

## GLOSSARY

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| **ACCREDITATION** | A rigorous assessment conducted by an independent science-based organization to assure the overall capability and competency of a laboratory and its quality management systems. |
| **ACTIVE COMPOST** | Compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50˚ Celsius (122˚ Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake. |
| **ADEQUATE / ADEQUATELY** | That which is needed to accomplish the intended purpose in keeping with good public health practice. |
| **ADJACENT / NEARBY LAND** | Land within a proximity that could potentially affect safe production of leafy greens. |
| **AERATED STATIC PILE** | Composting process where active ingredients are covered with an insulating material and air is forced through the product. The product is maintained at a minimum of 131 degrees Fahrenheit for 3 days. |
| **AERIAL APPLICATION** | Any application administered from above leafy greens where water may come in contact with the edible portion of the crop; may be delivered via aircraft, sprayer, sprinkler, etc. |
| **AEROSOLIZED** | The dispersion or discharge of a substance under pressure that generates a suspension of fine particles in air or other gas. |
| **AGRICULTURAL /** **COMPOST TEA** | A water extract of biological materials (such as compost, manure, non-fecal animal byproducts, peat moss, pre-consumer vegetative waste, table waste, or yard trimmings), excluding any form of human waste, produced to transfer microbial biomass, fine particulate organic matter, and soluble chemical components into an aqueous phase. Agricultural / Compost teas are held for longer than one hour before application and are considered non-synthetic crop inputs for the purposes of this document. |
| **AGRICULTURAL MATERIAL** | *Agricultural Material* means waste material of plant or animal origin, which results directly from the conduct of agriculture, animal husbandry, horticulture, aquaculture, silviculture, vermiculture, viticulture and similar activities undertaken for the production of food or fiber for human or animal consumption or use, which is separated at the point of generation, and which contains no other solid waste. With the exception of grape pomace or material generated during nut or grain hulling, shelling, and processing, agricultural material has not been processed except at its point of generation and has not been processed in a way that alters its essential character as a waste resulting from the production of food or fiber for human or animal consumption or use. Agricultural material includes, but is not limited to, manures, orchard and vineyard prunings, grape pomace, and crop residues. |
| **AGRICULTURAL TAILWATER** | Excess run off water which is generated and collected during the process of irrigation. |
| **AGRICULTURAL WATER** | Water used in activities covered in these guidelines where water is intended to, or is likely to, contact lettuce/leafy greens or food-contact surfaces, including water used in growing activities (including all irrigation water and water used for preparing crop sprays) and in harvesting, packing, and holding activities (including water used for washing or cooling harvested lettuce/leafy greens and water used for preventing dehydration of lettuce/leafy greens). |
| **AGRICULTURAL WATER SYSTEM** | Each distinct, separate combination of water source, conveyance, storage used to carry water from its primary source to its point of use; includes wells, irrigation canals, pumps, valves, storage tanks, reservoirs, meters, pipes, fittings, and sprinklers. |
| **AGRICULTURAL WATER TREATMENT SYSTEM** | An add-on to an agricultural water system that improves the quality (safety) of the water to make it more acceptable for a specific end- use. The agricultural water treatment system may treat multiple ranches, water sources or batches of water as defined by the water system description. |
| **ANCILLARY EQUIPMENT** | Temporary storage equipment for fertilizers such as third-party storage tanks, pony tanks, etc. |
| **ANIMAL****BY-PRODUCT/PRODUCT** | Parts of an animal including organ meat, nervous tissue, cartilage, bone, blood, feathers, and excrement. This also include worm castings, guano, and other animal-based products and excrements. |
| **ANIMAL FEED OPERATION (AFO)** | Animal Feeding Operation (AFO)- are agricultural operations where animals are kept and raised in confined situations. An AFO is a lot or facility (other than an aquatic animal production facility) where the following conditions are met: \*animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and\*crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.Less than 1,000 animal units does not meet the requirements of a CAFO. |
| **ANIMAL HAZARD** | Feeding, skin, feathers, fecal matter, or signs of animal presence in an area to be harvested in sufficient number and quantity to suggest to a reasonable person the crop may be contaminated. |
| **ANIMAL UNIT** | There are three approaches to defining an animal unit: cow-calf unit, 1,000 pounds of live weight of any species, and on an energy basis. |
| **ANTIMICROBIAL WATER TREATMENT** | A physical, energetic, or chemical agent, applied alone, in combination, or as a sequential process, to achieve and maintain a defined microbiological water quality standard. |
| **ADENOSINE TRI-PHOSPHATE (ATP)** | A high-energy phosphate molecule required to provide energy for cellular function. |
| **APPLICATION INTERVAL** | Means the time between application of an agricultural input (such as a soil amendment) to a growing area and harvest of leafy greens from the growing area where the agricultural input was applied. |
| **ATP TEST METHODS** | Exploits knowledge of the concentration of ATP as related to viable biomass or metabolic activity; provides an estimate of cleanliness. |
| **BIOFERTILIZERS** | Fertilizer materials/products that contain microorganisms such as bacteria, fungi, and cyanobacteria that shall promote soil biological activities. |
| **BIOLOGICALS** | Biologicals are products that contain beneficial, naturally occurring microorganisms or microbial derivatives as active ingredients. |
| **BIORATIONALS** | Biorationals are non-synthetic input materials in agriculture that are derived from natural sources such as microorganisms, biochemicals, minerals, organic materials, and plant extracts |
| **BIOSOLIDS** | Solid, semisolid, or liquid residues generated during primary, secondary, or advanced treatment of domestic sanitary sewage through one or more controlled processes.**Class A:** Class A biosolids undergo a “Process to Further Reduce Pathogens (PFRP).” Pathogens are reduced to a level similar to the native soil and environment. Class A biosolids products can be used on hand golf courses, and other places where public contact is likely. Class A biosolids products include composted biosolids, lime pasteurized biosolids, and fertilizer pellets. Class A biosolids products are soil amendments, potting soils, and slow-release fertilizers.**Class B:** Class B biosolids undergo a “Process to Significantly Reduce Pathogens (PSRP).” This means that while pathogens are significantly reduced to levels which are often below those found in animal manure, management practices (BMPs) are required at the site where they are used. Class B biosolids are used in bulk as fertilizers in agriculture and forestry and to reclaim barren lands. Site permits are required. |
| **BLUE VALVE** | Pipes which are used as a closed conveyance system for moving agricultural surface water from water source to irrigation systems or reservoirs for agricultural use. |
| **BREAKPOINT** | The point at which the disinfection demand has been met. |
| **BUILDINGS** | Any fully or partially enclosed building on the farm that is used for storing of food-contact surfaces and packaging materials, including minimal structures that have a roof but no walls. |
| **CARBOHYDRATE** | Ingredient for soil amendments and crop inputs that could improve growth of bacteria. |
| **CLOSED DELIVERY SYSTEM** | A water storage or conveyance system which is fully enclosed and protected such that water is not exposed to the environment from the water source to the point of use. |
| **COLONY FORMING UNITS (CFU)** | Viable microorganisms (bacteria, yeasts & mold) either consisting of single cells or groups of cells, capable of growth under the prescribed conditions (medium, atmosphere, time and temperature) to develop into visible colonies (colony forming units) which are counted. |
| **COLIFORMS** | Gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose to gas. They are frequently used as indicators of process control but exist broadly in nature. |
| **CO-MANAGEMENT** | An approach to conserving soil, water, air, wildlife, and other natural resources while simultaneously minimizing microbiological hazards associated with food production. |
| **COMPOST/MATURE COMPOST** | C*ompost* is the product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. The product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds and stabilizes the carbon such that it is beneficial to plant growth. Compost is typically used as a soil amendment but may also contribute plant nutrients. |
| **COMPOST FEEDSTOCK** | “Feedstock” means any compostable material used in the production of compost or chipped and ground material including, but not limited to, agricultural material, green material, vegetative food material, food material, biosolids, digestate, and mixed material. Feedstocks shall not be considered as either additives or amendments. |
| **COMPOSTING** | Means a process to produce compost in which organic material is decomposed by the actions of microorganisms under thermophilic conditions for a designated time period (for example, 3 days) at a designated temperature (for example, 131 °F (55 °C)), followed by a curing stage under cooler conditions. |
| **CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)** | A lot or facility where animals have been, are or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period and crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. In addition, there must be more than 1,000 'animal units' (as defined in 40 CFR 122.23) confined at the facility; or more than 300 animal units confined at the facility if either one of the following conditions are met: pollutants are discharged into navigable waters through a man-made ditch, flushing system or other similar man-made device; or pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation. |
| **COVERED PRODUCE** | Commodities that FDA has identified as typically consumed raw. For our purposes this is for lettuce and leafy greens. |
| **CROP INPUT** | Crop inputs are materials that are commonly applied post-emergence for pest and disease control, greening, and to provide organic and inorganic nutrients to the plant during the growth cycle. |
| **CROSS-CONTAMINATION** | The transfer of microorganisms, such as bacteria and viruses, from one place to another. |
| **CURING** | The secondary phase of the composting process. As the active phase slows down and the temperature drops, mesophilic microorganisms recolonize and continue to breakdown the remaining organic matter. This process is also known as or referred to as the maturation step. |
| **DETECTION LIMIIT** | A detection limit is the lowest quantity of a substance or measurable target that can be distinguished from the absence of that substance or measurable target. |
| **DIRECT WATER APPLICATION** | Using agricultural water in a manner whereby the water is intended to, or is likely to, contact leafy greens or food-contact surfaces during use of the water. |
| **ENTEROHEMORRHAGIC *E. COLI* (EHEC)** | Shiga toxin-producing *E. coli* clinically associated with bloody diarrhea. |
| ***ESCHERICHIA COLI* (*E. COLI*)** | *Escherichia coli* are common bacteria that live in the lower intestines of animals (including humans) and are generally not harmful. *E. coli* are frequently used as an indicator of fecal contamination but can be found in nature from non-fecal sources. |
| **FECAL COLIFORMS** | Coliform bacteria that grow at elevated temperatures and may or may not be of fecal origin. Useful to monitor effectiveness of composting processes. Also called “thermotolerant coliforms.” |
| **FIELD EQUIPMENT** | Equipment used to: prepare the production area and plant, cultivate, fertilize, treat or any other pre-harvest in-field activities. |
| **FLOODING** | The flowing or overflowing of a field with water outside a grower’s control that is reasonably likely to contain microorganisms of significant public health concern and is reasonably likely to cause adulteration of edible portions of fresh produce in that field. |
| **FOOD-CONTACT SURFACE** | Those surfaces that contact human food and those surfaces from which drainage, or other transfer, onto the food or onto surfaces that contact the food ordinarily occurs during the normal course of operations. ‘‘Food- contact surfaces’’ includes food-contact surfaces of equipment and tools used during harvest, packing and holding. |
| **FOOD MATERIAL** | *Food Material* means a waste material of plant or animal origin that results from the preparation or processing of food for animal or human consumption and that is separated from the municipal solid waste stream. Food material includes, but is not limited to, food waste from food facilities, food processing establishments, grocery stores, institutional cafeterias (such as prisons, schools and hospitals), and residential food scrapcollection. Material that is defined as “food material” is not agricultural material. |
| **FOOD SAFETY ASSESSMENT** | A standardized procedure that predicts the likelihood of harm resulting from exposure to chemical, microbial and physical agents in the diet. |
| **FOOD SAFETY PERSONNEL** | Person trained in basic food safety principals and/or working under the auspices of a food safety professional. |
| **FOOD SAFETY PROFESSIONAL** | Person entrusted with management level responsibility for conducting food safety assessments before food reaches consumers; requires documented training in scientific principles and a solid understanding of the principles of food safety as applied to agricultural production; in addition this individual must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the Food and Drug Administration (See Appendix B for more details). |
| **GEOMETRIC MEAN** | Mathematical def.: the nth root of the product of n numbers, or:Geometric Mean = nth root of (X1)(X2)...(Xn), where X1, X2, etc. represent the individual data points, and n is the total number of data points used in the calculation.Practical def.: the average of the logarithmic values of a data set, converted back to a base 10 number. |
| **GRAZING LANDS** | Grazing Lands include grasslands, savannas, and shrublands that are grazed by livestock. |
| **GREEN WASTE** | Any plant material that is separated at the point of generation contains no greater than 1.0 percent of physical contaminants by weight. Green material includes, but is not limited to, yard trimmings ("Yard Trimmings" means any wastes generated from the maintenance or alteration of public, commercial or residential landscapes including, but not limited to, yard clippings, leaves, tree trimmings, prunings, brush, and weeds), untreated wood wastes, natural fiber products, and construction and demolition wood waste. Green material does not include food material, biosolids, mixed solid waste, material processed from commingled collection, wood containing lead-based paint or wood preservative, mixed construction or mixed demolition debris. "Separated At The Point of Generation" includes material separated from the solid waste stream by the generator of that material. It may also include material from a centralized facility as long as that material was kept separate from the waste stream prior to receipt by that facility and the material was not commingled with other materials during handling. 1 |
| **GROUND/SOIL** | Ground – solid surface of the Earth.Soil – upper layer of the Earth in which plants grow. [growing mediaThese two words are considered synonymous throughout and for the purpose of the document. |
| **GROUND WATER** | The supply of fresh water found beneath the earth’s surface, usually in aquifers, which supply wells and springs. Ground water does not include any water that meets the definition of surface water. |
| **HABITAT** | The natural home or environment of an animal, plant, or other organism. |
| **HARVESTING** | Activities that are traditionally performed on farms for the purpose of removing leafy greens from the field and preparing them for use as food; does not include activities that transform a raw agricultural commodity into a processed food. Examples of harvesting include cutting (or otherwise separating) the edible portion of the leafy greens from the crop plant and removing or trimming parts, cooling, field coring, gathering, hulling, removing stems, trimming of outer leaves of, and washing. |
| **HARVEST EQUIPMENT** | Any kind of equipment which is used during or to assist with the harvesting process including but not limited to harvesting machines, food-contact tables, belts, knives, etc. |
| **HAZARD** | Any biological, physical, or chemical agent that has the potential to cause illness or injury in the absence of its control. |
| **HEAT TREATED SOIL AMENDMENTS AND CROP INPUTS** | Soil amendments and crop inputs that have been physically heat treated and dried in accordance to standards issued by the USDA. |
| **HOBBY FARM** | A noncommercial farming operation or a farm where the primary source of income is not obtained by the sale of its products. |
| **HOLDING** | Storage of leafy greens in warehouses, cold storage, etc. including activities performed incidental to storage (*e.g.,* activities performed for safe or effective leafy green storage) as well as activities performed as a practical necessity for leafy green distribution (such as blending and breaking down pallets) but does not include activities that transform the raw commodity into a processed food. |
| **HYDROPONIC** | The growing of plants in nutrient solutions with or without an inert medium (as soil) to provide mechanical support. |
| **INCOMPLETELY COMPOSTED MANURE /IMMATURE COMPOST** | Any form of compost that has not gone through a complete, validated, composting process approved by the LGMA and does not have tests showing that Fecal Coliforms, *E. coli*, *E. coli O157:H7, Listeria*, and *Salmonella* have been eliminated. |
| **INDICATOR MICROORGANISMS** | An organism that when present suggests the possibility of contamination or under processing. |
| **IRRIGATION WATER TREATMENT** | Any system used to treat agricultural water, so it makes the quality adequate for its intended use |
| **KNOWN OR REASONABLY FORESEEABLE HAZARD** | Known or reasonably foreseeable hazard means a biological, chemical, and physical hazard that is known to be, or has the potential to be, associated with the farm or the food. |
| **LETTUCE AND LEAFY GREENS** | Iceberg lettuce, romaine lettuce, green leaf lettuce, red leaf lettuce, butter lettuce, baby leaf lettuce (i.e., immature lettuce or leafy greens), escarole, endive, spring mix, spinach, cabbage (green, red and savoy), kale, arugula and chard. |
| ***LISTERIA*** | Any of a genus (*Listeria*) of small, gram-positive, rod-shaped bacteria that do not form spores and have a tendency to grow in chains and that include one (*Listeria monocytogenes*) that causes listeriosis. |
| **LOT**(Pertaining to Soil Amendments and Crop Inputs other than compost) | Lot means a specific quantity of a finished product or other material that is intended to have uniform character and quality, within specified limits, and is produced according to a single manufacturing order during the same cycle of manufacture. |
| **MANURE** | Animal excreta, alone or in combination with litter (such as straw and feathers used for animal bedding) for use as a soil amendment. |
| **MICROORGANISMS** | Yeasts, molds, bacteria, viruses, protozoa, and microscopic parasites and includes species having public health significance and those subjecting leafy greens to decomposition or that otherwise may cause leafy greens to be adulterated. |
| **MONITOR** | To conduct a planned sequence of observations or measurements to assess whether a process, point or procedure is under control and, when required, to produce an accurate record of the observation or measurement. |
| **MONTHLY** | Because irrigation schedules and delivery of water is not always in a grower’s control “monthly” for purposes of water sampling means within 35 days of the previous sample. |
| **MORTALITY COMPOST** | *Mortality Compost* is compost created through a process to manage livestock mortalities. The use of crop inputs, made from mortality composting processes, shall follow all local, state and federal regulations. |
| **MOST PROBABLE NUMBER (MPN)** | Estimated values that are statistical in nature; a method for enumeration of microbes in a sample, particularly when present in small numbers. |
| **MUNICIPAL WATER** | Water that is processed and treated by a municipality to meet USEPA drinking water standards. |
| **NON-DETECT** | Non-detect means not present but consideration should be given to the limit of detection of the approved laboratory method used for biological or chemical analysis. |
| **NON-SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS OF ANIMAL ORIGIN** | Any soil amendment and/or crop input that contains animal manure, an animal product, and/or an animal by-product that is reasonably likely to contain human pathogens. Includes agricultural or compost teas for the purposes of these guidelines. |
| **OPEN DELIVERY SYSTEM** | A water storage or conveyance system which is partially or fully open and unprotected such that water is exposed to the environment at any point from the water source to the point of use. |
| **PACKING** | Placing leafy greens into a container other than packaging them and also includes activities performed incidental to packing (*e.g.,* activities performed for the safe or effective packing of leafy greens (such as sorting, culling, grading, and weighing or conveying incidental to packing or repacking)). |
| **PARTS PER MILLION (PPM)** | Usually describes the concentration of something in water or soil; one particle of a given substance for every 999,999 other particles. |
| **PATHOGEN** | A disease-causing agent such as a virus, parasite, or bacteria. |
| **PEST** | Any objectionable animals or insects, including birds, rodents, flies, and larvae. |
| **POOLED WATER** | An accumulation of standing water; not free flowing. |
| **POST-CONSUMER WASTE** | *Post-consumer waste* is a waste type produced by the end consumer of a material stream. Generally, this is discarded materials after something has been used. Post-consumer waste can include items such as packaging and unconsumed food. |
| **POTABLE WATER** | Water that is safe to drink or to use for food preparation without risk of health problems. |
| **PRE-CONSUMER WASTE** | A food item that was produced for consumption but that was never purchased, consumed or used. |
| **PROCESS AUTHORITY** | A regulatory body, person, or organization that has specific responsibility and knowledge regarding a particular process or method; these authorities publish standards, metrics, or guidance for these processes and/or methods. |
| **READY-TO-EAT (RTE) FOOD*****(EXCERPTED FROM USFDA 2005 MODEL FOOD CODE)*** | 1. "Ready-to-eat food" means FOOD that:
	1. Is in a form that is edible without additional preparation to achieve FOOD safety, as specified under one of the following: 3-401.11(A) or (B), § 3-401.12, or § 3-402.11, or as specified in 3-401.11(C); or

(d) May receive additional preparation for palatability or aesthetic, epicurean, gastronomic, or culinary purposes.1. "Ready-to-eat food" includes:
	1. Raw fruits and vegetables that are washed as specified under § 3- 302.15;
	2. Fruits and vegetables that are cooked for hot holding, as specified under § 3-401.13;

(e) Plant FOOD for which further washing, cooking, or other processing is not required for FOOD safety, and from which rinds, peels, husks, or shells, if naturally present are removed. |
| **RECONDITIONED/RE- PROCESSED** | Finished product that is added to a new production lot and goes through the entire validated production process. The old, finished product is now part of the new lot and testing of the new lot must follow all current requirements for LGMA testing before the product is used. |
| **RESPONSIBLE PARTY** | The signatory is deemed to be the responsible party for purposes of the Commodity-Specific Food Safety Guidelines for the Production and Harvest of Lettuce and Leafy Greens. The signatory must assign or identify personnel to supervise or otherwise be responsible for food safety SOPs requiring responsible party oversight. |
| **RIPARIAN AREA** | A vegetated ecosystem along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high-water table and are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of those two landforms. They will sometimes, but not in all cases, have all the characteristics necessary for them to be also classified as wetlands (USEPA 2005) |
| **RISK MITIGATION** | Actions to reduce the severity/impact of a risk. |
| ***SALMONELLA*** | *Salmonella* is a Gram-negative facultative rod-shaped bacterium in the same proteobacterial family as Escherichia coli, the family Enterobacteriaceae, trivially known as "enteric" bacteria. Salmonellae live in the intestinal tracts of warm, and cold blooded, animals. In humans, Salmonella is the cause of two diseases called salmonellosis: enteric fever (typhoid), resulting from bacterial invasion of the bloodstream, and acute gastroenteritis, resulting from a foodborne infection/intoxication. |
| **SANITARY FACILITY** | Includes both toilet and hand-washing stations. |
| **SANITIZE** | To adequately treat cleaned surfaces by a process that is effective in destroying vegetative cells of microorganisms of public health significance, and in substantially reducing numbers of other undesirable microorganisms, but without adversely affecting the product or its safety for the consumer. |
| **SEDIMENT** | Undissolved organic and inorganic material transported or deposited by water. |
| **SHIGA-TOXIN PRODUCING *E. COLI*** | Bacteria found in the environment, foods, and animal and human intestines that produce a potent disease-causing toxin. The serogroup most commonly identified and associated with severe illness and hospitalization in the United States is *E. coli* O157; however, there are over 50 other serogroups that can also cause illness. |
| **SHIPPING UNIT/ EQUIPMENT** | Any cargo area used to transport leafy greens on the farm or from the farm to cooling, packing, or processing facilities. |
| **SOIL AMENDMENT** | Elements added to the soil, such as compost, peat moss, or fertilizer, to improve its capacity to support plant life. |
| **SURFACE WATER** | Water either stored or conveyed on the surface and open to the environment (e.g., rivers, lakes, streams, reservoirs, etc.). |
| **SYNTHETIC SOIL AMENDMENTS AND CROP INPUTS****(CHEMICAL FERTILIZERS)** | Any soil amendments and/or crop inputs that may be refined, and/or chemically synthesized and/or transformed through a chemical process (e.g., gypsum, lime, sulfur, potash, ammonium sulfate, etc.). |
| **TOTAL COLIFORMS** | Total coliforms are a group of related bacteria that are (with few exceptions) not harmful to humans. This family of bacteria are found in soil and water. The EPA considers total coliforms to be a useful indicator of the possible presence of other pathogens for drinking water. Total coliforms are used to determine the adequacy of water treatment and the integrity of a water distribution system. |
| **TRANSPORTER** | The entity responsible for transporting product from the field; LGMA guidelines apply only to handlers and cover production through harvesting. |
| **ULTRAVIOLET INDEX (UV INDEX)** | A measure of the solar ultraviolet intensity at the Earth's surface; indicates the day's exposure to ultraviolet rays. The UV index is measured around noon for a one-hour period and rated on a scale of 0-15. |
| **VALIDATED PROCESS** | A process that has been demonstrated to be effective though a statistically based study, literature, or regulatory guidance. |
| **VALIDATION** | The act of determining whether products or services conform to meet specific requirements. |
| **VEGETATIVE MATERIAL** | *Vegetative material* means food material resulting from the production or processing of food for animal or human consumption, but is no longer intended for such consumption, that is derived solely from plants and is separated from the municipal solid waste stream. |
| **VERIFICATION** | The act of confirming a product or service meets the requirements for which it was intended. |
| **VESSEL COMPOST PROCESS** | Enclosed composting process where ingredients are maintained at a minimum of 131˚Fahrenheit for at least 3 days. |
| **VISITOR** | Any person (other than personnel) who enters your field/operations with your permission. |
| **WATER DISTRIBUTION SYSTEM** | Distribution systems -- consisting of pipes, pumps, valves, storage tanks, reservoirs, meters, fittings, and other hydraulic appurtenances - to carry water from its primary source to a lettuce and leafy green crop. |
| **WATER SOURCE** | The location from which water originates; water sources can be municipal, well or surface water such as rivers, lakes, or streams. |
| **WATER TREATMENT** | Any process that improves the quality (safety) of the water to make it more acceptable for a specific end-use. |
| **WATER USE** | The method by which water is being used in the agricultural process. |
| **WELL** | An artificial excavation put down by any method for the purposes of withdrawing water from the underground aquifers. A bored, drilled, or driven shaft, or a dug hole whose depth is greater than the largest surface dimension and whose purpose is to reach underground water supplies |

## ACRONYMS AND ABBREVIATIONS

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| AFO | Animal feeding operation |
| AOAC | AOAC International (formerly the Association of Official Analytical Chemists) |
| AU | Animal units |
| CAFOs | Concentrated animal feeding operations |
| CFU | Colony forming units |
| cGMP | Current good manufacturing practices |
| COA | Certificate of analysis |
| DL | Detection limit |
| FDA | Food and Drug Administration |
| FSMA | Food Safety Modernization Act |
| GAPs | Good agricultural practices |
| GLPs | Good laboratory practices |
| HACCP | Hazard analysis critical control points |
| ISO | International Organization for Standardization |
| mL | Milliliter |
| MPN | Most probable number |
| NRCS | Natural Resources Conservation Service |
| ppm | Parts per million |
| SOP | Standard operating procedure |
| SSOPs | Sanitation standard operating procedures |
| STEC | Shiga-toxin producing *E. coli* |
| TMECC | Test methods for the examination of composting and compost US EPA |
| USDA | United States Department of Agriculture |
| US EPA | United States Environmental Protection Agency |
| UV | Ultraviolet |
| UVT | Ultraviolet transmittance |
| WHO | World Health Organization |

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## 12. ISSUE: FLOODING

Flooding for purposes of this document is defined as the flowing or overflowing of a field with water outside of a grower’s control, that is reasonably likely to contain microorganisms of significant public health concern and is reasonably likely to cause adulteration of the edible portions of fresh produce in that field. Pooled water (e.g., rainfall) that is not reasonably likely to contain microorganisms of significant public health concern and is not reasonably likely to cause adulteration of the edible portion of fresh produce should not be considered flooding. If flood waters contain microorganisms of significant public health concern, crops in close proximity to soil such as lettuce/leafy greens may be contaminated if there is direct contact between flood water or contaminated soil and the edible portions of lettuce/leafy greens (Wachtel et al. 2002a; 2002b).

In the November 4, 2005, FDA "Letter to California Firms that Grow, Pack, Process, or Ship Fresh and Fresh-cut Lettuce/leafy greens," the agency stated that it considers ready-to-eat crops (such as lettuce/leafy greens) that have been in contact with flood waters to be adulterated due to potential exposure to sewage, animal waste, heavy metals, pathogenic microorganisms, or other contaminants. The FDA is not aware of any method of reconditioning these crops that will provide a reasonable assurance of safety for human food use or otherwise bring them into compliance with the law. Therefore, the FDA recommends that such crops be excluded from the human food supply and disposed of in a manner that ensures they do not contaminate unaffected crops during harvesting, storage or distribution. “Adulterated food may be subject to seizure under the Federal Food, Drug, and Cosmetic Act, and those responsible for its introduction or delivery for introduction into interstate commerce may be enjoined from continuing to do so or prosecuted for having done so. Food produced under unsanitary conditions whereby it may be rendered injurious to health is adulterated under § 402(a)(4) of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 342(a) (4); (US FDA 2004).

Areas that have been flooded can be separated into three groups: 1) product that has come into contact with flood water, 2) product that is in proximity to a flooded field but has not been contacted by flood water, and 3) production ground that was partially or completely flooded in the past before a crop was planted. The considerations for each situation are described below and presented in Table 5.

## The Best Practices for Product That Has Come into Contact with Flood Water Are:

* See Table 5 for numerical criteria for lettuce and leafy greens production fields that have possibly come into contact with flood waters.
* FDA considers any crop that has come into contact with floodwater to be an “adulterated” commodity that cannot be sold for human consumption.
* To reduce the potential for cross-contamination do not drive field equipment through flooded areas reasonably likely to contain microorganisms of public health significance (see previous section).

## TABLE 5. Flooding – When evidence of flooding in a production block occurs.

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| **Practice** | **Metric/Rationale** |
| **Flooding Defined** | The flowing or overflowing of a field with water outside a grower’s control that is reasonably likely to contain microorganisms of significant public health concern and is reasonably likely to cause adulteration of edible portions of fresh produce in that field. Additional discussion of this definition and implications for production is provided in the text portion of this document. |
| **Allowable Harvest Distance from Flooding** | * Buffer and do not harvest any product within 100 ft. of the flooding.
* Required buffer distance may be greater than 100 ft. based on risk analysis by food safety professional.
* If there is evidence of flooding, the production block must undergo a detailed food safety assessment by appropriately trained food safety personnel (see Glossary) prior to harvest, as defined in the text of this document.
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| **Verification** | * Documentation must be archived for a period of two years following the flooding event. Documentation may include photographs, sketched maps, or other means of

delineating affected portions of production fields. |
| **Time Interval Before Planting Can Commence Following the Receding of Floodwaters** | * 60 days prior to planting provided that the soil has sufficient time to dry out.
* Appropriate soil testing can be used to shorten this period to 7 days prior to planting. This testing must be performed in accordance to the sampling and testing requirements explained later in this section.
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| **Rationale** | * The basis for the 100 ft. distance is due to the known potential for subsurface horizontal water movement and seepage that is not necessarily visible.
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## The Best Practices for Product in Proximity to A Flooded Area, But Not Contacted by Flood Water Are:

* Prevent cross-contamination between flooded and non-flooded areas (e.g., cleaning and sanitizing equipment, eliminating contact of any farming or harvesting equipment or personnel with the flooded area during growth and harvest of non-flooded areas).
* To facilitate avoiding contaminated/adulterated produce, place markers identifying both the high-water line of the flooding and an interval 100 feet beyond this line. If 100 feet is not sufficient to prevent cross-contamination use a greater appropriate buffer distance. Take photographs of the area for documentation. Do not harvest product within the 100-foot buffer zone.

## The Best Practices for Formerly Flooded Production Ground Are:

* Prior to replanting or soil testing, the designated food safety professional for the grower shall perform a detailed food safety assessment of the production field. This designated professional will be responsible for assessing the relative merits of testing versus observing the appropriate time interval for planting and will also coordinate any soil testing plan with appropriate third-party consultants and/or laboratories that have experience in this type of testing.
* Evaluate the source of flood waters (e.g., drainage canal, river, irrigation canal, etc.) for potential significant upstream contributors of human pathogens at levels that pose a significant threat to human health. This may include testing of the flood water.
* Allow soils to dry sufficiently and be reworked prior to soil testing and/or planting subsequent crops on formerly flooded production ground.
* Do not replant formerly flooded production ground for at least 60 days following the receding of floodwaters. This period and active tillage of the soil provide additional protection against the survival of pathogenic organisms.
* If flooding has occurred in the past on the property, soil clearance testing may be conducted prior to planting leafy greens. Soil testing may be used to shorten the clearance period to 7 days. If performed, testing must indicate negative for STEC and/or EHEC, *E. coli* O157:H7, and *Salmonella* and all samples must be ≤ 10 MPN/gram of soil for generic *E. coli.*
	+ Historical, baseline, data from non-flooded soil testing may be used to support replanting in the event that generic *E. coli* acceptance criteria cannot be met.

## The Best Practices for Soil Sampling and Testing Are:

Microbial soil sampling can provide valuable information regarding relative risks; however, sampling by itself does not guarantee that crops grown within the formerly flooded production area will be free of the presence of human pathogens. The decision to plant, or replant ground that has been flooded, is a risk-based decision.

The soil sampling parameters below are considered reasonable acceptance criteria when testing previously flooded soil.

* Sample area: Samples shall be collected from the previously flooded area moving from most flooded to least flooded. If available, include at least 2 samples from a non-flood area within the contiguous ranch. See the sampling diagram (Figure X) below.
* Minimum number of samples per defined lot location: A minimum of 10 individual soil samples shall be collected from an individual lot.
* Lot size: Lot size is determined by the grower based on field flooding, ability to work the ground, and future planting.
* Sample depth: Each soil sample shall be collected at a composite depth between 1 – 6 inches from the soil surface. It is important to maintain a consistent sampling depth across the defined lot.
* Sample weight: Sufficient soil weight shall be collected (approximately 100 grams per sample). Request the lab to analyze a minimum of 25 grams per target organism. Based on recent tests on flood-impacted soil, the surface-only nature of boot swab samples was shown to be less sensitive and, therefore, they are not acceptable for this purpose.
* Sampling plan: Random sampling shall be conducted with more samples taken closer to the location where flood waters entered and exited the field and fewer samples from the buffer and non-flooded area.

**Figure X.** A sampling diagram outlining soil samples collected across a defined lot in a randomized pattern across vertical transects, with more samples collected closest to the flooded area (green) and fewer samples collected away from the flooded area (white).

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 Green: Flooded area

Yellow: Buffer (100 ft from water mark)

White: Non-flooded area (>100 ft from water mark)

= Approximate 100-gram sample

* Testing frequency: Minimum one sampling event.
* Timing: The initial sampling event shall be conducted at least 7 days after flood waters have receded. It is important to note that because of flooded ground saturation, the use of tractors and other implements may take longer than 7 days post-water receding.
* Subsequent sampling events may be conducted until results indicate the acceptance criteria below have been achieved.
* Until these metrics are met, all equipment passing through the flood-impacted areas must be cleaned and sanitized before entering non-flooded areas.
* Target organisms:
	+ Generic *E. coli*
	+ *Salmonella*
	+ STEC and/or EHEC
* Acceptance criteria for sample set (sampling event):
	+ Generic *E. coli*: All 10 samples <10 MPN or CFU/gram of soil\*
	+ *Salmonella*: Negative or non-detect
	+ STEC or EHEC: Negative or non-detect
* Results:
* If you meet the acceptance criteria, planting can commence.
* If you do not meet the acceptance criteria:
	+ Consider conducting additional groundwork with the use of tractors and implements to turn the soil to encourage drying out and aeration.
		- Repeat sampling and testing until the criteria have been met or you have reached 60 days from when the water has receded from the ranch.
		- Perform enhanced pre-harvest product testing per Western Growers’ Appendix C: Sampling and Testing Protocol at the sample location of the failure when generic *E. coli* acceptability criteria is not met.

\*Historical baseline data from non-flooded soil testing may be used in lieu of pre-harvest product testing to support replanting in the event that generic *E. coli* acceptance criteria cannot be met.

## 17. ROMAINE TESTING AND DATA ANALYSIS PROGRAM

The purpose of a standardized romaine testing program is to enable the leafy greens industry to learn from personal and aggregated data, which contributes to industry knowledge and verifies that current food safety programs are adequate. The goal of this project is to collect and analyze data along with other potential key learnings from standardized romaine testing for a 2-year period.

LGMA handlers who test their romaine will report those test results using the approved database. Only romaine that is currently being tested, such as for customer and/or regulatory requirements, internal company policies, etc., must be submitted. No additional romaine is required to be tested if a handler member does not have a testing policy in place.

## The Best Practices for Sampling and Testing Are:

Sampling and testing parameters are as follows:

* Data sources: Current romaine test results
* Timeline: 2 consecutive years from program start date
* Sampling timeline: <10 days for pre-harvest or <24 hours for post-harvest samples
* Test organisms: STEC and/or EHEC, *E. coli* O157:H7, *Salmonella*
* Sampling lot size: <10 acres for both a pre-harvested product and/or a company-defined post-harvest

 product lot for product sampled at any step prior to, but not including processing.

* Sample size: Minimum 375 g from n=60 sub-samples \*
* Sampling method: Randomized sampling within a designated lot

\*The entire 375-gram sample must be analyzed by the laboratory.

## The Best Practices for Data Reporting and Analysis Are:

California LGMA members will submit data on a quarterly basis in excel format including the following information:

* Acres sampled; cartons sampled
* Sampling stage (pre-harvest or post-harvest) \*\*
* Commodity and field-packed description (romaine, romaine hearts, top and tail, etc.) †
* Sampling region (District 1-Salinas/Watsonville/San Joaquin Valley, Kern County, District 2-Oxnard/Santa Maria or District 3-Blythe/Imperial Valley)
* Sample date
* Organism tested (STEC and/or EHEC, *E. coli* O157:H7, *Salmonella*)
* Test result (molecular or cultural confirmed positive)

*\*\*Note: pre-harvest and post-harvest data will be analyzed separately*

†*Baby romaine is not included.*