

THE HIGH ENVIRONMENTAL COST OF DYING AND WHAT IF ANYTHING CAN BE DONE ABOUT IT

*Hope M. Babcock**

INTRODUCTION	152
I. DIFFERENT TYPE OF HUMAN DISPOSAL METHODS AND THEIR ENVIRONMENTAL IMPACTS	153
II. RELIGIOUS AND CULTURAL OBLIGATIONS	159
III. MITIGATING THE ADVERSE EFFECTS OF DISPOSING OF HUMAN REMAINS ON THE ENVIRONMENT	162
IV. WAYS TO CHANGE PUBLIC ATTITUDES TOWARDS ALTERNATIVE DISPOSAL METHODS	164
CONCLUSION	168

INTRODUCTION

The disposal of human bodies, whether through burial, cremation, or cryogenics, has an environmental cost. Among these costs are withdrawing land permanently for burial of remains, the use and disposal of chemicals involved in the preservation process, greenhouse gas emissions from associated activities, water consumption and contamination, and other adverse impacts.¹ These costs are rarely talked about, perhaps because many of the disposal activities are cloaked in religious beliefs and rituals or the topic is too emotional to invite discussion. While these costs are substantially less than emissions from industrial activities or from cars, to the extent they can be avoided, they should be to reduce overall pollution loadings. This Essay discusses these and other costs, identifies the least environmentally costly method of

* Professor Hope M. Babcock teaches environmental and natural resources law at Georgetown University Law Center. She thanks Georgetown for its continuing support of her scholarship and Rachel Jorgenson, Reference Librarian at the law school, for her tireless work in locating sources for this article. She also benefited from comments made by attendees at the Southern Environmental Law Scholars Workshop where the paper was presented in preliminary form, on July 16, 2021.

¹ Not included in these environmental costs are related transportation costs and the costs of providing flowers, both of which can play a significant role in the disposal of human remains. *See, e.g.*, Erin Blakemore, *Could the Funeral of the Future Help Heal the Environment?*, SMITHSONIAN MAG. (Feb. 1, 2016), <https://www.smithsonianmag.com/science-nature/could-funeral-future-help-heal-environment-180957953/> (mentioning the environmental impact of funeral transportation); MEGAN A. STYLES, *ROSES FROM KENYA: LABOR, ENVIRONMENT, AND THE GLOBAL TRADE IN CUT FLOWERS* 5–6, 9 (2019) (discussing the environmental impact of floriculture practices and the global trade using Kenya as a case study).

disposal of human remains, proposes ways to mitigate or offset costs that cannot be avoided, and suggests how public attitudes toward alternative disposal methods might be changed. The author concludes there is no disposal method of human remains, including so-called “green burials,” that does not have at least some attendant environmental costs and that it may be difficult for people to adopt non-traditional disposal methods even though they may be less environmentally costly. But she hopes that, by identifying these costs, when given a choice, people will opt for the least environmentally costly method and be prepared to offset or mitigate those costs that are unavoidable.

The first part of the Essay discusses different types of human disposal methods, focusing principally on land burial,² cremation, freezing, or allowing human remains to decay naturally, and their environmental impacts. None is without some environmental costs. The second part identifies to what extent religious and/or social customs dictate harm-causing disposal activities and whether those customs or norms can be changed to lessen environmental costs. The third part identifies the extent to which culturally unavoidable costs can be offset or mitigated, including, where possible, the costs of restoring the quality of the environment which has been adversely affected. The fourth part identifies possible ways of changing public attitudes toward the disposal of human remains, which might make more benign but non-traditional disposal methods more acceptable, and examines the possible role of norms in achieving that result. The Essay concludes by finding there is no way of completely avoiding some of these costs, regardless of the disposal method, and that there is a low likelihood of people changing their preferences, at least in the near term. The author, therefore, suggests that the best solution for people, when given a choice, is to select the least environmentally costly method allowed by social custom and to offset the remaining environmental costs by requiring compensatory mitigation for any environmental harm caused by the disposal of human remains.³

I. DIFFERENT TYPE OF HUMAN DISPOSAL METHODS AND THEIR ENVIRONMENTAL IMPACTS

Land burial and cremation are the most common burials in the United States, with greener forms of burial rare, but growing in popularity.⁴

² The article does not discuss burial at sea or in space.

³ Since the least environmentally costly practices are incommensurable, it is difficult, even meaningless, to put them in hierarchical order.

⁴ See, e.g., NATIONAL FUNERAL DIRECTORS ASSOCIATION, 2021 NFDA CREMATION & BURIAL REPORT 11 (July 2021) [hereinafter 2021 NFDA CREMATION & BURIAL REPORT], <https://dailymontan.com/wp-content/uploads/2021/09/2021-nfda-cremation-and-burial->

Promession, a process by which a body is reduced to biodegradable liquid form, is a theoretical burial option that is still in development and not yet in use in the United States.⁵ Alkaline hydrolysis, also called aquamation, is another disposal method for human remains, although it is also not used much in this country. Aquamation uses water pressure to accelerate decomposition of soft tissues and expends less energy than cremation.⁶ Of all these disposal methods, land burials have the greatest adverse impact on the environment as discussed below,⁷ not the least of which is removing land from other uses.⁸ One way of reducing the amount of space occupied by graves is to reclaim those that are deep enough for another corpse, placing the original corpse lower in the grave to allow the later burials of additional corpses.⁹

While the comparison is awkward, cemeteries are something like landfills to the extent that they both operate as a “resting-place for organic and other material that has the potential to degrade and be transported in the subsurface.”¹⁰ It is not just a body that enters the ground.¹¹ There is also “concentrations of nutrients, trace metals, formaldehyde, microbial pathogens, contaminants of emerging concern . . . , and age-dating compounds” in the ground and groundwater that originate from cemetery

report.pdf (summarizing surveyed preferences among United States consumers); Anthony Martin, *2022 Survey Results: Americans Are Exploring New Ways to Be Buried*, CHOICE MUT. INS. AGENCY (June 16, 2022), <https://choicemutual.com/funeral-preferences/> (finding that surveyed Americans preferring natural burials rose from 4% in 2020 to 10% in 2022).

⁵ Promession was first conceptualized in Sweden but is still not available as a burial option due to controversy surrounding the technical difficulties of the process. *Promession: The Swedish Utopia for Green Burials*, WORLD FUNERAL NEWS (July 20, 2021), <https://news.wfuneralnet.com/en/promession-the-swedish-utopia-for-green-burials/>. See also Saqib Shah, *Freeze-Drying Dead Bodies Could Be the Future of Cremation*, N.Y. POST (Apr. 16, 2018), <https://nypost.com/2018/04/16/freeze-drying-dead-bodies-could-be-the-future-of-cremation/>.

⁶ Sonya Vatomsky, *Thinking About Having a ‘Green’ Funeral? Here’s What to Know*, N.Y. TIMES (Mar. 22, 2018), <https://www.nytimes.com/2018/03/22/smarter-living/green-funeral-burial-environment.html>.

⁷ See *infra* notes 10–25 and accompanying text.

⁸ Historically it has been necessary to relocate earlier cemeteries in the course of developing large cities. See, e.g., Rosalind Wallduck, *Dealing with London’s Dead: The Aftermath of the Burial Acts*, NAT. HIST. MUSEUM (May 31, 2017), <https://naturalhistorymuseum.blog/2017/05/31/dealing-with-londons-dead-the-aftermath-of-the-burial-acts-human-anthropology/>.

⁹ See John McManus, *The World Is Running Out of Burial Space*, BBC NEWS (Mar. 13, 2015), <https://www.bbc.com/news/uk-31837964>; Ashley Walsh, *A Grave Occupation*, ABC LOCAL (Oct. 19, 2008), <https://www.abc.net.au/local/stories/2008/10/16/2393105.htm> (mentioning double and triple graves in Australia).

¹⁰ ENVIRONMENT AGENCY, POTENTIAL GROUNDWATER POLLUTANTS FROM CEMETERIES 7 (Dec. 2004).

¹¹ Rachel Marten, *Grave Danger – Cemeteries as a Source of Groundwater Pollution* (Oct. 24, 2019), <https://www.groundsure.com/grave-danger-cemeteries-as-a-source-of-groundwater-pollution/>.

leachate.¹² In particular various studies conclude that the following might leach into the ground as a result of land burials: varnishes, sealers, and preservatives from coffin treatments;¹³ embalming fluids, which used to include arsenic and mercury but now use formaldehyde;¹⁴ various metals, such as lead, zinc, copper, and steel from metal coffins,¹⁵ gold in dental fillings, or non-ferrous metals like silver, platinum, palladium, and cobalt from jewelry and orthopedic materials;¹⁶ chemicals used during chemotherapy;¹⁷ and pathogenic bacteria like *Escherichia coli* (*E. coli*).¹⁸

Additionally, through burial practices, “115 million tons of casket steel, nondegradable casket hardwood equivalent to 4 million acres of forest, and 2.3 billion tons of concrete” are put into the ground,¹⁹ which also leaves little space for native plant and animal life. More so, traditional burials put “4.3 million gallons of embalming fluids, . . . [and] 17,000 tons of copper and bronze” into the ground.²⁰

Buried human remains will eventually release associated toxic chemicals into the environment. For example, there are about 800,000 gallons of formaldehyde-based²¹ embalming fluids buried in U.S. cemeteries every year.²² Embalming is not a public health safeguard. Rather, it is a “cosmetic procedure” to make the dead body look

¹² ANGELA K. BRENNAN, CARRIE E. GIVENS, JULIA G. PORKOPEC & CHRISTOPHER J. HOARD, USGS: PRELIMINARY INVESTIGATION OF GROUNDWATER QUALITY NEAR A MICHIGAN CEMETERY, 2016–17, at 20 (2018).

¹³ Alison L. Spongberg & Paul M. Becks, *Inorganic Soil Contamination from Cemetery Leachate*, 117 WATER, AIR, & SOIL POLLUTION 313, 313 (2000).

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ Alwyn Hart, *Ammonia Shadow of My Former Self: A Review of Potential Groundwater Chemical Pollution from Cemeteries*, 13 LAND CONTAMINATION & RECLAMATION 239, 241 (2005).

¹⁷ Jozef Żychowski & Tomasz Bryndal, *Impact of Cemeteries on Groundwater Contamination by Bacteria and Viruses – A Review*, 13 J. WATER & HEALTH 285, 285 (2014).

¹⁸ *Id.* at 285–86.

¹⁹ Tony Rehagen, *Green Burials Are Forcing the Funeral Industry to Rethink Death*, BLOOMBERG (Oct. 27, 2016), <https://www.bloomberg.com/features/2016-green-burial/>.

²⁰ Vatomsky, *supra* note 6.

²¹ Exposure to formaldehyde “can cause irritation of the skin, eyes, nose, and throat. High levels of exposure may cause some types of cancers.” *Facts About Formaldehyde*, EPA (Apr. 18, 2022), <https://www.epa.gov/formaldehyde/facts-about-formaldehyde>.

²² Rehagen, *supra* note 19. Notably, a 2009 study reported that funeral directors have a higher mortality from myeloid leukemia. Michael Hauptmann et al., *Mortality from Lymphohematopoietic Malignancies and Brain Cancer Among Embalmers Exposed to Formaldehyde*, 101 J. NAT'L CANCER INST. 1696, 1696 (2009). A 2015 study reported almost triple the incidence of mortality from Amyotrophic Lateral Sclerosis (Lou Gehrig's disease) in men with a high probability of occupational formaldehyde exposure than in those with no formaldehyde exposure. Andrea L. Roberts et al., *Job-related Formaldehyde Exposure and ALS Mortality in the USA*, 87 J. NEUROLOGY, NEUROSURGERY, & PSYCHIATRY 786, 786 (2015).

“natural.”²³ After burial, embalming chemicals can leach from the body into the environment.²⁴ Alternative preservation methods, such as dry ice, a temporary refrigeration unit, or a non-toxic embalming agent, can be used to preserve a body for a short period of time, avoiding the environmental costs of embalming.²⁵

Cremating human bodies also has adverse environmental impacts. Cremation is an energy-intensive process, requiring a lot of fuel, and can result in millions of tons of annual carbon dioxide emissions.²⁶ A body must be heated to between 1,400 and 1,600 degrees Fahrenheit to achieve complete incineration, leaving only bones and ash.²⁷ On average, a body takes two to three hours to cremate and to be reduced to three to ten pounds of cremains, which are then pulverized by a machine called a cremulator.²⁸ Cremation emissions are equivalent to a 500-mile car trip.²⁹ They are inclined to have a large carbon footprint, although regional regulations require that most crematoriums significantly reduced emitted pollutants.³⁰ There are also toxic releases from cremation, such as heavy metals (e.g., vaporized mercury), organic pollutants (e.g., dioxins and furans), as well as combustion gases (e.g., sulfur dioxide).³¹

The Catholic Church, traditional Judaism, and Islam prohibit or otherwise do not prefer cremation for religious reasons.³² Perhaps indicating some softening of its opposition, the Vatican released new

²³ Vatomsky, *supra* note 6.

²⁴ *Id.*

²⁵ *Id.*

²⁶ Becky Little, *The Environmental Toll of Cremating the Dead*, NAT'L GEOGRAPHIC (Nov. 5, 2019), <https://www.nationalgeographic.com/science/article/is-cremation-environmentally-friendly-heres-the-science>.

²⁷ Karen Heller, *The Stunning Rise of Cremation Reveals America's Changing Idea of Death*, WASH. POST (Apr. 19, 2022), <https://www.washingtonpost.com/lifestyle/2022/04/18/cremation-death-funeral/>.

²⁸ *Id.*; Melonyce McAfee, *I'm Burning Up*, SLATE (July 26, 2006), <https://slate.com/news-and-politics/2006/07/i-m-burning-up-how-much-will-my-ashes-weigh.html>.

²⁹ Vatomsky, *supra* note 6.

³⁰ See, e.g., Little, *supra* note 26 (noting that most crematoria in the United States have “scrubbing or filtering systems . . . that burn and neutralize pollutants like mercury emissions from dental fillings”).

³¹ On air emissions from crematoria, see generally Juliette O'Keeffe, *Crematoria Emissions and Air Quality Impacts*, NAT'L COLLABORATING CTR. FOR ENV'T HEALTH (Mar. 20, 2020), <https://nceh.ca/documents/field-inquiry/crematoria-emissions-and-air-quality-impacts>. See also EPA, LOCATING AND ESTIMATING AIR EMISSIONS FROM SOURCES OF MERCURY AND MERCURY COMPOUNDS 3–7 (1997), <https://www3.epa.gov/ttnchie1/le/mercury.pdf>.

³² Elisabetta Povoledo & Gaia Pianigiani, *Vatican Clarifies the Rules for Cremation: Bury, Don't Scatter*, N.Y. TIMES (Oct. 25, 2016), <https://www.nytimes.com/2016/10/26/world/europe/vatican-bans-scattering-of-human-ashes.html>; Elliot Salo Schoenberg, *Jewish Education and Dying*, 78 RELIGIOUS EDUC. 210, 213 (1983); A.R. Gatrad, *Muslim Customs Surrounding Death, Bereavement, Postmortem Examinations, and Organ Transplants*, 309 BMJ 521, 522 (1994).

guidelines in 2016 dictating how the ashes should be kept in a sacred place, like a church cemetery.³³

Cryopreservation, or cryonics, involves storing bodies at deep-freeze temperatures. The thought is that frozen bodies can be brought back to life at some point in the future, even centuries from now.³⁴ The major cryonics company in the United States, Alcor, however, has seen calls for its services drop during the COVID-19 pandemic, perhaps because people are choosing to engage in less risky activities which might cause death.³⁵ Cryonics is quite expensive. It costs \$200,000 to deep-freeze a body and \$80,000 to deep-freeze a neuro (i.e., brain).³⁶ The Cryonic Institute standard fee is \$28,000 with up to an additional \$60,000 if transportation and rapid standby are required.³⁷ Just as cremation has a high energy cost, cryonics requires relatively a lot of energy to deep freeze a body and to keep it frozen.³⁸

Another form of burial is aquamation, or alkaline hydrolysis (i.e., liquid cremation). When using the higher-temperature approach, a body is put in a stainless-steel vessel filled with a solution that is 95% water and 5% potassium or sodium hydroxide kept at 300 degrees Fahrenheit.³⁹ Doing this allows the body to dissolve as though it were left lying on the earth, but taking only four to six hours as opposed to the months required for natural decomposition.⁴⁰ The remaining skeleton is then ground up into a white powder, which can be given to descendants.⁴¹ It is legal in twenty six states and four Canadian provinces.⁴²

Resomation (a type of aquamation) is another alternative form of cremation that avoids many of the environmental costs of more traditional cremation or land burials.⁴³ The process uses water and a water-soluble

³³ Povoledo & Pianigiani, *supra* note 32.

³⁴ Peter Wilson, *The Cryonics Industry Would Like to Give You the Past Year, and Many More, Back*, N.Y. TIMES (June 26, 2021), <https://www.nytimes.com/2021/06/26/style/cryonics-freezing-bodies.html>.

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*

³⁸ See, e.g., Air Products PLC, *The Costs of Mechanical Ultra-Low Temperature Freezers*, NEWS-MED. (June 24, 2020), <https://www.news-medical.net/whitepaper/20200624/The-Benefits-of-Mechanical-Ultra-Low-Temperature-Freezers.aspx#> (noting that a traditional ultra-low freezer, for example, could use about “the same energy as a single-family home”).

³⁹ Lauren Oster, *Could Water Cremation Become the New American Way of Death?*, SMITHSONIAN MAG. (July 27, 2022), <https://www.smithsonianmag.com/innovation/could-water-cremation-become-the-new-american-way-of-death-180980479/>.

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² *Id.*

⁴³ Philip R. Olson, *Flush and Bone: Funeralizing Alkaline Hydrolysis in the United States*, 39 SCI., TECH., & HUM. VALUES 666, 678 (2014) (discussing the environmental benefits of less land

alkali (commonly potassium hydroxide and/or sodium hydroxide).⁴⁴ The process can include agitation and/or pressure, which requires a certain amount of energy, but its total energy needs is significantly less than traditional cremation.⁴⁵ The remains are ultimately dried and converted into powdered ash, which can then be returned to loved ones.⁴⁶ The resomation process takes about three hours.⁴⁷ In addition to the ash, the process produces a green-brown tinted liquid during the liquefaction stage. Municipalities consider the liquid to be wastewater, which can be released into a sewer system or used in gardens or green spaces.⁴⁸ The Mayo Clinic uses resomation for disposing of donor bodies, and medical schools in Florida and California also use resomation to dispose of unwanted bodies.⁴⁹ Aquamation generally is legal in twenty-one states (Alabama, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Idaho, Illinois, Kansas, Maine, Maryland, Minnesota, Missouri, Nevada, North Carolina, Oregon, Utah, Vermont, Washington, and Wyoming).⁵⁰

The dominant alternative approach to the various ways of disposing of dead bodies discussed above is green burial.⁵¹ Green burials are becoming more popular. In 2018, approximately 54% of Americans considered a green burial, and 72% of cemeteries reported an increased demand for green burials that same year.⁵² A green burial site is usually placed within woodlands, fields, or meadows, eliminating the need for landscaping and fertilizers.⁵³ Eco-friendly biodegradable materials (e.g., cotton shrouds, linen, wicker, or cardboard) are used in place of coffins and concrete vaults.⁵⁴ Alternatively, green burials usually involve coffins

use for cemeteries and requiring less energy than cremation). For a more general description of resomation, see *The Struggle Is Real: Legal Challenges to Modern Disposition of Human Remains*, FUNERAL L. LADY (July 12, 2017), <https://funerallawlady.wordpress.com/2017/07/12/the-struggle-is-real-legal-challenges-to-modern-disposition-of-human-remains/>.

⁴⁴ Olson, *supra* note 43, at 667.

⁴⁵ *Id.* at 678 (noting that “the process uses 90 percent less energy, and results in over 75 percent less carbon output than incineration”).

⁴⁶ *Id.* at 668.

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ Irene Klotz, ‘Resomation:’ *Dissolving Body for Eco-Friendly Burial*, ABC NEWS (Sept. 6, 2011), <https://abcnews.go.com/Technology/resomation-green-alternative-cremation-burial-funeral-offered-florida/story?id=14457825>.

⁵⁰ Andrew McGee, *Where Is Aquamation Legal? Which States Have Legalized Aquamation or Bio Cremation?*, U.S. FUNERALS ONLINE (Nov. 19, 2021), <https://www.us-funerals.com/where-is-aquamation-legal-which-states-have-legalized-aquamation-or-bio-cremation/#.YwVPw-zMLjZ>.

⁵¹ Vatomsky, *supra* note 6.

⁵² *Id.*

⁵³ A GREENER FUNERAL 10 (Aug. 2015), https://www.agreenerfuneral.org/wp-content/uploads/2016/03/2015_AGF_Brochure-1.pdf.

⁵⁴ Vatomsky, *supra* note 6.

made with sustainably harvested wood and organic liners.⁵⁵ These materials allow the corpse and its housing to deteriorate more rapidly and decomposition products to return to the soil naturally, protecting the natural habitat.⁵⁶ Green burials use products that have not been transported over long distances.⁵⁷ There is no traditional embalming in a green burial, but there are some biodegradable embalming fluids.⁵⁸

The primary environmental impact of a green burial is land based. Unlike more traditional land burial practices or cremation, green burial is eco-friendly and “has the potential to create the multifunctional green spaces that community planners often struggle to realize.”⁵⁹ For example, by maintaining the natural landscape and using biodegradable options, trees around the area where the body is disposed can readily absorb water and seepage, which will reduce the amount of leachate that might otherwise disperse in the ground or even reach groundwater.⁶⁰ By having safer land, green burials permit communities to repurpose burial areas in ways that restores natural habitats or create public land spaces.⁶¹ Additionally, and in green burial’s favor, there are no releases of chemicals from the process, as none are used, and energy uses from a green burial are minor to non-existent.⁶²

II. RELIGIOUS AND CULTURAL OBLIGATIONS

This part describes and discusses to what extent religious beliefs and customs or social norms⁶³ dictate burial rituals, making it difficult to

⁵⁵ Lee Webster, *What Every Funeral Director Needs to Know About Green Funerals: A Handbook for Funeral Directors*, GREEN BURIAL COUNCIL, https://www.greenburialcouncil.org/green_burial_handbook_funeral_directors.html (last visited Aug. 3, 2022).

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Greener Embalming*, A GREENER FUNERAL, <http://www.agreenerfuneral.org/greener-funerals/embalming/greener-embalming/> (last visited July 31, 2022) (noting that the formaldehyde-free, biodegradable embalming fluids or dry ice adequately preserve a dead body for several weeks).

⁵⁹ Christopher Coutts et al., *Natural Burial as a Land Conservation Tool in the US*, 178 LANDSCAPE & URB. PLAN. 130, 130 (2018).

⁶⁰ See, e.g., Kartik Venkatraman & Nanjappa Ashwath, *Phytocapping: An Alternative Technique to Reduce Leachate and Methane Generation from Municipal Landfills*, 27 ENVIRONMENTALIST 155, 155 (2007) (arguing that “trees act as ‘bio-pump and filters’”). For a discussion on potential cemetery leachate, see *supra* notes 10–24 and accompanying text.

⁶¹ Coutts et al., *supra* note 59, at 133–36.

⁶² See *id.* at 136 (“[Natural burial] forgoes excessive resource consumption”); Vatonsky, *supra* note 6.

⁶³ Michael P. Vandenbergh & Kaitlin T. Raimi, *Climate Change: Leveraging Legacy*, 42 ECOLOGY L.Q. 139, 146 (stating that social norms are “informal obligations that are enforced externally through social sanctions or rewards”).

change them even if they are environmentally harmful. Some of these customs and rituals lessen the adverse environmental impact of disposing of bodies. The principal focus of this part is on Christian burials. Jewish and Muslim customs are examined only to the extent that they differ from traditional Christian burial customs.

Christians typically dispose of a deceased individual by burying them in consecrated ground.⁶⁴ Funerals typically take place a week after someone has died.⁶⁵ Embalming is generally allowed, and commonly practiced by Christians in the United States.⁶⁶ Funerals are usually held in church or other, already approved sacred areas.⁶⁷ Cremation was once forbidden because it interfered with the resurrection of the soul.⁶⁸ It is now allowed; however, Catholic tradition calls for burial of cremated remains and generally forbids scattering ashes.⁶⁹

In the Jewish religion, burial must take place as soon after death as possible.⁷⁰ Before burial, a Jewish body is washed (cleaned of dirt, bodily fluids, solids, and anything on the skin), bleeding is stopped, blood is buried with the deceased, and jewelry is removed.⁷¹ Sharing elements of a green burial, if there is a casket, all its linings and embellishments are removed, a winding sheet for wrapping the body is laid in the casket, the body is placed in the casket wrapped in a prayer shawl and sheet, soil from Israel, if available, is placed on various parts of the body, and the casket is closed.⁷²

Jewish caskets are simple and generally made of unfinished wood so the body can return to dust quickly—strictly observant caskets have no metal, and wooden parts of the casket are joined by wood dowels.⁷³ Small

⁶⁴ See Povoledo & Pianigiani, *supra* note 32 (summarizing the Vatican's stance on burial practices, and that it is best to bury an individual in the ground, whether cremated or not).

⁶⁵ *Christian Death and Burial*, BBC (June 23, 2009), <https://www.bbc.co.uk/religion/religions/christianity/ritesrituals/funerals.shtml>.

⁶⁶ Candi K. Cann, *Buying an Afterlife: Mapping the Social Impact of Religious Beliefs Through Consumer Death Goods*, 8 RELIGIONS 167, 171 (2017).

⁶⁷ *Christian Death and Burial*, *supra* note 65; Povoledo & Pianigiani, *supra* note 32.

⁶⁸ Povoledo & Pianigiani, *supra* note 32; Frances Knight, *Cremation and Christianity: English Anglican and Roman Catholic Attitudes to Cremation Since 1885*, 23 MORTALITY 301, 302, 306 (2018) (noting that the Vatican moved away from banning the practice in 1963).

⁶⁹ Knight, *supra* note 68, at 302, 315, 317 n.24; Povoledo & Pianigiani, *supra* note 32.

⁷⁰ Schoenberg, *supra* note 32, at 212.

⁷¹ *Id.*; PARK SLOPE JEWISH CENTER HEVRA KADISHA, *TAHARA MANUAL* 7 (2d ed. 2009).

⁷² *Jewish Burial Practices*, PBS (Feb. 6, 2004), <https://www.pbs.org/wnet/religionandethics/2004/02/06/february-6-2004-jewish-burial-practices/1794/>; Zalman Goldstein, *The Taharah: Preparing the Body for Burial*, CHABAD [hereinafter *The Taharah*], https://www.chabad.org/library/article_cdo/aid/367843/jewish/The-Taharah.htm (last visited Aug. 23, 2022).

⁷³ Schoenberg, *supra* note 32, at 212; *The Taharah*, *supra* note 72.

stones are placed on the grave, instead of flowers.⁷⁴ There is no embalming or cremation in traditional Jewish funerals.⁷⁵

Islam encourages burial.⁷⁶ In fact, burying the dead is “a communal obligation.”⁷⁷ There are many specific rules for burying a dead Muslim. For example, the body must be placed on its right side if in the hospital or turned toward the direction of prayer (qibla/Mecca).⁷⁸ To prevent the body from any tampering and to conceal any decomposition odor, the body must be buried in a pit.⁷⁹ The grave’s floor can be sand or clay.⁸⁰ According to Muslim tradition, casket burials are disfavored but allowed for “necessity,” such as if required for assimilation reasons, and more than one person can be buried in the same grave as long as they are not comingled with individuals of other faiths.⁸¹

None of these traditions or religious requirements compel the use of environmentally harmful disposal methods. In fact, some disfavor harmful practices like cremation and embalming, and some lessen land consumption. But still, traditions like embalming or cremating human remains are hard to abandon, especially as the adverse effects will be felt in the future and not by the present generation. Thus, anyone seeking to change adverse behavior must convince the present generation “to sacrifice immediate gratification for later rewards not only for themselves, but also for other people, most of whom are not born yet.”⁸²

⁷⁴ David Wolpe, *Why Jews Put Stones on Graves*, MY JEWISH LEARNING, <https://www.myjewishlearning.com/article/putting-stones-on-jewish-graves/> (last visited Aug. 23, 2022); Schoenberg, *supra* note 32, at 213.

⁷⁵ Schoenberg, *supra* note 32, at 212–13.

⁷⁶ Gatrad, *supra* note 32, at 522.

⁷⁷ *What Is the Appropriate Manner of Burial According to Islamic Law?*, DAR AL-IFTA AL-MISSRIYYAH [hereinafter *What Is the Appropriate Manner*], <https://www.dar-alifta.org/Foreign/ViewFatwa.aspx?ID=8094> (last visited Jul. 31, 2022) (stating that if only some members of the community help bury the dead, the act is sufficient to fulfill any obligation to the dead, and the sin and responsibility are “lifted from the rest”). See also Gerdien Jonker, *The Knife’s Edge: Muslim Burial in the Diaspora*, 1 MORTALITY 27, 36 (1996) (“[T]he obligation to bury[] can also be fulfilled collectively. However, if an obligation [in the Qur’an] is not fulfilled or a prohibition neglected, severe punishments await the whole community, either in this life or in the next.”).

⁷⁸ Gatrad, *supra* note 32, at 521–22.

⁷⁹ *What Is the Appropriate Manner*, *supra* note 77.

⁸⁰ *Id.*

⁸¹ *Burying the Dead in Separate Coffins in the Same Pit*, DAR AL-IFTA AL-MISSRIYYAH, <https://www.dar-alifta.org/Foreign/ViewFatwa.aspx?ID=7314> (last visited Jul. 31, 2022) (noting that in the case of mass burials, Muslim tradition holds that the one who knows the Qur’an best should “enter” the grave first).

⁸² Vandenberg & Raimi, *supra* note 63, at 145.

III. MITIGATING THE ADVERSE EFFECTS OF DISPOSING OF HUMAN REMAINS ON THE ENVIRONMENT

Since it is not possible to avoid all costs to the environment when a dead human body is disposed of, sound environmental practices require the use of the least harmful disposal methods and offsetting or compensating for the remaining unavoidable harms. The concept of compensating for the environmental harm, or protecting an equivalent amount of the harmed resources, is a form of mitigation that is widely used in environmental law.⁸³ The least environmentally harmful disposal method is green burial, which, although it consumes some amount of land, does not involve the release of toxic materials into the environment, especially if a degradable coffin containing no toxic materials or a non-treated burial shroud is used. In contrast, the most environmentally harmful disposal technique is burying an embalmed body in a cemetery with the possibility of the release of toxic materials from the body or coffin and the withdrawal of land from use.⁸⁴ As the prior section shows, this is the approach employed by most Christian sects for disposing of deceased human beings. Jewish and Muslim adherents employ only some of these techniques, avoiding the environmentally worst of them.⁸⁵

Some of the unavoidable adverse environmental impacts of disposing of human remains might be mitigated by requiring minimization of unavoidable harm or offset by protecting equivalent resources and/or by setting up a conservation fund to acquire and protect equivalent resources in perpetuity.⁸⁶ The use of conservation easements as part of mitigation not only protects resources covered by the easement but also leaves a legacy for future generations.⁸⁷

An example of minimization is stacking bodies in a single grave, as is done in some European countries, to limit the land needed for burials.⁸⁸

⁸³ See 40 C.F.R. § 1508.20(b), (e) (2002) (describing ways to mitigate environmental harm by minimizing adverse impacts or by compensating for adverse impacts by “replacing or providing substitute resources or environments”).

⁸⁴ See discussion *supra* Part I.

⁸⁵ See discussion *supra* Part II.

⁸⁶ The concept of mitigation used here is drawn from regulations of the Council on Environmental Quality (“CEQ”). 40 C.F.R. § 1508.20 (2002) (CEQ defines the term “mitigation” as: “(a) avoiding impacts by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying impacts by repairing, rehabilitating or restoring the affected environment; (d) reducing or eliminating impacts over time by preservation and maintenance operations during the life of the action; and (e) compensating for impacts by replacing or providing substitute resources or environments”).

⁸⁷ Vatomsky, *supra* note 6.

⁸⁸ Zaria Gorvett, *The Buildings Designed to House the Dead*, BBC FUTURE (Nov. 28, 2017), <https://www.bbc.com/future/article/20171127-the-buildings-designed-to-house-the-dead> (describing both historical and modern approaches to stacking graves to minimize space usage).

Another example is a type of “time-share” cemetery plots, again limiting the amount of land that can be devoted to the burial of human remains.⁸⁹ To limit the adverse impacts of cremation on air quality and energy costs, mass cremations might be encouraged where relatives would find sufficient comfort in knowing that the ash contains connection to the deceased individual, even if the ashes are indistinguishable.⁹⁰

There are also ways of preserving bodies without using chemicals. For example, there is a mushroom burial suit in which mushrooms spores line special pajamas.⁹¹ The mushrooms absorb and purify toxins in a process called mycoremediation.⁹² Once human tissue is broken down, the mushrooms transfer nutrients from the body to an intricate network of fungi in the soil, where the nutrients are passed on to trees or other vegetation.⁹³ Alternatively, aquamation is another greener option, as it emits 80% of the carbon dioxide that is released during a traditional cremation.⁹⁴

People can donate their bodies to body farms, where bodies are used to study criminal science and thanatology, the study of death, enabling important discoveries like the “microbial clock,” which can help determine the precise time and cause of death.⁹⁵ Where usable burial grounds are scarce, some societies, like Tibet, put bodies in charnel grounds where vultures consume the flesh.⁹⁶ Then, there are burials at

⁸⁹ See Kaushik Patowary, *The Rise of Vertical Cemeteries*, AMUSING PLANET (Nov. 29, 2017), <https://www.amusingplanet.com/2017/11/the-rise-of-vertical-cemeteries.html> (citing as an example the Memorial Necrópole Ecumênica in Santos, Brazil, which in 2017 had space for the remains of 25,000 people; once a body has decomposed, usually within three years, the body can be exhumed or transferred to the ossuary).

⁹⁰ See, e.g., *India Coronavirus: Round-the-Clock Mass Cremations*, BBC NEWS (April 28, 2021), <https://www.bbc.com/news/in-pictures-56913348> (describing how in India, mass cremations were a common response to the high death rate from COVID-19).

⁹¹ Katie Zejdlik & Sarah E. Burke, *The Evolution of American Perspectives Concerning Treatment of the Dead and the Role of Human Decomposition Facilities*, in *EVOLUTIONARY PERSPECTIVES ON DEATH* 177, 188–89 (Todd K. Shackelford & Virgil Zeigler-Hill eds., 2019); William Ralston, *Your Final Resting Place Could Be a Coffin Made of Mushrooms*, WIRED (July 26, 2022), <https://www.wired.com/story/mycelium-coffins-loop/> (describing mycoremediation).

⁹² Zejdlik & Burke, *supra* note 91, at 189.

⁹³ *Id.* at 188–89.

⁹⁴ Devin Powell, *Dissolve the Dead? Controversy Swirls Around Liquid Cremation*, SCI. AM. (Sept. 7, 2017), <https://www.scientificamerican.com/article/dissolve-the-dead-controversy-swirls-around-liquid-cremation/>.

⁹⁵ Carolyn Beans, *Can Microbes Keep Time for Forensic Investigators?*, 115 PNAS 3, 3 (2018), <https://www.pnas.org/doi/10.1073/pnas.1718156114>.

⁹⁶ Julia Brown, *Five Death Rituals to Give You a New View on Funerals*, NEW SCIENTIST (Nov. 8, 2017), <https://www.newscientist.com/article/2152283-five-death-rituals-to-give-you-a-new-view-on-funerals/>.

sea,⁹⁷ as well as re-composting bodies, where remains are turned into compost after a few weeks and returned to the earth.⁹⁸

While the approaches mentioned above reduce the environmental impacts of disposing of human remains, none eliminates them entirely. Some solve the problem by finding a positive use for the remains, like a body farm, while others turn the remains into a useful product, like compost. But the acceptability of these non-traditional approaches, even given their social benefits, is another matter entirely and may prevent their widespread use. The next part addresses that problem.

IV. WAYS TO CHANGE PUBLIC ATTITUDES TOWARDS ALTERNATIVE DISPOSAL METHODS

One way of improving the acceptability of these approaches is to make avoidance of environmental harms from the disposal of human remains a social norm.⁹⁹ Social norms have the capacity to influence a wide range of human behavior.¹⁰⁰ When a specific personal norm, like avoiding environmental harm, is activated, an individual may feel an obligation to act consistently with its tenets.¹⁰¹ Failure to do so may lead to feelings of guilt.¹⁰² The problem here is connecting a specific norm about disposing of human remains to the general social norm of good environmental behavior—there is currently no connection, and, therefore, no social pressure to conform to its dictates. Alternatively, personal norms, what Michael Vandenbergh, Professor of Law at Vanderbilt University, defines as “obligations that are enforced through an internalized sense of duty to act and guilt or related emotions for failure to act,”¹⁰³ are

⁹⁷ See, e.g., 40 C.F.R. § 229.1 (describing general regulatory requirements for burials at sea).

⁹⁸ Zejdlík & Burke, *supra* note 91, at 189. See also Brendan Kiley, *Recompose, the First Human Composting Funeral Home in the U.S., Is Now Open for Business*, SEATTLE TIMES (Jan. 22, 2021) <https://www.seattletimes.com/life/recompose-the-first-human-compositing-funeral-home-in-the-u-s-is-now-open-for-business/>.

Farmers have composted livestock for decades. COMPOSTING LIVESTOCK 2017: LIVESTOCK MORTALITY COMPOSTING PROTOCOL, USDA 1 (Aug. 15, 2017), https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/livestock-mortality-compost-sop.pdf.

⁹⁹ On the role of norms influencing behavior, see generally Hope M. Babcock, *Assuming Personal Responsibility for Improving the Environment: Moving Toward a New Environmental Norm*, 33 HARV. ENV'T L. REV. 117 (2009).

¹⁰⁰ Vandenbergh & Raimi, *supra* note 63, at 146. See also Babcock, *supra* note 99, at 134–42 (discussing the formation and enforcement of norms, and the role norms play to influence behavior).

¹⁰¹ Babcock, *supra* note 99, at 139.

¹⁰² *Id.*

¹⁰³ Vandenbergh & Raimi, *supra* note 63, at 147.

widespread and can influence individual behavior affecting the environment.¹⁰⁴

But currently, there are no social, personal, or religious norms on minimizing the environmental impact of disposing of human remains. Therefore, a new norm needs to emerge that encourages environmentally beneficial disposal of human remains or at least discourages disposal methods that are environmentally harmful. To the extent that the new norms about the disposal of human remains would require abandoning preconceived ideas of how this should be done, their emergence will be difficult.¹⁰⁵ A new norm may emerge when a critical mass of individuals “with moral suasion” or who are considered important to achieving the new norm’s goals agree with it, creating an impression of broad acceptance of the new norm.¹⁰⁶ Key to norms influencing behavior is the availability of information about the problem and a solution to it.¹⁰⁷ The problem here is that this information is not widely available and interested parties must make an effort to learn about the problem and solutions to it, at least to the extent of doing a Google search.

“[N]orms that are clear and sufficiently specific so people know how to behave are more likely to be internalized, and, therefore, to change behavior[, than] norms that make ‘universalistic’ claims about what is good for a lot of people, and that are consistent with ‘existing normative frameworks’”¹⁰⁸ Clearer norms require norm leaders to construct “linkages” between norms that are more established: current good well-known environmental practices, in addition to those that might emerge, and connecting those practices to the disposal of human remains.¹⁰⁹ As none of this has happened yet, the creation of universal norms about disposing of human remains in environmentally positive or benign ways is a long way off. It takes time for a new norm to emerge, let alone for it to be broadly accepted, and then to be internalized.¹¹⁰ Regardless, creating new norms still might be the best prospect to changing current negative burial practices.

Additionally, making the desired behavior easy to do might help with its adoption.¹¹¹ Unfortunately, each of the new practices requires some

¹⁰⁴ *Id.*

¹⁰⁵ See Babcock, *supra* note 99, at 143–45 (discussing the emergence of new norms and noting that sometimes “external prodding” is required).

¹⁰⁶ *Id.* at 143.

¹⁰⁷ See, e.g., Vandenberg & Raimi, *supra* note 63, at 146.

¹⁰⁸ Babcock, *supra* note 99, at 144.

¹⁰⁹ *Id.*

¹¹⁰ *Id.* at 143–45 (noting the need for repeated behavior and habit to achieve a norm’s internalization by affected individuals).

¹¹¹ Ann E. Carlson, *Recycling Norms*, 89 CAL. L. REV. 1231, 1232 (2001).

effort to adopt—more effort than engaging in a traditional burial or cremation. It also requires the abandonment of previous beliefs and practices, which can be difficult and usually takes time,¹¹² especially if those beliefs and practices are deeply rooted in religious traditions.¹¹³ But, if prior negative behavior can be changed, there can be a “‘cascade’ or ‘bandwagon’ effect” as the new norm encouraging that behavior takes hold over the old behaviors.¹¹⁴

Although not as severe as the generational gap regarding climate change making it difficult to impose obligations on the current generation that will benefit distant generations, there can still be a time gap that blurs any sense of inter-generational obligations. Thus, to the extent that the opinion of others is important for enforcing norms, there needs to be information available in the future about how individuals are behaving in the present.¹¹⁵ Specifically, to the extent that people are concerned about how their behavior will be remembered, even after death, information about that behavior must be available to future generations.¹¹⁶ According to Professor Vandenberg, “an initiative that provides a mechanism to make an individual’s norm-relevant behaviors accessible to future generations could invoke a desire for a positive posthumous reputation.”¹¹⁷ He recommends the creation of a “registry system” with respect to climate harming or climate benefiting behaviors.¹¹⁸

The same might work here. The possibility of some public record of an individual’s behavior with respect to their decisions about the disposal of human remains could play into their reputational concerns for themselves and their children.¹¹⁹ Having such a record also inhibits the tendency of people to engage “in strategic ignorance—the tendency to ignore (or not seek out) information about the negative consequences of their actions.”¹²⁰ To the extent that organizations involved in disposing of human remains keep records of their actions, it would merely be a matter of recording that information in a single registry. The key feature

¹¹² Babcock, *supra* note 99, at 143.

¹¹³ *Id.* at 130 (discussing the difficulties “when complying with . . . a norm requires the abandonment of ingrained personal habits”). See also 2021 NFDA CREMATION & BURIAL REPORT, *supra* note 4, at 4 (reporting that in 2021, 47.3% of surveyed Americans felt that maintaining the religious traditions of a funeral is very important; this may be unlikely to change).

¹¹⁴ Babcock, *supra* note 99, at 145.

¹¹⁵ Vandenberg & Raimi, *supra* note 63, at 148.

¹¹⁶ Professor Vandenberg calls these “legacy concerns.” *Id.* at 139, 148 (noting that a social norm may be strengthened to the extent one’s children may suffer future social sanctions; in most cases, individuals want to leave a positive legacy).

¹¹⁷ *Id.* at 151.

¹¹⁸ *Id.*

¹¹⁹ *Id.* at 152.

¹²⁰ *Id.* at 155.

of such a registry is that it can “create an expectation in a large number of individuals that their actions and beliefs today will be known to future generations”¹²¹ The existence of a registry system that perpetuates information about how people dispose of human remains will also provide information that will allow the use of sanctions for bad or environmentally insensitive behavior, or the use of shame by norm leaders to encourage good behavior.¹²²

Simply providing information about the negative environmental consequences of some disposal techniques and educating the public about more benign alternatives via a registry system may be sufficient to motivate some people to adopt the latter, but it is unlikely. Beyond engrained individual behavior patterns that make it difficult to change bad environmental behavior attributed to personal beliefs,¹²³ it also does not help that pollution contributions from harmful human disposal actions are exceedingly small when compared to industrial pollution contributions and that there is almost no tangible benefit from doing the right thing or personal adverse consequences from behaving badly.¹²⁴ This fact may contribute to resistance to any change because the effect of doing or not doing something will not be visible to individuals whose opinions may be important to the potential actor.¹²⁵ And the disposal of human remains in an environmentally harmful way probably does not create a situation where shaming or sanctioning bad behavior as a means of inducing good behavior could be effective.¹²⁶

To result in “durable” behavior change in response to information, it helps if the “cognitive involvement is high, arguments are strong, sources are credible, topics are relevant, message is clear, distractions are few, and comparisons are favorable.”¹²⁷ Not only are few of these elements met in this situation but there is also the risk of “green fatigue”¹²⁸ or information overload and the resulting “marginalization of information about environmental harm.”¹²⁹ This consequence is particularly likely

¹²¹ *Id.* at 163. Professor Vandenberg admits that there is the risk of what he calls “moral licensing,” in which people feel freer to follow environmentally good behavior with bad behavior. *Id.* at 169. He is confident that the pressure created by a public registry will limit that risk. *Id.*

¹²² See generally Babcock, *supra* note 99, at 155–65.

¹²³ *Id.* at 130.

¹²⁴ *Id.*

¹²⁵ *Id.* at 130–31.

¹²⁶ See *id.* at 155–65 (noting that the use of shame and/or sanctions to encourage good behavior alone is insufficient, but “[r]ather, a combination of approaches may be necessary”).

¹²⁷ *Id.* at 168 (quoting Martha Monroe, *Two Avenues for Encouraging Conservation Behaviors*, 10 HUM. ECOLOGY REV. 113, 119 (2003)).

¹²⁸ *Id.* at 169 (quoting Alex Williams, *That Buzz in Your Ear May Be Green Noise*, N.Y. TIMES (June 15, 2008), <https://www.nytimes.com/2008/06/15/fashion/15green.html?>).

¹²⁹ *Id.*

here where the principal activity, disposing of human remains, seems unrelated to the environment, and the environment, in turn, seems an unnecessary added complexity to an already fraught topic.

Although the creation of a norm encouraging environmentally benign disposal methods for human remains could reduce the use of harmful methods—perhaps through Professor Vandenberg’s recommended registry system—the circumstances are not such that this is likely to occur. Even if such a norm were to arise, its enforcement would be difficult because there are no sanctions punishing deviant behavior and no basis to believe that shame as an enforcement tool would be effective. However, if a social norm exists or can emerge that recognizes the importance of reducing the environmental harms from disposing of human remains more broadly, then people may be willing to compensate monetarily for those harms or to protect an equivalent amount of the harmed resource to offset adverse impacts from continuing traditional burial practices.¹³⁰ To the extent that there are any relevant personal norms, which are “enforced through an internalized sense of duty to act and guilt . . . for fail[ing] to act,” those norms may be even more effective at eliciting compensation.¹³¹

CONCLUSION

The goal of this Essay has been to give some content to its title—the high environmental cost of dying—and to point out ways some of those costs can be minimized or even avoided. The hope is that people armed with this knowledge may be as self-aware about their death as they are about their life. The Essay acknowledges that changing the traditions which are at issue here, especially those that are based on social norms and have a long provenance, is difficult. The Essay, therefore, proposes mitigating the environmental costs, which are unavoidable, by reducing their severity through less environmentally costly burial practices or by compensating for the resulting harm from traditional burial techniques. Still, the biggest barrier to eliminating the problem will be more general recognition of it than at present by society and then a willingness to assume responsibility for the problem and correct it.

¹³⁰ See, e.g., Vandenberg & Raimi, *supra* note 63, at 146. See also 40 C.F.R. § 1508.20(e) (2002).

¹³¹ Vandenberg & Raimi, *supra* note 63, at 147.