

Nursery Greenhouse Production Evaluation Tool

* N/A: This nursery has no greenhouse plant production areas.

**Note:** Greenhouses are defined as those plant production operations utilizing structures with heat and other artificial environmental controls. Greenhouse operations with facilities qualifying as container nurseries or with field edges, scion orchards, display gardens, drainage areas and natural areas will also be evaluated under the Container Production and Field Production criteria for those specific portions of the operation. Field and container production nurseries with controlled environment structures such as those listed above will also be evaluated under the Greenhouse Production criteria for those specific portions of the nursery.

|  |  |
| --- | --- |
| **Operation Name:**  |  |
| **Address:**  |  |
| **Evaluation Date:**  |  |
| **Evaluator/Inspector:** |  |

# Instructions for Use

1. Each standard area is scored according to Food Alliance evaluation criteria. Points are given for performance of each evaluation criteria as measured against the indicators in Levels 1 through 4. Points are only earned for the highest Level achieved.
2. Scoring partial points is allowed. Example: Half of the operation is in a 4-year crop rotation, a Level 3 practice. As a result, you may score 2.5 points, or half the increase between Level 2 and Level 3.
3. No points are earned for a criterion that is not applicable (N/A) to the operation or region. These points are subtracted from the total as explained on the score sheet. This ensures all operations are scored fairly, based on the actual facilities present and practices in use. A full explanation for any N/A is required.
4. For producer/managers reviewing this evaluation tool: This is only a guideline for your use and does not guarantee acceptance of your application.
5. Inspectors should make notes on each criterion describing how they arrived at decisions, including means used to verify all specific producer/manager claims. These notes provide important background, which will be carefully considered in the final certification decision. Please make note of any criteria or indicators that were not applicable and the reason. Also include any Best Management Practices (BMPs) implemented by the producer/ manager that are not listed in this inspection tool.
6. Inspectors may request records or other materials to document any claims made by producer/manager.

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# Integrated Pest, Disease and Weed Management, and Pesticide Risk Reduction

**Note:** Pest is used in its inclusive sense to refer to all insects, mites, nematodes, pathogens, and weeds that are injurious to crop yield and quality.

## Continuing Education for IPM

**Level 1:** Manager exhibits little or no knowledge of IPM strategies and tactics. Current operation reflects this knowledge gap with no planning that is based on knowledge of severity or impacts of pests, clear evidence of unnecessary pest outbreaks and may use practices that are risky on and off the operation to ecological services and natural resources.

**Level 2:** Manager relies on general interest publications, salesmen to learn about pest management issues. Manager may not be connected to independent sources of knowledge or advice about pest management, but shows evidence of knowledge of prevention, avoidance, and biologically-based tactics, and the risks associated with IPM practices.

**Level 3:** Manager uses independent, technical information, specific to crop and location, and relevant to diverse prevention, avoidance, monitoring, and suppression (PAMS) tactics, ecological service management and pesticide risk reduction. Manager participates in independent education events. Manager can discuss and communicates plans, practices, and mitigation approaches. Manager is a licensed private applicator and meets all continuing education requirements for licensed private applicators.

**Level 4:** As per Level 3, and manager participates in on-site research to develop management or mitigation practices

**Score:**

**Verification methods and notes:**

## Production Plan Including IPM

**Level 1:** Manager has no IPM plan, and there is no evidence that PAMS principles, eco-service management or risk reduction are factored into the operation.

**Level 2:** Manager has completed a written IPM plan, but the plan lacks consideration of some or all of the following: pest status, economic impacts, and prevention and avoidance practices. Some monitoring is employed to support decisions and IPM practices reflect pest occurrence.

**Level 3:** Manager has completed a written IPM plan that considers pest status and impacts, and employs prevention, avoidance and biologically-based tactics, all in the context of clearly articulated production goals

**Level 4:** As per Level 3, and manager can show clear evidence that pest risks are exhibiting a downward trend. Where appropriate, IPM practices and their benefits are communicated in the market and value chain.

**Score:**

**Verification methods and notes:**

## IPM Activities: Prevention

**Level 1:** Manager makes very limited or no use of pest prevention practices resulting in high pest risk and reliance on suppression.

**Level 2:** Manager employs multiple prevention practices guided by crop selection and pest risks.

**Level 3:** As per Level 2, and manager can show that prevention practices are employed in response to pest risks on the operation, and that pest risks have declined because of practices being employed.

**Level 4:** As per Level 3, and manager can show that high risk suppression practices, particularly pesticide application, are limited or declining. Crops and varieties selected on their relative pest risks.

**Score:**

**Verification methods and notes:**

## IPM Activities: Avoidance

**Level 1:** Very limited or no use of avoidance practices resulting in high pest risk and reliance on suppression practices.

**Level 2:** Manager uses multiple avoidance practices guided by their specific crop selection and on-site pest risks.

**Level 3:** As per Level 2, and manager can show that avoidance practices are employed in response to pest risks, and that pest risks have declined because of practices being employed.

**Level 4:** As per Level 3, and manager can show that high risk practices, particularly pesticide application, are limited or declining.

**Score:**

**Verification methods and notes:**

## IPM activities: monitoring

**Level 1:** Monitoring and diagnosis of pest risks and weather conditions are minimal or do not occur. Monitoring records are limited or non-existent. There is evidence of significant pest risks.

**Level 2:** Records are maintained for all IPM practices and inputs, but the use of records in decision making is limited.

**Level 3:** Monitoring is scheduled according to pest risks and diagnostics are employed. Manager can describe or demonstrate what decision-support tools are used, and how those tools allow for pest epidemiology, crop susceptibility, weather conditions and other factors that affect risk.

**Level 4:** As per Level 3, and monitoring records are reviewed regularly to adapt and modify IPM practices, particularly prevention and avoidance.

**Score:**

**Verification methods and notes:**

## IPM Activities: Pest Suppression

**Level 1:** IPM practices consist mainly of chemical suppression, with limited employment of prevention and avoidance practices that could have reduced or eliminated chemical inputs.

**Level 2:** IPM practices emphasize suppression, particularly chemical, but these are applied in response to pest risks, applied to the minimum area necessary, and using low-risk chemicals and risk mitigation practices if applicable.

**Level 3:** IPM practices emphasize prevention and avoidance for severe pests, appropriate cultural, physical, and biological control tactics are used. Monitoring, diagnostics, and decision support tools are employed to determine the need for inputs, and reduced risk pesticides are applied with appropriate mitigations. Records of any pesticide applications incorporate pest monitoring information, crop growth stage, weather, and pest risk assessment information (e.g., thresholds, disease risk index, etc.).

**Level 4:** IPM practices emphasize prevention and avoidance for severe pests, appropriate cultural, physical, and biological control tactics are used. Monitoring, diagnostics, and decision support tools are employed to determine the need for inputs, and records are employed to devise PAMS strategies that reduce pest risks in any hot spots that occur. Reduced risk pesticides are applied with appropriate mitigations. Records of any pesticide applications incorporate pest monitoring information, crop growth stage, weather, and pest risk assessment information (e.g., thresholds, disease risk index, etc.) and measures of pesticide effectiveness.

**Score:**

**Verification methods and notes:**

## Protection Plan

**Level 1:** Manager has not previously developed an IPM plan that includes management of ecological services or management to reduce pesticide risks

**Level 2:** Manager has completed an IPM plan, and has limited management of ecological services and/or management to reduce pesticide risks

**Level 3:** Manager has completed an IPM plan, manages ecological services, and manages to reduce pesticide risks, all in the context of clearly articulated protection goals.

**Level 4:** Manager has completed an IPM plan, manages ecological services, and manages to reduce pesticide risks, all in the context of clearly articulated protection goals with clear evidence that risks are exhibiting a downward trend, and that practices and their benefits are communicated in the market and value chain.

**Score:**

**Verification methods and notes:**

## IPM Program Outcomes

**Level 1:** Significant pest risks are apparent and have not been responded to. Pesticides and other suppression tactics are used without first considering alternatives.

**Level 2:** Manager can describe what opportunities for pest risk reduction have been considered and how they have been implemented. Pest risks are apparent, and prevention and avoidance practices are limited or ineffective.

**Level 3:** Manager can describe what opportunities for pest risk reduction have been considered and how they have been implemented. Manager can describe or show that pest risks have been reduced. Prevention, avoidance practices and biologically-based approaches are in use.

**Level 4:** As per Level 3, and manager can describe or show how practices are adapted to address sporadic and potential novel or invasive species.

**Score:**

**Verification methods and notes:**

## Ecological Service Management Outcomes

**Level 1:** Limited or no practices to manage ecological services are apparent.

**Level 2:** Manager can describe what opportunities for ecological service management have been considered and how they have been implemented. Management and conservation practices are limited or ineffective.

**Level 3:** Manager can describe what opportunities for ecological service management have been considered and how they have been implemented. Ecosystem management and conservation practices are in use, and manager can describe or show their positive outcomes.

**Level 4:** As per Level 3, and manager can describe or show how ecological service management and conservation practices have been adapted to address sporadic pests and potential novel or invasive species, not just severe pests.

**Score:**

**Verification methods and notes:**

## Risk Management Outcomes

**Level 1:** Significant risks to health, environment, or natural resources are apparent and have not been responded to.

**Level 2:** Manager can describe what opportunities for risk reduction have been considered and how they have been implemented. Risks still apparent and elimination or mitigation practices are limited or ineffective.

**Level 3:** Manager can describe what opportunities for risk reduction have been considered and how they have been implemented. Risk management practices are in use, and manager can describe or show their positive outcomes.

**Level 4:** As per Level 3, and manager can describe or show how risk reduction strategies have been adapted to address sporadic and potential novel or invasive species, not just severe pests.

**Score:**

**Verification methods and notes:**

## Coordinated Whole Operation Management of Pests

**Level 1:** Manager does not use a coordinated whole-operation management approach to identify, verify, or respond to current and potential pest, environmental, health, and natural resource risks. Risk management is not coordinated geographically or across commodities.

**Level 2:** Manager uses a coordinated whole-operation management approach to identify, verify, or respond to current and potential pest, environmental, health, and natural resource risks. There is limited coordination of risks responses geographically or across commodities. Risk responses rely primarily on chemical suppression practices.

**Level 3:** Manager uses a coordinated whole-operation management approach to identify, verify, and respond to current and potential pest, environmental, health, and natural resource risks. Manager uses this information in planning and in real time to respond to risks in a coordinated manner geographically or across commodities.

**Level 4:** As per Level 3, and monitoring of status and trends of key indicators reveals and quantifies benefits of practices.

**Score:**

**Verification methods and notes:**

## Hazardous Material Storage

**Level 1:** Storage facilities for hazardous materials (crop and livestock pesticides, fertilizers, fuel, lubricants) meet legal requirements (where applicable). Hazardous materials are stored in original, clearly labeled containers.

**Level 2:** Storage is at least 150 feet away from wells and 200 feet away from surface water or sources of flame. Four or more of the following apply. Check all applicable:

* Empty hazardous material containers are triple-rinsed before they are returned to the supplier or disposed in an approved recycling program or licensed landfill.
* Tank rinsate is sprayed out on labeled crops at labeled rate or less.
* Storage size and organization is adequate to separate flammables from other materials.
* Pesticides are organized by insecticides, fungicides, herbicides, fertilizers, etc.
* Containers are organized to prevent spillage when storing/removing materials.
* Non-hazardous materials (e.g., seed, livestock feeds) are kept away from hazardous materials.
* Storage area is clearly marked on the outside with warning signs.
* Flammables are kept out of direct sunlight.
* Dry materials are stored above liquids.
* Storage area is locked, and lock allows free exit from within when locked.
* Other (please specify):

**Level 3:** As per Level 2, and a current written inventory is maintained and accessible in the event of an emergency. An emergency plan is posted directing people what to do in case of an emergency. Three or more of the following apply:

* Storage area has a sealed floor.
* Storage area is well ventilated (no strong chemical smell).
* Inventory is managed on a first-in, first-out basis.
* Operation has a written internal audit process for dealing storage and safety issues associated with hazardous materials.
* Other (please specify):

**Level 4:** Hazardous wastes are limited due to success in eliminating use of pesticides labeled “Danger” or “Warning”, ***or*** as per Level 3, and storage area is state of the art, and all the following apply:

* Storage area is in a separate facility or building.
* The storage area is diked/curbed to contain spills.
* Capacity of the diking system is at least 125 percent of the largest quantity stored.
* Shelves are lipped and of an impermeable material.
* Road access is adequate for delivery and emergency vehicles.
* Storage area is locked, and lock allows free exit from within when locked.
* Valves on (large) storage tanks are locked when not in use where other security measures are not in place (if applicable).
* Storage is downwind (prevailing wind) from nearby housing, play, or livestock areas.

**Score:**

**Verification methods and notes:**

## Application Equipment Calibration and Pesticide Drift Management

**Level 1:** Application equipment that can be calibrated (insecticide, fungicide, herbicide growth regulator, fertilizer application equipment) is calibrated less than once per year. Applications are made only with equipment designed for that use. Nozzles are checked and replaced when necessary.

**Level 2:** Check the following, as applicable:

* Products are mixed according to label directions.
* Application equipment is calibrated at the start of each season, if designed to be calibrated.
* Drift reduction strategies are used.
* Applications are made only under weather conditions that minimize off-site movement (e.g., low wind speed, not raining).
* Commercial application companies are hired on this operation.

**Level 3:** As per Level 2, and

* Spot applications are used exclusively on this operation. All the following apply:
	+ - * Spot applications are limited to infested areas.
			* Pressure gauge on applicator is calibrated regularly.
			* Training is provided in proper use of equipment for efficient and effective application.

***or*** all the following apply:

* The method of calibration is communicated to the inspector via written calibration records or verbal description. Note: Inspectors must feel confident that the method of calibration is adequate. Provide notation as to calibration methods used.
* When possible, calibration is adjusted to control amount applied and distribution of application (e.g., air blast sprayer nozzle distribution matches plant canopy size and shape).
* Buffer areas are established around fields to help reduce drift.
* Other (please specify):

**Level 4:** As per Level 3, and at least 1 of the following apply:

* Application equipment is calibrated more than once per season or uses technology that continuously calibrates.
* Technology is employed to keep particle size above 150 microns depending on the type of equipment and pesticide used.
* Water sensitive paper and spray droplet analysis software is used to avoid drift or over-application.
* Pesticide application equipment is selected and maintained for site-specific conditions (e.g., hooded sprayers for windy sites).
* Storage is downwind (prevailing wind) from housing, play, or livestock areas.
* An emergency plan is posted directing people what to do in case of an emergency.

**Score:**

**Verification methods and notes:**

Scorecard

Scorecard for integrated pest, disease, and weed management

|  |  |
| --- | --- |
| **CRITERIA** | **SCORE/LEVEL** |
| Continuing education for integrated pest, disease, and weed management |  |
| Production plan including IPM  |  |
| IPM activities: prevention |  |
| IPM activities: avoidance  |  |
| IPM activities: monitoring |  |
| IPM activities: pest suppression |  |
| Protection plan |  |
| IPM program outcomes |  |
| Ecological service management outcomes |  |
| Risk management outcomes |  |
| Coordinated whole operation management of pests |  |
| Hazardous material storage  |  |
| Application equipment calibration and pesticide drift management |  |
|  |  |
| **(1) TOTAL POINTS EARNED** |  |
|  |  |
| **Total Points Available** | **52** |
| **- Minus Total Points Not Applicable** |  |
| **(2) TOTAL APPLICABLE POINTS** |  |
|  |  |
| **(3) AVERAGE PERCENTAGE SCORE = [(1) / (2)] \* 100** | **%** |

# Soil and Water Conservation Evaluation Criteria Inside Greenhouses

## Continuing Education for Soil and Water Conservation

**Level 1:** Manager demonstrates little or no knowledge about soil and water conservation. Current greenhouse operation reflects this knowledge gap, with no special planning or action considered to prevent soil erosion, conserve water, and protect water quality.

**Level 2:** Manager relies on general interest agricultural publications (newspapers and general newsletters, etc.) to learn about soil and water conservation. During the discussion, manager demonstrates a basic understanding of the issue area.

**Level 3:** Manager uses technical, subject matter-specific information sources to aid in soil and water conservation. Manager can discuss these issues and communicates technical knowledge of the following specific soil and water conservation issues. If relevant national or state-wide best management practices (BMPs) exist, manager can describe which BMPs are meaningful to their operation and how they have been incorporated. (Several states and provinces in the United States and Canada as well as Australia, The United Kingdom, and others have published Best Management Practices (BMPs) standards for greenhouse production.) Check all that apply:

* Erosion prevention strategies
* Nutrient budgets
* Innovative irrigation systems and management
* Soil quality monitoring
* Precision application of plant nutrients
* Incorporation of crop residue or compost in container mix
* Riparian habitat and buffer zones around surface waters
* Carbon sequestration in agricultural soils, (i.e., around greenhouse facility perimeters)
* Water conservation practices (list practices used)
* Other (please specify):

**Level 4:** As per Level 3, and manager participates (or has participated in the last 5 years) in either on-site testing of soil or media, and/or water conservation strategies to evaluate their usefulness, or participates in a local or regional water quality council or organization. Manager also documents performance of on-site soil and water conservation practices.

**Score:**

**Verification methods and notes:**

## Irrigation Systems Inside Greenhouses

**Note:** Properly managed, flood irrigation can be managed in perennial systems to increase overall greenhouse operation productivity without causing erosion (in or below the site), and to maintain good litter distribution (where applicable in a greenhouse setting).

**Level 1:** An irrigation system is used that appears inefficient and may allow water, nutrients, pesticides, and/or soil particles to leave the site.

**Level 2:** An irrigation system with 3 or more of the following improvements is used.
Check all that apply:

* Drop pivot systems use high efficiency drop nozzles.
* Sprinkler systems make use of low-pressure micro-sprinklers.
* Drip emitter systems are used.
* Trickle emitters are used when appropriate for the crop.
* Soil moisture sensors are used to monitor moisture.
* Variable frequency drive pumps are used.
* Crop modeling is used to predict plant demand.
* A sub-irrigation system is utilized.
* An ebb and flow system is utilized.
* A weather data system is used to estimate crop water use.
* Other (please specify):

**Level 3:** A total of 5 or more from Level 2 apply. If relevant, national or state-wide best management practices (BMPs) exist, manager can describe which BMPs are meaningful to their operation and how they have been incorporated. Check all applicable:

* Drop pivot systems use high efficiency drop nozzles.
* Sprinkler systems make use of low-pressure micro-sprinklers.
* Drip emitter systems are used.
* Trickle emitters are used when appropriate for the crop.
* Soil moisture sensors are used to monitor moisture.
* Variable frequency drive pumps are used.
* Crop modeling is used to predict plant demand.
* A sub-irrigation system is utilized.
* An ebb and flow system is utilized.
* A weather data system is used to estimate crop water use.
* Other (please specify):

**Level 4:** As per Level 3, and a total of 6 or more from Level 2 apply. Improvements in water use efficiency for the greenhouse operation are documented. Check all applicable:

* Drop pivot systems use high efficiency drop nozzles.
* Sprinkler systems make use of low-pressure micro-sprinklers.
* Drip emitter systems are used.
* Trickle emitters are used when appropriate for the crop.
* Soil moisture sensors are used to monitor moisture.
* Variable frequency drive pumps are used.
* Crop modeling is used to predict plant demand.
* A sub-irrigation system is utilized.
* An ebb and flow system is utilized.
* A weather data system is used to estimate crop water use.
* Other (please specify):

**Score:**

**Verification methods and notes:**

## Irrigation Water Conservation Inside Greenhouses

**Note:** For greenhouse operations with a choice of irrigation water sources, the selected source of irrigation water results in the least potential impact to in-stream flows of fish-bearing streams, both on greenhouse property and downstream from it. Fish losses must be avoided by installing fish screens on diversions in accordance with the State Department of Fish and Wildlife, or other similar guidance requirements specific to the greenhouse operation’s geographic location.

**Level 1:** Water use or need is not monitored or planned.

**Level 2:** ***Either***

* Water use is monitored, and data is recorded.

*or*

* Annual planning for available water is a priority (as applies to regions with seasonal water availability).

**Level 3:** If national or state-wide best management practices (BMPs) exist, manager can describe which BMPs are meaningful to their operation and how they have been incorporated.
As per Level 2, and 5 or more of the following irrigation management behaviors are evident. Check all that apply):

* Irrigation activities are initiated based on moisture testing.
* Water use data is analyzed and interpreted for managers and staff for improving water conservation techniques.
* Irrigation practices consider media type and infiltration rates.
* Weather information is factored into the timing of irrigation activities.
* Crop demand or consumptive use is factored into irrigation activities.
* Non-synthetic fertilizers, e.g., vermicompost, are incorporated into media and improvement in organic matter is detected.
* Water system is completely closed, with no water discharged on- or off-site.
* Water is collected and recycled for other uses using crowned, graveled floors, permeable road cloth, collection tile lines that direct run off to ponds or underground tanks on-site.
* Water is collected in French drain systems and discharged slowly on-site.
* Water is collected in a leach field and discharged slowly on-site.
* Manager participates in a local or regional body responsible for water issues such as over-allocation, groundwater recharge, stream flow, etc.
* Other (please specify):

**Level 4:** A total of 8 or more items from Levels 3 and 4 apply. Check all applicable:

* Greenhouse operation works on diversions, including installing and servicing pumps and intakes, only when salmon are not present in streams, during approved in-stream work periods, and in accordance with state and local regulations and permits. If in-stream work is done when there is water in the stream, water is diverted around the construction area to limit impacts to habitat. Turbidity curtains and other in-stream sediment control and containment measures should be used to prevent sediment and construction debris from entering the waterway
* Greenhouse water is conserved by scheduling timing of water application in specific consideration of crop requirements, outside temperatures, media types, and known evapotranspiration rates for the area. Media moisture is to provide timely information about soil moisture levels relative to crop needs to improve irrigation efficiency. Excessive water application is unacceptable. Irrigation withdrawal volumes and rates are measured and recorded, with the intent of showing a reduction in water use over time or demonstrating that no further efficiencies are feasible.
* Greenhouse operation monitors the performance of their irrigation system equipment and routinely monitors it to verify that motors, pumps, and delivery systems are performing well and according to specifications. If the only available irrigation source is a salmon-bearing or potentially salmon-bearing stream, irrigation withdrawals should not significantly limit habitat conditions or harm fish

If it is reasonably possible that fish may be harmed by irrigation withdrawals, the manager should implement 1 or more of the following to the greatest extent operationally feasible.
Check all that apply:

* Greenhouse operation attempts to reduce the amount of area planted with high water demand crops.
* Greenhouse operation utilizes permeable, woven-fabric cloth below benches in propagation houses and other environmentally controlled structures to allow irrigation water to slowly absorb back in to the ground beneath.
* Greenhouse operation seeks alternative sources of water that do not limit habitat quality, particularly when required by fish during critical periods of their life cycle.
* Greenhouse operation considers leasing excess water rights to Oregon Water Trust, Washington Water Trust, or the Columbia Basin Water Transactions Program.
* Greenhouse operation uses no-potable water (captured rainwater, recycled graywater, reclaimed/treated wastewater, recycled/treated irrigation tailwater, etc.) for 70 percent of total irrigation volume.

**Score:**

**Verification methods and notes:**

## Nutrient Management Inside Greenhouses

**Level 1:** There is no nutrient management plan in place. Neither media nor plant tissues are monitored for nutrient levels.

**Level 2.** For fertilizer applications, 4 or more of the following apply. Check all applicable:

* Plant tissue testing is completed at regular intervals appropriate to the crop.
* Media pH is monitored and adjusted to ensure proper nutrient availability and uptake.
* Media and/or plant tissue tests are used to determine fertilizer application rates.
* Fertilizer applications comply with University or Extension crop and region-specific recommendations for rates and timing to minimize leaching and runoff while meeting plant needs.
* Manager considers media type, previous crop history, expected yields, and manures/ composts in fertilizer applications and account for these in nutrient budgets.
* Slow release fertilizers are used.
* Soluble, short-lived fertilizers are used.
* Fertilizer is incorporated into the media rather than applied on the surface.
* Split and/or dibbled applications are used.
* Organic fertilizers are used (e.g., animal manures, green manures, fish byproducts, kelp, bone meal, compost tea, ground up hazelnuts, meadowfoam byproducts, etc.) to meet, but not exceed, plant needs.
* Greenhouse operation cleans up and/or uses any spilled media from the planting and production process.
* Manager can describe how their operation recycles nutrients, and how they balance nutrient inputs with nutrient use.
* Other (please specify):

**Level 3:** A total of 6 or more from Level 2 apply. If relevant national or state-wide best management practices (BMPs) exist, nursery can describe which BMPs are meaningful to their operation and how they have been incorporated. A nutrient management plan is in place that includes at least 2 of the following. Check all that apply:

* Includes consideration of fertilizer type for both plant nutrient needs and environmental impact (broadly defined).
* Use of precision fertilizer applications based on multiple samplings per bench (with varying application rates per bench or house).
* Greenhouse operation participates in education, cost-share, and/or demonstration programs related to nutrient management planning.
* Greenhouse manager maintains records to demonstrate continuous improvement in nutrient management.
* One of the following 3 nutrient requirements is met exclusively with organic, non-commercial sources: nitrogen (N), phosphorous (P), or potassium (K), to meet, but not exceed, plant needs.

**Level 4:** As per Level 3, and a total of 9 or more practices from Level 2 apply. The nutrient management plan is written, and 3 or more from Level 3 apply. When available, and as appropriate, the nutrient management plan is completed with the assistance of a professional. Important indicators of success are evident. Check all that apply:

* The majority of nutrients are provided by on-greenhouse operation sources.
* Advanced media quality indicators related to nutrient retention and uptake (e.g., organic matter content, aggregation) are monitored and improvements documented.
* Greenhouse operation uses no peat in any planting media including for propagation of liners.
* Greenhouse operation uses no bark in any planting media including for propagation of liners.
* Greenhouse operation reuses all organic matter through composting and recycling of 100 percent of all vegetative trimmings or offers them for sale to the public.
* Other (please specify):

**Score:**

**Verification methods and notes:**

Scorecard

**Scorecard for soil and water conservation inside greenhouses**

|  |  |
| --- | --- |
| **CRITRIA** | **SCORE/LEVEL** |
| Continuing education for soil and water conservation |  |
| Irrigation systems inside greenhouses |  |
| Irrigation water conservation inside greenhouses |  |
| Nutrient management inside greenhouses |  |
|  |  |
| **(1) TOTAL POINTS EARNED =** |  |
|  |  |
| **Total Points Available** | **16** |
| **- Minus Total Points Not Applicable** |  |
| **(2) TOTAL APPLICABLE POINTS** |  |
|  |  |
| **(3) AVERAGE PERCENTAGE SCORE = [(1) / (2)] \* 100** | **%** |

# Soil and Water Conservation Evaluation Criteria for all Areas Outside Greenhouses

**Note:** Includes roll out areas, parking lots, landscaped areas, media storage areas, roads, walkways, non-nursery production areas (e.g., food or forage crops), etc. Any field or container plant production should be evaluated using the appropriate inspection tools.

## Stream Channel Protection and Restoration

Applies where operation has management control over streams on or adjacent to operation-managed property.

* N/A: There are no streams on or adjacent to operation-managed property ***or*** nursery has no management control over streams on or adjacent to operation-managed property.

**Level 1:** Channel manipulation, such as filling, excavating, and straightening is done without consideration for stream channel morphology and function. Manager cannot describe impacts to stream functions, stream temperature, and water quality resulting from on-site practices.
Check all that apply:

* Large and small woody debris are routinely removed from stream channels regardless of debris contribution to hydrologic or geomorphic function.
* Diversion structures present barriers for fish and wildlife.
* Floodplains and/or wetland areas appear in a degraded state (e.g., eroded areas of unusually sparse vegetation, hummocky, etc.) as applicable in a greenhouse operation.
* Other (please specify):

**Level 2:** Manager can describe appropriate management techniques for restoration and protection of stream channels and in-stream habitat. Manager can demonstrate that at least 3 management techniques are being implemented. List management techniques:

**Level 3:** As per Level 2, and manager has a basic written plan for or can describe how operation protects, and where possible, enhances stream channel morphology and function. Three or more of the following apply. Check all applicable:

* Existing levees have been removed or are set back to avoid encroaching on the floodplain.
* Unnatural in-stream barriers to fish and wildlife have been removed or plans are in place to remove them.
* Stream crossings avoid filling, excavating, or straightening stream channels.
* New stream crossings are designed to avoid impacts to in-stream habitat and allow for fish passage where appropriate.
* New stream crossings are designed to avoid constriction of floodwater conveyance during 25-year, 24-hour storm events.
* Unnecessary removal of woody debris is avoided.
* Disconnection of off-channel wetlands and ponds is avoided.
* Where appropriate, irrigation diversion structures are designed to allow adult and juvenile fish passage and do not trap fish.
* Existing channels are protected from new impacts such as filling and excavation, straightening, unnecessary stream crossings, excessive storm water runoff from greenhouse operations or disturbed areas.
* Other (please specify):

**Level 4:** As per Level 3, and active steps are being taken to restore stream channels to their natural condition. Channel manipulation, except for habitat restoration, is avoided to the greatest extent operationally feasible. A plan is in place to remove degraded wetlands from production and to restore natural functions to the greatest extent operationally feasible. A total of 5 or more from Level 3 apply. Check all applicable:

* Existing levees have been removed or are set back to avoid encroaching on the floodplain.
* Unnatural in-stream barriers to fish and wildlife have been removed or plans are in place to remove them.
* Stream crossings avoid filling, excavating, or straightening stream channels.
* New stream crossings are designed to avoid impacts to in-stream habitat and allow for fish passage where appropriate.
* New stream crossings are designed to avoid constriction of floodwater conveyance during 25-year, 24-hour storm events.
* Unnecessary removal of woody debris is avoided.
* Disconnection of off-channel wetlands and ponds is avoided.
* Where appropriate, irrigation diversion structures are designed to allow adult and juvenile fish passage and do not trap fish.
* Existing channels are protected from new impacts such as filling and excavation, straightening, unnecessary stream crossings, excessive storm water runoff from greenhouse operations or disturbed areas.
* Other (please specify):

**Score:**

**Verification methods and notes:**

## Buffer Strips Around Waterways (natural and constructed)

**Level 1:** Greenhouse production areas alongside waterways are currently managed to allow the following to occur less than 25 feet from water’s edge. Check all that apply:

* There is evidence of sediment or greenhouse effluent reaching watercourses.
* Riparian and/or wetland areas appear in a degraded state (e.g., eroded areas of unusually sparse vegetation, hummocky, etc.).

**Level 2:** Greenhouse production areas alongside waterways have been managed to achieve the following greater than 25 feet from water’s edge. Check all that apply:

* Sedimentation appears to be contained by the buffer.
* Stream banks seem stable with no evidence of falling into the watercourse.

**Level 3:** As the slope of the adjoining production area increases, the width of the riparian buffer zone is increased to adequately protect the riparian area from erosion and run-off. Riparian buffer zones are sufficiently vegetated to prevent the movement of agricultural chemicals, organics, nutrients, and sediment from adjoining fields and into surface waters. Check all that apply:

* Grass filter strips have been established and maintained in production areas above waterway.
* Riparian buffer areas are an average of 25-feet or more in width.
* The use of buffers and upland erosion-control measures has resulted in the prevention of the movement of sediment, nutrients, organics, and pesticides beyond the edge of the production area.
* Where water temperatures are an issue, buffer vegetation is managed to provide shade.
* Where appropriate, buffer vegetation provides wood recruitment, leaf litter supply, stream bank stability, and filtration of sediment to maintain aquatic habitat.
* Other (please specify):

**Level 4:** As per Level 3, and all the following apply (where applicable):

* On slopes of 10 percent or greater, riparian zones are no less than 50 feet wide in any location.
* Riparian zones and buffer areas are adequately vegetated with a diverse mix of species containing greater than 50 percent of mixed multi-aged, native and non-invasive non-native species.
* Newly established ground cover plantings include a diverse mix of adapted grasses and forbs appropriate to the site.
* Ecologically appropriate, trees and shrubs provide a second-story of cover and habitat, especially along stretches of streams or rivers in need of bank stabilization and shade. The use of native species is recommended when available and appropriate.
* Wetlands not currently in production and are protected by a minimum 25-foot uncultivated buffer. If 25-foot buffers are not operationally feasible, buffer must be provided to the greatest extent operationally feasible.
* Once established, practices are managed appropriately and maintained to ensure effectiveness.

**Score:**

**Verification methods and notes:**

## Irrigation Systems for All Areas Outside Greenhouses

**Note:** Properly managed, flood irrigation can be managed in perennial systems to increase overall greenhouse operation productivity, without causing erosion (in or below the site) and to maintain good litter distribution (where applicable in a greenhouse setting).

**Level 1:** An irrigation system is used that appears inefficient and may allow water, nutrients, pesticides, and/or soil particles to leave the site.

**Level 2:** An irrigation system with 3 or more of the following improvements is used.
Check all that apply:

* Drop pivot systems use high efficiency drop nozzles.
* Sprinkler systems make use of low-pressure micro-sprinklers.
* Mist systems are used.
* Drip emitter systems are used.
* Trickle emitters are used when appropriate for the crop.
* Soil moisture sensors are used to monitor moisture.
* Variable frequency drive pumps are used.
* Crop modeling is used to predict plant demand.
* A sub-irrigation system is utilized.
* An ebb and flow system is utilized.
* A weather data system is used to estimate crop water use.
* Irrigation is computer controlled to minimize consumption.
* Other (please specify):

**Level 3:** A total of 5 or more from Level 2 apply. If relevant national or state-wide best management practices (BMPs) exist, manager can describe which BMPs are meaningful to their operation and how they have been incorporated. Check all applicable:

* Drop pivot systems use high efficiency drop nozzles.
* Sprinkler systems make use of low-pressure micro-sprinklers.
* Mist systems are used.
* Drip emitter systems are used.
* Trickle emitters are used when appropriate for the crop.
* Soil moisture sensors are used to monitor moisture.
* Variable frequency drive pumps are used.
* Crop modeling is used to predict plant demand.
* A sub-irrigation system is utilized.
* An ebb and flow system is utilized.
* A weather data system is used to estimate crop water use.
* Irrigation is computer controlled to minimize consumption.
* Other (please specify):

**Level 4:** As per Level 3, and a total of 7 or more from Level 2 apply. Improvements in water use efficiency for the greenhouse operation are documented. Check all applicable:

* Drop pivot systems use high efficiency drop nozzles.
* Sprinkler systems make use of low-pressure micro-sprinklers.
* Mist systems are used.
* Drip emitter systems are used.
* Trickle emitters are used when appropriate for the crop.
* Soil moisture sensors are used to monitor moisture.
* Variable frequency drive pumps are used.
* Crop modeling is used to predict plant demand.
* A sub-irrigation system is utilized.
* An ebb and flow system is utilized.
* A weather data system is used to estimate crop water use.
* Irrigation is computer controlled to minimize consumption.
* Other (please specify):

**Score:**

**Verification methods and notes:**

## Irrigation Water Conservation for All Areas Outside Greenhouses

**Note:** For greenhouse operations with a choice of irrigation water sources, the selected source of irrigation water results in the least potential impact to in-stream flows of fish-bearing streams, both on greenhouse property and downstream from it. Fish losses must be avoided by installing fish screens on diversions in accordance with the State Department of Fish and Wildlife, or other similar guidance requirements specific to the greenhouse operation’s geographic location.

**Level 1:** Water use or need is not monitored or planned.

**Level 2: *Either***

* Water use is monitored, and data is recorded.

*or*

* Annual planning for available water is a priority (as applies to regions with seasonal water availability).

**Level 3:** If national or state-wide best management practices (BMPs) exist, manager can describe which BMPs are meaningful to their operation and how they have been incorporated.
As per Level 2, and 5 or more of the following irrigation management behaviors are evident.
Check all that apply:

* Irrigation activities are initiated based on moisture testing.
* Water use data is analyzed and interpreted for managers and staff for improving water conservation techniques.
* Irrigation practices consider media type and infiltration rates.
* Weather information is factored into the timing of irrigation activities.
* Crop demand or consumptive use is factored into irrigation activities.
* Drought resistant varieties are selected.
* Crops are produced without irrigation.
* Mulches and ground covers are used.
* Manures (animal and/or green) are incorporated into media and improvement in organic matter is detected.
* Water is collected and recycled for other uses using crowned, graveled floors, permeable road cloth, collection tile lines that direct run off to ponds or underground tanks on-site.
* Water is collected in French drain systems and discharged slowly on-site.
* Water is collected in a leach field and discharged slowly on-site.
* Manager participates in a local or regional body responsible for water issues such as over-allocation, groundwater recharge, stream flow, etc.
* Other (please specify):

**Level 4:** A total of 8 or more items from Levels 3 and 4 apply. Check all applicable:

* Greenhouse operation works on diversions, including installing and servicing pumps and intakes, only when salmon are not present in streams, during approved in-stream work periods, and in accordance with state and local regulations and permits. If in-stream work is done when there is water in the stream, water is diverted around the construction area to limit impacts to habitat. Turbidity curtains and other in-stream sediment control and containment measures should be used to prevent sediment and construction debris from entering the waterway
* Greenhouse water is conserved by scheduling timing of water application in specific consideration of crop requirements, outside temperatures, media types, and known evapotranspiration rates for the area. Media moisture is to provide timely information about soil moisture levels relative to crop needs to improve irrigation efficiency. Excessive water application is unacceptable. Irrigation withdrawal volumes and rates are measured and recorded with the intent of showing a reduction in water use over time or demonstrating that no further efficiencies are feasible.
* Greenhouse operation monitors the performance of their irrigation system equipment and routinely monitors it to verify that motors, pumps, and delivery systems are performing well and according to specifications. If the only available irrigation source is a salmon-bearing or potentially salmon-bearing stream, irrigation withdrawals should not significantly limit habitat conditions or harm fish

If it is reasonably possible that fish may be harmed by irrigation withdrawals, the manager should implement 1 or more of the following to the greatest extent operationally feasible.
Check all that apply:

* Greenhouse operation attempts to reduce the amount of area planted with high water demand crops.
* Greenhouse operation utilizes permeable, woven-fabric cloth below benches in propagation houses, and other environmentally controlled structures to allow irrigation water to slowly absorb back in to the ground beneath.
* Greenhouse operation seeks alternative sources of water that do not limit habitat quality, particularly when required by fish during critical periods of their life cycle.
* Greenhouse operation considers leasing excess water rights to Oregon Water Trust, Washington Water Trust, or the Columbia Basin Water Transactions Program.
* Greenhouse operation uses no-potable water (captured rainwater, recycled graywater, reclaimed/treated wastewater, recycled/treated irrigation tailwater, etc.) for 70 percent of total irrigation volume.

**Score:**

**Verification methods and notes:**

## Nutrient Management for All Areas Outside Greenhouses

**Level 1:** There is no nutrient management plan in place. Neither media nor plant tissues are monitored for nutrient levels.

**Level 2:** Fertilizer applications are performed using 4 or more of the following nutrient management practices. Check all that apply:

* Plant tissue testing is completed at regular intervals appropriate to the crop.
* Media pH is monitored and adjusted to ensure proper nutrient availability and uptake.
* Media and/or plant tissue tests are used to determine fertilizer application rates.
* Fertilizer applications comply with University or Extension crop and region-specific recommendations for rates and timing to minimize leaching and runoff while meeting plant needs.
* Manager considers media type, previous crop history, expected yields, and manures/composts in fertilizer applications and account for these in nutrient budgets.
* Slow release fertilizers are used.
* Soluble, short-lived fertilizers are used.
* Fertilizer is incorporated in to the media rather than applied on the surface.
* Split and/or dibbled applications are used.
* Organic fertilizers are used (e.g. animal manures, green manures, fish byproducts, kelp, bone meal, compost tea, ground up hazelnuts, meadowfoam byproducts, etc.) to meet but not exceed plant needs.
* Mulching is used to reduce nutrient leaching.
* Greenhouse operation cleans up and/or uses any spilled media from the canning and production process.
* Manager can describe how their operation recycles nutrients, and how they balance nutrient inputs with nutrient use.
* Other (please specify):

**Level 3:** A total of 6 or more from Level 2 apply. If relevant national or state-wide best management practices (BMPs) exist, operation can describe which BMPs are meaningful to their operation and how they have been incorporated. A nutrient management plan is in place that includes at least 2 of the following. Check all that apply:

* Precision agricultural-guidance systems are used.
* Includes consideration of fertilizer type for both plant nutrient needs and environmental impact (broadly defined).
* A procedure to record observations on important indicators of success, like impacts on surface water on-site (e.g., algal blooms, excessive vegetation), etc.
* One of the following 3 nutrient requirements is met exclusively with organic, noncommercial sources: nitrogen (N), phosphorous (P), or potassium (K), to meet but not exceed plant needs.

**Level 4:** As per Level 3, and a total of 3 or more from Level 3 apply. Additionally, a total of 4 or more from Level 2 apply. The nutrient management plan is written. When available and as appropriate, the nutrient management plan is completed with the assistance of a professional. Important indicators of success are evident. Check all that apply:

* The majority of nutrients are provided by on-greenhouse operation sources.
* Use of precision fertilizer applications based on multiple samplings per bench (with varying application rates per bench or house).
* Advanced media quality indicators related to nutrient retention and uptake (e.g., organic matter content, aggregation) are monitored and improvements documented.
* Greenhouse operation participates in education, cost-share and/or demonstration programs related to nutrient management planning.
* Greenhouse manger maintains records to demonstrate continuous improvement in nutrient management.
* Greenhouse operation uses no peat in any planting media including for propagation of liners.
* Greenhouse operation uses no bark in any planting media including for propagation of liners.
* Greenhouse operation reuses all organic matter through composting and recycling of 100 percent of all vegetative trimmings or offers them for sale to the public.
* Greenhouse operation uses floating islands of aquatic and other plants to remediate contaminants.

**Score:**

**Verification methods and notes:**

## Soil Organic Matter Management for All Areas Outside Greenhouses

**Level 1:** Organic matter is not monitored. Inorganic fertilizers supply the majority of plant nutrients. Fertilizers may be applied without regard to media testing or crop monitoring.

**Level 2:** Organic matter is considered a factor in management. Manager employs 2 or more of the following. Check all that apply:

* No-till, direct-seed, strip-till, or other restricted tillage practices are used.
* Seasonal cover crops that produce high volumes of organic material or root mass are used.
* Conservation cover (permanent vegetative cover) is planted between rows in orchards, vineyards, and other perennial row crops (e.g., scion orchards) is used.
* Mulches (natural or synthetic) are applied.
* Regular additions of organic matter (e.g., green manures, composts) are applied.
* Strip cropping with annuals and perennials is used.
* Least oxidizing inorganic fertilizers (e.g., urea versus anhydrous ammonia) are used.
* Perennial crops (e.g., scion orchards) are inter-rowed with cover crops.
* Fertilizers are applied using precision applications, banding applications and/or split applications.
* Precision agricultural-guidance systems are used.
* Other (please specify):

**Level 3:** As per Level 2, and organic matter management is a priority. A total of 4 or more from Level 2 apply. Changes in organic matter resulting from implemented practices are documented. Check all applicable:

* No-till, direct-seed, strip-till, or other restricted tillage practices are used.
* Seasonal cover crops that produce high volumes of organic material or root mass are used.
* Conservation cover (permanent vegetative cover) is planted between rows in orchards, vineyards, and other perennial row crops (e.g., scion orchards) is used.
* Mulches (natural or synthetic) are applied.
* Regular additions of organic matter (e.g., green manures, composts) are applied.
* Strip cropping with annuals and perennials is used.
* Least oxidizing inorganic fertilizers (e.g., urea versus anhydrous ammonia) are used.
* Perennial crops (e.g., scion orchards) are inter-rowed with cover crops.
* Fertilizers are applied using precision applications, banding applications and/or split applications.
* Precision agricultural-guidance systems are used.
* Other (please specify):

**Level 4:** As per Level 3, and manager has eliminated use of inorganic fertilizers due to the successful implementation of media quality and fertility-management activities. Media tests are taken annually and include organic matter content. Manager has developed and documented a plan for improvement on each individual production greenhouse site.

**Score:**

**Verification methods and notes:**

## Soil Erosion Prevention for All Areas Outside Greenhouses

**Level 1:** All applicable federal, state, and local erosion-related legal requirements are met
(if applicable for e.g., buffer zones, management of highly erodible areas).

**Level 2:** As per Level 1, and soil erosion is monitored regularly. Where allowed, structure runoff is controlled to avoid erosion. If signs of erosion are present, check all that apply:

* Soil deposits exist at production area margins as evidence of erosion.
* Substrate/media deposits exist at production area margins as evidence of erosion.
* Channels and gullies are present.
* Erosion pedestals are present.
* Wind scoured areas, blowouts, or depositional areas are present.
* Surface-crusted areas are visible.
* Other (please specify):

If erosion is present or reported, the manager must employ 2 or more landscape improvement or cultural practice. Check all that apply:

* Diversion ditches.
* Terracing.
* Contour buffer strips.
* Cross wind trap strips or herbaceous wind barriers for wind erosion control.
* Windbreaks/shelterbelts for wind erosion control.
* Sediment trap (sediment pond or other sediment trapping structure).
* Other (please specify):

**Level 3:** As per Level 2. Where erosion is present or reported, a total of 4 or more from Level 2 apply. Two or more of the following are integrated into the production system.
Check all that apply):

* Mulches are used for weed suppression and moisture retention.
* Organic matter (e.g., manures, composts) is incorporated into container substrate/media.
* Perennial crops are integrated into the nursery.
* Containment ponds are utilized, and the water reused on site.
* Runoff from greenhouse structures is collected for reuse.
* Other (please specify):

**Level 4:** As per Level 3, and a total of 3 or more from Level 3 apply. Signs of erosion (see Level 2) are very minimal or absent. Practices are designed for each field and there is an evaluation of the effectiveness of implemented practices. All the following apply, where appropriate:

* To the greatest extent operationally feasible, greenhouse operation roads are stabilized with gravel, wood chips, geotextile fabric, or vegetative ground cover capable of withstanding nursery machinery.
* Greenhouse operation property should be regularly inspected following storm events. Evidence of erosion or surface runoff during inspections must be immediately repaired consistent with BMPs and the above standards.

**Score:**

**Verification methods and notes:**

## Tillage Selection Practices and Soil Compaction Prevention for All Areas Outside Greenhouses

**Level 1:** The possible soil-degrading effects of tillage are rarely considered on the greenhouse operation. Tillage operations on bare ground are conducted with minimal concern for soil productivity and compaction.

**Level 2:** The greenhouse operation considers tillage as a tool to be used judiciously. A tillage system that conserves soil (lessens soil erosion and compaction) and/or improves soil health is used on the greenhouse operation (where applicable in a greenhouse setting). Three or more of the following apply. Check all applicable:

* Non-inversion tillage methods are selected that result in crop residue left on the soil surface during critical erosion periods (e.g., conservation tillage).
* Tillage is restricted to specific portions of fields (e.g., strip tillage).
* Greenhouse activities that cause soil compaction are not performed when soils are wet.
* Tracked equipment rather than equipment with wheels are used to avoid destruction of the soil profile.
* Greenhouse traffic is generally controlled (e.g., use of field borders, tractor paths, and lanes within fields for machinery).
* Greenhouse vehicles are operated with improved load distributions.
* Precision agricultural-guidance systems are used.
* Cover crops are planted to improve drainage and increase the tilth of the soil.
* Long-term crops, like alfalfa, are incorporated into the rotation.
* Manures or compost are added to soils on a regular basis to improve tilth.
* Conservation cover (permanent vegetative cover) is planted between rows in scion orchards, and other perennial row crops (e.g., display gardens).
* Other (please specify):

**Level 3:** As per Level 2, and a total of 5 or more from Level 2 apply. Evidence of success is seen and/or documented through photography, monitoring records, etc. Check all that apply:

* Management records show gradual increases in soil organic matter.
* Greenhouse operation uses equipment designed to reduce soil compaction.
* Monitoring records show a decrease in soil compaction.
* Evidence of erosion is minimal or not present.
* Soil quality indicators are all positive.
* Soil tilth appears good.
* Operation deep plows to reduce hardpan and works the ground when soil moisture allows for the least amount of compaction.
* Tillage or other soil disturbances are scheduled to reduce compaction.
* Other (please specify):

**Level 4:** As per Level 3, and the manager selects production systems based on any of the following. Check all that apply:

* Greenhouse operation is in the process of or has recently converted acreage to perennial crops.
* The greenhouse operation is entirely in no-till, direct-seed, or other agricultural production system that uses crop rotations and other strategies to limit inputs.
* Greenhouse operation evaluates and documents improved efficiency of crop production resulting from adoption of conservation practices.
* Where drainage problems exist, greenhouse operation uses drain tiles at least 30 feet on-center.

**Score:**

**Verification methods and notes:**

Scorecard

**Scorecard for soil and water conservation for all areas outside greenhouses**

|  |  |
| --- | --- |
| **CRITERIA** | **SCORE/LEVEL** |
| Continuing education for soil and water conservation |  |
| Stream channel protection and restoration  |  |
| Buffer strips around waterways |  |
| Irrigation systems for all areas outside greenhouses |  |
| Irrigation water conservation for all areas outside greenhouses |  |
| Nutrient management for all areas outside greenhouses |  |
| Soil organic matter management for all areas outside greenhouses |  |
| Soil erosion prevention for all areas outside greenhouses |  |
| Tillage selection practices and soil compaction prevention  |  |
|  |  |
| **(1) TOTAL POINTS EARNED =** |  |
|  |  |
| **Total Points Available** | **36** |
| **- Minus Total Points Not Applicable** |  |
| **(2) TOTAL APPLICABLE POINTS** |  |
|  |  |
| **(3) AVERAGE PERCENTAGE SCORE = [(1) / (2)] \* 100** | **%** |

# Operational Efficiencies

## Continuing Education for Operational Efficiencies

**Level 1:** Manager demonstrates little or no knowledge about recycling/reuse options, energy efficiency, low-impact packaging, or other means for achieving efficiencies and reducing negative social and environmental impacts of the greenhouse operation. Current greenhouse operation reflects this knowledge gap, with no special planning or actions considered to capture efficiencies and reduce negative social and environmental impacts of the greenhouse operation.

**Level 2:** Manager relies on general interest agricultural publications (newspapers and general newsletters, etc.) to learn about operational efficiencies. During the discussion, manager demonstrates a basic understanding of the issue area.

**Level 3:** Manager uses technical, subject matter-specific information sources to aid in increasing operational efficiencies. Manager can discuss these issues and communicates technical knowledge of the following specific operational efficiencies issues.

**Level 4.**: As per Level 3, and manager participates (or has participated in the last 5 years) in either on-site testing of operational efficiencies strategies to evaluate their usefulness, or, participates in a local or regional water quality council or organization. Manager also documents performance of on-site operational efficiencies practices.

**Score:**

**Verification methods and notes:**

## Reuse and Recycle

**Level 1:** Manager neither recycles nor reuses any waste or byproducts from the operation. Manager is not informed about the issue.

**Level 2:** Manager communicates some knowledge of recycling or reuse of waste or byproducts from the nursery operation. Manager has a limited plan, or systematic method of recycling or reusing waste or byproducts from the greenhouse operation. Two or more of the following apply. Check all applicable:

* Greenhouse operation recycles all paper products including office paper, refuse from lunch rooms, field trash, old catalogs, stationary, etc.
* Manager communicates some knowledge of recycling or reuse of waste or byproducts from the nursery operation.
* Greenhouse operation reuses recycled shredded paper from newsprint industry.
* Greenhouse operation recycles metals.
* Other (please specify):

**Level 3:** Manager communicates detailed knowledge of some area of recycling or reuse of waste or byproducts from the nursery operation. Greenhouse has a detailed plan or systematic method for recycling or reusing waste or byproducts from part of the nursery operation. Six or more of the following apply. Check all applicable:

* Greenhouse operation composts, recycles, and reuses some plant and/or yard debris.
* Greenhouse operation recycles and reuses some equipment oils.
* Greenhouse operation recycles and reuses some grain or hay straw after harvest
(where applicable for a greenhouse operation).
* Greenhouse operation recycles and reuses some other local waste or byproducts.
* Greenhouse operation uses sustainable media amendments that do not include peat moss.
* Greenhouse operation is committed to reducing greenhouse gas emissions by using renewable energy sources to meet at least 10 percent of electricity demands or engages in at least a 2-year contract for the purchase of at least 35 percent of electricity from renewable energy sources.
* Greenhouse operation recycles wood pallets.
* Greenhouse operation recycles some plastics, (e.g. triple rinsed pesticide containers, poly from greenhouses, used pots, shade cloth, tying tape, grow tubes, tree labels, packaging, banding, etc.).
* Greenhouse operation recycles some cardboard products.
* Greenhouse operation recycles some tying twine.
* Greenhouse operation reuses cedar shavings from cedar shingle industry.
* Greenhouse operation reuses sawdust from lumber industry.
* Greenhouse operation reuses or sells some vegetative trimmings.
* Greenhouse operation cleans up and/or uses any spilled media from the planting and production process.
* Other (please specify):

**Level 4:** Manager communicates detailed knowledge of recycling or reuse of most of the waste or byproducts from all parts of the greenhouse operation. Manager has a detailed plan, or systematic method of recycling or reusing most of the waste or byproducts from all parts of the greenhouse operation. Eight or more of the following apply. Check all applicable:

* Greenhouse operation does not recycle or reuse any quarantined plant or yard debris.
* Greenhouse operation recycles and reuses equipment oils to the fullest extent possible.
* Greenhouse operation composts, recycles, and reuses plant and/or yard debris full extent possible.
* Greenhouse operation recycles and reuses grain or hay straw after harvest to the fullest extent possible.
* Greenhouse operation recycles and reuses other local waste or byproducts.
* Greenhouse operation uses sustainable media amendments that do not include peat moss.
* Greenhouse operation is committed to reducing greenhouse gas emissions by using renewable energy sources to meet at least 10 percent of electricity demands or engages in at least a 2-year contract for the purchase of 35 percent of electricity from renewable energy sources.
* Greenhouse operation recycles wood pallets.
* Greenhouse operation recycles all plastics including triple rinsed pesticide containers, poly from greenhouses, used pots, shade cloth, tying tape, grow tubes, tree labels, packaging, banding, etc.
* Greenhouse operation recycles all cardboard products.
* Greenhouse operation recycles all tying twine.
* Greenhouse operation reuses cedar shavings from cedar shingle industry.
* Greenhouse operation reuses sawdust from lumber industry.
* Greenhouse operation reuses or sells 100 percent of vegetative trimmings.
* Greenhouse operation conducts a waste audit to identify the weight or volume of ongoing consumables and the reuse, recycling, or composting of at least 50 percent of the ongoing consumables waste stream.
* Other (please specify):

**Score:**

**Verification methods and notes:**

## Energy Efficiency

**Level 1:** Manager neither employs nor considers energy efficiency in the greenhouse operation. Manager is not informed about the issue. Check all that apply:

* Manager has no plan, or systematic method of auditing energy use in the greenhouse operation.
* Manager communicates no knowledge of energy efficiency in the greenhouse operation.
* Other (please specify):

**Level 2:** Manager communicates some knowledge of energy efficiency in the greenhouse operation. Manager has a limited plan, or systematic method of energy efficiency auditing in the greenhouse operation.

**Level 3:** Manager communicates detailed knowledge of some area of energy efficiency in the greenhouse operation. Manager has a detailed plan, or systematic method of energy efficiency auditing in part of the greenhouse operation. Four or more of the following apply.
Check all applicable:

* Greenhouse operation demonstrates that the energy use during the 3 most recent years is at least 10 percent less than the average energy use over the previous 10 years.
* Greenhouse operation partners with an energy efficiency alliance or similar organization to prioritize efforts for resource management.
* Greenhouse operation uses high efficiency measures when operating its equipment.
* Greenhouse operation uses occupancy sensors, LEDs, fluorescent, metal halide, or other energy efficient lighting, and audits their use.
* Greenhouse operation uses variable frequency drive pumps and controls, and variable speed pumps for irrigation.
* Greenhouse operation uses drip irrigation and/or high efficiency sprinklers, nozzles, and emitters for irrigation.
* Greenhouse operation captures and reuses rainwater runoff from roofs and parking lots.
* Greenhouse operation uses high efficiency heating, air conditioning, and ventilation systems in its offices, greenhouses and warehouses (see details below).
* Greenhouse operation uses high efficiency insulation in its offices, greenhouses (double poly), and warehouses including thermal curtains where appropriate.
* Greenhouse operation utilizes best management practices for compliance with the Climate Friendly Nurseries Project (CFNP).For more information see: <http://www.climatefriendlynurseries.org/resources/best_management_practices_for_climate_friendly_nurseries.pdf>.
* Greenhouses use scheduling of plants to meet target market to reduce total energy costs of production.
* Other (please specify):

**Level 4:** Manager communicates detailed knowledge of energy efficiency auditing in all parts of the greenhouse operation. Manager has a detailed plan, or systematic method of energy efficiency auditing in all parts of the greenhouse operation, with a specific timeline for implementation. Five or more of the following apply. Check all applicable:

* Greenhouse operation demonstrates that the energy use during the 3 most recent years is at least 25 percent less than the average energy use over the previous 10 years.
* Greenhouse operation partners with an energy efficiency alliance or similar organization to prioritize efforts for resource management.
* Greenhouse operation uses occupancy sensors, LEDs, fluorescent, metal halide or other energy efficient lighting, and audits their use.
* Greenhouse operation uses variable frequency drive pumps and controls and variable speed pumps for irrigation.
* Greenhouse operation uses drip irrigation and/or high efficiency sprinklers, nozzles, and emitters for irrigation.
* Greenhouse operation captures and reuses rainwater runoff from roofs and parking lots.
* Greenhouse operation uses high efficiency heating, air conditioning, and ventilation systems in its offices, greenhouses, and warehouses (see details below).
* Greenhouse operation uses cogeneration systems to generate at least 50 percent of energy used.
* Greenhouse operation uses fuel cells.
* Greenhouse operation uses solar panels.
* Greenhouse operation uses geothermal energy.
* Greenhouse operation uses a log-fuel generator.
* Greenhouse operation uses a pellet fuel generator.
* Greenhouse operation uses a clean coal generator.
* Greenhouse operation uses a hot water or a steam generator for energy.
* Greenhouse operation uses steam for heat delivery.
* Greenhouse operation uses steam for sterilization of containers and media.
* Greenhouse operation uses biodegradable paint on shade products.
* Greenhouse operation uses biodegradable, reusable, woven shade fabric wave length colored for light conservation.
* Greenhouse operation uses high efficiency ventilation equipment for air movement (i.e., vented roofs, forced air tubes or fan jets, motorized side panels, pad and fan systems, horizontal circulation fan units, etc.).
* Greenhouse operation uses high efficiency insulation in its offices, greenhouses (e.g., high R value hard-walled acrylic, double poly) and warehouses including thermal curtains where appropriate.
* Greenhouse operation uses under bench heat curtains or skirting.
* Greenhouse operation uses bicycles, 4-wheelers, Segways™, motorized carts, or other means of conveyances for employees around the operation.
* Greenhouse operation uses conveyors, carousels, or other means of mechanical movers for moving plant materials around the greenhouse operation.
* Greenhouse operation uses rolling benches, stack benches, or other mechanical means for moving what would otherwise be fixed structures to lessen employee-related repetitive movement injuries.
* Greenhouse operation uses low stress chairs with proper back, seat, arm, and leg support (i.e., tissue culture lab).
* Greenhouse operation utilizes best management practices for compliance with the Climate Friendly Nurseries Project (CFNP).
* Other (please specify):

**Score:**

**Verification methods and notes:**

## Low-Impact Packaging

**Level 1:** Manager neither employs nor considers low-impact packaging in the greenhouse operation. Manager is not informed about the issue. Check all that apply:

* Manager has no plan, or systematic method of employing the use of low-impact packaging in the greenhouse operation.
* Manager communicates no knowledge of the use of low-impact packaging in the greenhouse operation.
* Other (please specify):

**Level 2:** Manager communicates some knowledge of the use of low-impact packaging in the greenhouse operation. All the following apply:

* Manager has a limited plan, or systematic method of using low-impact packaging in the greenhouse operation.
* Manager communicates some knowledge of how to employ or use low-impact packaging in the greenhouse operation.
* Other (please specify):

**Level 3:** Manager communicates detailed knowledge of some area of use of low-impact packaging in the greenhouse operation. Two or more of the following apply.
Check all applicable:

* Manager has a detailed plan for using low-impact packaging in part of the greenhouse operation.
* Nursery sources materials from suppliers that use low-impact packaging.
* Nursery sources materials in bulk or otherwise to reduce packaging of sourced materials.
* Manager has a systematic method for using low-impact packaging in part of the greenhouse operation.
* Manager communicates detailed knowledge of using low-impact packaging in some parts of the greenhouse operation.
* Greenhouse operation uses biodegradable plastic containers or directly plantable pots.
* Greenhouse operation uses containers made with recycled plastic.
* Greenhouse operation uses containers made with feather waste byproducts.
* Greenhouse operation uses roller containers for green roof applications.
* Greenhouse operation uses containers made with recycled paper pulp byproducts.
* Greenhouse operation demonstrates that the use of low-impact packaging during the 3 most recent years is at least 25 percent more than the use of conventional packaging over the previous 10 years.
* Other (please specify):

**Level 4:** Manager communicates detailed knowledge of all areas of use of low-impact packaging in the greenhouse operation. A total of 3 or more from level 3 apply. Four or more of the following apply. Check all applicable:

* Manager has a detailed plan for using low-impact packaging in all parts of the greenhouse operation and can demonstrate implementation of that plan.
* Manager has a systematic method of using low-impact packaging in all parts of the greenhouse operation and can demonstrate implementation of that method.
* Manager communicates detailed knowledge of using low-impact packaging in all parts of the greenhouse operation.
* Greenhouse operation demonstrates their willingness to reduce the amount of conventionally packaged products used in their daily operation.
* Greenhouse operation demonstrates a reliable method of monitoring their use of conventionally packaged products.
* Greenhouse operation demonstrates a method to minimize waste streams while maximizing the reuse and recycling of materials in their daily operation.
* Other (please specify):

**Score:**

**Verification methods and notes:**

Scorecard

**Scorecard for operational efficiencies**

|  |  |
| --- | --- |
| **CRITERIA** | **SCORE/LEVEL** |
| Continuing education for operational efficiencies |  |
| Reuse and recycle |  |
| Energy efficiency |  |
| Low-impact packaging |  |
|  |  |
| **(1) TOTAL POINTS EARNED =** |  |
|  |  |
| **Total Points Available** | **16** |
| **- Minus Total Points Not Applicable** |  |
| **(2) TOTAL APPLICABLE POINTS** |  |
|  |  |
| **(3) AVERAGE PERCENTAGE SCORE = [(1) / (2)] \* 100** | **%** |

# Fixed Criteria

## No GMO Seeds or Plant Materials are Used

Check the following as applicable:

* No GMO seeds or plant materials are produced on the nursery.
* GMO seeds and/or plant materials are produced on the nursery.

Check the verification method used:

* Records show the plant varieties grown. All are non-GMO varieties.
* There are currently no GMO varieties for the crops grown.
* Other (please specify):

**Score:**

**Verification methods and notes:**

## No Prohibited Pesticides Used

Food Alliance Prohibited Pesticide List

The Food Alliance Prohibited Pesticide List (PPL) is based on the WHO Recommended Classification of Pesticides by Hazard (2009). The PPL consists of materials classified as extremely hazardous or highly hazardous on the WHO list that are registered for use by the USEPA. Exceptions are allowed if the use of a material on the PPL is required by law or by required for export. The PPL is in Appendix 1, at the end of the evaluation materials.

Check the following as applicable:

* Pesticide records indicate that **none** of the pesticides listed in the Reducing Pesticide Usage section certification criteria are used on this nursery operation.
* Other (please specify):

Check the verification method used:

* Visual inspection of hazardous material storage confirms no presence of prohibited pesticides.
* Other (please specify):

**Score:**

**Verification methods and notes:**

|  |
| --- |
| Appendix 1: Food Alliance Prohibited Pesticide List**Class Ia and Ib pesticides registered for use by the USEPA (See: The WHO recommended classification of pesticides by hazard and guidelines to classification: 2009.) ©Food Alliance 2011** |
| **EPA Reg No.** | **Product Name** | **WHO Mixture Classi** | **Chemical****Name** |
| 5481-448 | AMVAC BIDRIN 8 WATER MISCIBLE INSECTICIDE  | Ib | Dicrotophos |
| 10163-95 | AZINPHOS METHYL TECHNICAL  | Ib | Azinphos-methyl |
| 66330-233 | AZINPHOSMETHYL 50W  | Ib | Azinphos-methyl |
| 5481-9032 | AZTEC 3.78% GRANULAR INSECTICIDE  | Ib | Phostebupirim |
| 5481-9028 | AZTEC 4.67% GRANULAR  | Ib | Phostebupirim |
| 5481-552 | BIDRIN XP  | Ib | Dicrotophos |
| 100-987 | BRODIFACOUM TECHNICAL  | Ia | Brodifacoum |
| 270-371 | BROMADIOLONE 2.5% CONCENTRATE  | Ib | Bromadiolone |
| 270-374 | BROMADIOLONE TECHNICAL  | Ia | Bromadiolone |
| 47629-9 | BROMETHALIN TECHNICAL  | Ia | Bromethalin |
| 279-3060 | CARBOFURAN TECHNICAL  | Ib | Carbofuran |
| 67760-43 | CHEMINOVA METHYL PARATHION 4 EC  | Ib | Methyl parathion |
| 4787-33 | CHEMINOVA METHYL PARATHION TECHNICAL  | Ib | Methyl parathion |
| 34704-259 | CLEAN CROP PHORATE 20G  | Ib | Phorate |
| 13808-7 | COMPOUND 1080 LIVESTOCK PROTECTION COLLAR  | Ib | 1080 |
| 56228-26 | COMPOUND 1080 TECHNICAL (LPC)  | Ia | 1080 |
| 47000-144 | CO-RAL COUMAPHOS 25% DUST BASE  | Ib | Coumaphos |
| 11556-98 | CO-RAL COUMAPHOS FLOWABLE INSECTICIDE  | Ib | Coumaphos |
| 11556-123 | CO-RAL PLUS INSECTICIDE CATTLE EAR TAG  | Ib | Coumaphos |
| 11556-148 | CORATHON  | Ib | Coumaphos |
| 11678-53 | COTNION-METHYL  | Ib | Azinphos-methyl |
| 66222-11 | COTNION-METHYL AZINPHOS METHYL 50W  | Ib | Azinphos-methyl |
| 11556-11 | COUMAPHOS TECHNICAL  | Ib | Coumaphos |
| 5481-545 | COUNTER 15G SYSTEMIC INSECTICIDE-NEMATICIDE  | Ib | Terbufos |
| 5481-562 | COUNTER 20G  | Ib | Terbufos |
| 5481-547 | COUNTER CR  | Ib | Terbufos |
| 5481-546 | COUNTER TECHNICAL POISON SOIL INSECTICIDE  | Ia | Terbufos |
| 5481-447 | DICROTOPHOS TECHNICAL  | Ib | Dicrotophos |
| 47629-12 | DIFENACOUM TECHNICAL  | Ia | Difenacoum |
| 7173-204 | DIFETHIALONE TECHNICAL  | Ia | Difethialone |
| 61282-5 | DIPHACINONE, TECHNICAL GRADE FOR MANUFACTURING ONLY  | Ia | Diphacinone |
| 352-361 | DU PONT METHOMYL COMPOSITION  | Ib | Methomyl |
| 5481-492 | DUPONT FORTRESS TECHNICAL  | Ia | Chlorethoxyphos |
| 352-342 | DUPONT LANNATE SP INSECTICIDE  | Ib | Methomyl |
| 352-366 | DUPONT METHOMYL TECHNICAL  | Ib | Methomyl |
| 352-400 | DUPONT OXAMYL TECHNICAL 42 INSECTICIDE/NEMATICIDE  | Ib | Oxamyl |
| 5481-9043 | ETHOPROP TECHNICAL  | Ib | Ethoprop |
| 5481-493 | FORTRESS 5G GRANULAR INSECTICIDE  | Ib | Chlorethoxyphos |
| 279-2876 | FURADAN 4F INSECTICIDE/NEMATICIDE  | Ib | Carbofuran |
| 279-3038 | FURADAN 85 DB  | Ib | Carbofuran |
| 279-3310 | FURADAN LFR INSECTICIDE/NEMATICIDE  | Ib | Carbofuran |
| 10163-78 | GOWAN AZINPHOS-M 50 WSB  | Ib | Azinphos-methyl |
| 66222-162 | GUTHION SOLUPAK 50% WETTABLE POWDER INSECTICIDE  | Ib | Azinphos-methyl |
| 11678-70 | GUTHION TECHNICAL INSECTICIDE  | Ib | Azinphos-methyl |
| 61282-38 | HOPKINS COV-R-TOX ENCAPSULATED WARFARIN - 50% TECHNICAL  | Ib | Warfarin |
| 61282-39 | HOPKINS WARFARIN TECHNICAL RODENTICIDE  | Ib | Warfarin |
| 13808-8 | M-44 CYANIDE CAPSULES  | Ib | Sodium cyanide |
| 33858-2 | M-44 CYANIDE CAPSULES  | Ib | Sodium cyanide |
| 35975-2 | M-44 CYANIDE CAPSULES  | Ib | Sodium cyanide |
| 35978-1 | M-44 CYANIDE CAPSULES  | Ib | Sodium cyanide |
| 39260-1 | M-44 CYANIDE CAPSULES  | Ib | Sodium cyanide |
| 39508-1 | M-44 CYANIDE CAPSULES  | Ib | Sodium cyanide |
| 56228-15 | M-44 CYANIDE CAPSULES  | Ib | Sodium cyanide |
| 56228-32 | M-44 CYANIDE CAPSULES ARCTIC FOX  | Ib | Sodium cyanide |
| 10707-10 | MAGNACIDE B MICROBIOCIDE  | Ib | Acrolein |
| 10707-9 | MAGNACIDE H HERBICIDE  | Ib | Acrolein |
| 7173-174 | MAKI TECHNICAL  | Ia | Bromadiolone |
| 7946-11 | MAUGET INJECT-A-CIDE B  | Ib | Dicrotophos |
| 10163-252 | MESUROL 75 WDG  | Ib | Methiocarb |
| 10163-229 | MESUROL 75% CONCENTRATE  | Ib | Methiocarb |
| 56228-33 | MESUROL 75% WETTABLE POWDER AVERSIVE CONDITIONING EGG TREATMENT  | Ib | Methiocarb |
| 10163-231 | MESUROL 75-W  | Ib | Methiocarb |
| 10163-230 | MESUROL TECHNICAL INSECTICIDE  | Ib | Methiocarb |
| 100-530 | METHIDATHION TECHNICAL  | Ib | Methidathion |
| 10163-245 | METHIDATHION TECHNICAL  | Ib | Methidathion |
| 5481-9041 | MOCAP EC NEMATICIDE - INSECTICIDE  | Ib | Ethoprop |
| 279-2862 | NIAGARA FURADAN 75 BASE  | Ib | Carbofuran |
| 5481-8980 | PHORATE 20 G  | Ib | Phorate |
| 9779-293 | PHORATE 20-G  | Ib | Phorate |
| 5481-8979 | PHORATE TECHNICAL INSECTICIDE  | Ia | Phorate |
| 83100-28 | ROTAM METHOMYL 90SP INSECTICIDE  | Ib | Methomyl |
| 81598-9 | ROTAM METHOMYL TECHNICAL  | Ib | Methomyl |
| 7173-75 | ROZOL RODENTICIDE TECHNICAL POWDER  | Ia | Chlorophacinone |
| 72500-15 | SLN PHARMACHEM WARFARIN  | Ib | Warfarin |

|  |  |  |  |
| --- | --- | --- | --- |
| 5481-561 | SMARTCHOICE 5G  | Ib | Chlorethoxyphos |
| 35975-4 | SODIUM FLUOROACETATE (COMPOUND 1080) LIVESTOCK PROTECTION COLLAR  | Ib | 1080 |
| 35978-8 | SODIUM FLUOROACETATE (COMPOUND 1080) LIVESTOCK PROTECTION COLLAR  | Ib | 1080 |
| 39508-2 | SODIUM FLUOROACETATE (COMPOUND 1080) LIVESTOCK PROTECTION COLLAR  | Ib | 1080 |
| 46779-1 | SODIUM FLUOROACETATE (COMPOUND 1080) LIVESTOCK PROTECTION COLLAR  | Ib | 1080 |
| 56228-22 | SODIUM FLUOROACETATE (COMPOUND 1080) LIVESTOCK PROTECTION COLLAR  | Ib | 1080 |
| 36029-14 | STRYCHNINE ALKALOID N.F.  | Ib | Strychnine |
| 27995-1 | STRYCHNINE ALKALOID N.F. POWDER  | Ib | Strychnine |
| 37259-1 | STRYCHNINE ALKALOID NFX  | Ib | Strychnine |
| 5481-9031 | TEBUPIRIMPHOS TECHNICAL  | Ia | Phostebupirim |
| 12455-88 | TECHNICAL BRODIFACOUM  | Ia | Brodifacoum |
| 12455-70 | TECHNICAL BROMADIOLONE  | Ia | Bromadiolone |
| 12455-92 | TECHNICAL BROMETHALIN  | Ia | Bromethalin |
| 12455-25 | TECHNICAL DIPHACINONE  | Ia | Diphacinone |
| 61282-1 | TECHNICAL DIPHACINONE  | Ia | Diphacinone |
| 12455-26 | TECHNICAL WARFARIN  | Ib | Warfarin |
| 100-1015 | TEFLUTHRIN TECHNICAL  | Ib | Tefluthrin |
| 264-330 | TEMIK BRAND 15G ALDICARB PESTICIDE  | Ib | Aldicarb |
| 5481-526 | THIMET 10-G SOIL AND SYSTEMIC INSECTICIDE  | Ib | Phorate |
| 5481-527 | THIMET 15-G SOIL AND SYSTEMIC INSECTICIDE  | Ib | Phorate |
| 5481-530 | THIMET 20-G  | Ib | Phorate |
| 5481-528 | THIMET MC - 85 FOR MANUFACTURING PURPOSES ONLY  | Ia | Phorate |
| 5481-529 | THIMET TECHNICAL FOR MANUFACTURING PURPOSES ONLY  | Ia | Phorate |
| 352-532 | VYDATE C-LV INSECTICIDE/NEMATICIDE  | Ib | Oxamyl |
| 352-372 | VYDATE L INSECTICIDE/NEMATICIDE  | Ib | Oxamyl |
| 69826-1 | WARFARIN TECHNICAL  | Ib | Warfarin |
| 3282-32 | WINCON WARFARIN TECHNICAL  | Ib | Warfarin |
| 61282-3 | ZINC PHOSPHIDE 93  | Ib | Zinc phosphide |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| NOTE: WHO classification is based on acute risks to human health. Class Ia = extremely hazardous, Class Ib = highly hazardous.  |  |  |

# Appendix 2: Checklist for Combined Food Alliance and Salmon Safe Certification of Nursery and Greenhouse Operations

1. **Production System**

For each production system, the following boxes must all be checked for the applicant to claim Salmon Safe Certification, to make Salmon Safe-related marketing claims or to use any Salmon Safe promotional materials, such as seals, etc. If the operation does not use a particular production system, mark that system N/A.

1. **Field Production**

**Standard Area: Soil and water conservation**

**Evaluation Criteria: Stream channel protection and restoration**

* Stream crossings avoid filling, excavating, or straightening stream channels.
* New stream crossings are designed to avoid impacts to in-stream habitat and allow for fish passage where appropriate
* New stream crossings are designed to avoid constriction of floodwater conveyance during 25-year, 24-hour storm events.
* Unnecessary removal of woody debris is avoided.
* Disconnection of off-channel wetlands and ponds is avoided.
* Where anadromous fish are present, irrigation diversion structures on the operation are designed to allow adult and juvenile fish passage and do not trap fish.
* Existing channels are protected from new impacts such as filling and excavation, straightening, unnecessary stream crossings, excessive stormwater runoff from nursery operations or disturbed areas.

**Evaluation Criteria: Buffer strips around waterways (natural and constructed)**

* + - As the slope of the adjoining field increases, the width of the riparian buffer zone is increased to adequately protect the riparian area from erosion and run-off.
		- Riparian buffer zones are sufficiently vegetated to prevent the movement of agricultural chemicals, organics, nutrients and sediment from adjoining fields into surface waters.

**Evaluation Criteria: Irrigation water conservation**

* Nursery work on diversions, including installing and servicing pumps and intakes, occurs only when salmon are not present in streams, during approved in-stream work periods, and in accordance with state and local regulations and permits.

**Evaluation Criteria: Soil erosion prevention**

* Signs of soil erosion are minimal or absent, and there is no evidence of sediment transport to downstream waterways
1. **Container Production**

**Standard Area: Soil and water conservation for all areas**

**Evaluation Criteria: Stream channel protection and restoration**

* Stream crossings avoid filling, excavating, or straightening stream channels.
* New stream crossings are designed to avoid impacts to in-stream habitat and allow for fish passage where appropriate.
* New stream crossings are designed to avoid constriction of floodwater conveyance during 25-year, 24-hour storm events.
* Unnecessary removal of woody debris is avoided.
* Disconnection of off-channel wetlands and ponds is avoided.
* Where anadromous fish are present, irrigation diversion structures on the operation are designed to allow adult and juvenile fish passage and do not trap fish.
* Existing channels are protected from new impacts such as filling and excavation, straightening, unnecessary stream crossings, excessive stormwater runoff from nursery operations or disturbed areas.

**Evaluation Criteria: Buffer strips around waterways (natural and constructed)**

* As the slope of the adjoining field increases, the width of the riparian buffer zone is increased to adequately protect the riparian area from erosion and run-off.
* Riparian buffer zones are sufficiently vegetated to prevent the movement of agricultural chemicals, organics, nutrients and sediment from adjoining fields into surface waters.

**Evaluation Criteria: Irrigation water conservation**

* Nursery work on diversions, including installing and servicing pumps and intakes, occurs only when salmon are not present in streams during approved in-stream work periods, and in accordance with state and local regulations and permits.

**Evaluation Criteria: Soil erosion prevention**

* Signs of soil erosion are minimal or absent, and there is no evidence of sediment transport to downstream waterways.
1. **Greenhouse Production**

**Standard Area: Soil and water conservation for inside greenhouses**

**Evaluation Criteria: Irrigation water conservation**

* Greenhouse works on diversions, including installing and servicing pumps and intakes, occurs only when salmon are not present in streams during approved in-stream work periods, and in accordance with state and local regulations and permits.

**Standard Area: Soil and water conservation for all areas outside greenhouses**

**Evaluation Criteria: Stream channel protection and restoration**

* Stream crossings avoid filling, excavating, or straightening stream channels.
* New stream crossings are designed to avoid impacts to in-stream habitat and allow for fish passage where appropriate
* New stream crossings are designed to avoid constriction of floodwater conveyance during 25-year, 24-hour storm events.
* Unnecessary removal of woody debris is avoided.
* Disconnection of off-channel wetlands and ponds is avoided.
* Where anadromous fish are present, irrigation diversion structures on the operation are designed to allow adult and juvenile fish passage and do not trap fish.
* Existing channels are protected from new impacts such as filling and excavation, straightening, unnecessary stream crossings, excessive stormwater runoff from nursery operations or disturbed areas.

**Evaluation Criteria: Buffer strips around waterways (natural and constructed)**

* + - As the slope of the adjoining field increases, the width of the riparian buffer zone is increased to adequately protect the riparian area from erosion and run-off.
		- Riparian buffer zones are sufficiently vegetated to prevent the movement of agricultural chemicals, organics, nutrients and sediment from adjoining fields into surface waters.

**Evaluation Criteria: Soil erosion prevention**

* Signs of soil erosion are minimal or absent, and there is no evidence of sediment transport to downstream waterways
1. **Salmon Safe HIGH HAZARD PESTICIDE LIST**

Certain pesticides are a serious threat to salmon and other aquatic life. In addition to killing fish, these pesticides at sub-lethal concentrations can stress juveniles, alter swimming ability, interrupt schooling behaviors, cause salmon to seek sub-optimal water temperatures, inhibit seaward migration, and delay spawning. All these behavioral changes ultimately affect survival rates.

The following table (next page) lists many of the pesticides known to cause problems for salmon and other fish. The list includes chemicals that could be used in nursery and greenhouse applications that are listed with the EPA in various risk categories. Use this chart to help identify pesticides that require special consideration. Please note that this chart lists only some of the currently available pesticides in common usage.

A nursery using any of the pesticides indicated as “High Hazard” below may be certified only if Salmon-Safe’s variance request form is submitted *in advance* demonstrating a clear need for use of the pesticide, that no safer alternatives exist, that the method of application (such as timing, location, and amount used) represents a negligible risk to water quality and fish habitat, *and* that the landowner has consulted with university extension or comparable technical expert.

**Salmon Safe “HIGH HAZARDOUS” Agricultural Pesticides**

1,3-dichloropropene

2,4-D

Abamectin

Acephate

Altacor

Atrazine

Azinphos-Methyl

Bensulide

Bentazon

Bifenazate

Bifenthrin

Bromoxynil

Carbaryl

Carbofuran

Carboximide

Carboxin

Carfentrazone-ethyl

Chlorothalonil

Chlorpyrifos

Copper Sulfate\*

Coumaphos

Cyhalothrin

Cypermethrin

Diazinon

Dicamba

Dichlobenil

Diclofop-methyl

Diflubenzuron

Dimethoate

Dimethylformamide

Disulfoton

Dithane

Diuron

Dodine P

Emamectin Benzoate

Esfenvalerate

Ethoprop

Extoxazole Technical

Fenamiphos

Fenbutatin-Oxide

Fenpropathrin P

Fenpyroximate

Flumioxazin P

Hexythiazox P

Imidacloprid

Iprodione

Linuron

Malathion

Mancozeb/Penncozeb

Methamidophos

Methidathion

Methomyl

Methyl Parathion

Metolachlor

Metribuzin

Molinate

Nale

Norflurazon

Oryzalin

Oxyfluorfen

Paraquat Dichloride

Parathion

Pebulate Pendimethalin

Permethrin

Phorate

Phosmet

Prometryn

Propargite

Propiconazole

Pyriproxyfen P

Rimon

Quintozene

Rimon

Simazine

Spirodiclofen
 Tebuthiuron

Terbacil

Terbufos

Thiacloprid

Thiocarbamate

Thiophanate-methyl P

Thiram

Triclopyr

Trifluralin

**\***Salmon-Safe restrictions apply to any copper-containing pesticide including copper hydroxide, copper ammonium hydroxide, copper carbonate, and copper oxide, and others.

P: Pending Review. This list is based on EPA hazard level for fish and fish habitat. It is revised by Salmon Safe as pesticide registrations are updated and as more environmental data becomes available.