.[240] The *Langan* court analyzed whether the aerial spraying constituted an abnormally dangerous activity using the six factors of the *Restatement* test.[241]

For the first factor, the *Langan* court concluded aerial spraying involves a high degree of risk of harm because of the impossibility of eliminating the risk of drift in crop spraying.[242] Next, the court considered the gravity of the harm that might result and concluded that drifting pesticides would be very damaging to an organic farmer.[243] For the third factor, the court recognized that the uncontrollability of dust or spray drift could not be eliminated, even with the exercise of

235. *See* RESTATEMENT (SECOND) OF TORTS § 520 (a)-(c) ("[E]xistence of a high degree of risk of some harm to the person, land or chattels of others...[I]nability to eliminate the risk by the exercise of reasonable care.").

236. *See supra* Part IV.C and accompanying text (discussing evidence of GM crop vulnerability to crop failure). *See also* Saxena, *supra* note 35, at 480 (reporting GM corn roots exude toxins into the soil).

237. *Cf. Langan*, 567 P.2d at 222 (noting the impossibility of limiting the risk of drift in crop spraying because of three "uncertain and uncontrollable factors: (1) the size of the dust or spray particles; (2) the air disturbances created by the (applicating aircraft); and (3) natural atmospheric forces"). While the air disturbances created by applicating aircraft is not relevant to GMO contamination cases, the size of GM pollen and/or seeds and their susceptibility to the impact of natural atmospheric forces, as well as other natural forces, makes genetic drift cases analogous to pesticide drift cases.

238. *Id.*

239. *Id.* at 219-20. This was the first state appellate court decision establishing strict liability for aerial spraying of agricultural pesticides.

240. *See id.*

241. *Id.* at 221 (stating "this court has adopted the Restatement (Second) of Torts," and quoting the factors listed in *Restatement* Section 520).

242. *Id.* at 222 (noting "uncertain and uncontrollable factors" inherent to crop dusting).

243. *See id.* (recognizing damage caused by organic farmer losing organic certification and/or ability to market his goods).

reasonable care.[244] The court then decided that crop dusting was not a matter of common usage because it was used by a small number of people.[245] Fifth, the court ruled that land adjacent to an organic farming operation is an inappropriate place for aerial spraying because of the nature of organic farming.[246] Finally, the court acknowledged that pesticides "are socially valuable in the control of insects, weeds and other pests," but concluded that "an equitable balancing of social interests" would require the defendant to pay for the consequences of his spraying because he stood to profit from continued application of pesticides, while plaintiffs would be eliminated from the organic food market.[247] At the end of this six-point analysis, the *Langan* court held the defendant strictly liable for the damage caused by the pesticide drift.[248]

A similar analysis of a GM contamination case could theoretically have the same result. Applying each one of the six factors, as the *Langan* court did, a court could conclude that: (1) growing GM crops involves a high degree of risk of harm because of the impossibility of eliminating the risk of genetic drift from pollen, plant seeds, and pests;[249] (2) the gravity of harm to a non-GM grower could be very damaging because of market restrictions and/or crop failure;[250] (3) the uncontrollability of genetic drift can not be entirely eliminated even after establishing recommended buffer zones and otherwise exercising reasonable care in the production of GM crops;[251] (4) although GM production may be the dominant production method in a particular area, it might not qualify as a matter of common usage because the total number of GM producers represent a minority of all farmers;[252] (5) land adjacent to an organic farm or other non-GM farm is an inappropriate place for GM crop production because of the risk of contaminating the non-GM crops;[253] and (6) despite the socially valuable goals of increasing food production and controlling insects, weeds, and other pests without applying pesticides, an "equitable balancing of social interests" would require a GM crop producer to pay the conse-

244. *See id.* (referring to same elements causing a high risk of harm).
245. *See id.* at 223.
246. *See id.*
247. *Id.*
248. *Id.*
249. *Id.* at 222 (noting "uncertain and uncontrollable factors" inherent to crop dusting).
250. *Id.* (recognizing damage caused by organic farmer losing organic certification and/or ability to market his goods).
251. *Id.* (referring to same elements causing a high risk of harm).
252. *Id.* at 223.
253. *Id.*

quences of the production activities that cause damage to neighboring farmers.[254]

VI. CONCLUSION

The possibility exists that, in the right circumstances, plaintiffs could find remedy for GMO contamination under any, or all, of the theories discussed in this Comment. Although the cases cited in this Comment addressing airborne pollution and other sources of property damage may not be directly analogous to the circumstances a court will face in an actual GMO contamination case, the same analytical factors used in these cases can be expected to arise in a future GMO case. If the plaintiffs provide sufficient evidence to satisfy each of these elements then a court could find a defendant liable for the plaintiffs' damages. The fact that this liability could arise under trespass, nuisance, negligence and/or strict liability theories, should concern both the farmers growing GM crops, and the biotech industry selling them the GM seeds.

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254. *Id.*

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