Potato Sustainability Initiative (PSI) Survey and Audit Organizational Manual

for the 2017 Survey and 2018 Audit

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- Introduction and how to use this manual
    - This material was developed to coordinate and document your operation's practices that answer questions outlined in the current version of Potato Sustainability Initiative (PSI) survey and audit. It is designed to provide a detailed template for a potato farm's operations that is directly referenced to the PSI survey questions and the requested documentation/interview questions when audited.

    - Please note that this manual needs to be tailored to your specific farming operation and suggested answers or means to document your practices are for informational purposes only. Within this manual there are sections that include PSI survey questions, reference guidance, and audit guidance; preformatted documents; areas to insert maps/documents; suggested information to help answer questions during the audit; and listings of resources for additional information. A Glossary of terms from the PSI Survey has been included in the back of the manual.

    - The survey is currently administered through the FoodLogiQ website and is completed electronically. The current version of the survey has 108 questions that include topics within sustainable farming, and social, economic and environmental sustainability. All growers are requested by their processor(s) to submit answers to the survey, but only 20% of growers will be audited each year on the survey.

    - Questions are designated into three priority levels. There are 15 minimum questions (designated as mandatory and orange heading in this manual) that must be asked at every audit. The auditor will select at least 15 questions from the Priority 1 category (yellow heading in this manual) and no more than 10 questions from the Priority 2 category (blue heading). You will be audited on no more than 40 questions. The Priority 1 and 2 questions are picked by the auditor regardless of whether the survey answer is yes or no. If you are certified by a food safety program (e.g. USDA or Canada GAP; see Question 1) some questions will be turned off and you will not be audited on them. That will decrease the number of minimum questions audited, but you will still be audited on the same number for Priority 1 and 2 categories.

- The objective of the audit is to verify both yes and no answers you provided on the initial survey. There are three ways you may fail the audit:
    1. Do not meet 2 or more minimum requirements.
    2. Do not complete required follow-up resolution report within six months.
    3. Change more than 20% of the audited survey answers

- This manual was designed to simplify the necessary responses to successfully and efficiently document your sustainable farming practices.
    - In this manual, each question is broken into the following columns: 2017 survey question number, survey question, survey level, reference guide and guidance given to auditors for the interview questions and required or requested documentation.
    - Below each question you will find clarification on documents to attach, common practices to help answer interview questions, document templates, and additional resources.
    - Minimum (mandatory) questions in this manual are 1-15.

- Helpful hints for the audit:

    - There are changes from the 2016 audit to the 2017 audit. Be aware question numbers, documents and questions have changed from the previous year.
    - The person who filled out the PSI survey should attend the audit and bring a copy of the survey answers. This audit asks questions that encompass all aspects of the farming operation from how you clean between seed lots to employee compensation calculations.
    - New this year. The first question concerns your food safety (e.g. GAP) certification. Depending upon which type of certification you have, subsequent questions will be turned off and you will not be audited on them. See Question 1 for a list of questions you will not be audited on depending upon which food safety certification program you have.
    - Use the reference guide ("i" in the top right hand corner of the question box) associated with your PSI survey to help in answering questions when filling out the survey. It is also included in this manual.

- You may have any personnel in the room to help with the audit, and you may excuse people from the room if you wish.
- Have all documents easily accessible- computer, files, notebook, printed out, etc. You will need:
    - A list of field names exactly as inputted into the survey and names provided for processor information. See below for an example list.
    - A list of all 3rd party pesticide applicators, license # and expiration dates.
    - Access to all of your pesticide and fertilizer records that you provided to your processor. Electronic programs that collate all the information for you are ideal (e.g., Land. DB; Agrian, etc.). Pesticide application records must include all the following: Time, Date, Locations, Target pest, Material applied, Rate, Applicator, Application method, Weather conditions (including wind speed and direction and temperature) in order to get credit for many questions. You can access electronically or have printed copies available for the audit.
- Other documents to have readily available:
    - Food safety certificate (e.g. USDA GAP, Global or Harmonized).
    - Copies of seed tags, seed receipts or electronic records of seed purchases.
    - Farm maps to identify sensitive areas, roads, conservation areas, etc.
    - SDS (formerly MSDS) of pesticides used on farm.
    - Inventory records or receipts for personal protective equipment (PPE), if farm employees apply any pesticides on farm (exempt if all third-party applications).
    - Pesticide application calibration records for all equipment used on farm.
    - List of potato fields with previous rotational crops for past three years.
    - Nutrient analysis results from soil or petioles.
    - Copy of water rights, permits or water share certificate.
    - See manual for additional documents needed for steward, master and expert designations.

- Changes to this manual will be done periodically/annually to adjust for the changes to the PSI survey. This manual along with additional resources are posted at www.uidaho.edu/potatoes. For additional information or comments regarding this manual, please contact us at:

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Fields Planted to Potatoes in year _____

Grower's Field Name	Processor	Processor Field ID Number	Location	

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
1	Mark all that apply Grower is certified in one of the following Good Agricultural Practice (GAP) food safety audits a) USDA GAP b) Canada GAP c) Primus Standard GAP Harvest Crew and Ranch d) Harmonized GAP e) Global GAP Harmonized Produce Safety Standard f) Global GAP Integrated Farm Assurance Standard g) Primus GFS h) None of the above	a) Basic b) c) Steward d)-g) Expert h) none	GAP-Good Agricultural Practice Harmonized GAP-Produce GAPs Harmonized Food Safety Standard Audit HACCP-Hazard Analysis & Critical Control Points GFSI-Global Food Safety Initiative (If you are part of the GLOBALG.A.P. program, then you meet this requirement).	**Documentation:** Valid certificate issued by the food safety auditor.

Attach the marked certificates here: Depending upon which certification you have; subsequent questions will be blocked from your ability to answer them. This is because your food safety certification validates your answer to those questions. Questions turned off are indicated in parentheses behind the certificate below.

- USDA GAP (5,6,7,9,11,14,22,24,26,27,28,32,70)
- Canada GAP (5,6,13,14,15,26,36,70,73,85,103,107)
- Primus Standard GAP Harvest Crew and Ranch (2,5,6,7,8,9,11,13,14,19,22,24,26,28,71,72,73,83,85)
- Harmonized GAP (9,13,70,77,85)
- Global GAP Harmonized Produce Safety Standard (2,5,7,9,13,19,24,32,71,72,73,77,81)
- Global GAP Integrated Farm Assurance Standard (2,4,5,6,7,8,13,19,24,26,28,29,32,33,36,46,47,54,59,71,72,73,77,81, 91,92,102,103,107,108)
- PrimusGFS (2,7,11,13,14,22,24,26,28,70,71,83,85,103,108)
- None of the above

Continue on to next question.

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
2	Mark all that apply: To avoid introducing pest or disease problems and reduce disease transmission potential a) Only certified seed is used for the potato crop. b) Farm has a system in place to track seed planted in the field to a specific source to aid with disease traceability. c) None of the above.	a) Basic b) Steward	a) To avoid introducing pest or disease problems, either seed certified by an independent third party, or seed potatoes grown on the same farm under an inspected seed program are planted exclusively. b) A management system is used to track seed and seed sources in the event of a disease outbreak caused by diseased seed.	**Documentation:** a) Certified seed receipts and/or certificates for the last three years. Tags are not required if written or electronic records of certified seed are kept. b) Records of seed planted within the last year, including dates, field names and seed source.

If you answer:

a) Show seed receipts or certificates for the past three years. Written or electronic records can also be used.

- If you used "year-out" seed as allowed in the Idaho state seed law, then provide documentation that the seed adhered to established requirements prior to planting. If uncertified seed potato lots are submitted to ISDA for testing they will issue a letter with results and guidelines to follow for using as seed. Under this circumstance the seed is not considered certified, but has been tested and passed equivalent requirements. You could still answer "yes" to this question (see reference guide; https://adminrules.idaho.gov/rules/current/02/0639.pdf).
- In Washington and Oregon, all commercial potato fields (> 1 acre in WA) must be planted with certified seed. Legally, "no" cannot be answered for this question if farming in the state of Oregon or Washington. Insert seed tags (blue, green or yellow) or seed receipts here.

b) Fill in form for **each** field planted with potatoes or use a form from your preferred electronic information program (e.g., Land.db, Agrian, etc.). Being able to track seed from seed grower to field planted is the intent here.

c) Continue on to next question.

Crop Year	Date	Operation	Seed Quantity	Variety	Seed Provider/lot number	Field Name (and location within field if not entire field)
2017	4/10/17	Seed planting	X cwt	Best variety	John Doe/ 123456	Example
For PSI question 2						

No.	Switch Question
3	Switch Question: Are genetically modified (GM) potatoes trialed on the farm in the current crop year? If no, disregard question 4.

- If you answer yes to question 3 then go to question 4, if no go to question 5.

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
4	Yes or No GM farm trials are conducted following established regulatory and industry protocols and the commercial customer is informed.	Basic		If grower answers "yes" to question 4, then the following is required: **Documentation:** -GM seed trial protocols and records. -Letter/email informing commercial customer of GM farm trials.

If you answer yes:

- Contact your seed source for all the required documentation and attach here. Provide copies of trial protocols and an example of a letter or agreement that your customer is aware of the GM crop.

If you answer no:

Continue on to next question.

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
5	Yes or No Pesticides and nutrients are mixed, used, stored and disposed of according to legal requirements and farm meets all regulations for employee health and safety. In the absence of legal requirements all components of the reference guide must be followed.	Basic	Pesticides and nutrients are applied and stored as per all label directions and applicable regulations. Products are properly labeled; concentrates are in original containers; and cross contamination between pesticides and fertilizers is prevented in storage. Pesticides stored temporarily for near-term use are secure, e.g., in a locked storage box. Empty pesticide containers and pesticides no longer in use are properly disposed of. Pesticides awaiting disposal are segregated and clearly marked for disposal at the next opportunity. All pesticide storage and mixing by a custom applicator or the grower is done away from sensitive areas (e.g., surface water) and in a manner to prevent site contamination. Surplus spray mix and washings are used on the crop or disposed of according to applicable regulations and label directions. Applicators are certified or licensed if required by applicable regulations. Personal protective equipment is available and in working order. Pesticide labels, Material Safety Data Sheets and application postings are accessible to applicators and farm workers in appropriate language(s). Applicable regulations include the Emergency Planning and Community Right-to-Know Act of 1986 in the US, and in Canada, the Workplace Hazardous Materials Information System and Controlled Products Regulations.	**Documentation must include:** -Pesticide label and Safety Data Sheet (SDS) examples. -Personal protective equipment inventory records and/or receipts of personal protective equipment purchases (e.g., coveralls, rubber boots, gloves, respirators, googles). -Valid pesticide applicator licenses for those required by law to have them. AND **Interview:** What personal protective equipment (PPE) do you use when applying pesticides and/or nutrients? Do you have any pesticides in storage that you no longer plan to use? If so, how are they segregated? How do you dispose of contaminated tank or container rinsate?

If you answer yes:

- If your farming operation does not apply any pesticides or nutrients, then supply name and applicator licenses number and expiration date of all applicators.
- Be prepared to show documents for all pesticide labels and SDS (formerly MSDS) for pesticides and nutrients used on farm. Access to an on-line source can be used such as CDMS.
- You must be able to show receipts for PPE purchases or inventory list of items.
- You must be able to show a list of names, pesticide license numbers and expiration dates of all pesticide applicators used by the farming operation.
- Be prepared to describe if you have any pesticides in storage that you no longer plan to use and how they are segregated.

- Example responses would include - stored on separate shelf or separate area, disposal plan is in place.
- Disposal/ recycling programs are available in each state:
  - WSDA has pesticide recycling/disposal program. You can contact them to come to your farm or drop them off at a designated site. See: http://agr.wa.gov/pestfert/pesticides/wastepesticide.aspx
  - ODA: http://www.oregon.gov/ODA/programs/Pesticides/RegulatoryIssues/Pages/PesticideStorageDisposal.aspx
  - ISDA: https://agri.idaho.gov/main/56-2/pesticides/pesticide-disposal/

- You must be able to describe disposal practices of contaminated tank or container rinsate.
  - Rinsate must be utilized according to the pesticide label. Many labels indicate it should be applied to an area that has already been treated. Do not apply rinsate to roads or parking areas etc. It can be further diluted so that the application to crop site is not illegal. It can be placed into the waste disposal program or used as make-up water for another batch.

If you answer no:

Continue on to next question.

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
6	Yes or No Complete pesticide application records are available and are maintained for three years.	Basic	Pesticide records should include: grower/farm name with field location, date, time, weather (temperature, wind speed, wind direction), material applied including EPA or PCP numbers, crop, application rate with unit of measurement, applicator name and license number (if required), application method/type, acres applied and target pest.	**Documentation:** Written or electronic record of pesticide applications made in the last year. Records **must** include: -Date -Time -Field Location -Target pest -Material applied (EPA/PCP number) -Rate -Applicator name/license number -Application method -Weather conditions (wind speed and direction and temperature)

If you answer yes:

- Be prepared to provide information from the system you use to record pesticide applications. Show on-screen or print out forms. Must have all requirements listed above; any missing information like wind speed or applicator's license number will result in a "no" response.
- Agrian, Land.db or other similar program will typically have this information, but you must include/input all required information if the program does not include it. Have access to this information via computer, tablet, phone, or printed copies.
- See next page for example of a form. Forms are also available from WSDA at http://agr.wa.gov/PestFert/Pesticides/docs/RecForm4226.pdf .

If you answer no:

Continue on to next question.

Field and Post-Harvest Pesticide Treatment Report Form*

List all soil treatments, preplant soil and seed treatments, post plant soil and foliar treatments. Include all fumigants, herbicides, insecticides, fungicides, growth regulators, vine killers, etc.

Farm Name:	Field Name:	Field Location:	County, State:	Total acres:	Crop/Variety:
Seed Source:	Planting Date:	Total Acres or Weight treated:		Harvest Date:	Storage/Processing Site:

*Application Method: G=Ground A=Air C=Chemigation W=Ground Application - Water Incorporated

** Pesticide Type: 0=Repellant 1=Seed Treatment 2=Fumigant 3=Nematicide 4=Herbicide 5=Fungicide 6=Insecticide 7=Grow Regulator 8=Sprout Inhibitor 9=Desiccant

*** Rate Type: Field: Acre, 1000ft/row, 1000 sq ft Seed: CWT (100 lbs) Dilution: 10 gal, 50 gal, 100 gal

**** Target Pest Type: 1=Bacterial 2=Fungal 3=Viral 4=Chewing Pest 5=Sucking Pest 6= Tuber/Root Pest 7=Broadleaf Weed 8=Grass 9=General Weed

Treatment Date &Time Start/Finish	Field #	Acres Treated	App Method*	Pesticide Type**	Product Name and Formulation	Rate	Unit of Measure	Rate Type ***	Primary Target Pest	EPA No.	Sensitive Area Y/N	Wind speed	Wind Direction	Temp	Applicators License # or Training Date if no license	Name of Applicator

Grower Signature:_____ Date:_____ Field Rep Review Initials: _____ Date: _____

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
7	Yes or No Pesticide application equipment is operated within recommended wind-speed limits and with appropriate pressure, nozzle selection, boom height and droplet size to minimize spray drift.	Basic	Spray application equipment is adjusted to provide the optimal droplet size possible while still maintaining coverage and control, and the lowest application height while still providing uniform distribution.	**Interview** What factors do you consider and how do you operate equipment to minimize drift? **OR** **Documentation:** -Third Party Applicator License.

If you answer yes:

- See documents used for question 26.
- Remember large droplets travel less than smaller ones. Spray application equipment is adjusted and used in a manner to minimize spray drift. Maximum wind requirements from labels and local jurisdiction are abided, low pressure, course droplets and low release height of pesticides is used to mitigate drift. Air induction nozzles also minimize drift.
- If you do not apply pesticides, then supply name and applicator license number and expiration date of all applicators.
- Resource: Droplet size calculator: http://pat.unl.edu/droplet-size-calculator

If you answer no:

Continue on to next question.

No.	Survey Question Mandatory	Survey Level	Reference Guide	Audit Guidance
8	Yes or No Nutrient application records are available and are maintained for three years.	Basic	Fertilizer records must contain: grower/farm name with field location, crop, date, product applied including fertilizer formulation, application type (dry, liquid, granular, etc.), application method (band, broadcast, seed placed, fertigated, etc.), and acres applied with rate per acre.	**Documentation:** Records of nutrient applications made in the last year. Records **must** contain grower/farm name with: -Field location -Crop -Date -Product name including formulation -Application type and method -Acres applied with rate per acre

If you answer yes:

- Have nutrient application records for the past 3 years available.
- Fill in top part of included form for **each** field planted with potatoes or use a form from your preferred electronic information program but make sure it includes all information required (asterisked in form and includes: field location, crop, date, product name including formulation, application type and method, acres applied with rate per acre).

If you answer no:

Continue on to next question.

Nutrient Application Report Form*

List all soil treatments, pre-plant soil, in-furrow and seed treatments, post plant soil and foliar treatments.

Farm Name:	*Field Name:	*Field Location:	County, State:	Total acres:	*Crop/Variety:									
Seed Source:	Planting Date:	Total Acres or Weight treated:						Harvest Date:	Storage/Processing Site:					
*Application Method: band, broadcast, in-furrow, seed placed, fertigated, etc														
** Application Type: dry, liquid, granular,														
*Treatment Date &Time Start/Finish	Field #	*Acres Treated	App Method*	Application Type **	*Product Name and Formulation	*Rate/ A	Unit of Measure	EPA No.	Sensitive Area Y/N	Wind speed	Wind Direction	Temp	Applicators License # or Training Date if no license	Name of Applicator

Grower Signature:_____ Date:_____ Field Rep Review Initials: _____ Date: _____

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
9	Choose one that applies: a) Biosolids have not been used within one year prior to planting of the potato crop and untreated sewage has never been used on fields currently in potato production. b) Biosolids have been used within one year prior to planting of the potato crop or untreated sewage has been used on fields currently in potato production.	a) Basic b) none	Biosolids, i.e., residues generated during treatment of domestic sanitary sewage, are not used on fields within a year of planting to potatoes.	**Documentation:** -Company policy prohibiting the application of biosolids the year prior to planting. -Grower exempt if Food Safety Certification (such as USDA/GAP, Canadian equivalent, GlobalGAP etc.) is presented.

If you answer:

a) Have a written farm policy describing that you prohibit the application of biosolids within one year prior to planting and that no untreated sewage has been applied to any fields on the farm that will be in potato production.

- Attach policy here.

Sample policy (modify for farming operation): “Farm X prohibits the application of biosolids within one year prior to planting of the potato crop and no untreated sewage has been applied to any fields on the farm that will be in potato production.”

or

- Show GAP or food safety certification (see question 1 for certificate). GAP audits require documentation on the use of animal based soil amendments.

b) Continue on to next question.

No.	Switch Question
10	Switch Question: Is animal manure or compost containing animal manure spread on potato fields? If no, disregard question 11.

- If you answer yes to question 10 then go to question 11, if no go to question 12.

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
11	Yes or No Animal manure or compost containing animal manure used on fields on which potatoes are grown is managed following a nutrient management plan, to include sample analysis, and according to contract requirements, food safety requirements or federal, state/provincial or local regulations.	Basic	If animal manure or compost containing animal manure is used any year on any field potatoes are grown at any time, a written or electronic nutrient management plan is available that includes a science-based approach for determining the nutrient contribution from the manure or compost, e.g., periodic analysis, analysis provided by the compost or manure supplier, or specifications from a credible source such as a Land-Grant University or government reference publication.	Written or electronic nutrient management plan meeting contract/legal requirements and incorporating nutrient contribution from manure or compost based on analysis or an applicable reference document.

If you answer yes to question 11:

- Attach a nutrient management plan that includes lab analysis results for all manure/compost applied within the last year including nutrient value. If applicable, request nutrient analysis from company/source of compost or manure if purchased and attach results. If nutrient analysis is not performed, provide recommendations/calculations on how you factor in nutrient release from compost or manure applications in your nutrient management plan.
- If you have a GAP certificate (see question 1), then manure/compost was applied according to food safety requirements. Manure cannot be applied to fields within 120 days of potato harvest.

If you answer no:

Continue on to question 12.

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
12	Yes or No Does farm comply with all bribery, corruption, extortion and embezzlement laws?	Basic	Farm is compliant with all federal, state/provincial and local laws.	**Interview** How does farm maintain awareness and compliance with all bribery, corruption, extortion and embezzlement laws?

If you answer yes:

- Describe how your farm complies with all federal, state/provincial and local laws including all bribery, corruption, extortion, and embezzlement laws.
- Response examples could include: you follow all federal and state laws; use a certified accountant; use a third party auditor; do not sign checks made out to self; review payroll for unnecessary overtime or payments; reconcile all accounts and payroll records on a regular basis; do not falsify records; and ethical in all transactions and employment.

If you answer no:

Continue on to next question.

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
13	Yes or No Adequate first aid supplies are available at the farm to meet reasonably foreseeable emergency medical situations.	Basic	First aid supplies are readily accessible and adequate for each work environment and foreseeable emergency.	**Interview:** -In what locations do you keep first aid supplies? (e.g., in pesticide storage/mixing area, in equipment sheds, in packinghouse) -How often are these supplies checked to ensure that supplies are replenished when stocks are low?

If you answer yes:

- Explain or list locations and how often supplies are replenished.
- This is required for some GAP certifications. See attached form.

If you answer no:

Continue on to next question.

First Aid Kit Monitoring Log

Date	Location or # of First Aid Kit	Checked & Stocked	List Added Items (bandaids, ointment, etc.)	Initials
PSI Question 13				

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
14	Yes or No Pesticide applicator(s) has taken a pesticide safety course or passed an exam as required by local, state, provincial and federal laws, and participates in continuing education.	Basic	To improve pesticide safety, all individuals who apply pesticides have taken a pesticide safety course and participate in continuing education opportunities at least every three years. This must be true whether the applicator is a farm employee or a contract applicator.	**Documentation:** -Applicator license, if required. and -Pesticide training attendance records from a course taken within the last 3 years.

If you answer yes:

- Pesticide applicator name, license number and expiration date are recorded on pesticide application records used for mandatory question 6.
- Show receipt or agenda from attending a pesticide training course or a meeting where you received pesticide recertification credits within three years.

If you answer no:

Continue on to next question.

No.	Survey Question **Mandatory**	Survey Level	Reference Guide	Audit Guidance
15	Yes or No Fuel is stored safely and securely, and consistent with all legal requirements.	Basic	Fuel storage, including portable containers, meets requirements of applicable regulations and is located at a safe distance from potential heat sources, wells and surface water. Fuel storage containers are in good condition and inspected for leaks and signs of deterioration regularly.	**Interview:** -According to applicable regulations, how far does fuel storage have to be from potential heat sources, wells or surface water? -How often are fuel storage containers checked for leaks and signs of deterioration?

If you answer yes:

- Be able to describe in the interview question:
  - Distance fuel storage must be from heat sources, wells or surface waters (in Idaho it is 100 feet). Contact your local fire marshal for more information.
  - Common practices include instructing employees to check for leaks or damage each time fueling. Requesting fuel provider to check container when re-fueling.
- Additional resources:
  - Washington State Department of Ecology: https://fortress.wa.gov/ecy/publications/publications/0308014.pdf
  - WS DOE Underground Tank Storage: http://www.ecy.wa.gov/programs/tcp/ust-lust/tanks.html
  - Oregon Underground Tank Program: https://www.oregon.gov/deq/tanks/Pages/UST.aspx
  - Idaho Underground Tank: https://deq.idaho.gov/waste-mgmt-remediation/storage-tanks/

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
16	Yes or No In rotational crops (excluding cover crops) certified or cleaned seed is used to minimize weeds.	Expert	To avoid introducing weed seeds into crop fields, seed for rotation crops is certified weed-free or cleaned to remove weed seeds. Cover crops, grown between cash crops to hold soil in place, increase organic matter content and/or retain moisture and or nutrients, should also be planted with certified weed-free or cleaned seed, however that is not a requirement to earn credit for this question, due to limited access to those options for cover crop seed at this time.	**Documentation:** -Receipts of seeds purchased or receipts of seeds cleaned.

If you answer yes:

- Attach receipt of seeds purchased for all rotational crops with potatoes **or**
- Certificate from a seed company confirming seeds are certified or cleaned.

Note: If you only grow potatoes and plant certified or ISDA tested seed potatoes you can still answer “yes” to this question.

If you answer no:

Continue on to next question.

No.	Switch Question
17	Switch Question: Does the farm cut its own seed potatoes? If no, disregard question 18

- If you answer yes to question 17, then answer question 18. If no, continue to question 19.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
18	Yes or No: Farm washes and sanitizes seed cutting equipment between seed lots.	Steward	Seed cutting equipment is washed with water and soap-based detergent, rinsed and sanitized with disinfectant.	**Interview:** How is seed hauling, handling and cutting equipment cleaned? Practices include three-step cleaning process: washing with water and soap-based detergent, rinsing, and sanitizing.

If you answer yes:

- Common cleaning practices include continuous disinfectant (labeled and registered) spray on cutting knives; Clean handling equipment and cutter with soap-based detergent and water, followed by disinfectant. Remember that cleaning is a three-step process: washing with a detergent and water; rinsing, and applying a disinfectant.
- Common frequency would be
    - Trucks between seed lots, and handling equipment between lots or at employee breaks.
    - Seed cutting equipment is cleaned after each designated seed lot or after suspect lot is cut. Other frequency may be continuous application of disinfectant on knives (ensure disinfectant is labeled for direct spray on seed potatoes), but it is recommended to always clean handling equipment between lots.

Resource: University of Idaho CIS bulletin 1180: 'Cleaning and Disinfecting Potato Equipment and Storage Facilities' (https://www.cals.uidaho.edu/edcomm/pdf/CIS/CIS1180.pdf)

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
19	Choose the single best answer: Farm cleans potato planting equipment to remove soil/weeds/debris: a) On a periodic basis b) When moving between farms c) When moving between fields with identified pest issues and clean fields d) Between fields on the same farm e) None of the above	a) Basic b) Steward c) Expert d) Master e) none	Farm refers to a growing operation/business entity that consists of one or more fields. Field refers to an area of land used for agricultural purposes, whether cash or cover crops. Removing soil/weeds/debris can be done by knocking off soil, spraying with water, washing with water and soap-based detergent or following a three-step process: washing with a detergent and water; rinsing, and applying a disinfectant.	**Interview:** How is potato planting equipment cleaned? Practices include: i) Knocking dirt off equipment ii) Rinsing with water iii) Washing with water and soap-based detergent iv) Cleaning with disinfectant Frequency of cleaning must be stated.

If you answer:

- a), b), c) or d) Describe standard cleaning practices such as removing soil from truck, handling equipment, and planter. This could include knocking or brushing off soil adhering to equipment. If necessary, the next step would be to clean with soap-based detergent and water. Rinse. Apply properly labeled and registered disinfectant.
- You will need to describe the frequency of cleaning planting equipment. Common frequency would be
    - a) Periodically cleaned as needed
    - b) When moving equipment between farms
    - c) When moving equipment between fields that have a known pest concern (eg. High nematode populations, powdery scab, etc.).
    - d) When moving equipment between all fields

Resource: University of Idaho CIS bulletin 1180: 'Cleaning and Disinfecting Potato Equipment and Storage Facilities' (https://www.cals.uidaho.edu/edcomm/pdf/CIS/CIS1180.pdf)

e) Continue to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
20	Mark all that apply: Potato planting is assessed by: a) Uncovering a portion of the planted row to check seed spacing, centering in row and depth b) Seed placement is monitored and adjustments are made to maintain and improve accuracy c) Post emergent plant-stand measurements d) Records of post emergent plant stand results, seed decay analysis and diagnosis of missing plants and diseased seed are kept annually and available for at least three years e) None of the above	a) Basic b) Steward c) Expert d) Master	a, b) While planting, performance is assessed periodically by removing soil to examine seed position. c, d) To determine if improvements are needed in future potato planting operations, after tuber emergence from soil, the number of plants (e.g., per acre) is determined to evaluate performance of seed handling and planting systems on the farm.	**If the grower marked response "a":** **Interview:** How do you assess seed placement performance? Measures could include: -Seed spacing -Centering in row -Seed depth **If the grower marked response "b":** **Interview:** What adjustments have you made when placement wasn't adequate? Practices could include: -Recalibration of equipment -Increasing uniformity of seed size **If the grower marked response "c":** **Documentation:** Include post-emergence plant stand records from the last crop cycle. **If the grower marked response "d":** **Documentation:** Record from a crop cycle within the last three years that documents: -Post-emergence plant stand numbers -Seed decay analysis -Diagnosis of missing plants and diseased seed for all fields

If you answer:

a) Describe in interview that you uncover a certain amount of feet (recommend at least 25 feet) of row behind each planter unit and measure actual seed spacing (number of seed pieces divided by a given length of row), depth (measure top of hill to seed piece), and accuracy of placement centered in furrow.
b) Describe in interview examples that you adjusted equipment, depth, speed, sprocket size, seed size, etc. when the planting was not performed to desired specifications, if necessary.
c) Documentation is required to show recorded plant stand records for each field. Count the number of plants within a given amount (e.g. 25 feet) of row in each field, or seed lot or variety within a field. Record the number of plants in and electronic format or in a sample document below. Insert document in manual here.

d) Written or electronic documentation is required to show plant stand records for all fields for the past 3 years. Any issues with emergence and missing plants are noted and diagnosed for lack of seed performance. Record the information in example document below. Insert document in manual here.

Resource: 'Seed and Planting Management', pages 103-113 in University of Idaho 'Potato Production Systems' edited by Stark/Love, 2003.

e) Continue on to next question.

Field name	Variety	Seed lot	Date counted	Number of plants/ length	Intended number of plants	Comments (e.g., seed decay, cause of decay, planter skips, herbicide damage)
For PSI question 20						

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
21	Yes or No Farm is a participating site for testing of new potato varieties for the farm in the past 5 years.	Expert	New potato varieties have been grown on the farm under a testing program in the past five years.	**Interview:** -What new varieties were tested? -Why did you introduce them? Reasons for introduction could include: -Customer request -Cost reduction -Reduced environmental impact -Other

If you answer yes:

- List the varieties that you grew to assess performance.
- Interview question will require you to describe why you selected to test a new variety to your farming operation. Examples of reasons may include:
    - Processor requested you to grow it for larger sample testing.
    - Looking for a variety that would better suit your farm because fewer inputs required (e.g., water, pesticides or fertilizer), yield potential, better quality, storability, pest tolerance or resistance, or seeking a new market; better adapted to your grower location; greater return on investment.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
22	Yes or No Potato fields are selected to optimize crop quality, minimize environmental impacts and risks from chemical, foreign material and microbiological hazards.	Expert	While all are important to sustainable production, food safety requirements are given priority over environmental practices in the selection of production acreage.	**Interview:** What factors were taken into consideration for potato field selection? Factors could include: -Crop quality -Environmentally sensitive areas -Risk from chemicals, microbiological hazards and foreign material

If you answer yes:

- Describe the factors considered for specific field selections. Examples could include:
    - Previous crop history with pest pressure
    - Distance from housing, environmentally sensitive area, populated areas
    - Buffer at edge of fields located beside a road for foreign material pickup
    - Areas of old homesteads, corrals, etc.
    - Suitable topography

Resource: Managing Foreign Material for Quality Idaho Potatoes, University of Idaho CIS bulletin 1104, http://www.cals.uidaho.edu/edComm/pdf/CIS/CIS1104.pdf and videos on "Minimizing Foreign Material" in both English and Spanish are available at http://www.uidaho.edu/cals/potatoes/food-and-farm-safety

If you answer no:

Continue on to next question.

No.	Switch Question
23	Switch Question: Has any ground not previously farmed by you been entered into potato cultivation in the past three years? If no, disregard question 24.

- If you answer yes to question 23, then answer question 24. If no, continue to question 25.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
24	Yes or No When determining suitability of a field for growing potatoes, grower considers the current characteristics of the land and adjacent land, and the potential impact of or on neighboring activities.	Steward	Potato ground being cultivated is evaluated, including adjacent property, for conditions that might affect crop production, or be negatively impacted by crop production. For example, insect pest or disease immigration, drift from or onto the crop, residual herbicide history of the field, excessive shade, proximity to roads leading to waste collection sites, proximity to golf courses or driving ranges, etc.	**Interview:** What were the neighboring activities and potential impacts on or of crop production identified? Characteristics could include: -Insect/ disease migration -Drift from or onto the crop -Residual herbicide history -Excessive shade -Other

If you answer yes to question 24:

- Describe in the interview how you determine if a field is suitable for potato production in that cropping year and if there is any potential impact on or from neighboring areas. Comments could include:
    - Previous crops (herbicide carryover, pest host), rotation length, powerlines/houses to impact aerial applications, canal/waterway adjacent or through field, proximity to other potato fields/crops/natural areas that harbor pests to potatoes. In addition, proximity to sources of foreign material such as golf course, landfill, or major roads are considered in deciding suitability of field.
    - Wind patterns, field topography, soil type, availability of water.

If you answer no to question 24:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
25	Mark all that apply: Global Positioning System (GPS) navigation is used: a) For general (e.g. tillage) equipment on potato crop b) To optimize row spacing and positioning c) For variable rate input applications d) None of the above	a) Steward b) Expert c) Master		**Interview:** What tasks do you use Global Positioning System (GPS) navigation for?"

Global position system (GPS) navigation can be used to improve the following farm operations providing cost savings by increasing efficiency and conserving inputs:

If you answer a) b) or c), examples to describe include:

a) General tillage, minimizing overlap and skips in the field. Reducing a tillage step. No hilling operation prior to planting. Cultivation (dammer-diking) to minimize crop damage.

b) Planting to optimize row and seed spacing

c) For designating, then applying to specific regions of fields for variable rate fertilizer, fumigants, etc. Reducing overlap and skips when applying crop protection chemicals including insecticide, fungicide, and herbicides. Rate controllers for field application of crop protection chemicals.

If you answer d):

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
26	Yes or No All pesticide and nutrient application equipment is appropriate for use and calibrated annually or more frequently if recommended by manufacturer's instruction.	Basic	Application equipment includes seed treaters, in-furrow applicators, ground applicators (including side dressers), chemigation equipment, aerial applicators, storage pilers, etc.	**Documentation:** - Written or electronic records of application equipment calibrations done within the last year OR -Third party applicator license.

If you answer yes:

- And calibrate equipment, show records (see below for example or create own record).
- And use a third party, list license number, expiration date and name of certified applicator.

See examples of calibration:

http://kafmo.org/pdf/Calibration_Formulas_Workbook_(rev_6-2012).pdf

http://extension.missouri.edu/p/G1270

Also, pesticide license information for your third party applicator can be found on-line for licensed applicators:

Washington: http://agr.wa.gov/PestFert/LicensingEd/Search/

Oregon: http://oda.state.or.us/dbs/licenses/search.lasso?&division=pest

Idaho: https://agri.idaho.gov/AGRI/Categories/Pesticides/licensing/indexApplicatorInformation.php

If you answer no:

Continue on to next question.

Equipment Calibration Log		
Date Calibrated	Equipment Name	Comments (Calibration Task)
For PSI question 26		

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
27	Yes or No Pesticide spill containment materials and clean water are readily available at pesticide mixing and application sites.	Basic	Equipment required to contain pesticide spills and clean water are readily accessible from where pesticides are mixed and applied.	**Interview:** What spill containment and clean up equipment and materials do you have available at mixing and application sites? Equipment and materials could include: -Shovel -Absorbent material -Source of water -Personal protective equipment (PPE) -Container for contaminated material -Other

If you answer yes:

- Describe where spill containment materials are located.
- A spill kit should be available wherever pesticides are stored or handled. A spill kit can be purchased or easily assembled and should contain the following items:
    - Telephone numbers for emergency assistance.
    - Personal protective clothing and equipment (gloves, footwear, and apron that are chemically resistant; disposable coveralls; protective eyewear; and a respirator).
    - Containment “snakes” or "tubes" to confine the leak or spill to a small area.
    - Absorbent materials, such as spill pillows, absorbent clay, kitty litter, activated charcoal, and vermiculite.
    - Plastic cover for dry spills.
    - A spray bottle filled with water to mist dry spills.
    - "Caution tape” to isolate the area.
    - A shovel, broom, and dustpan.
    - Heavy duty disposal bags with ties.
    - Duct tape—a universal tool.
    - Sturdy plastic container that will hold the entire volume of the largest pesticide container being handled and that can be tightly closed; can also be used to store the contents of the spill kit.
    - A permanent marker to write the name of the spilled pesticide on the container.

Commercially available kits exist: https://www.newpig.com/pig-pesticide-spill-kit-in-stowaway-bag/p/KIT621?searchTerm=pesticide+spill+kits

https://www.grainger.com/category/spill-kits-and-stations/spill-control-supplies/safety/ecatalog/N-lc4

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
28	Yes or No Pesticide containers are disposed of according to all applicable legal requirements. Disposable pesticide containers are triple rinsed. Refillable pesticide containers are handled as required by the manufacturer or local distributor.	Basic	To avoid excessive pesticide residue on the inside of empty containers, reusable containers (e.g., plastic jugs) are re-rinsed with clean water three times in succession. Each time, the rinsate is added to the sprayer tank. Third-party contractors, e.g., custom applicators, are under the same requirement.	**Interview:** What is the procedure for disposing of pesticide containers? Practices include: i) Containers are triple washed ii) Returned to the manufacturer iii) Other disposal/recycling program is used

If you answer yes:

Describe your pesticide container disposal program. Common practices include:

- Pesticides no longer in use are properly disposed of by returning to the manufacturer or disposal through hazardous waste disposal companies or local/regional disposal programs. WSDA, OSDA and ISDA have pesticide container recycling programs. See question 5.

- Disposable containers must be triple rinsed, with rinsate added to the spray tank, and containers, made to not hold contents (punctured, cut out bottom of container) and recycled or disposed of in land fill.

- Do not re-use pesticide containers for anything! Including markers or trash barrels.

Recycling of disposable containers available through: http://agriplasinc.com/

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
29	Yes or No Farm drift management plans are written and readily accessible.	Expert	Written drift management plans should include the following components: staff roles and responsibilities; training protocol for staff; information to help applicator to determine when weather conditions are unsafe for specific types of pesticides; information to help applicator select or adjust formulations, additives, equipment, techniques, or other options to reduce drift; and contact information for those requiring notification if unexpected drift has occurred.	**Documentation:** Written drift management plan **must** include: -Staff roles and responsibilities -Training protocol for staff. -Information to help applicator to determine when weather conditions are unsafe for specific types of pesticides. -Information to help applicator select or adjust formulations, additives, equipment, techniques, or other options to reduce drift contact. -Information for those requiring notification if unexpected drift has occurred.

If you answer yes:

- Show a written farm drift plan. It must include employee responsibilities, training protocol for employees, how to determine appropriate weather conditions, options to minimize drift, and protocol if off-target drift occurs. Also be able to describe the conditions that lead to an air inversion.

- A good example that could be adapted:
http://fieldcrop.msu.edu/uploads/documents/Michigan%20drift%20mgmt%20plan.pdf

Note: Pesticide labels and local laws may be conflicting on maximum wind speed allowable for applying pesticides. When a conflict exists, use slowest allowable wind speed as the maximum.

If you answer no:

Continue on to next question.

No.	Information Question	Reference Guide	Audit Guidance
30	**Informational Only: does not impact score.** Yes or No Farm been cited by a regulatory agency for off-target application of agrochemicals within the last three years?	Informational Only: does not impact score Off-target applications may include drift incidents or applications to the wrong site.	Interview Please describe any violations for off-target pesticide applications or drift in the past three years. "

Only need to answer yes or no (and interview question if yes) for information purposes. This question will not be audited.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
31	Yes or No Weather forecast is considered prior to nutrient applications to minimize off-target movement.	Basic	Off-target movement may include drift during application or runoff or leaching after application due to heavy rain.	**Interview:** What factors do you consider prior to nutrient applications to prevent off-target movement? Off target considerations include: -Drift during application -Runoff and/or leaching after application due to heavy rain -Runoff with snowmelt -Other

If you answer yes:

- Describe how you minimize off-target movement, for example where you get your weather forecast or current weather information and how you use this information to minimize nutrient drift, runoff and/or leaching.
- An example would be to not apply if heavy rain or snow is expected or wind speeds above appropriate for proper distribution.
    - If conditions that may favor off-site movement occur, you wait to make the application.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
32	Yes or No Farm minimizes run-off of pesticides, fertilizers, manure and soil amendments by not applying on water-logged, steep, cracked, compacted or frozen ground.	Basic	Where applications subject to runoff are made on slopes, appropriate measures are taken to reduce runoff such as buffers or filter strips.	**Interview:** What ground conditions on the farm do you avoid when applying inputs to minimize run-off?" Conditions include: -Water-logged ground -Steep ground -Frozen ground -Compacted ground -Cracked ground -Other

If you answer yes:

Describe that applications are not made when conditions are favorable to runoff. Possible conditions include:

- Water-logged ground (greater than 100% field capacity of soil; or less if application method would be conducive to drainage)
- Steep ground (greater than or equal to 20% slope)
- Compacted ground
- Frozen ground

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
33	Mark all that apply: Farm staff member or crop advisor: a) Can identify the major and emerging insect pests, diseases and weeds for the region b) Understands the life cycle of major and emerging insect pests, diseases and weeds for the region c) Can identify beneficial insects, such as natural predators of crop insect pests d) None of the above	a) Basic b) Steward c) Expert	At least one individual employed by or under contract with the farm can: a) visually identify the major and emerging insect pests, diseases and weeds present in the region b) describe the life cycle of the major and emerging insect pests, diseases and weeds present in the region that typically require a control measure c) visually identify the major beneficial insects present in the region, for example, lady beetles, lacewings, syrphid flies, tachinid flies, predatory mites, bigeyed bugs, minute pirate bugs	**Interview:** Please identify who on the farm, or contracted for the farm, is able to: a) visually identify the major and emerging insect pests, diseases and weeds present in the region b) describe the life cycle of the major and emerging insect pests, diseases and weeds present in the region that typically require a control measure c) visually identify the major beneficial insects present in the region, for example, lady beetles, lacewings, syrphid flies, tachinid flies, predatory mites, bigeyed bugs, minute pirate bugs If the specified individual is not available, ask those present to describe the most recent event they are aware of when that individual performed that role.

If you answer a) b) or c):

Name at least one person, either on the farm or contracted by the farm, who is able to a) identify the major and emerging pests, diseases and weeds in the region, b) understands their lifecycles, and c) can identify natural predators of pests. If that person is present, they should be prepared to explain their role and to answer the questions. If not, then those present should be prepared to describe a recent event when that person demonstrated their ability to do a) b) or c). For the latter, an example could include, your agronomist found potato psyllids in your field, knowing the life cycle of the pest, the agronomist recommended immediately applying an insecticide but not one that would harm natural predators of the psyllid.

- The Northwest Potato Research Consortium Website (www.nwpotatoresearch.com) has insect and disease libraries with images of the major and emerging insect pests and diseases of potato in the PNW, and includes descriptions of the life cycles of insect pests and biology of pathogens. Weeds are not covered. The website also has images and descriptions of beneficial organisms.

- *Integrated Pest Management for Potatoes in the Western United States* (2nd edition, 2006) is a book with images and descriptions (including life cycles) of insects, pathogens, and weeds that are found in potatoes in the Western U.S. *Weeds of the West* (11th edition, 2012) is a reference book with images and descriptions of weeds.

If you answer d) none:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
34	Yes or No Farm has access to Integrated Pest Management (IPM) information resources.	Basic	Farm manager and farm personnel have access to IPM resources such as crop and region-specific production guides, in-season update bulletins and newsletters, association publications, industry publications, bookmarks to online resources, and Extension bulletins.	**Interview:** What IPM information resources do you use. These could include: -IPM Regional Center websites -University Extension publications -Grower association newsletters/bulletins

If you answer yes:

- Describe or show examples of newsletters (email or hard copy) or bulletins that can be used as IPM resources. Although not required, you can print some examples and attach here.

Idaho - http://www.cals.uidaho.edu/edComm/list.aspx?category1=Crops&category2=Potatoes

Oregon - https://catalog.extension.oregonstate.edu/search/content/potato

Washington - http://pubs.wsu.edu/ListItems.aspx?CategoryID=135

Sign up for Potato IPM Newsletters in the Pacific Northwest:

WSU Potato Pest Alerts – for the Columbia Basin in Washington

http://wsu.us13.list-manage.com/subscribe?u=2eff8714011ff4bfba18a0704&id=9dc1a6349a

Potato Update – from OSU Hermiston http://oregonstate.edu/dept/hermiston/trap-reports

Pacific Northwest Pest Alert Network – for Idaho and Malheur County http://pnwpestalert.net/user/join/

Potato Bytes – from OSU Klamath Falls http://oregonstate.edu/dept/kbrec

Western Regional IPM Center: http://westernipm.org/

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
35	Yes or No Noxious weeds on field edges are controlled, by mowing, cultivation, burning (when recommended as a Best Management Practice) or chemical methods.	Steward	Noxious weeds (as defined by local authority as damaging to humans, crops or ecosystems) immediately adjacent to fields are not allowed to produce seed by mowing, cultivation, burning (when recommended as a Best Management Practice) or chemical methods.	**Interview:** How do you control noxious weeds on field edges? Control measures could include: -Herbicide application -Mowing -Cultivating -Other

If you answer yes:

- Describe how you control noxious weeds on field edges. Control measures can include applying herbicides, mowing weeds before they go to seed, cultivation, or burning (if it is allowed and recommended as a management practice).

For more information about noxious weeds:

Idaho – http://invasivespecies.idaho.gov/noxious-weed-program/

Oregon – http://www.oregon.gov/ODA/programs/Weeds/Pages/AboutWeeds.aspx

Washington - http://www.nwcb.wa.gov/

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
36	Mark all that apply: Management decisions regarding soil-borne pests or diseases are based on: a) Historical experience b) Documented results of monitoring, scouting or sampling c) None of the above	a) Basic b) Expert c) none	Soil-borne pest and disease management decisions (e.g., fumigation, potato variety selection, cover crops) are determined by monitoring, scouting or sampling for pests or diseases to improve timing and results. For example, soil samples are taken and checked for nematodes prior to planting potatoes in ground with potential for nematode problems.	**If the grower marked response "a": Interview:** How do you determine when and how to take action against soil-borne pests and diseases? (e.g., based on pest patterns from previous years in combination with knowledge of the pest life cycle) **If the grower marked response "b": Documentation:** Pest scouting records from a month of agricultural activity within the last year.

This question addresses management of soil-borne pests (ex. wireworms, nematodes, voles) and pathogens associated with common diseases (ex. Verticillium wilt, black dot, Fusarium, Rhizoctonia, white mold, silver scurf, powdery scab, common scab, pink rot, Pythium leak).

If you answer:

a) Explain how you decide when and how to control soil-borne pests and diseases. For example, decisions are based, in part, on field history (past problems) or scouting/sampling.
b) Show records of previous monitoring, scouting, or soil tests for soil-borne pests (nematodes) and/or pathogens (Verticillium) or wireworm baiting records. See document used on question 38.
c) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
37	Yes or No Non-chemical practices such as cultural controls (resistant varieties, adjusting planting time), mechanical controls (mowing, cultivating, disking, burning, etc.) or biological controls (cover crops, crop rotation, soil amendments) are used to control pests.	Steward	Methods of non-chemical pest control include tilling, thermal control, bio-herbicides, rolling, releasing organisms that feed on pests, soil solarization, green manures, crop rotation, eliminating cull piles or removing weeds that could carry potato diseases or be habitats to insect pests.	**Interview:** What non-chemical methods have you used to control weeds in the past year? Methods of non-chemical records including: i) Tilling ii) Thermal control iii) Bio-herbicides iv) Rolling v) Releasing organisms that feed on weeds vi) Soil solarization vii) Green manures viii) Crop rotation ix) Eliminating cull piles x) Removal of weeds that could carry potato disease or be habitats to insect pests xi) Other

If you answer yes:

- Describe the non-chemical methods you use to control weeds in potato fields. This does not exclude the combined use of non-chemical weed controls and application of herbicides. Non-chemical methods could include tillage, cultivation, hand-weeding, rolling, flaming, utilizing bio-herbicides (use of plow-down Brassica cover crops or application of Brassica seed meals; other available products), incorporating use of a biocontrol (release of organisms that feed on weeds), and maintaining a vigorous potato canopy that outcompetes weeds.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
38	Choose the single best answer from the options performed: Pest scouting, sampling and monitoring is performed: a) In random fields across the farm b) Systematically in potato fields and scouting is adjusted according to pest, crop stages and high risk areas c) Systematically in potato fields on a weekly basis during the growing season d) None of the above	a) Basic b) Steward c) Expert	a) All farm fields are randomly selected for pest scouting once during the season. b) Potato fields are scouted systematically according to a schedule dictated by crop phenology, pest life cycles and recommended by local/regional experts. High risk sites within the farm are scouted, e.g., new ground brought into cultivation, field edges near Colorado potato beetle overwintering sites or fields planted to potatoes the prior season. c) Once a week during the growing season, potato fields are scouted systematically using a planned travel path (e.g., X, W, Z pattern) to ensure a representative sample and accurate determination of action thresholds.	**If the grower marked response "a": Interview:** How do you randomly select fields for pest scouting, sampling and monitoring? **If the grower marked response "b": Documentation:** Pest scouting records from the past year, including: -Scouting date -Person scouting -Location -Pest/ disease -Count -Frequency (based on crop or pest life cycle) **If the grower marked response "c": Documentation:** Pest scouting records from the past year, including: -Scouting Date -Person scouting -Location -Pest/ disease -Count -Frequency (weekly)

If you answer a) b) or c):

a) Describe how you randomly select fields for scouting, sampling and monitoring for pests. Random indicates there is no selection criteria and no at-risk areas are specifically scouted or monitored.

b) Describe or show a map of your farm and talk about the high risk areas where you expect to find certain pests. Discuss neighboring crops and pests that might move from them into potatoes. Discuss where you grew potatoes last year and the pests that might emerge from those fields and move into the current crop.

b) and c) Be prepared to show your pest and disease scouting records. Example of record document is given on next page. Ensure the document has the field id, date, scout's name, pest monitored, and prevalence (count or rating) of pest on the record. You must be able to show **weekly** scouting records to get credit for c).

d) Continue on to next question.

Field ID	Date	Scout's Name	Pest observed	Count or rating	Comments
For PSI questions 36, 38					

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
39	Yes or No Farm participates in regional insect and disease scouting programs or provides own scouting results for information sharing on blight "hot lines" or newsletter alerts.	Master	Scouting or monitoring data collected on the farm are shared with others in the region as part of a regional scouting program or by reporting self-collected data to a regional alert system.	**Interview:** How are scouting or monitoring results from your farm shared with others in the region?" Measures include: -Communication with field reps -Communication with neighboring growers -Information sharing on' blight hotlines' -Contributing to newsletter alerts -Others

If you answer yes:

- Discuss how you are a grower-cooperator in a regional scouting program that publishes findings, or discuss how you notify neighbors, field representatives, university personnel or newsletter authors when a pest occurs on your farming operation that has community impact (e.g., psyllids, late blight).

Potato IPM Newsletters in the PNW:

WSU Potato Pest Alerts for the Columbia Basin in Washington http://wsu.us13.list-manage.com/subscribe?u=2eff8714011ff4bfba18a0704&id=9dc1a6349a

Potato Update from OSU Hermiston http://oregonstate.edu/dept/hermiston/trap-reports

Pacific Northwest Pest Alert Network for Idaho and Malheur County http://pnwpestalert.net/user/join/

Potato Bytes from OSU Klamath Falls http://oregonstate.edu/dept/kbrec

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
40	Yes or No Pesticide application decisions and timing are based on techniques such as action thresholds, degree-day models and decision-support/predictive systems.	Steward	Where available and recommended by Extension or other regional experts, action thresholds are used to determine whether or not and when to take action against pests such as Colorado potato beetle, aphids, leafhoppers, nematodes. Where models are recommended to estimate when pests or diseases will reach a critical time period, for example, disease inoculum is present and plants are susceptible, or insect pests reach a damaging life stage or migrate into a region, these are used to determine when to take action.	**Interview:** Please describe any thresholds, degree day models or decision support/predictive systems that you use to guide pesticide application decisions. Systems could include: -Thresholds -Degree-day models -Blight prediction tools -Other decision tools

If you answer yes:

- Describe how you utilize support/predictive systems. An example is if you subscribe to one of the pest alert newsletters in the Pacific Northwest; receive information about late blight, certain insect pests, and other problems that show up in potatoes in the region. Degree-day models and blight-prediction models are often included in the alerts. Print out a copy of one of these reports to show as an example.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
41	Choose the single best answer from the options below: Biological product(s) recommended to control or suppress pests, e.g., green manures, biological controls (introducing natural enemies), bio-pesticides (living organisms or products of living organisms): a) Have been tested on the crop b) Are practiced on at least 25% of the potato crop acres c) Are practiced on at least 50% of the potato crop acres d) Other e) None of the above	a)Steward b) Expert c) Master d) e) none	Biological products include bio-pesticides (living organisms or products of living organisms), and biological controls (releasing predatory insects or other living organisms to control pests). For example, green manures used to suppress Verticillium wilt, Bacillus thuringiensis) applied or parasitic insects released. a) At least one biological management strategy has been tested on part of the potato crop for pests) or disease(s) in the past three years. b) and c) Biological methods are used on the portion of acreage indicated.	**Documentation:** Documentation could include: -Bio-pesticide applications -Use of green manures -Natural enemies -Other

If you answer a) b) or c):

Be prepared to show by field documentation (acres for each field) that biological products to control or suppress pests were used on either

a) Part of the crop/field up to 24% of your acreage.
b) On 25 to 49% of your crop.
c) Above 50% of your crop acres.

- Show pesticide records or label of bio-pesticide applications or other documentation (green manures planted or receipt of predatory insects that were released). Additional biological methods could be described and documented.

Using Green Manures in Potato Cropping Systems:
https://research.libraries.wsu.edu:8443/xmlui/bitstream/handle/2376/6283/FS218E.pdf?sequence=1

Biological Control: https://biocontrol.entomology.cornell.edu/purpose.php

d) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
42	Yes or No In potato field edges, pests are partially controlled through chemical treatment or non-chemical management (e.g., mowing, disking) of alternate hosts or sites.	Expert	At least once during the past year, insect, disease, weed or other pest management included management actions are taken on edges of fields planted to potatoes, e.g., pesticide applications or non-chemical management tactics were used to suppress alternate hosts such as nightshade.	**Interview:** What control measures have you taken to control alternate hosts on non-potato ground? Measures could include: -Mowing insect and disease hosts -Disking insect and disease hosts -Chemical treatment of insect and disease hosts -Other

If you answer yes:

- Talk about how you control potato insects, diseases, and/or weeds in fields that are not planted to potatoes or along field edges of potato fields. Common examples include: mowing, tilling, or applying herbicide to field edges or non-potato planted areas, or identifying host plants and removing by tillage, herbicide or controlling pest on host plant(s) via pesticide application.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
43	Yes or No Has a banded pesticide application been made, when a pesticide application was required, to reduce the overall area treated?	Steward	Banded application involves applying the pesticide to the planted row.	**Documentation:** Pesticide application records showing treated area is a fraction of field area.

If you answer yes:

- Show pesticide application records (See question 6). This will show use of seed treatment, band or in-furrow application of a pesticide.
- Agrian, Land.db or other similar program will typically have this information.
- Forms are also available from WSDA http://agr.wa.gov/PestFert/Pesticides/docs/RecForm4226.pdf.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
44	Yes or No Has a spot spray pesticide application been made within a field, when a pesticide application was required, to reduce the need for whole field applications, not including on field edges?	Master	Spot spray application involves directly spraying an area to reduce the need for whole field applications.	**Documentation:** Pesticide application records demonstrating that the treated area is a fraction of field acreage.

If you answer yes:

- Show pesticide application records (See question 6). The record should note that only a fraction of the total acreage was treated. Include spot spray pesticide applications made both within the field and/or on field edges.
- Land.db, Agrian or other similar program will typically have this information.
- Forms are also available from WSDA http://agr.wa.gov/PestFert/Pesticides/docs/RecForm4226.pdf Section (6.) on the form allows you to indicate the total area treated (in acres, etc.) but you should also note the size of the field and calculate the % of treated area.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
45	Mark all that apply: When selecting a pesticide for potato crop, grower considers: a) Label restrictions and Maximum Residue Limit (MRL) guidelines as per market designation b) Toxicity to mammals (by pesticide signal word) and makes efforts to reduce use of most toxic c) Toxicity to beneficials and aquatics and makes efforts to reduce use of most toxic d) Site-specific features that may increase pesticide risk (such as close proximity to surface water, public roadways, schools, etc.), and makes efforts to reduce the use of pesticides with the greatest risk e) None of the above.	a) Steward b) Expert c) Master d) Master	a) The pesticide is approved for use on potatoes and follows Maximum Residue Limit (MRL) guidelines. b) Acute toxicity to mammals is considered using signal word on label (Danger, Warning, Caution). Other factors considered in evaluating pesticides for chronic toxicity to mammals may include SDS information on chronic hazards, carcinogenicity rating by US EPA, international agency for research on cancer and/or California Proposition 65, reproductive/developmental toxicity (EPA, CA Prop 65) or endocrine system hazard rating. Most toxic products are targeted for use reduction c) Insecticide options are carefully evaluated for potential to negatively impact beneficial insects and aquatic organisms. Most toxic products are targeted for use reduction.	**Interview:** **If the grower marked response "a":** Do you consider label restrictions to ensure the product is approved for use on potatoes? Are you applying at rates that follow MRL guidelines? Tools could include: - Noting approved crop list on label - Reviewing MRL guidelines as per market designation. **If the grower marked response "b":** How do you consider toxicity to mammals? Methods could include: -Noting signal word on label (Danger, Warning, Caution) and selecting those least toxic -Reviewing SDS for information on chronic hazards, carcinogenicity or endocrines system hazard rating and selecting least toxic. **If the grower marked response "c":** How do you consider toxicity to beneficial insects and aquatics? Methods could include: -Reviewing pesticide label for insect or aquatic warning signs -Using pesticide risk estimation tools -Reviewing environmental toxicity data on active ingredients. **If the grower marked response "d":** What site-specific features on the farm increase pesticide risk? -Proximity to surface water -Proximity to public roads, schools or public facilitiesc) -Proximity to environmentally sensitive areas -Other.

If you answer a):

- Be prepared to explain how you review consideration in the use of a pesticide on potatoes such as listing of the crop on the label and ensuring the pesticide is approved for use from processors or other customers. A list is often provided to contract growers on registered pesticides that cannot be used due to lack of MRL acceptance in export countries.

If you answer b):

- Be prepared to explain how you consider toxicity to mammals when selecting a pesticide to use. They will expect you to mention the signal word (Caution, Warning, or Danger) on the label (see http://www.npic.orst.edu/factsheets/signalwords.pdf or https://edis.ifas.ufl.edu/pdffiles/PI/PI13700.pdf). Products with the DANGER signal word are the most toxic and those with the CAUTION signal word are the least toxic to mammals. If you marked a) you probably avoid using products with the DANGER signal word.

If you answer c):

- Explain how you consider toxicity to beneficial insects and aquatics when selecting a pesticide to use. In this case, you could mention scanning the product label for information about toxicity to non-targeted insects or aquatic organisms, or refer to Extension production guides that include information on toxicity of pesticides to beneficial insects. Pesticide labels include environmental hazard statements, including some very specific statements about toxicity to non-target organisms (like aquatic algae, animals and insects; birds; mammals; bees and other non-target insects). It is legal to apply products that have these hazard statements, but only in the manner described on the label (see http://edis.ifas.ufl.edu/pdffiles/PI/PI13600.pdf). Discuss avoidance in using products that have environmental hazard statements for bees or aquatic mammals and insects. If you use pesticide risk assessment tools, then you can mention their output relative to non-target organisms.

If you answer d):

- Describe sites on your farm that pose a greater risk to inadvertent pesticide exposure; i.e. site-specific features that increase pesticide risk. Think about fields that are in close proximity to surface water, public roads, schools and hospitals, or other environmentally sensitive areas. The environmental hazard statements on the label usually include information about protecting water sources and the potential of the product to drift or runoff.

Resources: Understanding Pesticide Labels

https://pesticidestewardship.org/homeowner/how-to-read-the-label/

http://extensionpublications.unl.edu/assets/pdf/g1955.pdf

If you answer e):

Continue to the next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
46	Yes or No Pesticide uses at greatest risk of resistance have been identified and evaluated, and farm uses one or more strategies to delay resistance.	Expert	Pesticide uses are evaluated for potential for resistant pests to develop. Strategies to delay resistance are implemented such as rotating annual crops, rotating or combining modes of actions for products most at risk of resistance and rotating chemical controls with non-chemical controls.	**Interview:** What measures are taken to reduce pesticide resistant risks? Measures could include: -Rotating or combining modes of action for pesticide uses most at risk of resistance. -Rotating crops. -Establish refuges (untreated areas). -Use maximum application rates for pesticide uses most at risk where appropriate. -Rotate chemical controls with non-chemical methods where appropriate. -Other

If you answer yes:

Be prepared in the interview to describe your resistance management strategy on the farm. Common information to include:

- Awareness of pesticide uses, i.e., pest and pesticide combinations, most at risk of resistance, e.g., Colorado potato beetle and neonicotinoid insecticides.
- Follow label requirements and rotate modes of action (knowing IRAC, HRAC, FRAC codes); “sandwiching” same mode of action against a target pest.
- Combining multiple modes of action in a single application.
- Integrate cultural methods with chemical methods
- Crop rotation

Additional resources:

- Insecticide Resistance Action Committee (IRAC) Website: www.irac-online.org
- Fungicide Resistance Action Committee (FRAC) Website: www.frac.info
- Herbicide Resistance Action Committee (HRAC) Website: www.hracglobal.com

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
47	Choose the single best answer from the options below: Soil sampling is done using grid or zone sampling to identify variability within fields and nutrients are applied using variable rates: a) Some potato fields b) All potato fields c) Whole farm (all cultivated areas receiving N, P or K applications including crops other than potatoes) d) None of the above	a) Basic b) Steward c) Expert d) none	Soils are tested using methods designed to detect within-field variations in nutrient availability, and this information is used to determine application amounts within fields.	**Documentation:** Soil test results from a collection of samples taken within the last year, including names of fields the samples were taken from.

This question refers to variability within a field and if you take soil nutrient samples to test for **pre-plant** recommendations, and use the results to apply prescribed nutrient needs for the crop using variable rates.

If you answer a) b) or c):

- **Attach** grid or zone soil test results here that include date taken and field names.

  a) Show that some of the potato fields were variable rate fertilized.
  b) Show that all potato fields were grid or zone sampled and nutrients applied at variable rate.
  c) Show that all cultivated areas on the farm were grid or zone sampled, and nutrients applied at variable rate.

Resource for Idaho:
http://www.extension.uidaho.edu/nutrient/pdf/Potato/Nutrient%20Management%20Guidelines%20for%20Russet%20Burbank%20Potatoes.pdf

Soil testing methods are described in the above publication. Determine the best design, number and location of soil tests per field and number of fields tested using this design. Submit samples to certified soil testing laboratory.

d) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
48	Yes or No In-season crop nutrition sampling, e.g., petiole or soil testing, is performed.	Steward	To ensure adequate nutrition, sampling and testing is performed after the crop has emerged where this practice is recommended by regional experts. For example, leaf petiole sampling is used to determine nitrogen needs during the growing season.	**Documentation:** Petiole or soil test results taken during the last crop season, including date(s).

This question refers to in-season nutrient sampling. The below website and publication are good resources for petiole and soil testing methods and recommendations.

If you answer yes:

- Attach petiole and/or in-season soil tests here.

Resources:

- www.extension.uidaho.edu/nutrient/crop_nutrient/potato.html
- http://www.extension.uidaho.edu/nutrient/pdf/Potato/Nutrient%20Management%20Guidelines%20for%20Russet%20Burbank%20Potatoes.pdf

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
49	Yes or No Remote sensing technology is used to monitor crop health status.	Expert	For all potato fields, plant health is assessed by aerial photography, satellite imagery or other technology designed to evaluate crop health indicators from a distance.	**Documentation:** Results of work performed by the remote sensing technology (e.g., aerial photo, satellite image), taken from analysis done within the last year.

If you answer yes:

- Show documents that demonstrate the use of remote sensing technology (e.g., aerial photo, satellite image, drone/UAV) taken within the last year. Show copies of the photographs either digitally or on paper.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
50	Yes or No Nutrient application rates reflect available nutrients and projected crop need, i.e., by nutrient management planning.	Basic	Nutrient application rates are determined by methods such as soil sampling, foliar analysis, nutrient crediting from prior to concurrent crops, or other science-based techniques.	**Documentation:** Documentation could include: -Petiole/soil test results. -Nutrient Management Plan. -Records of crop grown in previous years. -Nutrient application records from previous years.

If you answer yes:

- Show pre-plant soil test and nutrient calculations to be used on current crop based upon variety, soil type, rotational crop, yield goal. See question 8, 47.

- Attach in-season soil/petiole tests or see question 48.

Additional resource:

- http://www.extension.uidaho.edu/nutrient/pdf/Potato/Nutrient%20Management%20Guidelines%20for%20Russet%20Burbank%20Potatoes.pdf

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
51	Yes or No Multiple nitrogen applications or slow release fertilizers are used where recommended, e.g., high-porosity soils with low water-holding capacity.	Steward	To reduce potential for nitrate leaching and provide adequate nutrition, nitrogen is applied in multiple, smaller applications or as a slow release formulation, rather than one single application at or before planting.	**Documentation:** Nutrient application records from the past year.

If you answer yes:

- See questions 8, 48, and 50 for nitrogen management and documentation.
- If slow release fertilizers were used, denote on nutrient management plan. Indicate timing of nutrient application (e.g., fertigation, aerial, ground rig) type to show smaller applications made.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
52	Yes or No Nitrogen-contributing or nitrogen-recovering crops are included in the rotation as partial alternatives to commercial fertilizer prior to at least 25% of the current potato crop.	Expert	On at least 25% of the current potato crop, one nitrogen fixing crop, such as legumes, or one nitrogen recovering crop, such as mustard or sudan, have been grown since last cropped to potato.	**Documentation:** Crop rotation records showing legume crops grown, such as: -Soybeans -Alfalfa -Lentils -Peas

If you answer yes:

- Show document of previous year(s) crop records for current potato fields when legumes (nitrogen contributing; such as alfalfa, beans, peas, vetch) or nitrogen recovering crop (green manure crops; such as mustards/brassicas, sorghum sudangrass, triticale) were grown. List potato fields and at least 25% of the fields must have had one of these crops in rotation prior to potatoes being planted.

Additional Resource:

- Cover crops for high-desert farming systems in Idaho, University of Idaho CIS Bulletin 889. http://www.extension.uidaho.edu/nutrient/culturalpractices/PDF/Cover%20Crops%20for%20High-Desert%20Farming%20Systems%20in%20Idaho.pdf

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
53	Yes or No Nutrients are applied with practices that help to avoid cropland losses, help to avoid contaminating surface water and help to maximize uptake, e.g., broadcasting and quickly incorporating and/or dammer-diking, applying in sideband or in furrow, applying to growing crop, fertigation, etc.	Steward	Grower uses generally accepted good practices when applying nutrients to avoid runoff and maximize uptake, e.g. broadcasting on the soil surface then dammer-diking, which is the process of creating reservoirs in rows using tillage; applying in a band alongside the crop row; placed in furrow and covered with soil; fertigation which is application through the irrigation system; etc.	**Interview** What techniques do you use when applying nutrients to avoid losses (for example through runoff, leaching, and/or volatization) and maximize uptake? Techniques can include: i) Broadcasting and quickly incorporating ii) Applying in sideband or in furrow iii) Applying to a growing crop iv) Fertigation v) Other

If you answer yes:

Be prepared in the interview to describe the techniques you use when applying nutrients to avoid cropland losses and maximize uptake. Common information to include:

- Broadcasting and quickly incorporating – this strategy is particularly important to minimize nitrogen volatilization from urea and other N fertilizers, including manure. See also: Management to Minimize Nitrogen Fertilizer Volatilization, MSU Extension Bulletin EB0209. http://msuextension.org/publications/AgandNaturalResources/EB0209.pdfApplying in a sideband or in furrow – placement of fertilizer near the root system where uptake occurs.
- Applying to a growing crop – that is actively taking up nutrients.
- Fertigation – also called spoon-feeding, where nutrients can be applied in small increments as plants need them.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
54	Yes or No The farm has implemented a written whole-farm soil and water conservation plan to maintain/improve soil and water quality.	Expert	A written whole-farm conservation plan describes the soil and water resources on, under and adjacent to the farm, potential threats to those resources including soil and nutrient losses and chemical contamination, and details strategies and actions taken to mitigate threats including monitoring and evaluation.	**Documentation:** Conservation plan containing the following: -Identifies soil and water resource on and adjacent to farm. -Identifies potential threats to resources. -List measures taken to mitigate threats.

If you answer yes:

- Be prepared to show documentation of your farm's soil and water conservation plan. The plan should identify all soil and water resources on and near the farm. Most plans pay special attention to wetland areas and highly erodible land. Mitigating measures may include windbreaks and cover crops to prevent wind erosion, buffer zones surrounding wetland areas, reservoir tillage (dammer diker) to limit runoff, etc.
- An example from Benton County, WA is located on our website (www.uidaho.edu/potatoes) under Sustainability Audit Information/ Resources.
- Contact your state conservation service for assistance in developing conservation plans specific to your farming operations:
  Idaho: https://scc.idaho.gov/

  Oregon: http://www.oregon.gov/ODA/programs/NaturalResources/SWCD/Pages/SWCD.aspx

  Washington: http://scc.wa.gov/

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
55	Mark all that apply: a) Overall crop management performance is evaluated by looking at success of nutrient, irrigation and pest management. b) Evaluation is documented including records of changes made and effect of changes.	a) Expert b) Master	At least once per season, overall crop performance is evaluated, including nutrient management, irrigation management, insect pest damage, disease incidence and severity and weed presence to assess which measures worked or did not work well to maintain productivity with minimum inputs. This information is used to adjust practices.	**If the grower marked response "a": Interview:** How do you evaluate crop management performance? Grower could discuss evaluating: -Nutrient management -Pest management -Irrigation management -Yields **If the grower marked response "b":** **Documentation must include:** -Evaluation of factors above -Record of changes made -Impact of changes

If you answer a) or b):

a) Be prepared to talk about how you evaluate the success of crop management practices on your farm. This could be an end-of-season review of management programs for nutrients, pests, and irrigation. Explain how management practices will be adjusted next year based on the review.
b) Show documents that note how management practices have been adjusted and the outcome of the adjustments. Some farms maintain this kind of information in end-of-season reports. For example, a report might note that control of a recurrent pest/disease was improved by adjusting the timing of a pesticide application. A report might note that yields were improved by modifying the amount or timing of nitrogen fertilizer applications.

If a) and/or b) does not apply to your farming operation, continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
56	Yes or No Grower or third party has conducted and documented on-farm research on topics such as new varieties, soil amendments, pesticides, equipment, techniques, etc., within the past three years using science-based procedure.	Master	On-farm research utilizes checks or controls and quantitative results are documented in writing. On-farm research may include new variety trials, soil amendments, pesticides, equipment, techniques, etc.	**Documentation:** Documentation of on-farm research conducted within the past three years, including methods and results. Research conducted could include: -New variety trials -New soil amendments -New equipment -New techniques -Other

If you answer yes:

- Be prepared to show documentation that on-farm research was conducted within the past three years.
- On-farm research utilizes checks or controls and quantitative results are documented in writing. On-farm research may include potato variety trials and trials of reduced pesticide and fertilizer application rates or new reduced risk pesticides or new formulations of fertilizers.
- Documentation would include a brief report of what was done (methods) and resulting information for example differences in yield, quality, or pest presence. If research was conducted by University or private entity, ask for the report of what they did and attach.

Resources on how to do on-farm research:

- http://www.fao.org/docrep/006/Y5146E/y5146e05.htm
- https://www.agry.purdue.edu/ext/corn/news/timeless/onfarmresearch.pdf

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
57	Mark all that apply: Grower communicates farm stewardship practices and/or improvements (e.g., sensitive area/biodiversity protection, soil erosion control/improvements in soil health, increased water and energy use efficiency, reuse and recycling efforts): a) To employees, neighbors, or community members, etc. b) In a written document c) Online or in an annual report d) None of the above	a) Steward b) Expert c) Master d) none	Improvements in stewardship are reported via company website, employee communications, annual performance report, shareholder communications, etc. Improvements may include sensitive area/biodiversity protection, soil erosion control/improvements in soil quality, increased water and energy use efficiency, and reuse and recycling efforts.	**If the grower marked response "a": Interview:** Who do you share improvements in stewardship with? (e.g., employees, neighbors, community members). **If the grower marked response "b":** **Documentation:** Example of written communication. **If the grower marked response "c":** **Documentation:** Example of electronic communication.

For this question, stewardship relates to sensitive area/biodiversity protection, soil erosion. control/improvements in soil quality, increased water and energy use efficiency, and reuse and recycling efforts.

If you answer a), b) or c):

a) Be prepared to talk about who you share stewardship improvements with (employees, neighbors, community members, etc.). This could be done at an employee meeting, community event, etc.
b) Show a written document that describes farm improvements in stewardship.
c) Show an annual report or a website that describes the farm's stewardship improvements.

If you answer d):

Continue on to next question.

No.	Switch Question
58	Switch Question: Does the farm have employees? If no, disregard questions 59 through 65.

- If you answer yes to question 58, then answer question 59. If no, continue to question 66.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
59	Mark all that apply: a) Farm employment policies comply with all federal, state/provincial or local laws. b) Farm has a written employee handbook outlining employment practices that is available in an accessible language to all employees. c) A worker health and safety plan identifies and mitigates the risk for workers health, safety and welfare. A member of management has been designated as responsible for identifying and mitigating risks to worker health, safety and welfare. d) None of the above	a) Basic b) Steward c) Expert d) none	The farm is compliant with ALL applicable legislation regarding employment regulations including child employment (if applicable) for the farm's jurisdiction. In the absence of legislation, an employment policy is in place. Operation has a written health and safety plan and has designated an individual to ensure worker protection standards are adhered to.	**Interview:** **If the grower marked response "a":** Do your employment policies comply with all federal, state/provincial or local laws?. **Documentation:** **If the grower marked response "b":** Employee handbook, including translations if necessary. **If the grower marked response "c":** Worker health and safety plan, including identified risks and mitigation strategies identified to ensure worker health, safety and welfare. Position description for responsible individual.

If you answer a):

Be prepared to discuss how you comply with federal, state/provincial or local laws.

If you answer b) or c):

Bring a copy of your farm's employment policy, employee handbook, and/or worker health and safety plan to the audit. The websites below provide templates or information to help design your farm employment policy, handbook and worker health and safety plan.

- https://www.dol.gov/whd/ag/ag_flsa.htm
- https://farmanswers.org/Library/Record/agriculture_employee_handbook_template
  http://fyi.uwex.edu/ag-human-resources/resources-for-farmers-managers
- http://agsci.oregonstate.edu/main/health-and-safety-training-manual

- http://fyi.uwex.edu/agsafety/files/2011/02/Farm-Safety-Handbook.doc

If you answer d):

Continue on to next question.

No.	Survey Question
60	Switch Question: Does the farm provide employee housing? If no, disregard questions 61.

- If you answer yes to question 60, then answer question 61. If no, continue to question 62.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
61	Yes or No Do employee housing standards comply with all federal, state/provincial or local laws?		The farm is compliant with ALL applicable legislation regarding housing laws. In the absence of legislation, a housing policy is in place that sets minimum standards for housing including how those standards are monitored and maintained.	**Interview** **If the grower marked response "yes":** Do your employee housing standards comply with all federal, state/provincial or local laws?

If you answer yes:

- Be prepared to discuss how you comply with federal, state/provincial or local laws.

Resource: US Dept. of Labor Website

https://www.dol.gov/whd/mspa/

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
62	Yes or No Farm maintains open communications with employees. This includes a grievance process that addresses and resolves the grievance in a timely and equitable manner.	Basic	Farm ensures open communication with employees, e.g., employee involvement in decision making and transparency in performance measures and has a formal employee grievance procedures that includes workplace violence.	**Documentation:** Documentation could include: -Policy on employee involvement in decision making. -Policy on financial/other performance measure transparency. -Formal employee grievance procedures. -Employee satisfaction surveys.

If you answer yes:

- Be prepared to provide a document or written farm employment policy or employee handbook that includes farm policies on decision making, grievances, and expectations.
- An example from Michigan State University is shown below.

  https://farmanswers.org/Library/Record/agriculture_employee_handbook_template

  "Employee concerns/suggestions

  …The policies and procedures listed in this handbook are meant to be consistent with, and in support of our Mission and Values. If at any time you find your work environment in conflict with these written policies and procedures, we encourage you to share your concerns about the areas that are diverging from these policies. These questions, as well as any concerns or suggestions, should be shared with your immediate supervisor. If he/she is not available, please share your concerns or suggestions with the owner. We understand that in order to be the best that we can be, we need your input."

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
63	Yes or No Compensation calculations are clear and accessible to workers.	Basic	Calculation of worker's wages are available to workers in an understandable format including in a language of their understanding.	**Interview:** How/when are compensation calculations explained to workers? This could be explained through: -Written compensation explanations, including translations if necessary. -Training sessions -Employee handbook

If you answer yes:

Be prepared to describe how you explain compensation calculations to your employees. Examples would include

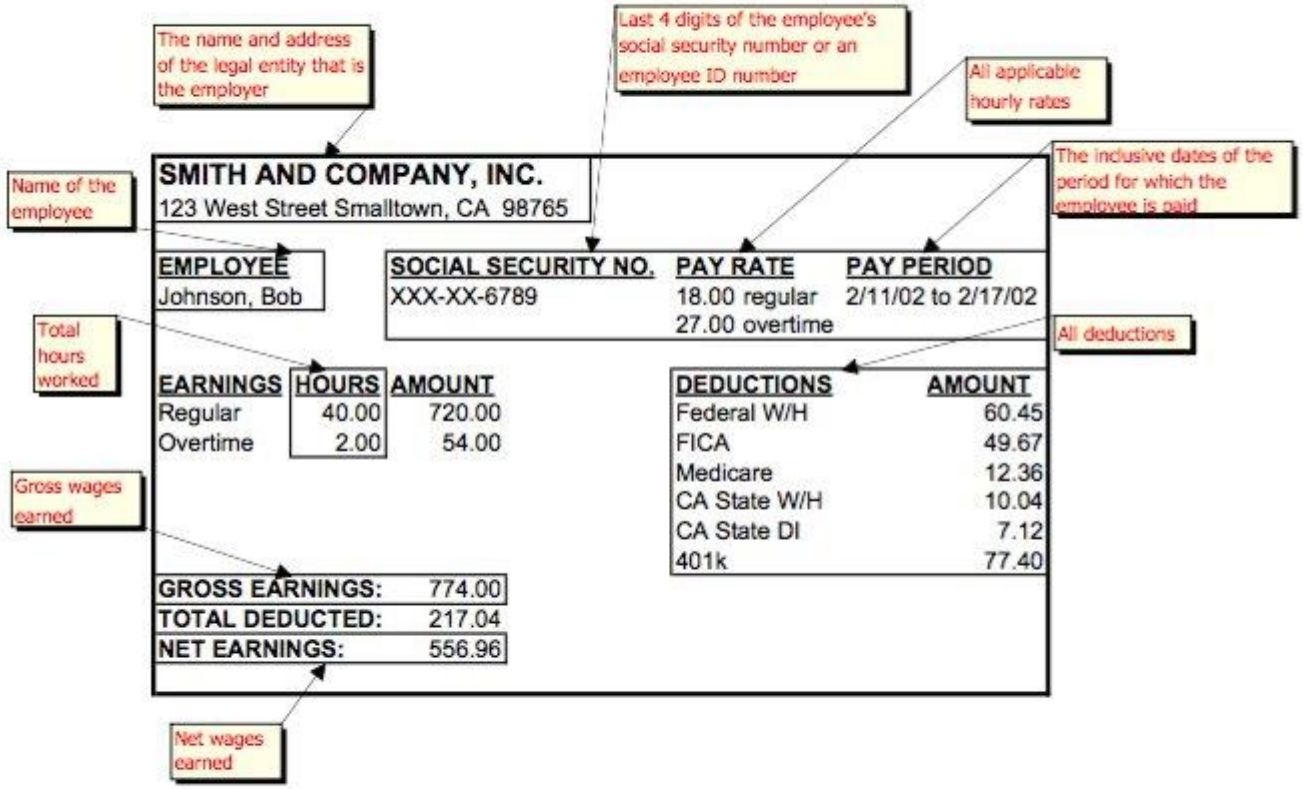
- Explained at employee orientation or training sessions.
- Described when filling out employment paperwork.
- Described in written farm employment policy or employee handbook.
- Described in letter with first paycheck.

Details on how wage is calculated should include amount earned, deductions taken, and net earnings per paycheck. Example given on next page.

If you answer no:

Continue on to next question.

Pay stub for an employee paid an hourly wage



This pay stub is not applicable to an employee whose compensation is solely based on a salary and who is exempt from payment of overtime under Labor Code section 515(a) or any applicable IWC order.

www.dir.ca.gov/dlse/PayStub.pdf

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
64	Yes or No Farm provides opportunities for employee advancement such as education benefits, training and internal advancement.	Steward	Farm provides employees the opportunity to advance by offering benefits such as cost share for education, leave time for education, in-house education and training and an internal advancement policy vs. external hires.	**Interview:** What opportunities are provided for employee advancement? Opportunities could include: -Cost share for education -Leave time for education -In-house training -Internal advancement policy

If you answer yes:

Be able to explain in the interview what opportunities are provided for employee advancement at your farm. For example:

- As outlined in our employee manual, opportunities for employee advancement include:
  - Cost share and/or leave time for education
  - In-house training
  - Internal advancement policy
- Example template from Michigan State University: https://farmanswers.org/Library/Record/agriculture_employee_handbook_template

"Training and Continuing Education

Consider whether you wish to include a statement in support of training/education and/or a financial budget for such activities. An example policy is as follows: [Farm Name] believes in the continuing development of all of our team members, employees and management as well. We believe that professional and personal growth are both important. In order to encourage continuing education, we provide each team member with $500 annually to use for professional or personal development. This could be training around a specific skill that may help you with your job or it may be training that you wish to attend that relates to a favorite hobby. We ask that you present you request to your supervisor for pre-approval, and then we ask that you share back with us how the training helped you.

In addition to this employee directed improvement, [Farm Name] may from time to time ask that you attend a specific training. In these cases of farm directed professional improvement, we will cover the cost of your attending the event, and also pay you an eight hour day's pay for each day spent at the training."

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
65	Yes or No Rewards and incentives are offered to employees, e.g., employee recognition, profit sharing, quality bonuses or safety incentive.	Expert	Rewards and incentives are offered for employee innovations or improvements, e.g., employee recognition (naming an Employee of the Month), profit sharing, bonuses or safety incentives.	**Interview:** What incentives exist for employees to improve farm operations? Incentives could include: -Profit sharing with employees/trade partners -Incentive bonus for employees -Quality bonus to suppliers -Safety incentives - Employee recognition (naming an "Employee of the Month")

If you answer yes:

- Describe the rewards or incentive program on your farm. Examples include:
  - "As outlined in our farm employee handbook incentives may from time to time be developed by the farm in order to encourage the fulfillment of farm goals. For this Employee Handbook version, the following current incentive(s) are available: (list for your operation)."
  - "Bonuses are provided periodically for quality, safety, good work, arriving at work on time to employees on your farm operation." Describe type of bonus (monetary, clothing, food).

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
66	Mark all that apply: Farm contributes to the community and to the development of the local economy through: a) Providing employment opportunities which generate revenue b) Grower supports industry or community-based activities c) Grower or employees actively engaging in community development by donating time, money, equipment or produce to charities or the local community d) None of the above	a) Basic b) Steward c) Expert d) none	Contributions include cash, produce or other in-kind donations to local and/or national charities.	**Interview:** Describe how you have contributed to the local community in the past year. **If the grower marked response "a":** Contributions could include: -Seeking employment from local pool. **If the grower marked response "b":** Contributions could include: -Membership to industry or local organizations. **If the grower marked response "c":** Contributions could include: -Cash contributions to charity. -Produce contributions to charity. -Opportunities for full-time employees to take paid leave for community service.

If you answer a), b) or c):

Be able to describe how you contributed to the local community in the past year.

a) An example would be that you hired employees from local area.
b) Examples include farm personnel involvement as youth leader (coach, scout leader, etc.), community board member (library, school, Farm Bureau, etc.), advisory member (research committees, national industry committees, etc.).
c) Examples include donation of employee time for activities, events, committees; cash or fresh produce to local fundraisers, charities, community service organizations.

If you answer d):

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
67	Mark all that apply a) Farm meets all relevant legal requirements regarding times of operation. b) Waste and cull piles are managed so as not to become a nuisance. c) Farm has awareness and understanding of nuisance levels from farm activities. d) Equipment is managed appropriately so as not to become a visual nuisance.	a) Basic b) Steward c) Steward d) Expert	a) Ordinances may require farm operations only take place at certain hours so as not to disturb residents nearby. b) Waste and cull piles can become a visual or odor nuisance. c) The most effective way to reduce nuisances from farm operations is to identify which farm activities may cause a nuisance, and identify and implement measures to reduce that possibility. d) Visual 'eye sores' of equipment (retired or in-use) can be viewed as a nuisance by the community.	**Interview** **a)** Are there any laws restricting your hours of operation? Grower can site times when farming operations are allowed (if any restrictions). b) What measures do you take to reduce nuisances from farm activities for your neighbors? - Stopping farm operations at unsociable hours. - Farm does not carry out operations that could lead to dust spreading to residential areas. - Grower uses back roads for slow vehicles. - Grower only uses main roads for slow vehicles at off-peak hours. c) What nuisances are caused by farm activities? Grower lists nuisances. d) How do you manage and where do you store equipment (retired and in-use)? Identify where waste and abandoned equipment is stored.

If you answer:

a) Describe laws pertaining to hours of farming operations. As there are no legal restrictions for hours of operation in the state of Idaho a) should be marked for Idaho growers.

b) Be prepared to describe that when possible the farm does not carry out farm operations at unsociable hours or allow drifting soil and water to spread into populated areas or residential neighborhoods.

c) Be prepared to describe in the interview question that when possible the farming operation avoids farm activities that are a nuisance to their community. Common practices would include avoiding slow moving equipment, irrigation water and mud on roads that would impact local community travel. Avoiding drifting dirt and odors. Minimizing loud equipment and lights especially at hours that could cause a nuisance.

d) Describe that equipment is stored in an orderly manner and abandoned equipment is kept out of sight from major roads if possible. Be able to describe or show on farm map where waste equipment is kept.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
68	Mark all that apply a) Farm performs emergency drill procedures at least once per year. b) Spill containment materials and clean water are readily available at fuel storage and fueling locations. c) Has an emergency management plan that is readily available in the event of possible emergencies including natural disasters, medical emergencies, fire and fuel or hydraulic fluid spills. d) None of the above	a) Basic b) Steward c) Expert	a) Drills for fire and natural disasters are performed at least once per year and instructions are given in a language that is accessible to employees. b) Equipment required to contain fuel and hydraulic fluid spills and clean water are readily accessible from all fuel storage and fueling locations. c) Written emergency management plans include the following components: list of potential emergencies (e.g., fuel spills, pesticide spills, worker exposure to chemicals, fires) and responses, staff roles and responsibilities, training protocol for staff, resources for control/contain/cleanup, and emergency contacts. The plan or appropriate portions of the plan are in languages accessible to appropriate staff.	**Interview:** a) What month or date was the drill conducted? What type of drill was conducted? (e.g., fire drill, tornado drill) b) What material/equipment is readily accessible at fuel storage and fueling location to contain fuel spills? b) Containment materials could include: i) Clean water ii) Sorbent material iii) Equipment to stop the spill **Documentation:** c) Written emergency management plan that includes: - List of potential emergencies (e.g., fuel spills, pesticide spills, worker exposure to chemicals, fires) and responses - Staff roles and responsibilities - Training protocol for staff, resources for control/contain/cleanup - Emergency contacts.

If a), b), c) and/or d) does not apply to your farming operation, continue on to next question.

If you answer:

a) Describe an emergency drill you had on farm within the past year. Be prepared to elaborate on the type of drill (e.g. fire, contamination).

b) See question 27 for details on what is typically included in a spill containment kit. Provide additional information on supplies you have in these kits.

c) Have a written emergency plan for potential emergencies that could occur on farm.

- List potential emergencies. Examples include tractor fire, fuel tank fire, pesticide spills, glass breakage causing foreign material, etc.

- Provide appropriate responses for each listed emergency. Describe what employee response should be. Typical response would include ensure it is safe to be present, call 911 if appropriate, and provide help as required. Indicate how an employee should contact their supervisor.
- Provide periodic training. Use a document to log topic, date and employees attending.
    - Supply a list of emergency contacts such as supervisors, safety personnel, fire and police department, and 911.

d) Continue on to next question.

No.	Information Question	Reference Guide	Audit Guidance
69	Yes or No **Informational only, does not impact score.** Has the farm experienced an environmental emergency in the past three years?	**Informational only, does not impact score.** Environmental emergencies are accidents or disasters resulting from natural, or human-induced factors that use or threaten to cause environmental damage and/or the loss of human life or property. If yes, describe the emergency and response in memo.	**Interview:** Describe the emergency, if any, and response.

If you answer yes:

- Be able to describe the emergency and the response that occurred. This is informational only and does not impact score.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
70	Yes or No Equipment contaminated with pesticides (e.g., PPE, sprayers, measuring equipment) is stored separately from food, feed, living quarters and food preparation and consumption areas.	Basic		**Interview:** -Where do you store equipment contaminated with pesticides? Equipment contaminated with pesticides must be stored separately from food, feed, living quarters and food preparation or consumption areas.

If you answer yes:

- Equipment possibly contaminated with pesticides is stored in an equipment shed or yard separated from food, animal feed, living quarters and food preparation or eating areas.
- Examples where equipment is stored include: equipment yard, equipment shed, and edges of fields.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
71	Mark all that apply: a) Employee training is conducted at hire. b) Training is ongoing throughout term of employment. c) Annual training is documented. d) None of the above	a) Basic b) Steward c) Expert	Initial and on-going training of all employees, including new employees, is provided consistent with job requirements and activities.	**If the grower marked response "a":** **Interview:** What training is given to employees at the beginning of employment? Training could include: -Presentations -Equipment demonstrations -In-field practical training **If the grower marked response "b":** **Interview:** What training is given to employees over their term of employment? Training could include: -Presentations -Equipment demonstrations -In-field practical training -Seminars **If the grower marked response "c":** **Documentation:** Training plan, including topics covered and annual review summaries.

If you answer:

a) Discuss the training given at each new hire training.
b) Discuss job duty and safety trainings given over their employment time. Examples could include first day on the job and review at start of season. Before an employee uses a piece of equipment the proper operation and safety information is demonstrated. This is reviewed before first use each season.
c) Show documentation of employee trainings. See example training log below. It should include training plan, including a plan with topics and date covered, annual review summary.

d) Continue on to next question.

Worker Training Log

	Employee name	Employee signature	Training date	Topic and Method	Trainer's Initials
1.					
2.					
3.					
4.					
6.					
5.					
7.					
8.					
9.					
10.					
11.					

***Training method - video, formal group presentation, one-on-one presentation, demonstration. Include follow-up or reviews.**

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
72	Mark all that apply: a) All workers have received safety training related to specific job or duties. b) Farm conducts safety training meeting at least once per year. c) Farm documents topics covered and attendance of safety training meeting.	a) Basic b) Steward c) Expert	All employees receive health and safety training focusing on risks related to their job role, e.g., using fertilizers or other chemicals, handling waste, using machinery, working at height, or other work-related risks.	**If the grower marked response "a":** **Interview:** What types of safety training do you provide to workers? Safety training includes: -Safety compliance -Personal Protective Equipment (PPE) -Safety practices -Workplace hazards **If the grower marked response "b":** **Interview:** How often are training safety meeting conducted? Training should be at least once a year. **If the grower marked response "c":** **Documentation must include:** -Training topics covered -Attendance records

If you answer:

a) Discuss topics of safety training provided to workers.

b) Discuss how frequent training on safety is provided to workers. Trainings must be at least once a year.

c) GAP certification requires worker trainings and signed logs with dates <u>but not topic</u>. Add topic to current GAP records or add separate agenda for each training topic. See question 71, the attached log includes a space for training topic.

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
73	Yes or No Farm workers and/or management have participated in training covering biosecurity (procedures to protect humans, animals and food supply against pathogens or other harmful organisms), sustainable agriculture or IPM topics within the past year.	Steward	At least one individual employed by or under contract with the farm participated in training covering issues related to sustainability such as water conservation and quality, nutrient use efficiency, energy conservation, IPM strategies, etc.	**Documentation:** Documentation could include: -Receipts -Material from course -Other

If you answer yes:

- Provide proof of attendance for Idaho or WA/OR Potato Conference or other grower or regional meetings that provided training in biosecurity, sustainable agriculture or integrated pest management topics within the past year. Proof of attendance can include receipt, agenda or program, materials/handouts from course/workshop/meeting/conference, or certificate of participation.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
74	Yes or No The farm is used as a community educational site for pesticide applicator training, worker training, biosecurity training, public awareness or other educational events.	Expert	At least once during the last five years the farm has been a site for public, farmer or applicator education addressing sustainability-related issues. The farm manager or employee does not need to be a speaker during the event, but the farm or equipment is provided as an essential component for hosting and/or demonstration.	**Interview:** What educational events has the farm hosted in the past year? Events could cover: -Biosecurity -Pesticide applicator training -Public awareness -Integrated Pest Management (IPM) -Sustainable Agriculture

If you answer yes:

- Discuss types of education the farm has hosted for the public. Describe how the farm was used as an educational site such as providing equipment, farm ground, plots, information, facilities, shop, or storage. Be able to denote the date since participation must have occurred within the last 5 years.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
75	Yes or No Farm personnel participate as educators in industry trainings on sustainable agriculture, IPM, pesticide safety or worker safety.	Master	At least once during the last five years at least one individual employed by or under contract with the farm has participated as a speaker in public, farmer or applicator education regarding issues related to sustainability. The educational event does not need to be held on the farm and is intended to demonstrate the sharing of best practices or new knowledge. This practice recognizes expertise present on the farm.	**Documentation:** Written or electronic records of presentation at an educational event regarding issues related to sustainability held within the last five years, including date, location and topics covered (e.g., email correspondence with organizer of the event, program from the event).

If you answer yes:

- Provide an agenda/program of a meeting, workshop, seminar, or field day with the farm personnel as a speaker or participant and the title of their presentation. An email request to participate can also be used as documentation. Participation must have occurred within the last 5 years. Print out and place here in manual.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
76	Mark all that apply: Farm plans for economic sustainability with practices and plans addressing: a) Cost of production b) Marketing plan c) Risk management plan d) Succession plan e) None of the above	a) Basic b) Steward c) Expert d) Master	Production costs are understood. Marketing plan addresses options for selling crop under potential scenarios including above and below average yields, variations in quality. Risk management plan identifies financial risks and strategies to reduce risk. Succession plan addresses personnel options for ensuring long-term sustainability of the operation.	**If the grower marked response "a": Interview:** How are production costs managed to keep costs low? Measures include: -Monitoring costs -Identifying areas to reduce costs -Measures to reduce costs **If the grower marked response "b": Interview:** What does your marketing plan include? -Above average yields -Below average yields -Variations in quality **If the grower marked response "c": Interview:** What does your risk management plan include? -Crop insurance -Potential financial risks -Mitigation strategies for potential financial risks **If the grower marked response "d": Interview:** What is your succession plan? -Personnel options -Communication plans -Retirement plan -Life insurance/ Contingency plan

If you answer:

a) Describe how the farm monitors cost of production. Examples include use of production database (Land.db, Agrian), accounting programs/firms, and/or spreadsheets. Describe how the farm uses cost accounting to keep production at desired costs.
b) Be prepared to explain your farm marketing plan. A marketing plan may include scenarios for above or below average yield and/or quality, where selling crop to (contract), etc.
c) Be prepared to explain the farm's risk management plan. This may include scenarios for mitigating potential financial risks such as a copy of crop insurance.

d) Be prepared to describe in the interview the farm's succession plan. You do not need to give personal information, but be able to describe how and when you produced a plan and/or hired a company to help with this plan.

Resources:

Succession planning:

http://www.extension.umn.edu/agriculture/business/farm-transfer-estate-planning/

http://ofp.scc.wa.gov/succession-planning/

e) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
77	Yes or No Water is obtained according to all applicable regulations.	a) Basic	All water use for irrigation, washing, spraying, etc. meets all applicable source withdrawal regulations.	**Interview** What regulations, if any, apply to your water uses and how do you maintain compliance? **Documentation:** Valid water rights, permits or certificates, if applicable.

If you answer yes:

- Be prepared to discuss how you comply with source withdrawal regulations for water used on your operation.
- Attach one of the following documents or certificates here:
  - Water rights
  - Water permits
  - Canal company water share certificate

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
78	Yes or No Are measures in place to conserve water used in facilities (e.g., farm offices, worker housing, etc.)?	Steward	A water conservation program is in place addressing water uses for washing, cooling and other non-irrigation uses that includes measures such as low-flow toilets and showerheads, waterless urinals, rainwater collection systems, grey-water recycling systems, etc.	**Interview:** What measure have you taken to conserve water used in facilities? Water conservation measures could include: -Low flow toilets and showerheads -Waterless urinals -Rainwater collection systems -Grey-water recycling systems

If you answer yes:

Common interview responses include:

- Low flow toilets and showerheads
- Waterless urinals
- Rainwater collection systems
- Grey-water recycling systems
- Routinely check faucets and pipes for leaks
- Planted drought resistant trees, shrubs and lawns around offices and/or worker housing

This question does not refer to water conservation related to irrigation. The Environmental Protection Agency sponsors a program (WaterSense) that labels water-efficient products and serves as a resource for water conservation (https://www.epa.gov/watersense).

If you answer no:

Continue on to next question.

No.	Switch Question
79	Switch Question: Is irrigation water used for the potato crop? If no, disregard questions 80 through 85 and irrigation metric.

- If you answer yes to using irrigation answer question 80, if no (e.g., dryland crop) skip questions 80-85.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
80	Yes or No Records are kept of irrigation water applied and grower is aware of rainfall received.	Basic	Grower uses regional weather records or gauges in the field to monitor rainfall received. Grower maintains records of irrigation from planting through harvest including dates and amounts applied.	**Documentation:** Written or electronic records of total inches of irrigation water used for the past three years and rainfall information (e.g., regional weather records or gauges in the field) from pre-planting through harvest for the past year.

If you answer yes:

- You will be asked to show records of total irrigation water applied to each potato field in inches over the past three years. The records must include information about rainfall from pre-planting to harvest for the past year. Rainfall information can be regional weather records or measurements you take using rain gauges in the field.
- Irrigation records showing the amount of water applied to each field for the season is also included in your on-line agronomy database (e.g., Land.db or Agrian).

Resources for Water Measurement:

http://www.irrigation.wsu.edu/Content/Calculators/Water-Measurement-Calculators.php

Resources for Recording Precipitation: AgWeaterNet (http://www.weather.wsu.edu/) provides easy access to weather data (including precipitation) from a network of weather stations in Washington and some in northern Oregon. Click on “Calculators” for rain totals for a given period of time at any of their 177 automated stations. Agrimet (https://www.usbr.gov/pn/agrimet/) is a similar resource with weather stations throughout the Pacific

Northwest (including Idaho, Oregon, and Washington). Click on “Historical Weather Data” and then the “Historical Archive (Daily) Access” to calculate precipitation totals.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
81	Yes or No Irrigation system maintenance is performed at system startup and repaired/adjusted as needed.	Steward	All irrigation equipment is calibrated prior to the potato crop to ensure intended amounts of water are delivered.	**Interview:** How is irrigation equipment performance monitored? Measures include: - Calibration - Infra-red monitoring - Other

If you answer yes:

- Describe how you evaluate irrigation system performance and improve uniformity of water application before planting the crop. Common practices include checking nozzles every year and replacing broken ones; measuring water output with catch cans.

Resource: Irrigation Uniformity: http://www.cals.uidaho.edu/edComm/pdf/BUL/BUL0824.pdf. This Extension bulletin includes information on how to evaluate the water output from center pivot, linear move, and wheel line irrigation systems and how to maintain for good performance. It also describes furrow irrigation.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
82	Mark all that apply: Irrigation is scheduled: a) According to previous history and experience or water availability. b) In-field inspection such as the hand feel method. c) Using an evapotranspiration (ET) model. d) Using a soil probe or other real-time instruments. e) None of the above	a) Basic b) Steward c) Expert d) Master e) none	a) Irrigation is scheduled to optimize yield, provide what is necessary for the crop, and minimize water waste based on experience, history and/or water availability, but without the use of ET models or soil probe/hand-feel methods. b) Crop water need is estimated by hand-feel. c) Crop water need is estimated using evapotranspiration (ET) estimates incorporating current weather, crop growth stage, etc. d) Crop water need is estimated using appropriate soil texture description charts, sensors placed in the soil, or through other instrumentation.	**If the grower marked response "a":** **Interview:** How do you determine when to irrigate so that irrigation runoff is minimized or does not occur? Factors could include: -Water availability -Historical experience -Irrigation runoff **If the grower marked response "b":** **Interview:** How do you determine when to irrigate so that irrigation runoff is minimized or does not occur? **If the grower marked response "c": Documentation:** ET model used (e.g., results page from software/calculator used) **If the grower marked response "d":** **Documentation:** Records of the results of hand-feel/soil probe/other instrumentation soil moisture testing, from the last year.

If you answer:

a) Discuss how you irrigate to avoid or minimize runoff. You can talk about what you know about the types of soils on your farm and how they take in water. Identify (if there are some) areas of the farm that are more prone to runoff (like slopes or areas with poor water infiltration). Explain what you do to minimize runoff in those difficult areas.

b) Describe checking soil moisture content and how that helps to minimize runoff. This can be done with a soil moisture monitoring tool or by the soil feel and appearance method.

c) Show the output or report from ET calculators in your area. Evapotranspiration estimates are available online from Agrimet (Pacific Northwest States) (https://www.usbr.gov/pn/agrimet/) by clicking on “Crop Water Use”, or from AgWeathernet (WA and northern OR) (http://www.weather.wsu.edu/) by clicking on “Calculators” and selecting the ET Table.

d) Show records of your soil moisture monitoring from the last year. This can be the output from soil moisture sensors like (neutron probes, tensiometers, Watermark sensors, etc.) or a hand-written record of your observations using the soil feel and appearance method.

If you answer e):

Continue on to the next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
83	Choose the single best answer from the options below: a) Pressurized irrigation systems are used exclusively (drip, reels, guns, wheel lines, solid set, center pivot or linear move). No furrow irrigation is used. b) Pressurized irrigation systems with low pressure sprinkler systems are used for at least 75% of fields. c) Variable rate irrigation systems with low pressure sprinkler systems are used on at least one potato field. d) None of the above	a) Steward b) Expert c) Master	a) No surface or furrow irrigation is used on potato crop. b) 75% of potato fields are irrigated with pressurized irrigation systems with low pressure sprinkler systems. c) At least one potato field uses variable rate irrigation systems with low pressure sprinkler systems.	**Interview:** **If the grower marked response "a":** What systems make up the balance of the irrigation on the farm? **If the grower marked response "b":** What percent of your irrigation is done with low pressure sprinkler systems and a pressurized irrigation system? **If the grower marked response "c":** How many of your potato fields use variable rate irrigation systems with low pressure sprinkler systems?

If you answer:

a) Discuss the type of irrigation system(s) used on your farm for potatoes fields only. Furrow irrigation for potatoes is not allowed as a response.

b) Identify the percent of your pressurized irrigation system with low pressure sprinkler systems for potato fields only.

c) Identify the number of potato fields on your farm that use variable rate irrigation systems with low pressure sprinkler systems.

d) Continue on to the next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
84	Choose the best answer from the options below: Irrigation system efficiency is evaluated: a) Only when there is an apparent problem b) Every 5-10 years. c) Every 2-4 years. d) Every year.	a) Basic b) Steward c) Expert d) Master	Irrigation system components are inspected to ensure they are operating at maximum efficiency.	**If the grower marked response "a" or "b":** **Interview:** How does grower check irrigation system efficiency? i) Checking for pipe leaks ii) Calibration of nozzles iii) Infrared monitoring iv) Other (drones etc.) **If the grower marked response "c" or "d":** **Documentation:** Frequency of evaluation including: -Dates -Measures taken to evaluate efficiency

If you answer a) or b):

Explain how often you evaluate the efficiency of your irrigation system and how you check it. Possible responses include:

- Look for leaks
- Inspect nozzles
- Ensure proper tire inflation
- Use catch cans to identify problems
- Use infrared images to identify problems

If you answer c) or d):

- Show records from your irrigation system evaluations. The auditor will expect to see dates when the system(s) were checked (it has to be done at least every 4 years (c) or every year (d) to qualify).

Continue on to the next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
85	Yes or No Written or electronic plans and/or records documenting all water withdrawal sources for irrigation have been prepared and implemented; the plans define efforts to mitigate or minimize detrimental impacts on the water source (unless from a municipal water system) and surrounding area.	Master	Written or electronic plans and/or records documenting water withdrawal sources for irrigation have been prepared and implemented. The plans define efforts to mitigate or minimize detrimental impacts on the water source(s) and surrounding area(s).	**Documentation:** Water withdrawal plan, including: -List of all water sources they are pulling from. -Documentation of water uses (e.g., irrigation records) -List of potential detrimental impacts (e.g., overdrawing aquifer or threatening aquatic habitats) -List of measures to mitigate detrimental impacts (e.g., State mitigation plan or variable rate pumps to mitigate depletion of aquifer)

If you answer yes:

Be prepared to provide a water withdrawal plan. This should include:

- A list of all water sources (groundwater or surface water) that are used for irrigation on the farm.
- Irrigation records showing the amount of water applied to each field for the season. This is included in your on-line agronomy database (e.g., Land.db or Agrian). See question 80.
- A list of potential detrimental impacts on the water source and neighboring aquatic areas.
- A list of measures that can be taken to mitigate detrimental impacts. Print out and place here in manual.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
86	Choose the single best answer from the options below: a) Two-year rotation b) Three-year rotation c) Four or more-year rotation d) None of the above	a) Basic b) Steward c) Master	A three-year rotation means potatoes every third calendar year; a four-year rotation means potatoes every fourth calendar year. To conserve soil and reduce carryover disease and insect pressure, potatoes are rotated with other crops. At least one crop in the rotation conserves soil by providing nearly full soil coverage such as small grains, grasses or forages. A two-year rotation means potatoes are planted every other year.	**Documentation:** Crop rotation records, including crops, years involved and field names.

If you answer a), b) or c):

Use document described in question 52 to show rotation. This could include list of fields and previous crops with years indicated, spreadsheets, or mapping program.

a) At least 2-year potato rotation on farming operation
b) At least 3-year potato rotation on farming operation
c) Four or more-year rotation

d) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
87	Mark all that apply: a) Soil compaction is avoided or minimized by at least one of the following: flotation tires, tracks, avoiding traffic when soils are wet, GPS tracking, etc. b) Soil compaction is monitored through measurements taken to determine the existence or lack of compaction zone. c) Soil compaction is monitored and if compaction is present, existing compaction is reduced by cultural practices, e.g., deep ripping or deep-rooted cover crops. d) None of the above	a) Basic b) Steward c) Expert	a) Farm uses active strategies such as flotation tires, tracks, avoiding operations in wet soils, and GPS tracking to limit trafficked areas, to minimize compaction and enhance crop health by improving infiltration and air circulation in the root zone. b) Compaction has been monitored with a testing device (compaction rod or meter) within the past year on one or more fields where compaction has been suspected. c) Testing has confirmed that compaction is not present or if compaction is present, cultural practices are used to reduce the compaction.	**Interview:** **If the grower marked response "a":** What practices are taken to mitigate soil compaction? Equipment used to avoid compaction could include: -Flotation tires -Tracks -GPS tracking **If the grower marked response "b":** How is soil compaction monitored? Equipment to monitor soil compaction could include: -Compaction rod -Compaction meter **If the grower marked response "c":** When compaction is present, what cultural practices do you try to relieve compaction? Measures could include: -Deep ripping -Deep-rooted cover crops

If you answer a), b) or c):

a) Discuss using active strategies such as flotation tires, tracks, avoiding operations in wet soils, and GPS tracking to limit trafficked areas, to minimize compaction and enhance crop health by improving infiltration and air circulation in the root zone.

b) Discuss compaction monitoring with a testing device (compaction rod or meter) within the past year on one or more fields where compaction has been suspected. A penetrometer is a common device for use, see guide: http://extension.psu.edu/plants/crops/soil-management/soil-compaction/diagnosing-soil-compaction-using-a-penetrometer

c) Provide examples of practices to alleviate compaction include crop rotation and timing, deep ripping, and planting deep-rooted cover crops.

d) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
88	Choose the single best answer from the options below. After the potato crop is harvested, soil erosion from wind, rain and snowmelt is reduced on the majority of acreage previously planted to potatoes by: a) Tilling soil and not planting rotation or cover crop b) Leaving crop residue on the field c) Using specialized tillage or bale busting d) Planting a rotation or cover crop e) None of the above	a) none b) Basic c) Expert d) Master e) none	Practices may include leaving crop residue on the field, reducing tillage or using tillage to reduce wind erosion, bale busting (adding straw/hay to erosion zones) or planting an annual crop such as winter wheat.	**Interview:** What practices are taken to reduce bare soil? Practices include: i) Leaving potato vines in field ii) Bale busting (adding straw/hay to erosion zones) iii) Reduced tillage iv) Tillage to reduce wind erosion v) Cover crops vi) Rotation Crops vii) Other

If you answer b), c) or d):

- Be prepared to discuss action you have taken to reduce bare soil.
- Common practices to describe would be b) leaving crop residue in the field such as potato vines, c) using no or reduced tillage or straw/hay in high erosion prone areas, or d) planting of a cover or rotational (e.g., winter cereal) crop after early potato harvests. Many potato fields in the Pacific Northwest are not harvested until late fall and will not provide enough time or irrigation to plant and initiate a crop in the fall after harvest except with early harvested fields. In these cases, discuss how you have altered tillage practices to minimize erosion of bare ground. If you do not till in the fall after harvest that would be considered a no tillage situation (c).

If you answer a) or e): Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
89	Yes or No Structural or cultural practices such as increased organic matter, strip cropping, contours, terraces, waterways, buffer zones, dammer diking, tile drainage are in place to reduce erosion or water collection problems.	Master	Structural changes to the topography, slope length, runoff passages, etc., are constructed for long-term erosion control and plant/root health. Cultural practices such as increasing organic matter or dammer diking are used for erosion control.	**Interview:** Can you demonstrate examples of structural changes to fields implemented to control erosion? Practices could include increased organic matter, strip cropping, contours, terraces, waterways, buffer zones, dammer diking, tile drainage are in place to reduce erosion or water collection problems, etc.

If you answer yes:

- Be able to discuss examples of field cultural practices to control erosion. Common practices could include use of:
  - Tile drain
  - Dammer diking
  - Deep rooted cover crops
  - Strip, contour or terrace cropping areas
  - Grass waterways
  - Buffer zones

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
90	Mark all that apply: Advanced soil testing is done to monitor soil health. a) At least one measure is evaluated b) More than one measure is evaluated c) Improvement over time on more than one measure has been documented d) None of the above	a) Steward b) Expert c) Master	In addition to basic sampling and testing for soil pH and nutrients, one or more advanced measure of soil quality and health has been monitored on fields used for potato production within the past three years, e.g., potentially mineralizable nitrogen, soil biological activity/respiration, earthworm populations, organic matter content, aggregate stability, available water capacity, bulk density, surface hardness, soil texture or infiltration rate.	**Documentation:** Soil test results from a collection of samples taken within the last year, including test results for one or more advanced measure of soil quality (e.g., potentially mineralizable nitrogen, soil biological activity/respiration, earthworm populations, organic matter content, aggregate stability, available water capacity, bulk density, surface hardness, soil texture or infiltration rate.)

If you answer a), b), or c):

- Be prepared to provide soil test results taken within the last year. See document used for questions 47 and/or 48.
- Common soil characteristics given on soil test results include mineralizable N (e.g., estimated N release from organic matter), % organic matter, available water capacity, soil texture, and bulk density.

- For c) previous soil tests from that field to compare to the current test would need to show positive changes or lack of negative changes associated with a specific soil characteristic.

Additional resources:

- NRCS Maps: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm
- NRCS Soil texture calculator: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_054167
- Infiltration rate can be tested as described: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052494.pdf

If you answer d): Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
91	Yes or No Maps identify sensitive areas at each farm.	Basic	Maps identify sensitive areas, e.g., aquifers, surface water, wetlands, endangered/threatened species habitat, roadways, residences, wells.	**Documentation:** Farm map/ diagram. Sensitive areas are either identified on the farm map or communicated verbally to the auditor.

If you answer yes:

- Show or attach a farm map and indicate the sensitive areas. If the sensitive areas are not noted in the farm map, then point them out on a map to the auditor during your interview.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
92	Yes or No Measures are in place to protect sensitive areas at farm sites and these are monitored at least annually.	Steward	Examples of measures to protect sensitive areas include establishing undeveloped reserves, filter strips, fencing, buffers and removing invasive plants.	**Interview:** What measures are in place to protect each sensitive area? Practices could include: -Establishing undeveloped reserves -Filter strips -Fencing -Buffers

If you answer yes:

- Explain the measures that are in place to protect sensitive areas on the farm.
- Common practices for protection from soil erosion could include:
    - Creating banks to prevent water from running off into sensitive areas.
    - Fence areas or post “No Trespassing” signs to prevent vehicles from entering and causing erosion or disruption to sensitive areas.
- Common practices to protect breeding areas:
    - Maintain undeveloped areas as reserves for animals and native plant species.
    - Filter strips (areas of vegetation between disturbed farmland and environmentally sensitive areas).

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
93	Yes or No: Field production has not been established in environmentally sensitive areas in the past three years.	Steward	New field production is defined as land that has not previously been cultivated. Wetlands, endangered/threatened species habitat, archeological sites, areas at risk of deforestation or sensitive areas defined by government have not been converted to production within last three years.	**Interview** Has field production been established in environmentally sensitive areas in the last three years?

This question asks whether you plant in environmentally sensitive areas. If you do not have field production in sensitive areas, then you answer "**YES**" --<u>you do **not** plant in these areas</u>.

If you answer Yes to the survey question:

- Simply state that production **has not** occurred in sensitive areas in the past three years. Know what constitutes a sensitive area such as wetlands, wildlife habitat, etc.

If you answer **NO** to the survey question, it means that <u>you do plant in an environmentally sensitive area</u>:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
94	Mark all that apply: Farm has a written plan in place that: a) Addresses potential impacts of farming activities on native species b) Enhances existing habitat for native species c) Has been implemented with the assistance of an third party expert d) None of the above	a)Steward b) Expert c) Master	a) A written plan documents current conditions and potential impacts from farming operations on native species. b) The plan details measures to protect and/or enhance habitat of native species that is compatible with farm productivity. c) Third-party expertise (Extension agent, government agency, NGO) has been accessed to create or improve the plan.	**Documentation:** Wildlife management and conservation plan that addresses the criteria outlined in the Reference Guide.

If you answer a), b), and or c):

- Be prepared to show the auditor your written wildlife management and conservation plan.
  - For a) it must include possible impacts on native species. A list of some native species in Idaho can be found at https://idfg.idaho.gov/species/taxa, Oregon at http://www.dfw.state.or.us/species/, Washington at http://wdfw.wa.gov/living/species/.
  - For b) it must explain how you are protecting native species habitat and/or improving their habitat.
  - For c) indicate that you have contacted a third party expert to help implement your plan.

Additional Resources:

- Visit your local USDA Farm Service Agency county office (http://offices.usda.gov) and ask about the Conservation Reserve Program (CRP), or go to www.fsa.usda.gov/crp for more information.

If you answer d):

Continue on to next question.

o.	Survey Question	Survey Level	Reference Guide	Audit Guidance
95	Yes or No Farm resources have been invested in converting unproductive or marginally productive sites on the farm or in the community to conservation areas.	Master	Unproductive or marginal lands include ground that generates minimal or negative net economic returns due to poor drainage, low fertility, high salinity or other factors. Conservation areas support a diverse population of wildlife, e.g., ponds used to retain water for irrigation or pesticide application may not qualify as a conservation area.	**Documentation:** Farm map/diagram. Conservation areas are either identified on the farm map or communicated verbally to the auditor. Conservation areas could include: -Aquatic habitats -Wild flower beds for pollinators -Trees planted for avian habitats

If you answer yes:

- Provide a farm map and indicate the conservation areas (aquatic habitats, wildflower/flowering shrubs for pollinators and beneficial insects, trees/shrubs/native areas for birds, etc.). If the conservation areas are not labeled on your farm map, then point them out on a map to the auditor during your interview. This includes the CRP lands on your farm, if you are enrolled in that program.

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
96	Yes or No Invasive plant species are identified and measures are in place to avoid their presence and spread.	Steward	Efforts are taken to learn about and avoid the spread of invasive plant species through manual removal of plants, cleaning equipment or herbicide applications. Invasive species are defined as a non-native species whose presence is likely to or does cause environmental and/or economic damage.	**Interview:** How do you manage invasive species on your farm? Management practices could include: -Knowledge of invasive species present in the area -Manual removal of plants -Cleaning equipment -Herbicide applications

If you answer yes:

- Explain how you prevent introduction and spread of invasive plant species on your farm. Spread prevention usually involves good sanitary practices (cleaning equipment, etc.). Control measures may include applying herbicides, mowing invasive weeds before they go to seed, cultivation, or burning (if it is allowed and recommended as a management practice). In some cases, there may be some biological control agents available. See also Questions 35, 37 and 42.

Additional Resources:

- Idaho – http://invasivespecies.idaho.gov/noxious-weed-program
- Oregon – http://www.oregon.gov/ODA/programs/Weeds/Pages/AboutWeeds.aspx
- Washington - http://www.nwcb.wa.gov
- University of Idaho CIS bulletin 1180: 'Cleaning and Disinfecting Potato Equipment and Storage Facilities' at https://www.cals.uidaho.edu/edcomm/pdf/CIS/CIS1180.pdf

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
97	Mark all that apply Farm minimizes particulate drift (dust and dirt) through: a) Water or suppressants applied to unpaved road b) Wind breaks on field edges c) Avoiding field operations during high winds d) Applying organic materials (straw, wood chips, etc.) to unpaved roads and field edges e) Pre-irrigating or following a rain event for field operations f) None of the above	a) Steward b) Steward c) Expert d) Expert e) Master	Particulate drift (dust and dirt) can be minimized through applying water or suppressants to unpaved roads to reduce dust caused by driving on unpaved roads. Planting vegetation and/or building a berm on filed edges can provide a wind break to reduce field dust and dirt drift. Avoiding operating equipment in fields during high winds can reduce particulate emissions. Pre-irrigating fields or operating equipment in the fields following a rain event can reduce particulate emissions but soil compaction should be avoided by using permanent drive rows, limiting to light equipment, flotation tires or other approaches. Organic material can be applied to unpaved roads and field edges to reduce dust.	**Interview:** **a) What steps are taken to reduce air emissions from unpaved roads?** Discuss using water or other material to reduce dust generation from unpaved roads **b) Can you identify wind breaks on a farm map?** Show farm maps with wind breaks identified **c) What weather conditions are taken into consideration for field operations regarding air emissions?** Discuss, provide examples of delaying farm operations in windy, dry conditions to avoid particulate emissions. **d) What organic materials are applied to unpaved roads and field edges?** Discuss using organic materials (straw, wood chips, etc.) to reduce dust. **e) Examples of pre-irrigation or tillage following rain event.** Explain pre-irrigation or following rain events for field operations

If you answer:

a) Be prepared to discuss dust prevention techniques used on unpaved roads. Common actions include using wind speed information to avoid driving during higher risk times, use of water trucks to wet dirt roads, and/or graveling roads.

b) Attach map with windbreaks (e.g., trees, shrubs, wind fences) identified.

c) Be prepared to discuss wind speed, soil moisture and temperature considerations when driving in the fields to reduce dust.

d) Be prepared to describe how organic materials (eg. wood chips, straw, etc.) were applied to unpaved roads or field edges to reduce airborne dirt and dust particulate.

e) Discuss how rainfall or pre-irrigation to tillage, planting, or harvest practices are used to minimize airborne dirt and dust particulate.

f) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
98	Yes or No Ozone-depleting methyl bromide, carbon tetrachloride (tetrachloromethane, benzinoform, Carbona, CAS 56-235, Dowfume 75, ENT 4705, Flukoide, Halon 104) or methyl chloroform (trichloroethane, chloroethene NU, Aerothene TT) are not used in potato production.	Basic	Ozone-depleting substances (ODS) are CFCs, HCFCs, methyl bromide, carbon tetrachloride, methyl chloroform. The most common ODS used in agriculture is methyl bromide as a soil sterilant/fumigant. The ozone layer in the atmosphere reflects harmful UV radiation from reaching the biosphere.	**Documentation:** Spray records show no use of methyl bromide Contract agreement to follow all federal regulations.

If you answer yes:

- Show pesticide records indicating that no methyl bromide was used in producing crop. Methyl bromide is no longer labeled for potato production.
- Document (e.g., photo; manual) that portable fire extinguishers are free from halon.
- See question 100 regarding use of CFCs and HCFCs (also known as R22) in refrigeration units.

If you answer no:

Continue on to next question.

No.	Switch Question
99	Switch Question: Does the farm own or lease refrigeration equipment to store potatoes? If no, disregard question 100.

- If you answer yes to using refrigeration equipment answer question 100, if no skip to question 101.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
100	Mark all that apply: Are any of the following refrigerants used to cool your potato storage(s)? The type of refrigerant used in your potato storage equipment can be found on the equipment label; look for 'R' followed by a number. a) Chlorofluorocarbons (CFCs, discontinued in 1996), refrigerants include: R11, R12, R13, R12B1, R113, R114, R500, R502, R503. b) Hydro chlorofluorocarbons (HCFCs) phase out began in 2010 and will be limited by 2020, refrigerants include: R22, R123, R124, R401A, R401B, R402A, R403B, R408A, R409A, R414B, R416A. c) Hydrofluorocarbons (HFCs) are ozone-safe refrigerants and include: R134, R134a, R152a, R143a, R125, R32, R218, R116, RC218, R290, R600a, R717 and others. d) None of the above	a) none b) Basic c) Expert d) none	If your refrigeration equipment was purchased new after 1996, it does not use CFCs. If purchased prior to 1996 verify if refrigeration was converted to HCFC or HFC. HCFCs are currently being phased out but are still used in refrigeration equipment. HFCs are safe non-ozone-depleting refrigerants that are used as an alternative to HCFCs. The type of refrigerant used in your potato storage equipment can be determined by R followed by a number that can be found on the equipment label.	**Interview:** What refrigerant does your storage/refrigeration unit use?

To answer:

- Be prepared to name the type of refrigerant used for storage refrigeration units. If you are leasing storage space, check with owner to see what type of refrigeration is being used.
- If your refrigeration units use (see list above):
  - CFCs then answer a)
  - HCFCs then answer b)
  - HFCs then answer c)
  - Other than listed then answer d)

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
101	Mark all that apply: Farm protects and enhances pollinator abundance and species diversity by: a) Restoring or encouraging existing habitat and/or forage opportunities for pollinators b) Maintaining > 20 ft. buffers around habitats in non-crop areas c) Using tools to inform pesticide selection to minimize impacts on pollinators d) Not applying pesticides that are toxic to pollinators during bloom e) Applying pesticides toxic to pollinators in the evening or night when pollinators are not active f) Informing farm bee-keepers when, where, how and what pesticides are applied and/or driftwatch.org is used to improve communication g) None of the above	a) Basic b) Steward c),d) Expert e) f) Master	a) E.g., establishing nesting sites for ground or wood and cavity-nesting bees; planting or maintaining vegetation that provides nectar and pollen to pollinators in non-crop areas, such as flowering cover crops in corners of pivot- irrigated fields; providing clean water sources. c) In addition to pollinator safety information on pesticide labels including the EPA Pollinator Protection Box, farm uses the New York State IPM Environmental Impact Quotient (EIQ) Calculator, Table 4 in the Pacific Northwest Extension Publication How to Reduce Bee Poisoning from Pesticides, The Pesticide Manual by the British Crop Production Council, or the Pesticide Risk Tool, pesticiderisk.org (formerly ipmprime.com). d) Pesticide defined as toxic to bees can be identified using the resources listed in c above.	**If the grower marked response "a": Documentation:** Photos of non-crop areas for pollinator habitat (e.g., nesting sites provided, flowering plants for forage, clean water source) **If the grower marked response "b":** **Documentation:** Farm map or photos showing the presence of >20 ft. buffers **If the grower marked response "c":** **Documentation:** Records of tool used to inform pesticide selection to minimize impacts on pollinators (e.g., output from EIQ or Pesticide Risk Tool, pesticiderisk.org). **If the grower marked response "d":** **Documentation:** Records of pesticide application records from the last year, including time of application. Crop bloom records from the last year. **If the grower marked response "e": Documentation:** Records of pesticide application records from the last year, including time of application. Crop bloom records from the last year. **If the grower marked response "f":** **Interview:** How do you communicate with bee keepers on pesticides? Communication could include: -Emails/ telephone calls/text messages -Driftwatch.org -Direct communication

If you answer:

a) Show photos of non-crop areas that encourage pollinator habitat. Native non-disturbed land is a great nesting habitat for ground nesting bees. Most farms have some non-disturbed areas for ground nesting bees. Other areas could include flowering plants and clean water sources.
b) Show farm map or photos indicating at least a 20 ft. buffer area around the pollinator habitats.

c) Show the output from one of the pesticide risk assessment tools (see Question 45 if used a tool). In this case, the output should compare your pesticide options and relative impact on pollinators. Or describe results from another tools used to assess risk.
d) Show pesticide application records that indicate pesticides toxic to bees were not applied during bloom. Use documents from Question 6. The document needs to indicate when the potato crop was in bloom. This is typically in June-July for potatoes in the PNW, but varies with the variety, planting date and growing location.
e) Use document from question d) above to indicate pesticides toxic to pollinators were not applied during times of greatest bee movement, but rather in the evening or night.
f) Describe how you communicate and contact neighboring bee keepers or growers using pollinators (e.g., alfalfa seed) that you will be applying a pesticide. Examples include calling, texting, emailing, personal visit, or letter. Driftwatch.org is an example of an on-line resource or tool to aid in communication.

Additional resources:

- Idaho Pollinator Protection Plan: http://www.agri.idaho.gov/AGRI/Categories/PlantsInsects/Bees/Idaho%20Pollinator%20Protection%20Plan-%201-17.pdf
- How to reduce bee poisoning from pesticides: https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/pnw591_1.pdf
- EPA pollinator risk assessment guidance: https://www.epa.gov/pollinator-protection/pollinator-risk-assessment-guidance

g) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
102	Mark all that apply: a) Energy use on the farm is monitored (utility bills, fuel bills) b) Practices are implemented to conserve energy c) Farm has undergone an energy audit or review d) A written plan is in place documenting goals and efforts to optimize energy use, including practices implemented and results e) None of the above	a) Basic b) Steward c) Expert d) Master	a) Energy use of the farm is evaluated, e.g., utility bills, fuel bills are reviewed for changes in consumption over time. b) Energy conservation practices are implemented, e.g., transitioning to use of alternative fuels, utilizing GPS for reduced field travel and fuel use, reduced tillage practices, and installing more efficient irrigation pump motors. d) A written plan setting goals and evaluating progress is available.	**Interview:** **If the grower marked response "a":** a) How do you monitor energy use on farm? -Energy bills - Fuel receipts **If the grower marked response "b":** b) What practices have you implemented to conserve energy? -Efficiency irrigation pump motor - LED lighting -Efficient mechanical equipment -Insulation **Documentation:** **If the grower marked response "**c"; Document results of the most recent energy audit/review. **If the grower marked response "**d"; Produce energy conservation plan: -Energy conservation goals - Practices implemented - Results from measure implemented

If you answer:

a) Explain how you monitor energy use. For most farms this will include a regular review of energy bills and fuel receipts.

b) Describe practices you use to conserve energy. Energy conservation measures include using high efficiency irrigation pump motor, LED lighting, efficient mechanical equipment, insulation etc.

c) Be prepared to show the results of your most recent energy audit/review.

d) Show the interviewer a written plan that documents the farm's goals and efforts to optimize energy use. The interviewer will expect to see:

i) Energy conservation goals

ii) Practices implemented

iii) Results from any of the practices you have implemented

Additional resources:

- On-farm Energy Initiative: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/eqip/?cid=stelprdb1046252

e) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
103	Mark all that apply: a) Manufacturer-recommended maintenance of motorized equipment is performed to maximize fuel efficiency b) Maintenance records are kept c) None of the above	a) Basic b) Steward	a) For efficient use of fuel, tractors and implements are maintained on a regularly scheduled basis. b) Written or electronic maintenance records are available."	**If the grower marked response "a":** **Interview:** a) Provide an example of manufacturer-recommended maintenance performed on at least one piece of motorized equipment. **If the grower marked response "b":** **Documentation:** Measures include: i) Calibration ii) Tire pressure is maintained at recommended level iii) Oil change iv) Other Equipment maintenance records from the last year, including dates and procedures followed.

If you answer:

a) Discuss a general manufacturer recommended preventative maintenance schedule that is implemented on the farm for at least one piece of machinery. General maintenance on tractors (oil and air filter changes) occurs every 250-500 hours depending on the brand and size of tractor used.

b) The records are kept at the shop by the maintenance technician, and the operators monitor the hours on machines to notify the maintenance technician when maintenance needs to be performed.

c) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
104	Yes or No At least once during the past three years, farm has used the CoolFarm Tool, FieldPrint Calculator or other software tools to assess contribution to greenhouse gas production D".	a) Master	Farm has used software or other tools, e.g., CoolFarm Tool, FieldPrint Calculator, at least once in the past three years to assess contribution to greenhouse gas production.	**Documentation:** Documentation of greenhouse gas assessment completed within the last three years (e.g., output from CoolFarm Tool or FieldPrint Calculator).

If you answer yes:

Provide a print out of a greenhouse gas assessment completed within the last three years.

Greenhouse gas assessments can be calculated from several on-line software tools. Examples include:

- CoolFarm Tool (https://coolfarmtool.org/)
- FieldPrint Calculator (https://fieldtomarket.org/)
- Farm Carbon Calculator (http://www.cffcarboncalculator.org.uk/)
- COMET-Farm (http://www.comet2.colostate.edu/)

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
105	Yes or No Farm does not burn trash (garbage, plastic, recyclables, broken pallets).	a) Basic	Trash should never be burned.	**If the grower marked response yes:** **Interview:** a) What materials do you dispose of through burning? (e.g., wire fencing, plastic) b) How is trashed disposed? What company is contracted to pick up trash?"

If you answer **YES** (meaning you do not burn trash):

a) It is highly recommended <u>not to burn trash on the farm</u>, and reiterate in the interview question that you do not dispose of trash on the farm via burning.

b) Discuss how trash is disposed. Is it taken to a local disposal site by the farm or a contracted company? Be prepared to cite the landfill, transfer station, or disposal company you utilize to remove trash.

If you answer **NO** (meaning you burn trash):

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
106	Choose one that applies a) If vegetation is burned, burning is limited to where it is an acceptable Best Management Practice (BMP). b) No vegetation is burned. c) Vegetation is burned without consideration of Best Management Practices.	a) Basic b) Steward	Vegetation is only burned when it is recommended as a Best Management Practice, e.g., regional-expert recommended burning of infected plant material to reduce disease inoculum or ditch bank management.	**If the grower marked response "a":** **Interview:** If burning is practiced, what regional-expert recommendation was used to inform this decision? Recommendations could be from: -Letter from Extension agent/consultant -Extension publication **If the grower marked response "b":** **Interview:** Please describe the policy on not burning vegetation.

If you answer:

a) Explain how, when and where burning is practiced and identify the regional expert recommendation source: Example includes:
   - Burning ditch banks is described by regional canal companies as a routine and standard practice.
   - Check local regulations as well and cite those.
     - Washington Department of Ecology Outdoor Agricultural Burning

       https://ecology.wa.gov/Air-Climate/Air-quality/Smoke-fire/Agricultural-burning

     - Idaho Department of Environmental Quality
       http://www.deq.idaho.gov/air-quality/burning/crop-residue-burning/
     - Oregon Department of Agriculture Burning
       http://www.oregon.gov/oda/programs/NaturalResources/Pages/Burning.aspx

b) Be able to describe the farm's policy on burning vegetation. Example:
   - "This farm does not burn vegetation as a cultural practice."

c) Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
107	Yes or No All seed waste, culls and other crop waste are properly disposed of, composted, or fed to livestock according to regional guidelines to eliminate disease risk and prevent environmental contamination.	Basic	All discarded potatoes and other crop waste are properly disposed of so that any pathogens present are not allowed to spread, volunteer plants do not emerge, and waste and leachate do not contaminate water sources.	**Interview:** How do you dispose of crop waste to ensure the elimination of disease risk and environmental contamination? Practices could include: - Burying potato crop waste -Removal of potato crop waste off-site

If you answer yes:

- Describe cull or waste potato management.
    - Common practices include feeding to livestock, hauling to landfill, spreading on non-potato ground, burying or composting. If cull potatoes are piled, be able to describe methods to ensure potatoes do not sprout (herbicide, freezing, tillage. etc.).

Additional resources:

- U of I Extension Bulletin on Cull and Waste Potato Management. http://www.extension.uidaho.edu/nutrient/pdf/Potato/Cull%20and%20waste%20potato%20management.pdf

If you answer no:

Continue on to next question.

No.	Survey Question	Survey Level	Reference Guide	Audit Guidance
108	Yes or No Waste water is managed according to all applicable federal, state/ provincial and local regulations and requirements for the protection of surface and groundwater from direct and indirect pollution.	Basic	Any irrigation tail water, potato wash water or other waste water discharges meet all applicable regulations.	**Interview:** What are the applicable regulations pertaining to waste water discharge? Growers has knowledge of: -Local regulations on protection of water resources -State/ Provincial regulations on protection of water resources -Federal regulations on protection of water resources

If you answer yes:

- Be able to describe:
    - Compliance with local canal company or irrigation district recommendations for surface runoff.
    - If you are chemigating/fertigating, describe how the farm follows regulations related to use of backflow prevention assemblies to prevent contamination.
    - If you wash potatoes prior to hauling, common practice would include not discharging the water, but rather pumping it back into a retaining pond.
- Additional resources:
    - Washington State Department of Ecology: https://ecology.wa.gov/
    - Idaho Department of Environmental Quality http://www.deq.idaho.gov/laws-rules-etc/deq-guidance/
    - Idaho State Department of Agriculture http:// www.agri.idaho.gov/

This completes the survey questions.

Glossary*

Action thresholds: The number of pests or level of pest damage at which action is required to prevent economic loss.
Aggregate stability: The ability of soil aggregates, or groups of soil particles, to resist disintegration when tillage, water, wind erosion or other disruptive forces act on the soil. Soil aggregates are an indicator of healthy soil and enhance plant growth by easing root penetration, water infiltration and access to nutrients.
Application equipment calibration: Process to ensure that input application equipment is operating properly by testing equipment measurements against a known value. Improperly calibrated equipment may cause either too little or too much of an input, e.g., pesticides, fertilizers, manure, compost, to be applied.
Aquatic ecosystems: Lakes, lagoons, rivers, streams, brooks, swamps, marshes, bogs and other surface water bodies and their immediate surroundings.
Available water capacity: The maximum amount of plant-available water a soil can provide. It is an indicator of a soil's ability to retain water and make it sufficiently available for plant use.
Beneficial insect: Insects that provide a benefit, such as suppressing pests or providing pollination.
Biopesticides: Certain types of pesticides made up of living organisms or derived from **the products of living organisms**, such as microbes, bacteria, plant extracts, fatty acids or pheromones, and used to control pests.
Biosecurity: A strategic and integrated approach to analyzing and managing risks to animal and plant life and health from the introduction and spread of pests, diseases and invasive species.
Biosolids: Organic matter recycled from sewage for use in agriculture.
Blight prediction tool: Tool that monitors and forecasts weather to predict outbreaks of blight diseases in potatoes.
Buffer zone: An area of permanent vegetation that is maintained between agricultural fields and the water bodies to which they drain. Buffers are intended to intercept runoff from fields including water, soil particles, nutrients and/or pesticides, thereby protecting water quality and aquatic organisms.
Bulk Density: An indicator of soil compaction which is calculated as the dry weight of soil divided by its volume. This volume includes the volume of soil particles and the volume of pores among soil particles. Bulk density is typically expressed in g/cm^3 and reflects the soil's ability to function for structural support, water and solute movement and soil aeration.
Certified seed potato: Potato seeds that have been tested to verify they are without disease and are of a consistent variety.
Cover crops: Crops planted and later incorporated into the soil to help manage soil erosion, soil fertility, soil quality, water, weeds, pests, diseases, biodiversity and wildlife. Examples include legumes, cereals, grasses and more.
Cull pile: A discarded pile of plant material, especially potato tubers.
Cultural practice: Agricultural practices that aim to disrupt the pest's environment without the use of chemical substances to enhance crop health and prevent weed, pest or disease problems. Examples include turning under crop residues, sterilizing tools and equipment and harvesting early.
Deep ripping: Mechanically disturbing the soil below the normal cultivation layer, without inverting the soil, to break up compaction layers which can reduce water infiltration and limit root growth.
Degree-day models: Models that use daily air temperature to help predict the best timing for pest management activities such as scouting or pesticide applications. These models are based on the fact that the growth and development of insects and microbes is closely linked to the temperature where it is found.
Disease monitoring: See Pest scouting
Disking: Working of the upper layer of the soil with disk implements, such as disk harrows and shallow plows, to prepare a field for planting, reduce weed growth, eliminate surface crusting or other purposes.
Drip irrigation: Irrigation method that saves water and fertilizer by allowing water to drip slowly, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing and emitters.

Environmental Impact Quotient (EIQ): Formula created to provide growers with data regarding the environmental and health impacts of their pesticide options so they can make better informed decisions regarding their pesticide selection.
Evapotranspiration (ET): Loss of water from a vegetated surface through the combined processes of soil evaporation and plant transpiration. ET information provides accurate estimates of daily water use and thus can inform when to apply water and how much water to apply.
Fertigation: Injection of fertilizers, soil amendments and other water-soluble products into an irrigation system.
Filter strips: An area of permanent herbaceous vegetation used to reduce sediment, organics, nutrients, pesticides and other contaminant movement in runoff.
Furrow irrigation: Irrigation of farmland by water run in open furrows created in soil between the crop rows.
Genetically modified organisms (GMOs): Organisms (i.e. plants, animals or microorganisms) in which the genetic material (DNA) has been altered in a way that does not occur naturally by mating and/or natural recombination.
Green manure: Living plant material incorporated into the soil, or killed and left on the surface, for soil improvement, or when composed of legumes to increase the soil N supply.
Greenhouse gases: Compounds that trap heat in the atmosphere. These gases include carbon dioxide, methane, nitrous oxide and fluorinated gases.
Grey-water: Wastewater generated in households or office buildings without fecal contamination, i.e., does not include wastewater from toilets.
Infiltration Rate: The rate at which ponded water on a soil surface enters the soil profile.
Infrared monitoring: Use of infrared sensors to monitor a crops water needs.
Integrated Pest Management (IPM): Integrated pest management (IPM) is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment.
Invasive: Designated by state or national agricultural authorities as threatening to agricultural and/or horticultural crops and/or humans and livestock, e.g., an invasive weed.
Mode of action: Describes a functional or anatomical change, at the cellular level, resulting from the exposure of a living organism to a substance.
Native Species: Those species that occur naturally in the place where they are found. Naturalized species - exotic species that have adapted, grow and multiply as if they are native - are also considered as native if it is proven that they do not cause negative economic or environmental impacts.
Nutrient leaching: Loss of water-soluble plant nutrients from movement down through the soil profile, due to rain and irrigation. Soil structure, crop planting, type and application rates of fertilizers, and other factors are taken into account to avoid excessive nutrient loss.
Pest scouting: Process of precisely assessing pest pressure and crop performance to evaluate economic risk from pest infestations and disease, as well as to determine the potential effectiveness of pest and disease control interventions.
Pesticide drift: Airborne movement of pesticides, away from the intended target. Pesticide drift can affect everyone, both urban and rural communities, by having negative effects on human health and the environment.
Pesticide resistance: Ability of an organism to avert the attack of a potential pathogen up to a certain degree or to resist the effect of a harmful agent.
Petiole testing: Assessing the nutrient content of crops at a selected time in the growth of the plant through analyzing the petiole (stalk attaching the leaf to the stem).
Reduced tillage: Method of tillage in which the soil has been disturbed to a lesser extent relative to the conventional tillage (plowed/harrow till). Reducing tillage can reduce soil erosion, loss of carbon from the soil into the atmosphere, and reduce energy consumption and costs.
Refuges: An area of a field not treated with pesticides to allow beneficial insects and susceptible pest organisms to survive.

Rotation: Alternating plantings of one type of plant with at least one other (e.g., potatoes followed by oats); alternating pesticides of one type with at least one other type (e.g., an organophosphate followed by a biopesticide).
Sensitive areas: Sensitive areas are parts of the natural or built environment that may be impacted by growing operations. Most growing operations have sensitive areas that can be protected from production activities such as surface water bodies, aquifers, public travel ways, residences, wildlife habitat, etc.
Soil amendments: Material that can improve soil physically or chemically, making it more suitable for plant growth.
Soil compaction: A compression of soil that results in poor water drainage and air movement, and reduced root growth.
Soil-borne diseases: Plant diseases present in the soil.
Thermal control: Using heat to control pests (usually weeds).
Variable rate application technology: Any technology which enables producers to vary the rate of crop inputs. Variable rate application technology combines a variable-rate (VR) control system with application equipment to apply inputs at a precise time and/or location to achieve site-specific application rates of inputs.
Variable rate irrigation system: Irrigation system that works by applying water at a variable rate along the center pivot rather than one uniform rate along the entire length of the system.
Viral diseases: Plant disease caused by a virus.
Waste water: Any water that has been adversely affected in quality by man-made influence or pollutants. It comprises liquid waste discharged by domestic residences, commercial properties, industry and/or agriculture and can encompass a wide range of potential contaminants and concentrations.

*Glossary definitions adapted from resources provided by the following organizations: Alabama Cooperative Extension System, Cornell University Northeast Region Certified Crop Advisor (NRCCA) Study Resources, eXtension.org, Food and Agriculture Organization of the United Nations, Gempler's 1999-2000 IPM Almanac, IPM Institute of North America, Kansas Natural Resources Conservation Service (NRCS), Merriam Webster Dictionary, NRCS National Soil Survey Center, New York State IPM Program, Penn State Extension, Sustainable Agriculture Network, University of Arizona Cooperative Extension, University of Idaho Extension, University of Minnesota Extension, U.S. Environmental Protection Agency (EPA), Washington State University Extension, Western Australia Department of Agriculture and Food and the World Health Organization.