

## **Appendix-1**

### **References, Glossary, Personal Statements**

## Attachment-1

### References Consulted

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## Attachment-2

### Glossary of Terms

**active ingredient (A.I.)** - The chemical or substance component of a pesticide product that can kill, repel, attract, mitigate or control a pest or that acts as a plant growth regulator, desiccant, or nitrogen stabilizer. The remainder of a formulated pesticide product consists of one or more "[inert ingredients](#)" (such as water, solvents, emulsifiers, surfactants, clay and propellants), which are there for reasons other than pesticidal activity.

**acute effect** - An adverse effect on any living [organism](#) in which severe symptoms develop rapidly and often subside after the exposure stops.

**acute toxicity** - Adverse effects that result from a single [dose](#) or single exposure of a chemical; any poisonous effect produced within a short period of time, usually less than 96 hours. This term normally is used to describe effects in experimental animals.

**adsorb, adsorption** - The process by which molecules of a substance, such as a gas or a liquid, collect on the surface of another substance, such as a [solid](#).

**aggregate exposure** - The sum total of all exposure to pesticides through inhalation, or dermal, oral, or optic contact.

**Agribusiness Development Corporation (ADC)** – an agency attached to the Hawaii Department of Agriculture to facilitate the transition of agriculture from the former plantation systems to modern farming. ADC manages and leases state owned agricultural lands to private operators.

**ambient** - Any unconfined portion of the atmosphere; open air; outside surrounding air.

**Aquatic Life Benchmark** - are pesticide levels below which are not expected to harm fish, invertebrates, and aquatic plants. Benchmarks are extracted from the most recent publically available EPA risk assessments for the pesticide and are based on the most sensitive aquatic toxicity data of the distribution for each taxa.

**apiary** – pertaining to bees.

**bactericide** - A pesticide used to control or destroy bacteria, typically in the home, schools, or on hospital equipment.

**benchmark** - A designated level or percent of response relative to the control level of response.

**bioassay** - A method of testing a material's effects on living [organisms](#).

**biochemical** - Chemicals that are either naturally occurring or identical to naturally occurring substances. Examples include hormones, [pheromones](#), and enzymes. Biochemicals function as pesticides through non-toxic, non-lethal modes of action, such as disrupting the mating pattern of insects, regulating growth, or acting as



repellants. Biochemicals tend to be environmentally compatible and are thus important to [Integrated Pest Management](#) programs.

**buffer Zone, buffer Area** – a set distance between an activity such as pesticide spraying and a potential receptor, such as a house or water body.

**carcinogen or carcinogenic** - Capable of causing cancer. A suspected carcinogen is a substance that may cause cancer in humans or animals but for which the evidence is not conclusive.

**certified applicator** - A person who is authorized to apply "[restricted-use](#)" pesticides as result of meeting requirements for certification under FIFRA-mandated programs. Applicator certification programs are conducted by states, territories and tribes in accordance with national standards set by EPA. "Restricted use pesticides" may be used only by or under the direct supervision of specially trained and certified applicators.

**certified pesticide applicator** - Any individual who is certified under Section 4 of the Federal Insecticide, Fungicide, and Rodenticide Act ([FIFRA](#)) as authorized to use or supervise the use of any pesticide which is classified for restricted use. Any applicator who applies registered pesticides, only to provide a service of controlling pests without delivering any additional pesticide supplies, is not deemed to be a seller or distributor of pesticides under FIFRA.

**chlorination** - Adding chlorine to water or wastewater, generally for the purpose of disinfection, but frequently for accomplishing other biological or chemical results. Chlorine also is used almost universally in manufacturing processes, particularly for the plastics industry.

**cholinesterase** - an enzyme, found especially in the heart, brain, and blood. Certain pesticides, such as organophosphates, are known to inhibit cholinesterase, and the measurement of this enzyme in a person can indicate if they've been exposed to organophosphates.

**chronic effect** - An adverse effect on any living organism in which symptoms develop slowly over a long period of time or recur frequently.

**chronicity** – the state of being chronic, or having a long duration.

**Cleome gynandra** - an [annual](#) wildflower native to [Africa](#) that has become widespread in many [tropical](#) and [sub-tropical](#) parts of the world, including Hawaii. It is often called 'stinkweed' in Hawaii due to it's sometimes strong odor.

**colony collapsed** - syndrome defined as a dead bee colony with no adult bees or dead bee bodies but with a live queen and usually honey and immature bees still present.

**commercial applicator** - a person applying pesticides as part of a business applying pesticides for hire or a person applying pesticides as part of his or her job with another (not for hire) type of business, organization or agency. Commercial applicators often are certified, but need to be so only if they use [restricted-use pesticides](#).

**common land unit** - the smallest unit of land that has a permanent, contiguous boundary, a common land cover and land management, a common owner and a common producer

**concentration** - The relative amount of a substance mixed with another substance. An example is five parts per million of carbon monoxide in air or 1 milligram/liter of iron in water.

**confidential business information (CBI)** - Information that contains [trade secrets](#), commercial or financial information, or other information that has been claimed as confidential by the submitter.

**confidential statement of formula (CSF)** - A list showing the identity of the ingredients (both active and inert) contained in a pesticide formulation. \*

**conventional pesticides** - Pesticides that are chemicals or other substances developed and produced primarily or only for use as pesticides. The term is generally used in reference to [active ingredients](#). An example is DDT, which was developed and used almost exclusively as a pesticide. **Combine with below**

**conventional pesticide** (vs. biological pesticide) - Any man-made chemical which can be used to kill pests.

**COPD** - chronic obstructive pulmonary disorder

**cryptorchidism** -the absence of one or both [testes](#) in males.

**disinfectant** - A chemical that destroys vegetative forms of harmful [microorganisms](#), but does not ordinarily kill bacterial spores.

**dose** - In terms of monitoring exposure levels, the amount of a [toxic substance](#) taken into the body over a given period of time.

**dose response** - How an [organism](#)'s response to a [toxic substance](#) changes as its overall exposure to the substance changes. For example, a small dose of carbon monoxide may cause drowsiness; a large dose can be fatal.

**drift** - the movement of pesticides through the air.

**ecology** - The study of the relationships between all living [organisms](#) and the environment, especially the totality or pattern of interactions; a view that includes all plant and animal species and their unique contributions to a particular habitat.\*

**ecosystem** - The interacting [synergism](#) of all living organisms in a particular environment; every plant, insect, aquatic animal, bird, or land species that forms a complex web of interdependency. An action taken at any level in the food chain, use of a pesticide for example, has a potential domino effect on every other occupant of that system.

**effluent** - Wastewater discharged from a [point source](#), such as a pipe.

**effluent limitations** - Limits on the amounts of pollutants which may be discharged by a facility; these limits are calculated so that water quality standards will not be violated even at low stream flows.

**endangered species** - Animals, plants, birds, fish, or other living [organisms](#) threatened with extinction by man-made or natural changes in the environment.

**endocrine** - referring to the secretion of hormones by glands which are carried by the [circulatory system](#) towards target organs.

**enzyme-linked immunosorbent assay (ELISA)** - a test that uses antibodies and color change to identify a substance.

**EPA Registration Number (EPA Reg. No)** - A two-part number assigned by EPA to identify each pesticide product registration (e.g., 1253-79). The first number is company number, the second number (after the dash) is the product number. This registration number must appear on the product's label.

**epidemiologist** - A medical scientist who studies the various factors involved in the incidence, distribution, and control of disease in a population.

**Experimental Use Permit** - authorizes the testing of new [pesticides](#) or alternative uses existing pesticides in experimental field studies.

**exposure** - Radiation or pollutants that come into contact with the body and present a potential health threat. The most common routes of exposure are through the skin, mouth, or by inhalation.

**FFDCA** - Federal Food, Drug, and Cosmetic Act is the law which controls [pesticide residues](#) in food and feed, along with FIFRA.

**FIFRA** - The Federal Insecticide, Fungicide, and Rodenticide Act was enacted in June 25, 1947. The Act instructs the EPA to regulate: 1) the registration of all pesticides used in the United States, 2) the licensing of pesticide applicators, 3) re-registration of all pesticide products, 4) the storage, transportation, disposal and recall of all pesticide products. [FIFRA's home page](#) provides many more details.

**Finding of No Significant Impacts (FONSI)** - issued when environmental analysis and interagency review during the EA process find a project to have no significant impacts on the quality of the environment.

**FQPA** - The Food Quality Protection Act was enacted on Aug. 3, 1996 to ensure the safety of food in the United States. The [FQPA home page](#) will provide more detailed information.

**fumigants** - Produce gas or vapor intended to destroy pests in the house or in the ground

**fungicides** - A pesticide used to control or destroy fungi on food or grain crops.

**general use pesticide** - a pesticide which may be purchased and applied by anyone.

**Good Neighbor Program** - a voluntary program through which large-scale users of agricultural pesticides on Kauai report details about their monthly use of individual Restricted Use Pesticides.

**ground water** - Water found below the surface of the land, usually in porous rock

formations. Ground water is the source of water found in wells and springs and is used frequently for drinking.

**hazardous chemical** - EPA's designation for any hazardous material that requires a [Material Safety Data Sheet](#). Such substances are capable of producing adverse physical effects (fire, explosion, etc.) or adverse health effects (cancer, dermatitis, etc.)

**hazardous waste** - A subset of solid wastes that pose substantial or potential threats to public health or the environment and meet any of the following criteria:

- is specifically listed as a hazardous waste by EPA;
- exhibits one or more of the characteristics of hazardous wastes (ignitability, corrosiveness, reactivity, and/or toxicity);
- is generated by the treatment of hazardous waste; or is contained in a hazardous waste.

**herbicide** - A pesticide designed to control or kill plants, weeds, or grasses. Almost 70% of all pesticide used by farmers and ranchers are herbicides. These chemicals have wide-ranging effects on [non-target species](#).

**hypospadias** - a condition in which the opening of the urethra is on the underside of the penis, instead of at the tip.

**incineration** - The destruction of solid, liquid, or gaseous wastes by

**inert ingredients** - Substances that are not "[active](#)," such as water, petroleum distillates, talc, corn meal, or soaps. When discussing pesticides, inert ingredients do not attack a particular pest, but some are chemically or biologically active, causing health and environmental problems.

**in situ** - literally "on site" or "in position" to describe an event where it takes place, such as a specific aquatic habitat.

**insecticide** - A pesticide compound specifically used to kill or prevent the growth of insects.

**insectivore** - a carnivorous plant or animal that eats insects.

**Integrated Pest Management (IPM)** - The use of pest and environmental information in conjunction with available pest control technologies to prevent unacceptable levels of pest damage by the most economical means and with the least possible hazard to persons, property and the environment.

**irritant** - A substance that can cause irritation of the skin, eyes, or respiratory system. An irritant can cause an acute effect from a single high-level exposure, or chronic effects from repeated, low-level exposures. Some examples of irritants are chlorine, nitric acid, and various pesticides.

**legacy agriculture or pesticide** - referring to plantation era agricultural operations in Hawaii.

**Lethal Concentration 50 (LC 50)** - A concentration of a pollutant or [effluent](#) at which 50% of the test organisms die; a common measure of [acute toxicity](#).

**Lethal Dose 50 (LD 50)** - The dose of a toxicant that will kill 50% of test [organisms](#) within a designated period of time. The lower the LD 50, the more toxic the compound.\*

**Lowest Observed Adverse Effect Level (LOAEL)** - The lowest dose in a toxicity study resulting in adverse health effects.\*

**lymphoma** - any of a group of blood cell tumors that develop from lymphatic cells.

**manifest system** - Tracking of [hazardous waste](#) from "[cradle to grave](#)" (generation through disposal), with accompanying documents known as "manifests."\*

**Master Record Identification Number (MRID)** - A unique cataloging number assigned to an individual pesticide study at the time of its submission to the Agency.\*

**Material Safety Data Sheet (MSDS)** - Printed material concerning a [hazardous chemical](#), or Extremely Hazardous Substance, including its physical properties, hazards to personnel, fire and explosion potential, safe handling recommendations, health effects, fire fighting techniques, reactivity, and proper disposal. Originally established for employee safety by OSHA.

**Maximum Contaminant Level (MCL)** - The maximum level of certain contaminants permitted in drinking water supplied by a public water system as set by EPA under the federal Safe Drinking Water Act.

**Maximum Contaminant Level Goal (MCLG)** - The maximum level of a contaminant that is associated with no adverse health effects from drinking water containing that contaminant over a lifetime. For chemicals believed to cause cancer, the MCLGs are set at zero. MCLGs are not enforceable, but are ideal, health-based goals which are set in the National Primary Drinking Water Standards developed by EPA. MCLs are set as close to MCLGs as possible, considering costs and technology.

**mechanisms of toxicity** - The biochemical method by which a chemical reacts in a living [organism](#).

**meta-study** - a statistical approach to combine the results from multiple studies in an effort to increase power (over individual studies), improve estimates of the size of the effect and/or to resolve uncertainty when reports disagree.

**Methyl isothiocyanate (MITC)** - a general biocide used to control weeds, nematodes, and soil and wood fungi. MITC is also a naturally-produced chemical in *Cleome gyandra* (a.k.a., stinkweed).

**microorganisms** - Bacteria, yeasts, simple fungi, algae, protozoans, and a number of other organisms that are microscopic in size. Most are beneficial but some produce disease. Others are involved in composting and sewage treatment.

**milligrams/liter (mg/l)** - A measure of concentration used in the measurement of

fluids. Mg/l is the most common way to present a concentration in water and is roughly equivalent to parts per million.

**miticides** - Kill mites that feed on plants and animals

**morbidity** - Rate of incidence of disease.

**mortality** - Death rate.

**multiple myeloma** - is a **cancer** of **plasma cells**, a type of **white blood cell** normally responsible for producing **antibodies**.

**National Pollutant Discharge Elimination System (NPDES)** - The primary permitting program under the Clean Water Act which regulates all discharges to surface water.

**necropsy** - the examination of a body after death.

**nematicides** - Kill nematodes (microscopic, worm-like organisms that feed on plant roots)

**neonicotinoid** - a class of neuro-active insecticides chemically similar to nicotine. Neonicotinoids are sometimes used to coat seeds prior to planting, after which the pesticide is incorporated into plant tissue.

**neurodevelopmental** – pertaining to the growth and development of the brain or central nervous system

**neuropsychiatric** – pertaining to a branch of medicine that deals with mental disorders attributable to diseases of the nervous system.

**No Observed Adverse Effect Level (NOAEL) or No Observed Effect Level (NOEL)** - A level of **exposure** which does not cause observable harm.

**Non Hodgkins Lymphoma** - cancer that originates in the body's lymphatic system, the disease-fighting network. In non-Hodgkin's lymphoma, tumors develop from lymphocytes — a type of white blood cell.

**non-target organism** - Any **organism** for which the pesticide was not intended to control.

**organically grown** - Food, feed crops, and livestock grown within an intentionally-diversified, self-sustaining agro-ecosystem. In practice, farmers build up nutrients in the soil using compost, agricultural wastes, and cover crops instead of synthetically derived fertilizers to increase productivity, rotate crops, weed mechanically, and reduce dramatically their dependence on the entire family of pesticides. Farmers must be certified to characterize crops as organically grown and can only use approved natural and synthetic **biochemicals**, agents, and materials for three consecutive years prior to harvest. Livestock must be fed a diet that includes grains and forages that have been organically grown and cannot receive hormones, sub-therapeutic antibiotics, or other growth promoters.

**organism** - Any living being, whether plant, mammal, bird, insect, reptile, fish, crustacean, aquatic or estuarine animal, or bacterium.



**organophosphates** - a group of human-made chemicals that poison insects and mammals by damaging an enzyme in the body called acetylcholinesterase.

**parts per billion (ppb)** - One ppb is comparable to one kernel of corn in a filled, 45-foot silo, 16 feet in diameter.

**parts per million (ppm)** - One ppm is comparable to one drop of gasoline in a tankful of gas (full-size car).

**parts per trillion (ppt)** - One ppt is comparable to one drop in a swimming pool covering the area of a football field 43 ft. deep.

**pathway of exposure** - The physical course a pesticide takes from the source to the [organism](#) exposed (e.g., through food or drinking water consumption or residential pesticide uses).

**pesticide** - Substances intended to repel, kill, or control any species designated a "pest" including weeds, insects, rodents, fungi, bacteria, or other organisms. The family of pesticides includes [herbicides](#), [insecticides](#), [rodenticides](#), [fungicides](#), and [bactericides](#).

**pesticide usage** - Refers to actual applications of pesticides, generally in terms of quantity applied or units treated.

**private applicator** - A category of applicator certification for farmers and/or employees such that they can legally apply [restricted use pesticides](#) or supervise others doing so who are not certified.

**proprietary information** - information and data considered confidential to a business operation, and whose disclosure is thought to potentially reduce the operation's competitive advantages.

**registration** - Formal listing with EPA of a new pesticide before sale or distribution. EPA is responsible for pre-market licensing of pesticides on the basis of data demonstrating no unreasonable adverse health or environmental effects when applied according to approved label directions.

**renal** - pertaining to the kidney.

**residue studies** - Research which examines the recalcitrance, bioavailability, toxicity, solubility, etc. of pesticide residues. More information on this topic can be found at the FDA site for [residual pesticides monitoring](#).

**restricted use pesticides** - A pesticide that can be sold to or used by only certified applicators.

**risk** - A measure of the chance that damage to life, health, property, or the environment will occur.

**risk assessment** - A methodology used to examine all possible risks involved with a particular product or organism. Risk assessment can be divided into four parts: identification of hazards, dose response (how much exposure causes particular problems (ie.cancer, convulsions, death)), exposure assessment (determining how much exposure will be received by people during particular activities), and risk

characterization (determining a probability that a risk will occur).

**risk factor** - A characteristic (e.g., race, sex, age, obesity) or variable (e.g., smoking, exposure) associated with increased chance of toxic effects. Some standard risk factors used in general risk assessment calculations include average breathing rates, average weight, and average human life span.

**rodenticide** - A pesticide or other agent used to kill rats and other rodents or to prevent them from damaging food, crops, or forage.

**route of exposure** - The way a chemical enters an [organism](#) after contact (e.g., ingestion, inhalation, or dermal absorption).

**Safe Water Drinking Act** - the principal [federal law](#) in the [United States](#) intended to ensure safe [drinking water](#) for the public.<sup>1</sup>

**sediment** - Topsoil, sand, and minerals washed from the land into water, usually after rain or snow melt. Sediments collecting in rivers, reservoirs, and harbors can destroy fish and wildlife habitat and cloud the water so that sunlight cannot reach aquatic plants. Loss of topsoil from farming, mining, or building activities can be prevented through a variety of erosion-control techniques.

**statistically significant** - The likelihood that a result or relationship is caused by something other than mere random chance.

**structural fumigators** - pest control operations who target termites and other insect threats to buildings by use of toxic gas.

**surface water** - All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, seas, estuaries) and all springs, wells, or other collectors directly influenced by surface water.

**surfactant** - A detergent compound that promotes lathering.

**tolerance** - Permissible [residue](#) level for pesticides in raw agricultural produce and processed foods. Whenever a pesticide is registered for use on a food or feed crop, a tolerance must be established. EPA establishes the tolerance levels, which are enforced by the Food and Drug Administration and the Department of Agriculture.

**Total Dissolved Solids (TDS)** - The quantity of dissolved material in a given volume of water.

**toxic** - Substance that can cause severe illness, poisoning, birth defects, disease, or death when ingested, inhaled, or absorbed by living organisms.

**toxicity** - The capacity of a chemical to do harm to an organism by other than mechanical means.

**trade secret** - Any confidential formula, pattern, process, device, information, or set of data that is used in a business to give the owner a competitive advantage. Such information may be excluded from public review.

**USDA** - U.S. Department of Agriculture

**vapor** - The gas given off by substances that are solids or liquids at ordinary



atmospheric pressure and temperatures.

**volatile** - Any substance which evaporates quickly.

**Volatile Organic Compounds (VOC)** - Any organic compound which evaporates readily to the atmosphere. VOCs contribute significantly to photochemical smog production and certain health problems.

**Volatilize, Volatilization** – the act of a substance evaporating into the atmosphere.

**Water Quality Standard (WQS)** - The combination of a designated use and the maximum concentration of a pollutant which will protect that use for any given body of water. For example, in a trout stream, the concentration of iron should not exceed 1 mg/l.

**wetlands** - Areas that are soaked or flooded by surface or ground water frequently enough or for sufficient duration to support plants, birds, animals, and aquatic life. Wetlands generally include swamps, marshes, bogs, estuaries, and other inland and coastal areas, and are federally protected. Wetlands frequently serve as recharge/discharge areas and are known as "nature's kidneys" since they help purify water. Wetlands also have been referred to as natural sponges that absorb flood waters, functioning like natural tubs to collect overflow. Wetlands are important wildlife habitats, breeding grounds, and nurseries because of their biodiversity. Many endangered species as well as countless estuarine and marine fish and shellfish, mammals, waterfowl, and other migratory birds use wetland habitat for growth, reproduction, food, and shelter. Wetlands are among the most fertile, natural ecosystems in the world since they produce great volumes of food (plant material).

**worker protection standards** - Standards designed to reduce the risks of illness or injury resulting from workers' and handlers' occupational exposures to pesticides used in the production of agricultural plants on farms or in nurseries, greenhouses, and forests and also from the accidental exposure of workers and other persons to such pesticides. They require workplace practices designed to reduce or eliminate exposure to pesticides and establish procedures for responding to exposure-related emergencies.

Attachment-3

**Personal Statements**

*(To be added to the final report)*