

Salmon-Safe® Farm Management Certification Program

Field Assessor's Guidelines 4.2



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Salmon-Safe, Inc.

This document contains the evaluation procedures and standards to be used by contract inspectors conducting field assessments of farming operations applying for certification under the Salmon Safe agricultural program. The procedures and evaluation standards have been implemented at more than 100 farms, orchards, vineyards, and dairies. The standards are continually refined based upon consultation with key stakeholders and pertinent experts, as well as ongoing research into the relationships between farmland management activities and stream ecosystem health.

The purpose of this certification program is to provide a structured and reproducible procedure for recognizing those farm operations that are doing their part in contributing to the restoration of water quality and stream ecosystem health in the important salmonid fisheries of the Pacific Northwest. The focus of this program is on management practices and the degree to which a farm operation's practices are compatible with best management practices for avoiding harm to watercourses located within or near the farm.

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BIOLOGICAL BASIS FOR STANDARDS

The intent of Salmon Safe's certification program is to ensure that farm management practices utilize Best Management Practices (BMPs) to avoid harm, and where appropriate, enhance and restore the health of stream ecosystems.

From the standpoint of avoiding adverse impacts to salmonid stream ecosystem health, farm operations must address the principal forms of impact:

- ⊙ Introduction into streams of sediment, energy (temperature) or chemicals from surface or sub-surface runoff.
- ⊙ Elimination/reduction of riparian vegetation that serves as filters for chemicals and sediment in runoff, provides shade and cover along streams, and supports diverse communities of organisms, including those key to aquatic food chains.
- ⊙ Direct alteration or disruption of in-stream habitat, stream banks, and streamside conditions through purposeful practices such as bank armoring, redirecting the course of streams, building dams, or inadvertent impacts resulting from excessive, poorly designed or inadequately maintained stream crossings.
- ⊙ Alteration of stream flow regimes through stream water diversions or excessive groundwater pumping.

The field evaluation is organized around six farm management program elements:

- A. Riparian and Wetland Area Management
- B. Irrigation Water Use and Management
- C. Erosion and Sediment Control
- D. Fertility and Pest Management Systems to Reduce Impacts on Salmon Ecosystems
- E. Animal Management
- F. Biological Diversity Conservation- highly recommended, not mandatory

Each element addresses a different aspect of habitat management that directly relates to protection of water quality and aquatic habitat. Each element is comprised of one to several certification standards. The standards describe the management objective or desired outcome for habitat conditions. Under each standard are more specific performance requirements that must be met for certification.






PROCESS OVERVIEW

An independent expert evaluator conducts Salmon Safe field assessments based on a scoring protocol that is structured around a set of management practices categories or elements. Each element is comprised of several specific practices that are important in terms of potential impacts (both negative and positive) on stream ecosystem health.

The assessor assigns scores for each practice based upon field observations and by utilizing the qualitative scoring guidelines that follow. The score for each element is derived by adding the scores assigned for the practices within the element.

Each element is separated into sub-element topics or management practice categories. The assessor assigns scores at this level of detail, using the scoring guidelines that follow.

-  **+3** Full compliance with best known management practices or available technologies
-  **0** Marginally acceptable management practices or the score assigned to an irrelevant or non-applicable practice
-  **-3** Significant or total non-compliance with pertinent best management practices

Scope of Certification: Whole Farm Evaluation

Salmon-Safe operates with a whole farm (not crop specific) orientation. To achieve certification, an operation must meet Salmon-Safe standards throughout its entire property, including non-farmed areas.

Decision Rule for Certification

To meet the requirements for certification under the Salmon Safe program, each of the program elements must result in a positive computed score (i.e., greater than 0).

A farm operation can have management deficiencies within a program element, with negative scores assigned to certain practices, and still be certified as Salmon Safe, as long as across all practices in a program element, a positive score is awarded. Practices that receive a negative score ought to be looked at by farm managers as areas for improvement. In some cases, field evaluations lead to a set of requirements for improvement set forth as conditions to qualify for certification. In such cases, progress in implementing recommended or required practices is a focus of subsequent field assessments.

Maintaining Certification

Salmon-Safe certification is valid for three years, subject to annual site evaluation that includes a performance overview focusing on any significant alterations in management objectives and practices that could affect the continued validity of certification. Satisfactory progress in meeting any outstanding conditions is confirmed during annual evaluation.



RIPARIAN AND WETLAND AREA MANAGEMENT

The focus of this element is on measures taken and management practices employed to protect areas adjoining and close to salmonid in-stream habitat. The prevention of adverse impacts is accomplished through the design and management of riparian zone buffers, vegetative cover, and by minimizing stream channel disturbances.

Riparian area enhancement can require considerable work, technical expertise and investment by landowners. It must be viewed as an ongoing process and obligation. Natural cycles and events govern both the need for changes in riparian area management and the success of riparian buffer systems on a given piece of land. A major storm and flood can create significant new challenges or erase years of effort in a matter of days.

On farms with serious riparian area deficiencies, Salmon Safe will require more extensive remedial efforts on a quicker timeline as a condition of ongoing certification, in contrast to farms that have minimal needs because riparian areas are already in place and sustaining high-quality in-stream habitat.

A.1. Establishment Of Buffers Around Stream Courses And Wetlands

A maximum score (+3) is achieved when the following are observed:

- a. Riparian zones or cultivation setbacks are an average of 50-100 feet, with a minimum width of 25 feet. As the slope of the adjoining field increases, the width of the riparian buffer zone must be increased to adequately protect area from erosion and run-off. On slopes of 10 percent or greater, riparian zones should be no less than 50 feet. The buffer zone size will also be affected by the width and depth of the waterway to be protected.
- b. Riparian zones and buffer areas are adequately vegetated with a diverse mix of species. Where riparian zones are already established, there should be good canopy cover (>50 percent) of mixed multi-aged, native and non-invasive non-native species. Where appropriate, newly established ground cover plantings should be designed for maximum diversity in through a mix of grasses. Trees and shrubs should 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.
- c. Management needs in wetland and riparian areas are inventoried in order to identify improvement goals and establish an incremental plan for remedial actions, focusing first on the most serious problems degrading riparian zones. These zones need to stabilize soil, act as a filter strip, and provide shade. Inventory should include photographs taken from the same locations every year.
- d. On farms with identified needs and a remedial action plan, effective efforts are being taken to improve the vegetative cover and functional integrity of riparian zone buffer systems. The actual results of this effort will be determined by taking into account: (1) the economic status and objectives of the farm operation, (2) whether the farm field is rented, owned, or crop-shared, (3) the cause of problems and how long they have existed and whether they are growing worse,



and (4) the availability of technical and financial cost-share support and efforts by the farm operator to qualify for such support. In the end, on-the-ground improvement must be demonstrated.

A negative score up to (-3) is assigned when the following is observed:

- f. Riparian zones or cultivation setbacks are generally less than 25 feet.
- g. There is apparent evidence of sedimentation or farm effluent reaching watercourses, regardless of the width of riparian zones or cultivation setbacks.
- h. Riparian and/or wetland areas are in a degraded state and are not being managed to achieve restoration goals.

A.2. Design, Location, And Maintenance Of Stream Crossings And In-Stream Structures

A maximum score (+3) is achieved when the following are observed:

- a. Stream crossings are kept to the absolute minimum.
- b. Crossing structures are designed to withstand 25-year flood events with minimum disturbance of in-stream habitat structure and should be kept clear of debris.
- c. When a new crossing is established, existing stream channels are not modified unless back to historic conditions.

A negative score up to (-3) is assigned when the following is observed:

- d. Excessive number of stream crossings.
- e. Poorly designed crossing structures unlikely to withstand 25-year storm events.
- f. Stream channel modifications adverse to fish habitat have been or are being undertaken, such as stream cleaning, diking, dredging, channelizing, and bank armoring.



A.3. Stream Channel Restoration

A maximum score (+3) is achieved when the following are observed:

- a. A well-documented inventory of stream channel conditions has been conducted for purposes of identifying restoration needs and development of a remedial action plan.
- b. Efforts are being taken to restore stream channels to their natural condition with techniques such as bank stabilization and habitat enhancement, to the full extent possible given accessible technical and financial support.

A negative score up to (-3) is assigned when the following is observed:

- c. No restoration efforts are being undertaken or planned on degraded portions of streams.
- d. No inventory of stream course conditions for purposes of identifying restoration needs has been undertaken.



IRRIGATION WATER USE & MANAGEMENT

This element addresses the impacts of water used for irrigation on water quality, stream flows, and in-stream ecosystems. Water withdrawals, depending upon the extent, source, and timing, have the potential to adversely impact salmonid habitat, primarily by reducing in-stream flows.

B.1. Source Selection And Delivery System Design

A maximum score (+3) is achieved when the following are observed:

- a. For farms 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.
- b. The system utilizes design features to minimize delivery losses.
- c. The system includes a method to measure the volume of water withdrawals and return flows. Consumptive water use for each major crop on the farm can be estimated with reasonable accuracy.
- d. Fish losses are avoided by installing fish screens on diversions.
- e. In installing and servicing pumps and intakes, steps are taken to minimize disruption of fish habitat, especially when and where spawning is underway.

A negative score up to (-3) is assigned when the following are observed:

- f. The selected source of irrigation water results in significant reduction of in-stream flows at or above segments of a stream or river that supports salmon, or once supported salmon.
- g. The water delivery and irrigation system results in significant off-site infiltration or evaporation losses. Generally, losses are greatest with unlined open ditch water conveyance and poorly designed sprinkler systems.
- h. The farm operator has no means of measuring and/or controlling the volumes and/or timing of water applications.

B.2. Selecting Crops For Cultivation With Minimum Irrigation Water Demands.

A maximum score (+3) is achieved when the following are observed:

- a. The farm operator selects crops that are well suited to the meteorological regimes of the region in which the farm is located.
- b. Irrigated crops, particularly orchard trees, are managed so as to best balance overall growth with high quality fruit production, using practices such as pruning, cultivar selection, and modified fertilization regimes.



A negative score up to (-3) is assigned when the following are observed:

- c. The crops that are selected for cultivation require large volumes of irrigation water that are clearly incompatible with regional meteorological and hydrologic circumstances.
- d. The value of final product per unit of water application is not maximized due to inadequate plant and fruit management.

B.3. Efficient Use Of Irrigation Practices

The efficiency of irrigation water application is enhanced by assuring that the quantity and timing of application is need-based, as determined by soil moisture levels and the water requirements of the target crops. As a result, there is minimal irrigation return flow to adjacent waterways or to the lower perimeter of the property.

A maximum score (+3) is achieved when the following are observed:

- a. Soil moisture monitoring systems are installed and are employed to provide timely information about soil moisture levels relative to crop needs.
- b. The volume of irrigation water applied is based upon measured soil moisture levels at rooting depths relative to known crop requirements. Excessive water application is avoided to minimize nutrient leaching and system efficiency.
- c. Timing and scheduling of water application considers crop requirements, daily rainfall amounts and evapotranspiration rates for the area. Water is applied based upon the soil moisture deficit, the water storage capacity of the soil, and water infiltration rates.
- d. Sufficient information is available to compute overall irrigation system efficiency in terms of acre-feet or gallons of net withdrawals per acre of cropland irrigated and per unit of crop harvested.
- e. The performance of irrigation system equipment is routinely monitored to assure motors, pumps, and delivery systems are performing well and according to specifications.

A negative score up to (-3) is assigned when the following are observed:

- f. There is no means for accurately determining soil moisture levels.
- g. Rainfall amounts are not monitored.
- h. The farm operator lacks information sufficient to project daily water needs of the target crops.
- i. Proven management practices that increase yields per unit of water application are not utilized or are under utilized.
- j. Generally, irrigation practices are informal and *ad hoc* with little or no attempt to en-



hance efficiency of application; thereby increasing the volume of water required to produce a crop. Irrigation systems are clearly inefficient.

- k. Minimal effort has been made to improve system efficiency and reduce energy use through changes in irrigation scheduling and delivery systems.

EROSION: KEEPING SOIL OUT OF STREAMS

Sediment delivery into fish-bearing streams is a major cause of habitat degradation, particularly for salmonid spawning. All farming operations bear responsibility for minimizing the movement of soil off-site, as sediment transport can occur over long distances if not stopped at the source.

Soil is one of a farm's most valuable assets. The goal must be to minimize soil losses through conservation tillage and other erosion control practices. Responsible farmland management does not rely exclusively on stream course buffers. Some soil loss is unavoidable creating the need for sediment traps and diversions within the landscape as run-off water flows through and off farms. By each operation "doing its part" in reducing erosion throughout a watershed, the effectiveness and longevity of downslope buffers adjacent to streams will be enhanced.

C.1. Maintaining Vegetative Cover

A variety of proven techniques, practices and systems are available to reduce soil erosion. Most erosion control systems rest upon keeping tillage, or other soil disturbance, to a minimum, while maintaining as much soil vegetative cover as possible.

A maximum score (+3) is achieved when the following are observed:

- a. Cover crops and green manure practices are systematically employed in conservation systems designed to sustain or increase soil organic matter levels, enhance soil fertility, and minimize soil erosion losses.
- b. Highly erodible cultivated land has been identified on the operation and a Natural Resources Conservation Service (NRCS) conservation plan, or its equivalent, is in place. This plan has been implemented to reduce erosion to or below applicable soil loss tolerance values.
- c. Vegetative ground cover capable of withstanding farm machinery is maintained and established on all disturbed sites. This includes between the rows in orchards and vineyards.
- d. Critical areas are maintained in continuous vegetative cover. Steps have been taken to minimize soil movement from high-erosion hazard areas including roads, steep slopes, dry gullies, animal watering and feeding locations, and animal trails.
- e. When farming on sloping erodible soils the ends of row crop furrows are planted in grass or ground covers.



- f. Active steps are taken to diversify ground cover species.
- g. Straw mulching, or other methods, are used when bare soils may be subject to rain or irrigation-induced erosion.
- h. As appropriate, tillage and planting operations are timed to minimize erosion.

A negative score up to (-3) is assigned when the following are observed:

- i. The farm operator is not knowledgeable about or adequately committed to the use of techniques, practices and systems capable of minimizing soil erosion losses.
- j. Farm roads, paths or livestock trails are laid out in a manner which leads to concentrated flow erosion and the risk of gullyng.
- k. Orchard corridors are inadequately protected (<50%) by cover crops.

C.2. Controlling Water Runoff

Conservation systems must integrate erosion control practices with techniques that reduce the volume and velocity of surface runoff moving down and off fields.

A maximum score (+3) is achieved when the following are observed:

- a. Field borders; buffer and/or filter strips, and/or grass waterways are used in areas subject to concentrated flow erosion and along down-slope field borders to slow runoff and trap sediment, nutrients, and pesticides. The width and design of the border area, filter strip or grassed waterway should match the volume and velocity of surface water runoff occurring during periods of peak runoff, as specified in NRCS field technical guides.
- b. When needed and where appropriate, sediment traps or catchment basins are installed consistent with NRCS field technical guides and are adequately maintained.
- c. Erosion control and field-edge practices effectively reduce runoff, trap sediment, and reduce the flow of sediment reaching down slope water resources.
- d. Windbreaks and vegetative barriers are used to reduce wind erosion losses.
- e. There is regular monitoring of the quantity of soil movement in runoff at key points below areas of cultivation, especially after major precipitation events, in order to confirm the efficacy of conservation systems and identify places in the landscape where further measures are needed.

A negative score up to (-3) is assigned when the following are observed:

- f. The farm operator has not inventoried the operation for highly erodible land and lacks the information needed to design and monitor the effectiveness of a conservation system.



- g. No special efforts are made to prevent erosion on sloping ground.
- h. There is readily apparent evidence of unnecessary soil loss (e.g., small gullies in fields; sediment deposition at the bottom of slopes).
- i. Soil losses exceed accepted tolerance levels.

FERTILITY & PEST MANAGEMENT SYSTEMS: REDUCING IMPACTS ON SALMON ECOSYSTEMS

A significant cause of salmonid habitat degradation is contamination from farmland chemicals, particularly pesticides and fertilizers. Nutrients and pathogens from livestock operations can also degrade water quality, especially when and where large numbers of animals are kept in relatively small, confined spaces or where overall animal densities are high relative to surrounding cropland (issues addressed in the Animal Management Program Area 5).

Fertility and pest management systems are governed by a complex mix of agronomic and economic factors, regulatory policies, buyer and/or food processing industry requirements, and unpredictable natural forces. Salmon Safe recognizes that there are trade-offs between chemical use and the mechanical practices that can lead to soil erosion. (As an example, no-till practices can involve greater herbicide usage.)

D.1. Managing Crop Nutrient And Soil Fertility

Fertilizer, manure, compost and other sources of nutrients are applied only to the extent that the soil is not of sufficient productivity to achieve targeted yield levels. The focus in this program element is on measures to sustain soil fertility while minimizing the chance that excessive nutrients will flow off cropland to surface waters or leach to groundwater.

All farms producing crops for harvest as a major component of the operation shall be scored on this BMP.

Field assessors may skip this element on grazing and pasture based livestock operations actively cultivating little or no acreage, other than hayland.

A maximum score (+3) is achieved when the following are applied:

- a. Plant tissue analysis is conducted on a routine basis to determine nutrient needs, according to Cooperative Extension or industry guidelines.
- b. Soil is tested routinely, according to Cooperative Extension or industry guidelines, to determine nutrient needs, application rates, and to insure that soil quality indicators are moving in a positive direction.
- c. Nutrient application is timed so as to minimize runoff to surface waters.
- d. Where appropriate, small grain cover crops are employed to help tie up excessive nutrients. Green manure crops and crop rotations are used to maintain soil fertility to the maximum extent possible.



- e. Yield targets are set to avoid excessive rates of fertilization.
- f. Soil compaction is minimized by avoiding field operations when soils are wet and by periodically planting deep-rooted crops and/or cover crops, when appropriate. These practices help increase the soil infiltration rate and water holding capacity.
- g. The farm operation has developed and is adhering to a nutrient management plan covering all major crops produced on the farm sufficient to estimate, by crop, the efficiency of nitrogen uptake into harvested crops and expected trends in soil P and K levels.

A negative score up to (-3) is assigned when the following are observed:

- h. Soil quality indicators are decreasing over time.
- i. There is no systematic effort to assess soil chemistry and nutrient deficiencies.
- j. Heavy equipment usage has led to areas of obvious soil compaction.
- k. Crop rotations are non-existent. There is no use of deep-rooted cover crops or other methods known to combat compaction.
- l. A nutrient management plan has not been, nor is in the process of being, developed.
- m. The farm operator is unaware of timing issues related to effectiveness of nutrient application.
- n. Yield targets are incompatible with soil productivity and typical climatic conditions leading to excessive rates of application of N, P, and K.

D.2. Avoiding Use Of High-Risk Pesticides

Salmon Safe maintains a “High Risk” list (Appendix A–Salmon-Safe’s Cautionary List of High Risk Pesticides) of restricted pesticides that pose excessive risks to salmon and aquatic ecosystems, even when used carefully and in accord with product label directions. The compilation of the list, and additions to it, is driven by potential acute or chronic impacts on salmonid fish species, including developmental and behavioral impacts. Adverse impacts on essential organisms in the salmon food chain is a factor in determining whether a pesticide should be placed on the list.

A maximum score (+3) is achieved when the following are observed:

- a. No pesticides are applied on the farm operation that appear on the Salmon Safe “High Risk” list.

A negative score up to (-3) is assigned when the following are observed:

- b. Restricted pesticides are applied on the farm operation *without* written explanation for each pesticide that demonstrates that risk to aquatic systems is negligible.



D.3. Minimizing Pesticide Use Through Integrated Pest Management (IPM)

In order to minimize the possibility of waterway contamination with agricultural chemicals, it is important that growers look carefully at how they manage pests. Using IPM enables growers to establish an effective pest control management plan that takes into account the environment, avoids unnecessary treatments, and makes use of the best “least toxic” products and methods available.

IPM is a decision-making process that treats pests as a part of the total production system. There are five parts to the IPM process: 1.) *Pest Identification* - to positively identify the pest and learn about its biology. 2.) *Field Monitoring* - to track the pest problem over time. 3.) *Setting Action Thresholds* - to determine at what point treatment is necessary. 4.) *Reviewing Treatment Options and Making the Treatment*- using “least toxic” products when necessary, but also biological controls, trapping, and other non-chemical methods. 5.) *Evaluation* - to determine whether the treatment was effective and what else needs to be done.

- a. Farm managers are committed to the systematic use of Integrated Pest Management (IPM). Grower’s can provide documentation of the use of IPM from scouting reports, pesticide use records, and records of other practices.
- b. Farm managers are very knowledgeable about pest management and economic thresholds for pesticide application.
- c. Past pest problems and previous pest control measures and cropping history have been evaluated to identify crop sensitivities and the effectiveness of pesticide applications.
- d. Fields are scouted as needed to enable early detection and targeted treatment of pest, disease, and weed outbreaks.

A negative score up to (-3) is assigned when the following are observed:

- e. Farm managers do not employ procedures for systematically identifying when pesticides may be needed. There is no or insufficient periodic monitoring of field conditions and insect activity.
- f. Farm managers are not applying the concept of economic thresholds in determining the need for pesticide application.
- g. There is no operational use of IPM techniques.

D.4. Ensuring the Responsible/Safe Use of Pesticides

It is essential that growers are committed to using agricultural chemicals safely and responsibly, and that they provide thorough training for all workers who handle pesticides.

A maximum score (+3) is achieved when the following are observed:

- a. The selection of pesticides considers persistence, toxicity to aquatic species, runoff, and leaching potential.



- b. Policy requiring field worker training in pesticide handling and use is in place and effectively implemented. This is to ensure farm workers safety is never compromised.
- c. Spray equipment is calibrated routinely to assure accurate rates of application and minimize control failures and environmental impacts.
- d. Anti-backflow devices are used on all hoses carrying toxic materials.
- e. Mixing, loading, transport, and cleaning of pesticide and fertilizer application equipment do not produce any appreciable surface water runoff. Practical steps are taken to minimize the chances of accidental spills.
- f. On farms where fuel, fertilizer, or pesticides are stored in underground tanks, a groundwater or subsurface monitoring well is in place and checked at least once annually.
- g. Pesticides are stored in a safe, locked building with ready access to safety and fire protection equipment. To prevent liquid products from flowing directly into streams or rivers in the case of a fire or explosion, the storage building is either surrounded by a berm, or is sited sufficiently far from waterways.

A negative score up to (-3) is assigned when the following are observed:

- h. There is evidence that farm workers handling and applying pesticides are not adequately trained. There is no formal and systematic worker-training program and no monitoring of pesticide use applications or the cleaning of spray equipment.
- i. Spray equipment is not recalibrated on a routine basis.
- j. Pesticide applications are made without regard to effects on non-target species.
- k. Generally, farm managers are indifferent to, or unfamiliar with, the environmental risks associated with pesticide use.
- l. Farm chemicals are used in a haphazard fashion with little or no regard for environmental consequences including non-target organisms.
- m. There are no apparent efforts on the part of the farm operator to monitor the potential release of farm chemicals into surface or sub-surface waters.



ANIMAL MANAGEMENT

This element promotes management practices that prevent adverse effects and/or produce beneficial effects to stream systems from livestock. Prevention of fecal contamination of streams and water bodies is accomplished by providing adequate manure storage and handling. Management practices maintain pasture and rangeland health at levels sufficient to provide adequate forage while conserving soil and groundwater resources, controlling noxious weeds, and providing habitat for wildlife species. Livestock includes, but is not limited to: dairy and beef animals, bison, poultry, hogs, sheep, horses, goats and llamas.

E.1. Animal Movement and Husbandry System

Intensive management of livestock through rotational grazing practices is highly recommended. Rotating, or moving, livestock from pasture to pasture is determined by the number of livestock, pasture size, the season, and plant growth

A maximum score (+3) is achieved when the following are applied:

- a. Livestock are managed to avoid excessive compaction, erosion, and loss of vegetation cover, and to maintain soil organism diversity and enhance pasture condition.
- b. In riparian zones, grazing is managed to enhance recovery of native biodiversity. Rotational grazing systems or exclusion are utilized, as needed, to allow for recovery of vegetation.
- c. On pasturelands, adequate forage remains or is restored throughout the year to protect soil and root systems, promote water infiltration and soil fertility, and to filter surfacewater runoff.
- d. Grazing is managed to promote plant diversity within grazed areas.
- e. Grazing is managed to reduce aggressive weed populations.
- f. Watering facilities are installed that exclude or limit livestock need for access to streams and irrigation ditches.
- g. Permanent or temporary (e.g., electric) fences are utilized to limit continuous livestock access to streams and other fish-bearing water bodies
- h. Corridors and trails used to move livestock around pastures or to rangeland are managed to prevent gullying and erosion and to preserve vegetation cover.

A negative score up to (-3) is assigned when the following are observed:

- i. manure is applied at greater rates than the soil and plants can uptake the nutrient .
- j. Grazing system does not adequately protect resources.



- k. Pasturelands are grazed such that inadequate growth remains to filter surface water.
- l. Pasture vigor is allowed to decline through lack of management.
- m. No off-stream watering facilities have been developed and livestock have unlimited access to streams and wetlands.

E.2. Manure Handling and Storage

When animals are raised in confined spaces, a well-designed system must be in place to collect and store manure. The system is required to prevent direct runoff of manure into surface waters and leaching into groundwater. In most cases confinement would be limited to short periods due to seasonal requirements for housing and 'finishing out'.

A maximum score (+3) is achieved when the following are observed:

- a. There is a manure storage management plan in place, taking into consideration a 25 year 24 hour storm event.
- b. In general, sufficient storage capacity to store 120 to 180 days of manure production, unless the operation has access to other environmentally acceptable methods to recycle manure nutrients (such as composting and/or biogas production). All manure and/or compost piles are covered during rainy periods and/or a leachate containment system is in place
- c. Confined livestock facilities, manure piles, liquid storage tanks, and lagoons are not located in floodplains or areas with shallow groundwater tables and/or frequently moisture-permeated soils. Clean water run-off from roofs, surface flows, and overflowing waterers are diverted away from manure piles.
- d. Livestock confinement and manure storage facilities are designed to prevent any direct or indirect flow of manure into streams, rivers, or other surface waters in the event of sustained heavy rains and runoff, ruptures in storage tanks, leaching from in-ground pits, or breaching of storage lagoons.
- e. Periodic waterway testing is required to confirm there are no fecal or other livestock-derived contaminants, such as antibiotics, in the waterways adjacent to farmer's property.
- f. Vegetated filter systems can be used to accommodate manure leachate overflow corresponding with a 100-year storm.



A negative score up to (-3) is assigned when the following are observed:

- g. There is no plan for manure management
- h. Inadequate manure storage facilities exist for storage of manure during periods when manure spreading is inappropriate.

- i. Manure storage areas are exposed to the elements.
- j. There is runoff of manure to waterways.

Note -- In general, the larger the volume of stored manure and the shorter the distance to a stream or river, the greater the responsibility of an operator to design and install a system with safeguards sufficient to prevent direct flows of nutrients into surface waters.

E.3. Efficient Utilization of Manure through Nutrient Management Plan

Manure needs to be managed for its nutrient resource value.

A maximum score (+3) is achieved when the following are observed:

- a. The operation has, or is actively developing, a manure and nutrient management plan covering all manure produced on the farm, as well as all other sources of nutrients. Ideally, the plans should be sufficiently detailed to allow the producer and evaluator to: 1.) estimate the total pounds of N, P, K in manure and bedding (if applicable), 2.) approximate nutrient losses at each stage of the collection, storage, handling, and land application processes, and 3.) approximate nitrogen uptake by harvested crops. The plan should also provide a basis for monitoring changes in soil P and K levels on lands receiving manure applications.
- b. A system is in place to beneficially recycle the nutrients in manure when supplies are in excess of local crop needs. Methods and data are available to document system performance relative to the fate of excess nutrients.
- c. The highest utilization of this manure is to apply it to one's own fields, ideally in the form of compost. This is not to be done during the rainy season.

A negative score up to (-3) is assigned when the following are observed:

- d. The operator has no plan for monitoring or managing manure or nutrient runoff.
- e. There is no system in place for reuse of nutrients.
- f. No documentation is kept relative to excess nutrient distribution.
- g. Field application of manure is not governed by a nutrient management plan. There is no calculation of application rates based upon animal, plant, or soil resources.



BIOLOGICAL DIVERSITY

In addition to promoting the use of farming practices that protect and enhance stream ecosystems, Salmon Safe encourages the use of practices that support and enhance biodiversity throughout the farm. As stewards of the land, farmers have an important opportunity to protect and enhance wildlife of all kinds, and to that the farm is part of a diverse and dynamic ecosystem.

There is a growing body of evidence suggesting that agriculture can benefit from greater biodiversity. Soil microfauna, such as bacteria and fungi, break down organic matter, help maintain the quality of soils, and recycle nutrients. Insects, spiders and mites, pollinate crop plants and fruit trees, and prey on agricultural pests. At the ecosystem level, farm hedgerows and woodlots can attract beneficial insects or predators that feed on agricultural pests. Increasing biodiversity on the farm not only enhances wildlife; it has direct benefits to farming itself.

The use of the following practices helps support biodiversity on farms. These are *conservation options*, not required practices, and can be considered BMPs for encouraging biodiversity.

F.1. Biodiversity Practices in Farmed Areas

Cultivated areas on the farm can be managed to encourage biodiversity.

conservation option

- a. *Agroforestry* – optimizes the biological benefits that occur when trees and/or shrubs are combined with crops and/or animals. Agroforestry combines agriculture and forestry by utilizing trees to protect crops and livestock, conserve natural resources, improve human environments, and provide new sources of income.
- b. *Crop Rotations* – is when crops are changed year by year in a planned sequence, adds complexity to farming systems, creating habitat for more species. Residues of different crops added to the soil stimulate soil organism diversity and aid nutrient and disease management.
- c. *Intercropping* - two or more crops together in combinations can stimulate greater biodiversity by creating a more complex cropping system.
- d. *Strip Cropping* - is the planting of two or more crops in strips next to each other. It increases diversity over a larger area. Strip cropping can be less management intensive than other intercropping methods because it can be designed for mechanical planting and harvesting.
- e. *Cover crops* - provide soil cover between cropping cycles or in areas where the ground is not cropped. Cover crops provide habitat for beneficial insects and bird populations, nutrients, and organic matter.
- f. *Alternate Mowing* - ensures that all the habitat for beneficial insects and wildlife is not removed at one time. When practical, harvest in sections to allow beneficial insects to escape to adjacent areas.
- g. *'Beetle Banks'* - is a British term referring to grass strips that are planted in the center of large fields to provide habitat for beneficial insects, (especially ground beetles,



an important predatory insect), and other wildlife. In larger fields, the centers tend to have significantly less biodiversity than around the edges. By planting 'beetle banks,' more edges are created in the field encouraging greater biodiversity

- h. *Reduced or Minimum Tillage* -reduces the intensity of soil cultivation and allow plant residues to accumulate on the soil surface. This leads to an increase in the diversity of soil organisms on and below the soil surface.
- i. *High 'Organic Matter' Inputs* - such as compost, cover crops, and tilled-in plant residues help increase biodiversity within the soil which can lead to increased soil fertility and a more dynamic soil ecosystem.

F.2. Biodiversity Practices in Non- Farmed Areas

Permanent Non-Farmed Areas can include: forests, wetlands, marginal fields, unimproved grasslands, fence rows, or other areas that are not actively farmed. These areas are of key importance and should be managed as refuges for biodiversity. When possible, these areas should be connected by non-farmed corridors.

- a. *Farmscaping* - is a term that refers to the use of hedgerows, nectar and pollen producing plants, cover crops, and water reservoirs to attract and support populations of beneficial organisms such as insects, bats, and birds of prey. Flowering plants are particularly important to adults of the wasp and fly families, which require nectar and pollen sources in order to reproduce the immature larval stages that parasitize or prey on insect pests.
- b. *Hedgerows and Buffers* - are multi-species planting strips located between fields, at field borders, and in riparian zones. These diverse plantings shade water, offer wildlife habitat, encourage beneficial insects, reduce soil erosion, provide bank stabilization, uptake nutrients and pollutants, act as shelterbelts, windbreaks, and privacy screens. They can be managed to provide income.
- c. *Woodlands* - should be left as "wild" as possible. Fallen and rotting trees provide valuable habitat. Woodland edges can be "scaloped" to create warm, sheltered areas. Edges can be met with taller grass margins and low growing shrubs to provide continuous habitat from field to woodlands.
- d. *Field Margins* - especially of pastures, should be maintained "rough." Edges can be sown with taller perennial grasses. Inputs can be restricted from 5-10 feet from field edges creating pesticide refuges.
- e. *Fallow Fields* - provide tillage refuges. Fieldwork should be delayed, when possible, until after ground-nesting birds have finished nesting (fledged). Stubble provides an important resource for many species.
- f. *Bird and Bat-Friendly Sites* - encourage specie specific nesting boxes for bats and insect-eating birds.
- g. *Ponds* - provide additional habitat for a wide variety of species and are especially important on farms without riparian zones.



APPENDIX A: SALMON-SAFE HIGH RISK PESTICIDE LIST

Certain pesticides are a serious threat to salmon and other aquatic life. In addition to killing fish, certain 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 of these behavioral changes ultimately affect survival rates.

The following chart lists many of the pesticides known to cause problems for salmon and other fish. The list includes chemicals that could be used in agricultural 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 farm using any of the pesticides indicated as “High Risk” below may be certified *only* if written documentation is provided that demonstrates a clear need for use of the pesticide, that no safer alternatives exist, and that the method of application (such as timing, location, and amount used) represents a negligible risk to water quality and fish habitat.

COMMONLY USED PESTICIDES THAT POSE HIGH RISK TO SALMON AND AQUATIC LIFE

| | | |
|---------------------------|---------------|---------------------|
| 1,3-dichloropropene | dichlobenil | naled |
| 2,4-D | diflubenzuron | norflurazon |
| acephate | dimethoate | oryzalin |
| atrazine | disulfoton | oxyfluorfen |
| bensulide | diuron | paraquat dichloride |
| bentazon | esfenvalerate | pendimethalin |
| bifenthrin | fenamiphos | permethrin |
| bromoxynil | iprodione | simazine |
| captan | lindane | tebuthiuron |
| carbaryl | linuron | triclopyr |
| chlorothalonil | malathion | trifluralin |
| chlorpyrifos ³ | metolachlor | |
| cyhalothrin | metribuzin | |
| cypermethrin | naled | |
| diazinon | norflurazon | |
| dicamba | oryzalin | |

This list is based on EPA hazard level for fish and fish habitat. It is subject to change as pesticide registrations are updated and as more environmental data becomes available.

³Chloropyrifos is not allowed for use at Salmon-Safe certified operations.

