United States Department of Agriculture

Animal and Plant Health Inspection Service

Plant Protection and Quarantine

Agricultural Quarantine Inspection Monitoring (AQIM) Handbook

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Purpose

The AQIM Handbook provides an information source for:

- Analyzing information enabling managers to make risk-based decisions
- Implementing AQIM activities,
- Training employees about risk analysis and management, and

Scope

The AQIM Handbook covers background information about the Government Performance Results Act (GPRA) and its influence to integrate risk analysis and risk management into Agriculture Quarantine Inspection (AQI) program. With that introduction, the Handbook then provides necessary information about statistics, risk analysis, and a sampling process to provide the foundation for implementing AQIM. Next, the Handbook provides guidelines and instruction for setting up designated locations for AQIM. The remainder of the Handbook is divided into pathway sections.

Given that AQIM is a different way of conducting business, this Handbook is an attempt to provide officers and managers with background and guidance to implement AQIM activities. As processes improve and are developed, the Handbook will expand in its scope. Along with specific documents written to establish local procedures, such as a standard operating procedure, this Handbook will serve as the information tool for implementing AQIM activities and for training individuals about risk analysis and risk management.

The Handbook is divided into 15 major sections:

- Introduction
- Start-Up
- Air—Passenger Baggage
- Air—Cargo
- Maritime—Cargo
- Mail Facility
- Northern Border—Vehicles
- Northern Border—Truck Cargo
- Southern Border—Vehicles
- Southern Border—Truck Cargo
- Rail

- Glossary
- Appendixes
- Index
- Blank Tabs (for local use)

The Introduction section provides basic information about the Handbook and information that supports AQIM activities. The information includes background; the GPRA; strategic plans, performance plans, reports, and budgets; agriculture quarantine inspection monitoring; basic statistics and their importance to AQIM activities; the fundamentals of risk analysis; and the sampling process established for AQIM activities.

The Start-Up section provides a list of activities for setting up a designated location that is implementing AQIM, the roles and responsibilities of individuals involved, and a checklist to help designated locations implement AQIM.

The pathway sections begin with Air—Passenger Baggage and end with Rail. The sections are tabbed with color for easier access from the other sections of this Handbook. Each pathway section has a set of national guidelines developed for a specific pathway covering the following topics:

- Introduction and sampling guidelines
- Data collection and maintenance guidelines
- Data analysis guidelines (not all pathways)

The Glossary defines specialized words, abbreviations and acronyms, and other difficult terms used related to risk analysis, risk management, and AQIM.

The Appendixes list information, such as governing Acts, key contacts, duties, and samples of standard operating procedures.

The blank tabs allow work locations to add information about AQIM that is specific to that location, for example, a copy of the local standard operating procedure, information lists, and contacts.

Audience

The AQIM Handbook is used primarily by CBP Agriculture Specialists, PPQ employees (including officers, managers, technicians, identifiers) involved in AQIM activities. The users would include those who are responsible for:

- Determining a random sampling scheme
- Completing data worksheets
- Entering information into the Agriculture Quarantine Activity System (AQAS)
- Interpreting information in AQAS
- Documenting statistical information
- Monitoring AQIM implementation
- Conducting risk management

Secondary users of the information in this Handbook would include specialists of PPQ's Permits and Risk Assessments and cooperators from Veterinary Services and other Federal agencies.

Related Documents

The Government Performance Results Act (GPRA) of 1993 is the basis for implementing AQIM. This Act is introduced in this Handbook beginning on **page-1-7**.

Another related document that describes a new way of doing business is titled, "Safeguarding American Plant Resources" dated July 1, 1999. This document describes the new systems needed to deliver plant protection programs. AQIM activities support a safeguarding system founded on risk-based pathway studies and performance measurement that allow maximum effectiveness of operations.

How to Use This Manual

Review the content of this manual to get a feel for the scope of material covered. Glance through the section you will be using and familiarize yourself with the organization of information. Use the Table of Contents that follows each tab to quickly find information. If the Table of Contents is not specific enough, refer to the Index.

Reporting Problems

Use **Table 1-1** to report suggestions, problems, situation, and disagreements which directly affect the contents of this handbook.

TABLE 1-1: How to Report Problems with this Guide

If you:	And the problem is:	Then:
Are not able to access the on-line document	→	CONTACT the PPQ Manuals Unit John Patterson <john.l.patterson@aphis.usda.gov> or call 240-629-1934
Have a suggestion for improving the content of the guide	→	CONTACT the PPQ Manuals Unit, Josie Cooley <josie.cooley@aphis.usda.gov> or <john.l.patterson@aphis.usda.gov> or COMPLETE and MAIL the comment sheet located at the back of the handbook
Have identified a problem with the content of the Guide	NOT urgent	
	Urgent	CALL the Manuals Unit, either Josie Cooley 240-529-0358 or John Patterson 240-529-0351
Have a situation that requires an immediate response regarding a procedure or regulatory action	→	CONTACT the AQIM National Regional Coordinator (CBP contact PPQ through proper channels)
Disagree with a policy, procedure, or regulatory action identified in the Guide	→	CONTACT the AQIM National Regional Coordinator (CBP contact PPQ through proper channels)

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AQIM Handbook

Introduction

The Government Performance and Results Act

Background

The Government Performance and Results Act (GPRA), which was passed by Congress in 1993, is a law that requires all government programs to be managed based on results achieved. This process includes setting specific program outcome targets, measuring progress towards those outcomes, and analyzing and using the results to make program improvements. The law connects this focus on program outcomes to the budget development process by requiring the President's budget, starting in FY 99, to include the following for each program activity:

- A long-term (5 year) strategic plan that includes a comprehensive mission statement and general outcome oriented goal statements;
- Annual performance plans, including annual measurable goals and indicators of goal achievement; and,
- Annual performance reports which show whether measurable goals have been achieved.

Managing for results requires a different conceptual or philosophical framework. Use **Table 1-2** to view the difference between our old framework and that of GPRA.

TABLE 1-2:One Way Of Viewing The Difference Between The Old Framework And that Of GPRA

In the old framework for managing programs, the focus was on:	When managing for results, the focus is on:
Inputs	Outcomes
Process	Results
Activities	Strategic Objectives
Compliance	Performance
Management Control	Management Improvement
Retrospective Data Analysis	On-going Monitoring
Reporting Data	Using Data

The remainder of this section of the Introduction contains excerpts from the Comptroller General of the United States dated June 1996, effectively implementing the GPRA (GAO/GGD-96-118).

Federal Management Reform

Over the past several years, Congress has taken steps to fundamentally change the way Federal Agencies go about their work. Congress took these steps in response to management problems so common among Federal Agencies that they demanded government-wide solutions. In addition, two contemporary forces converged to spur Congressional action:

- Year-in and year-out budget deficits that had to be brought down, and
- A public now demanding not only that Federal Agencies do their jobs more effectively, but that they do so with fewer people and at lower cost.

This change was, and remains, an enormous challenge. For one thing, many of the largest Federal Agencies find themselves encumbered with structures and processes rooted in the past, aimed at the demands of earlier times, and designed before modern information and communications technology came into being. These Agencies are poorly positioned to meet the demands of the 1990's. Moreover, many of these Agencies find themselves without a clear understanding of who they are or where they are headed. Over the years, as new social or economic problems emerged, Congress assigned many Agencies new and unanticipated program responsibilities. These additions may have made sense when they were made, but their cumulative effect has been to create a government in which many Agencies cannot say just what business they are in.

In some cases, Agencies' legislative mandates have grown so muddled that Congress, the executive branch, and other Agency stakeholders and customers cannot agree on program goals, worthwhile strategies, or appropriate measures of success.

Traditionally, Federal Agencies have used the amount of money directed toward their programs, or the level of staff deployed, or even the number of tasks completed as some of the measures of their performance. But at a time when the value of many Federal programs is undergoing intense public scrutiny, an Agency that reports only these measures has not answered the defining question of whether these programs have produced real results.

Today's environment is ***results-oriented***. Congress, the executive branch, and the public are beginning to hold Agencies accountable less for inputs and outputs than for outcomes, by which is meant the results of government programs as measured by the differences they

make, for example, in the economy or program participants' lives. The difference between outcomes and outputs is the key to understanding government performance in a results-oriented environment.

Legislative Requirements

Congress' determination to make Agencies accountable for their performance lay at the heart of two landmark reforms of the 1990's:

- The Chief Financial Officers (CFO) Act of 1990, and
- The Government Performance and Results Act of 1993 (GPRA).

With these two laws, Congress imposed on Federal Agencies a new and more businesslike framework for management and accountability. In addition, the GPRA created requirements for Agencies to generate the information that decision makers in Congress and the executive branch need when considering measures to improve government performance and reduce costs.

The CFO Act was designed to remedy decades of serious neglect in operating and reporting financial management. While the CFO Act established the foundation for improving management and financial accountability among the Agencies, GPRA is aimed more directly at improving their program performance. The GPRA requires that Agencies consult with Congress and other stakeholders to clearly define their missions. It requires that they establish long-term strategic goals, as well as annual goals that are linked to them. They must then measure their performance against the goals they have set and report publicly on how well they are doing.

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AQIM Handbook

Introduction

Strategic Plans, Performance Plans, Reports, and Budgets

Background

The experiences of leading organizations suggest that the successful implementation of the Government Performance and Results Act (GPRA) may be as difficult as it is important. For example, obtaining agreement among often competing stakeholders is never easy, particularly in an environment where available resources are declining. In addition, measuring the Federal contribution to outcomes that require the coordinated effort of numerous public and private entities--such as improvements in education, employment, or health--can require sophisticated and costly program evaluations. Three key steps are contained within the guidelines of the GPRA that redefine the methods by which strategic plans, performance plans, reports, and budgets are developed and conducted within the Federal sector. These three key steps are:

- Define Mission and Desired Outcomes
- Measure Performance
- Use Performance Information

Step 1—Define Mission/Desired Outcomes

The GPRA requires that federal agencies, no later than September 30, 1997, develop **strategic plans** covering a period of at least 5 years and submit them to Congress and the Office of Management and Budget (OMB). If done well, continuous strategic planning provides the basis for everything the organization does each day.

Strategic plans are intended to be the starting point for each agency's performance measurement efforts. Each plan must include a comprehensive **mission statement** based on the agency's statutory requirements, a set of outcome-related strategic goals, and a description of how the agency intends to achieve these goals.

The **mission statement** brings the agency into focus. It explains why the agency exists, tells what it does, and describes how it does it.

The **strategic goals** that follow are an outgrowth of the clearly stated mission. The strategic goals explain the purposes of the agency's programs and the results they are intended to achieve.

For strategic planning to have this sort of impact, three practices appear to be critical. Organizations must do the following:

- Practice 1—Involve their stakeholders;
- Practice 2—Assess their internal and external environments; and
- Practice 3—Align their activities, core processes, and resources to support mission-related outcomes.

Practice 1—Involve Stakeholders

Successful organizations base their strategic planning, to a large extent, on the interests and expectations of their stakeholders. These organizations recognize that stakeholders will have a lot to say in determining whether their programs succeed or fail.

Among the stakeholders of Federal Agencies are Congress and the administration, State and local governments, third-party service providers, interest groups, Agency employees, and the American public.

Involving customers is important as well. An Agency's customers are the individuals or organizations that are served by its programs. This is not to say that contact between a Federal Agency and its customers is always direct. Many Federally mandated or Federally funded services are dispensed through third parties, such as State agencies, banks, or medical insurance providers. In such cases, Federal Agencies face the particularly challenging task of balancing the needs of customers, service providers, and other stakeholders, who at times may have differing or even competing goals.

Practice 2—Assess The Environment

Successful organizations monitor their internal and external environments continuously and systematically. Organizations that do this have shown an ability to anticipate future challenges and to make adjustments so that potential problems do not become crises. By building environmental assessment into the strategic planning process, they are able to stay focused on their long-term goals even as they make changes in the way they intend to achieve them.

Assessing the **external environment** is particularly important, in part because so many external forces that fall beyond an organization's influence can powerfully affect its chances for success. For organizations both public and private, external forces can include newly emerging economic, social, and technological trends and new statutory, regulatory, and judicial requirements.

An organization's **internal forces** include its culture, its management practices, and its business processes. Today, Federal Agencies find that monitoring these internal forces is especially important, given the

effects of funding reductions and reorganizations. The tools available to organizations assessing the internal environment include program evaluations, employee surveys, independent audits, and reviews of business processes.

Practice 3—Align Activities, Core Processes, and Resources

An organization's activities, core processes, and resources must be aligned to support its mission and help it achieve its goals. Such organizations start by assessing the extent to which their programs and activities contribute to meeting their mission and desired outcomes. As organizations became more results-oriented, they often find it necessary to fundamentally alter activities and programs so that they can more effectively and efficiently produce the services to meet customers' needs and stakeholders' interests.

As Agencies align their activities to support mission-related goals, they should match funding with their anticipated results. Under a series of initiatives called Connecting Resources to Results, OMB is seeking to adopt a greater focus on Agencies' goals and performance in making funding decisions.

Leading organizations strive to ensure that their core processes efficiently and effectively support mission-related outcomes. This sort of integrated approach may include tying individual performance management, career development programs, and pay and promotion standards to organizational mission, vision, and culture.

Step 2—Measure Performance

After defining their missions and desired outcomes, the second key step that successful, results-oriented organizations take is to measure their performance. **Measuring performance** allows these organizations to track the progress they are making toward their goals and gives managers crucial information on which to base their organizational and managerial decisions.

The GPRA incorporates performance measurement as one of its most important features. Under the Act, agencies are required to develop annual performance plans that use performance measurement to reinforce the connection between the long-term strategic goals outlined in their strategic plans and the day-to-day activities of their managers and staff. The **annual performance plans** are to include the following:

- Performance goals for an Agency's program activities as listed in the budget,
- A summary of the necessary resources to conduct these activities,

- The performance indicators that will be used to measure performance, and
- A discussion of how the performance information will be verified.

Practices 4 and 5 are designed to ensure that performance measures are an integral part of Agency activities.

Practice 4—Produce a Set Of Performance Measures

The experiences are that at least four characteristics are common to successful hierarchies of performance measures. That is, a set of performance measures must be produced at each organizational level that:

- **Demonstrate Results—**Performance measures should tell each organizational level how well it is achieving its goals.
- **Limited To The Vital Few—**The number of measures for each goal at a given organizational level should be limited to the vital few. Those vital few measures should cover the key performance dimensions that will enable an organization to assess accomplishments, make decisions, realign processes, and assign accountability.
- **Respond To Multiple Priorities—**Government agencies often face a variety of interests whose competing demands continually force policy makers and managers to balance quality, cost, customer satisfaction, stakeholder concerns, and other factors. Performance measurement systems must take these competing interests into account and create incentives for managers to strike the difficult balance among competing demands.
- **Link To Responsible Programs—**Performance measures should be linked directly to the offices that have responsibility for making programs work. A clear connection between performance measures and program offices helps to both reinforce accountability and ensure that, in their day-to-day activities, managers keep in mind the outcomes their organization is striving to achieve.

Practice 5—Collect Sufficiently Complete, Accurate, and Consistent Data

As successful organizations develop their performance measures, they pay special attention to data collection. As the experiences of these organizations demonstrated, managers striving to reach organizational goals must have systems in place to provide them with needed information.

Step 3—Use Performance Information

After establishing an organizational mission and goals and building a performance measurement system, the third key step in building successful results-oriented organizations is to put performance information to work. Managers should use **performance information** to:

- Continuously improve organizational processes,
- Identify performance gaps, and
- Set improvement goals.

Organizations that progressed the farthest to results-oriented management did not stop after strategic planning and performance measurement. They applied their acquired knowledge and information to:

- Identify gaps in performance,
- Report on the performance, and
- Improve performance to better support their missions.

Practices 6 through 12 give structure to identifying and responding to performance information.

Practice 6—Identify Performance Gaps

Performance information can have real value only if they are used to identify the gap between an organization's actual performance level and the performance level it has identified as its goal. Once the performance gaps are identified for different program areas, managers can determine where to target their resources to accomplish the mission. When managers are forced to reduce their resources, the same analysis can help them target reductions to keep to a minimum the threat to the mission.

By analyzing the gap between where they are and where they need to be to achieve desired outcomes, management can:

- Target those processes that are in most need of improvement,
- Set realistic improvement goals, and
- Select an appropriate technique to improve processes.

Practice 7—Report Performance Information

Annual performance reports document the progress made toward achieving the goals established in annual performance plans. The reports link levels of performance to the budget expenditures, which is consistent with the GAPER's requirements that annual performance plans be tied to budget requests.

Practice 8—Use Performance Information To Support The Mission

Federal Agencies are feeling the pressure to demonstrate that they are putting the taxpayers' money to sound use. They are expected to demonstrate improved performance even as they cut costs--two simultaneous demands that are driving the trend toward results-oriented government.

As they focus on the outcomes they hope to achieve, federal managers increasingly are finding that the traditional ways they measured their success--and thus the traditional ways they did business and provided services--are no longer appropriate or practical.

Practice 9—Devolve Decision Making With Accountability

Leading organizations create a set of mission-related processes and systems within which to operate, along with giving their managers extensive authority to pursue organizational goals while using those processes and systems. Allowing managers to bring their judgment to bear in meeting their responsibilities, rather than having them merely comply with overly rigid rules and standards, can help them make the most of their talents and lead to more effective and efficient operations.

Practice 10—Create Incentives

Across government, the best incentive Congress can apply to foster results-oriented management is to use information about performance measurement to make decisions about policy, program, and resource allocation, and to provide agencies with the authority and flexibility to achieve results.

Successful organizations define their missions clearly and communicate them to their employees--particularly to their managers--so that they understand their contribution. At both the organizational and managerial levels, accountability requires results-oriented goals and appropriate performance measures through which to gauge progress.

Practice 11—Build Expertise

To make the most of results-oriented management, staff at all levels of an organization must be skilled in strategic planning, performance measurement, and the use of performance information in decision making. Training has proven to be an important tool for Agencies that want to change their cultures.

Results-oriented managers view training as an investment rather than an expense. And as experts in human resource management at leading private and public organizations have pointed out,

organizational learning must be continuous in order to meet changing customer needs, keep skills up to date, and develop new personal and organizational competencies.

Practice 12—Integrate Management Reforms

Within a given Federal Agency, the management reforms now under way may come from various sources. Some of these reforms may be self-initiated, others may have been mandated by legislation, still others may be the result of administration initiatives such as the National Performance Review. All of these reform activities need to be integrated, as the CFO Council urged in May 1995:

> "Existing planning, budgeting, program evaluation and fiscal accountability processes should be integrated with the GPRA requirements to ensure consistency and reduce duplication of effort. In addition, other management improvement efforts, such as implementation of the CFO Act, and FMFIA (Federal Managers' Financial Integrity Act), customer service initiatives, reengineering, and Total Quality Management, etc., should be incorporated into the GPRA framework to capitalize on the synergy and availability of key information and to improve responsiveness to customers and other stakeholders".

1 Introduction

AQIM Handbook

Agriculture Quarantine Inspection Monitoring (AQIM)

Introduction

This section of the Introduction gives you the what's and the why's of AQIM.

What Is AQIM?

AQIM is a group of activities initiated to help the AQI program become a results-oriented program. That is, a program that makes decisions using information about the agricultural risks present in a pathway.

The PPQ Executive Team initiated AQIM for two basic reasons:

- To assist in meeting the requirements of the Government Performance and Results Act (GPRA) of 1993. (Refer to **page-1-7** for an explanation of the GPRA)
- To provide information for risk-based decision-making

What Is Risk Based Decision Making?

PPQ is accountable for reducing the pest threat to U.S. agriculture in a way that does not unduly restrict commerce. To accomplish this, PPQ is moving to better methods for determining not only what to inspect, but how to inspect it. Many of those methods use **risk analysis**.

Risk analysis in business and government provides the framework for organizing and presenting information. This framework helps employees select and justify their actions. For unimpeded trade and movement of commodities in today's world, the AQI program must show that imports and people are inspected and treated based on the widely accepted science of risk analysis.

Traditionally, the AQI program based work on the quantity of pest interceptions and quarantine material intercepted (QMI). This seemed logical. Inspection tables were filled with QMI, pests were found, justifying a good job performance. The seriousness of the threat posed by the pest was not considered. In other words, effort was based on quantity, not the quality of the risk.

When time is spent on low risk activities, then work on high risk pathways suffers. Each work location must assess the risk of a particular pathway and change that assessment as trade and travel changes.

The entry potential of our worst pests is decreased when pathways are tracked, risk is predicted, and work reassigned. This process of tracking, predicting risk, and reassigning work based on those predictions is **risk-based decision making**. Therefore, the information produced from AQIM provides the information needed to assess the risk of entry of exotic pests and diseases.

How Does AQIM Produce Information?

Information is needed for risk management and the GPRA. To produce the necessary information, AQIM uses a sampling process to estimate the amount and kind of quarantine materials and pests approaching a work location via various known pathways of pest entry. Relative pathway risks can be measured by plugging in estimated numbers of actionable pests and information about pest destination into risk assessment models. We are using information from AQIM to measure the gap between the **estimated** amount of quarantine materials or pests approaching a location and the **actual** amount being intercepted by PPQ at that location.

AQIM data is collected and entered at designated locations into a computer database called Agriculture Quarantine Activity System (AQAS). This software allows each location to do simple analyses of the data.

Monitoring results can be used at various levels of the workforce. Work locations can use the results to verify the risk of various entry pathways and to shift resources to activities that are most effective in managing risks. Field offices can use the results to assess the relative risks of various entry pathways and locations. At a national level, the information can be used to assess risk, redesign regulations, and justify budget requests.

Who Is Responsible?

A national team has input in coordinating AQIM via the national coordinator in Headquarters. Information is collected by Customs and Border Protection Agriculture Specialists at designated locations. Basic analysis and use of the monitoring data can be accomplished by managers and employees at work locations to assist in decision making processes. A list of key contacts is in **Appendix B** of this Handbook for your reference.

Developing an appropriate sampling process is an important part of this effort. Designated locations must give considerable thought to a sampling process to ensure the gathering of valid and useful information about pathway risk and program performance. The national and regional AQIM coordinators can offer help in setting up a sampling process that is practical and sustainable at designated locations.

Who Is Involved?

Designated locations around the country and in Puerto Rico are collecting data. In order for AQIM to be fully operational, most ports of entry locations will need to become involved in some way. Each designated location collecting information selects an AQIM coordinator and assistant (refer to "Roles and Responsibilities" on **page 2-5** for more information). An infrastructure at the regional and national levels is also set up to coordinate the program implementation (refer to **Appendix B** for information on key contacts for AQIM).

1 Introduction

AQIM Handbook

Statistics and AQIM

Introduction

Statistics deal with the collection, analysis, and interpretation of information. The AQIM process uses proven statistical techniques to collect monitoring information about various pathways and the commodities entering through them into United States. The information is then used to explain and to explore the characteristics of the various pathways to assist in managing the risk they present to U.S. agriculture.

The information collected as part of AQIM will have very practical uses that will impact the work of port employees. Statistics will allow the use of AQIM information to respond to such practical questions as:

1. How much cargo approaching the work location is carrying actionable pests? What is the level of infestation of the pests in the cargo?
2. What poses the greater risk of spreading citrus canker? Is it maritime imports from South America or air passenger transport of home-grown fruit?
3. How effective is a work location in managing the pest and quarantine material threats that are identified through AQIM?

The use of valid, statistical techniques establishes the facts of the situation, and allows officers and managers to make risk-based decisions.

The following section provides additional information to better understand the role of statistics in monitoring and PPQ operations.

The Why of Statistics

Statistics allow for the objective analysis of information. The principles behind statistics help guide us to use the best methods for gathering information about a population without giving bias to the information.

Historically, selective criteria (targeting) is used to choose inspectional units that are the most likely to transport something of agricultural interest. Inspectional units that don't fit the criteria have less of a chance of being selected--that isn't random sampling. When selecting random samples, selective criteria cannot be used.

In AQIM, ports of entry randomly select pathway entrants to create a picture representative of the entire population. For example, the population might be all air passengers arriving at the international terminal of an airport. The random sampling unit would consist of 10 custom declarations (and associated passengers' baggage) per day for a year, or 3,650 custom declarations for the year. The sample would be selected randomly, such that every passenger had the same chance of selection. The randomness could be achieved in many different ways. One example might be that the random sampling units are selected at preselected random times of the day.

The data could be further refined to reflect which of those units in the population pose a threat and which do not. Why do we do this? So that we can draw inferences and make decisions about the population in an objective, scientific way. **Statistical inference** is drawing conclusions about the larger population from smaller, randomly sampled portions. From these sampled portions, we can construct generalizations about the population with varying levels of confidence.

Random Selection as a Key Step

In order to draw accurate conclusions about the larger population from a smaller subset or sample of the population, it is important that the subset be as similar to the larger group as possible. This means that each unit in the subset must be randomly chosen from the larger population. Consequently, each unit of the larger population must have the same chance of being randomly selected.

Because sampling units are chosen randomly where all units have the same chance of being selected, we can measure the error involved in the information. This measure of error will allow us to judge how good our information is and how much confidence we have in the overall monitoring process.

What Are The Implications for AQIM?

There are several implications of using a random sampling process for AQIM.

1. Monitoring is not the same as using selective criteria to determine a random sampling unit. (See the section about AQIM Sampling Process beginning on **page-1-41** for additional information.)
2. It is imperative that selected sampling units are truly random. This eliminates the possibility of human choice or preference in the selection.

3. Biasing the information to reflect high levels of pest and quarantine material interceptions, will mislead the interpretation. In some instances, giving higher levels than what really exists will cause a work location to appear extremely inefficient because time is spent on low risk activities, rather than on high risk pathways. Additionally, showing a no or low risk rate can result in high risk pathways being interpreted as low risk causing inappropriate staffing to occur.
4. Selected random sampling units must be thoroughly inspected to be sure if pests or quarantine materials are present. The goal is to have a clear snapshot of what is approaching a work location.
5. The goal of AQIM is not in the number of pest interceptions and DIM's collected, but in the decisions based on risk and analysis that can be drawn from the monitoring.

Statistical Concepts

There are several ways of analyzing the monitoring information that has been collected. This section addresses the types and benefits of analysis that are available.

Following are definitions of some basic terms used when analyzing monitoring information:

Confidence Interval—A level of belief that the true value of the population was captured. For AQIM, the numbers of samples taken at each work location were designed to ensure that by detecting the presence of certain pests and quarantine materials during the monitoring, PPQ could be 95 percent sure that it would happen again.

Data—Raw information that provides values for any characteristic of a larger population. For AQIM, these would be all the entries on the data collection form (i.e., flight number, origin, contaminant codes, etc.).

Mean—This term is also referred to as the average. It is computed by adding all the values for a characteristic and dividing by the number of observations. For example, the mean of passengers going through an airport in a day would be the total number of passengers in one year divided by 365 days.

Probability—The statistical prediction of the likelihood of possible outcomes.

Sample—The part (or a subset) of a population that has been selected for monitoring.

Simple Random Sampling—A selection process where each member of the population must have a known probability (greater than 0) of being sampled.

Variable—Any characteristic on which the elements of a sample differ from each other (i.e., height versus weight, cargo destinations versus type).

Data is the information that is collected from a **random sampling unit** (or smaller subsets) that accurately depicts characteristics (measured **variables**) of the larger population. Gathering data for AQIM is **simple random sampling** where we collect information regarding specific variables. This is done so we can predict the likelihood of an event occurring such as a pest or quarantine material interception. The number of inspections conducted at a work location is established so that there will be a **95 percent confidence interval**.

Types of Analysis and Use

There are several types of analysis that can be done with the AQIM data. The analysis can range from the simple to the complex. Explained here are some of the more useful methods available for use at your work location. More detailed analysis questions are located under the following pathway sections: Air—Passenger Baggage, Air—Cargo, Maritime—Cargo, Mail, Northern Border—Vehicles, Northern Border—Truck Cargo, Southern Border—Vehicles, Southern Border—Truck Cargo.

The simplest analysis is just to look at **a listing of the data**. Listings can answer questions such as what, what kind, and how many. **Figure 1-1** is an excerpt from a listing of the data gathered for passenger vehicles at a work location along the Southern border. Looking at the data could tell how many inspections were made on what dates, and the types of items being found.

REC.#	WORK UNIT	DATE	TIME DESTIN	ITEM
1413	Laredo, TX	01/01/97	1110 TX	Orange
1414	Laredo, TX	01/01/97	1300 TX	.
1415	Laredo, TX	01/01/97	1253 TX	.
1416	Laredo, TX	01/01/97	2010 TX	.
1417	Laredo, TX	01/01/97	2330 TX	.
1418	Laredo, TX	01/02/97	2130 TX	.
1419	Laredo, TX	01/02/97	2015 TX	.
1420	Laredo, TX	01/02/97	1540 TX	Apple
1421	Laredo, TX	01/04/97	0845 TX	.

FIGURE 1-1: An Example of a Listing Data

Since there are many variables in the data files for each work location, you have the option to **select** one of those records with specific variables that you are interested in looking at. Refer to **Figure 1-2** for an example of records containing quarantine material.

REC.#	WORK UNIT	DATE	TIME DESTIN	ITEM
1421	Laredo, TX	01/04/97	0845 TX	Orange
1428	Laredo, TX	01/08/97	1927 TX	Apple
1432	Laredo, TX	01/10/97	1849 TX	Sugarcane
1453	Laredo, TX	01/14/97	1840 TX	Hay
1466	Laredo, TX	01/17/97	1840 TX	Pear
1486	Laredo, TX	01/05/97	0813 TX	Avocado, w/seed
1590	Laredo, TX	01/20/97	1005 TX	Orange
1614	Laredo, TX	01/24/97	0854 TX	Apple
1631	Laredo, TX	01/25/97	0900 TX	Eggs

FIGURE 1-2: Printout of Records Having Specific Information

Frequencies answer the question, “To what degree do unique values exist in a variable?” Looking at the frequency of a certain variable will show summary data about the variable. For example, running a frequency on the date variable will give the number of inspections that were done on each date as well as the total number of inspections.

Figure 1-3 shows the frequency of items intercepted. You get a list of the different types of items intercepted and how many there were in the monitoring samples.

ITEM	Freq	Percent	Cum.
APPLE	3	30.0%	30.0%
AVOCADO, W/ SEED	1	10.0%	40.0%
EGGS	1	10.0%	50.0%
HAY	1	10.0%	60.0%
ORANGE	2	20.0%	80.0%
PEAR	1	10.0%	90.0%
SUGARCANE	1	10.0%	100.0%
Total	10	100.0%	

FIGURE 1-3: Printout of Frequencies of Items Intercepted

Frequencies, as well as the raw data, can also be displayed graphically using **pie** and **bar charts**. Refer to **Figure 1-4**

.

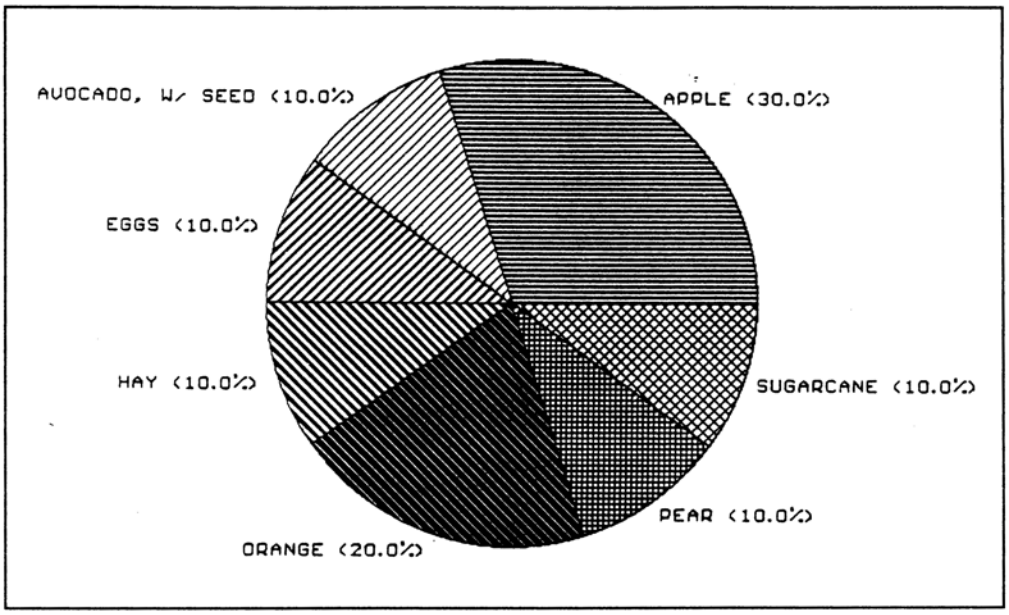

FIGURE 1-4: Example of Frequencies Displayed Using Pie Chart

Means or averages give an overview of the general tendency of a variable. The average number of passengers on a declaration might be of interest for your work location. This could be calculated by dividing the total number of passengers in the data file by the number of declarations (or samples). We can calculate the 'error' in this estimate and express it in the form of a **confidence interval**. Remember that the confidence interval gives an indication of how accurate the estimate is.

Proportions show the relative frequency of an event. For AQIM, we may be interested in the proportion or percentage of passengers with a QMI. We could calculate this by dividing the total number of QMI's by the number of passengers. We can also compute a confidence interval around proportions.

Next Steps

These are all statistics that are necessary to initially conduct and understand AQIM. Using statistics and risk management principles will become more critical as PPQ progresses toward complying with the GPRA and evaluating results-based performance.

1 Introduction

AQIM Handbook

Fundamentals of Risk Analysis

Basics About Risk

Agriculture is a business filled with numerous risks. Pests, diseases, weather, and market fluctuations continually impact the potential earnings of producers. These elements of risk and the reaction of producers and consumers to that risk, result in agricultural policy setting and government programs.

USDA has several programs by which it enhances overall U.S. agricultural markets; ranging from economic forecasting to genetic research. APHIS, PPQ helps protect the natural agricultural resource base of the United States by minimizing the entry potential of risk elements, which would increase the risk agents (i.e., pests and diseases). These efforts are designed to help give producers the best possible standing in international markets.

In the past, APHIS, PPQ has responded to risk issues on a historical knowledge basis. Through observation and experience, PPQ made judgements and decisions about the potential threat posed by various commodities entering the United States. These decisions must now be supported by empirical information.

Risk analysis processes give PPQ a basis for responding to the new mandates required by the international trade agreements: General Agreement on Tariffs and Trade (GATT) and North American Free Trade Agreement (NAFTA). GATT and NAFTA require transparency of risk-based decisions impacting agricultural products in U.S. markets. Therefore, PPQ must do business differently than in the past because of these new mandates. For information and criteria about risk management, refer to the **APHIS Trade Risk Analysis Position** paper and the **GATT Agreement on the Application of Sanitary and Phytosanitary Measures** located in **Appendix C** of this Handbook.

The basic function of PPQ is to manage exotic pest and plant disease risk. To accomplish this work, decisions must be based upon the risk that various commodities pose to U.S. agriculture. At the heart of risk-based decision-making is the need for good information. Because PPQ does not have perfect knowledge about the absolute risk of a particular pest, disease, or commodity; decisions must be made with clear understanding, knowledge, and an element of uncertainty.

Risk Analysis Process

Risk analysis is the process, tools, and methodologies by which organizations estimate the likelihood and potential consequences of an adverse event. International trade agreements require these processes be consistent, systematic, and transparent. Therefore, the organizational objective is that risk-based decision-making should be pervasive throughout all levels of PPQ and APHIS.

A risk analysis process places risk analysis activities within an organizational context. The process provides an internal structure and roles and responsibilities, which define and respond to risk-based policy issues. A risk analysis process comprises risk assessment, risk management, and risk communication. **Figure 1-5** chronicles the difference between risk assessment, risk management, and risk communication.

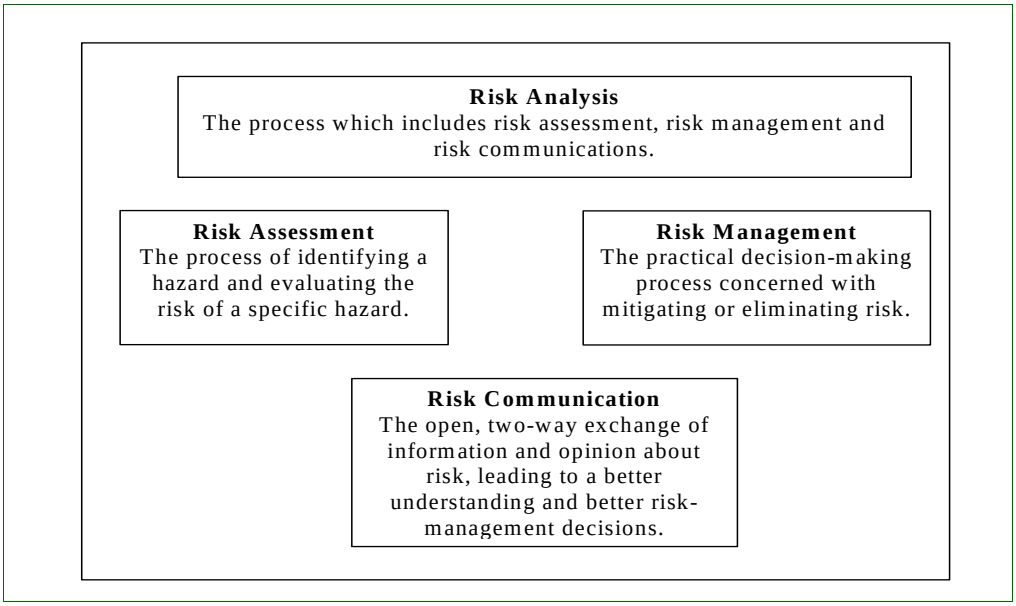

FIGURE 1-5: A Model of a Risk Analysis Process

The risk assessment (or analysis) portion of the model pays attention to estimating the probability and magnitude of the risk. Analysis ends with developing and selecting options. AQIM plays a major role in evaluating, monitoring, and improving options or mitigation programs. As risk analysis processes are used, it is essential to communicate with clients to ensure programmatic goals are met, and to ensure the results improve or to re-tool the process.

Field work occurs primarily at the implementation levels of risk management. PPQ officers are responsible for implementing risk management programs; monitoring and evaluating those programs;

and adjusting and improving activities to ensure that risk is being managed at the best possible level. Risk analysis is a systematic way of achieving risk-based decisions.

The major barrier to risk analysis is reliable data. Data errors may come from improper sampling procedures, errors in record-keeping and data entry or faulty analysis. In addition, risk analysis must take into account aggregate risks. For example, fruit that has citrus canker poses one level of threat while fruit that is contaminated with medfly poses another. However, if infested with citrus canker and medfly, the risk rate is more intense.

From a risk management viewpoint, agency leaders must actively respond to:

- What can be done to prevent, reduce, or eliminate the risk?
- What are the best options?
- Why?

There are multiple uses of risk analysis: problem definition, risk prediction, risk avoidance measures, mitigation strategies, management programs, and standards for protecting agriculture. From risk analyses, work locations can evaluate ongoing risk reduction activities; determine management and policy priorities; and identify and rank research and data collection needs.

The following model on pest risk assessment (analysis) gives context to risk analysis processes. See **Figure 1-6.**

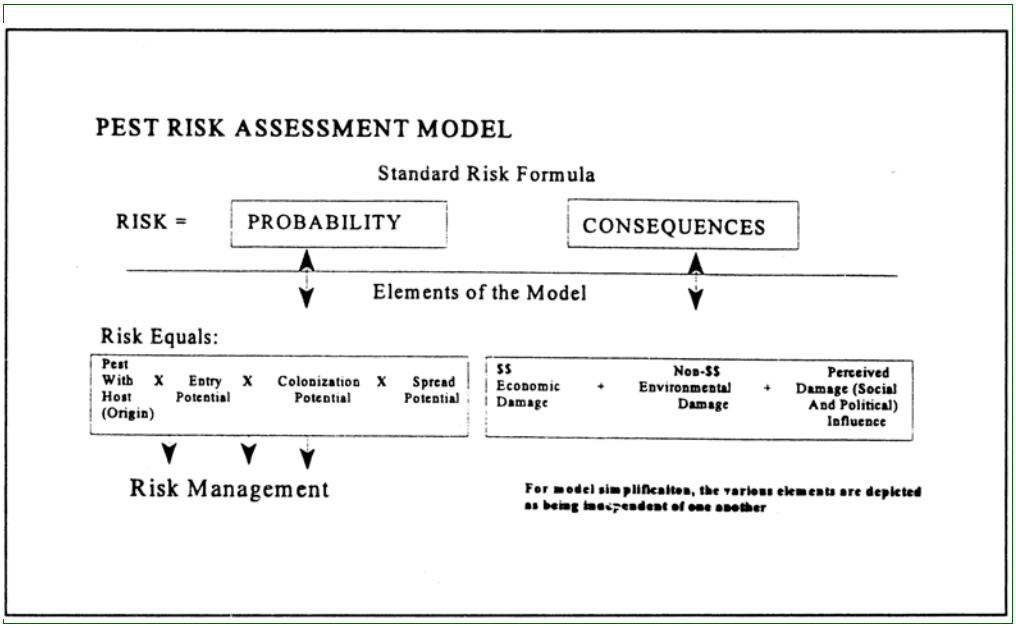

FIGURE 1-6: Pest Risk Assessment Model

The model in **Figure 1-6** helps to exemplify that risk equals probability and consequences. It is important to note in this model that AQIM activities are focused in the element of entry potential. The intent of AQIM is to assess entry potential and devise methodologies for reducing or eliminating that potential to the best possible level through the most efficient use of resources. Therefore, PPQ work locations can assess the approach rate of pests, evaluate the rate of detection, and devise methods to minimize or to ameliorate entry of any pest or disease.

It is important that work locations and Risk Management Teams concentrate a majority of their activities on reducing entry potential. However, they must also be aware of the other risk elements that impact overall effectiveness. Final activities at work locations may be influenced by such factors as colonization, spread potential, economic damage potential, environmental damage potential, and social-political influences.

Referring to **Figure 1-6**, the probability portion of the standard risk formula is multiplicative. This means that if any of the elements listed are zero (i.e., pest with host origin, entry potential, colonization potential, spread potential), then nothing can happen and there is no risk. However, if there is a positive occurrence or likelihood in all of these elements, then the risk level must be considered.

In **Figure 1-6**, the second portion of the standard risk formula is consequences. We tend to think of consequences in the negative. How much damage will this pest or disease threat pose in terms of dollars, environment, social, and political elements. The elements of risk consequences (i.e., economic damage potential, environment damage potential, perceived social-political damage) are additive in nature. You may have a “zero” or non-issue in any two elements. But, as long as one of the elements has a positive impact, then consequences have to be addressed. The intent is to determine if a risk will require mitigation. This brings us to the third part of the pest risk assessment model--risk management.

Risk Management

Risk management is the analysis of various options and the determination of which options can be pursued based upon current operating issues and parameters. The analysis discerns ‘what is viable’. Still, it is the responsibility of the decision-makers to weigh the various options, considering positive implications as well as the negative. All consequences are not equal.

Historically, APHIS has viewed all pest establishments as equally unacceptable. However, some pests may be harder to eradicate than others, and some may be harder to trap or have more long term effects. Management uses risk analysis to give greater specificity in the relative threat levels. Probability of establishment and consequences of impact must mutually be considered.

Therefore, the product of a risk analysis is a conclusion (or characterization) about the relative risk of a particular commodity or pest as it relates to others. It is not an absolute value. It is then up to the decision-makers to judge whether or not the risk is acceptable. If the risk is not acceptable, then the agency must move into risk management: the active intervention to minimize risk elements.

Decision makers must also understand that there is uncertainty in the conclusions. We are conducting predictive analysis. We cannot always be assured that what we think will happen, will in reality, occur. There is no perfect knowledge. In some cases, such as citrus canker and Medfly, the likelihood and impact of establishment is so great, that we can express a high confidence level in the appropriate type of action to take. However, not all situations are so clearly defined.

Risk strategies or decisions usually fall into one of four categories:

- Control of risk,
- Avoidance of risk,
- Risk transfer, or
- Acceptance of risk.

When the probability of the loss occurring is high, the general rule is to either avoid (e.g., commodity exclusion) or control (e.g., fumigation activities) the risk agent. When the probability of the loss is low, generally the activities center around accepting or transferring the risk. Accepting risk is exemplified by the discontinued inspection of low risk pathways. Risk transfer would occur if we decided, on some future date, we would stop excluding a particular commodity that had a high smuggling rate. We would begin to permit entry upon inspection. This way, we have transferred the risk from unknown entry paths to known ones.[1]

Regardless of which avenues are selected, there are certain principles for good risk management decision-making. A good risk management decision:[2]

1 Risk Management. “Designing Risk Management Strategies.” Module 4, Agriculture Canada.
2 Presidential Commission on Risk Assessment and Risk Management. “Framework for Environmental Health Risk Management.” Final Report Volume 1. 1997

- Addresses an articulated problem in its agricultural pest or disease threat context
- Emerges from a decision-making process that elicits the view of those affected by the decision, so that differing technical assessments, public values, knowledge, and perceptions are considered
- Is based on a careful analysis of the weight of scientific evidence that supports conclusions about a problem's potential risks to animal and plant health
- Is made after examining a range of regulatory and non-regulatory risk management options
- Reduces or eliminates risks in ways that:
  - are based on the best available scientific, economic, and other technical information
  - account for their multi-source, multi-risk contexts
  - are feasible, with benefits reasonably related to their costs
  - give priority to preventing risks, not just controlling them
  - are sensitive to political, social, legal and cultural considerations
  - include incentives for innovation, evaluation and research
- Can be implemented effectively, expeditiously, flexibly, and with stakeholder support
- Can be shown to have a significant impact on the risks of concern
- Can be revised and changed when significant new information becomes available while avoiding "paralysis by analysis."

Multiple elements or factors influence decisions made concerning risk. Management must carefully weigh each option in terms of effectiveness, feasibility, costs, benefits, unintended consequences, and cultural or social impacts.

Risk Communication

Stakeholders play an essential role in this phase by assisting in identifying risk-reduction options, developing and analyzing various avenues to pursue and evaluating the ability of each option to reduce risk (as offset by the above elements such as cost, etc.)
Non-regulatory and regulatory approaches (or some combination) can be used to minimize or eliminate risk. Innovative approaches to

changing behavior relative to risk (i.e., education, market incentives, monitoring, and research) may prove as effective to regulatory restrictions in ensuring compliance.

Risk Management Teams

It is essential to have an infrastructure, such as Pest Risk Teams, at work locations to deal with risk analysis and to assist management in making risk-based decisions. Following are general guidelines for the composition and structure of Pest Risk Teams.

Composition

The composition of Teams is flexible and should be diverse. Team membership should include Port Directors, managers, officers, and identifiers. Also, membership should include a back-up identifier, persons responsible for AQIM.

Structure

The structure of Pest Risk Teams depends on the size and complexity of operations at a work location. Team size may vary but should not be greater than 8 members. Larger ports may have more than one team based on the different risk pathways being monitored (i.e., cargo, passenger, etc.).

Skill

Teams need to have various skills. Such a skill base may include having experience of other work locations, using data base systems, and training or experience in researching.

Automated Data Sources for Teams

- Work accomplishment data systems (WADS),
- Pest interceptions (PPQ 309's),
- Importation of regulated articles (PPQ 280's),
- AQIM data
- Pest Not Known To Occur (KNOT's), and

Role

The role of Pest Risk Teams is to conduct local risk assessments that result in ranking the risks of various pathways associated with plant pests and diseases. Teams:

- Design sampling processes
- Identify information needs and methods to obtain information
- Recommend risk management options

- Share information with other work locations, industry, States, and regions

Recommendations from Pest Risk Teams may include some of the following options:

- Allocate staffing based upon relative risk of entry (i.e., pedestrian versus vehicle, cargo versus passenger, solid versus mixed loads, etc.)
- Change cargo inspection protocols (i.e., de-van versus tailgate)
- Change selection criteria (targeting) by validating the existing ones and developing new ones;
- Change the number of units inspected, decreasing or increasing as necessary
- Develop compliance agreements for low risk pathways in such areas as aircraft, ships, and rail cars
- Focus on risk (e.g., quality of pest interceptions and quarantine material interceptions, not the quantity)
- Target public awareness activities to high risk situations

Pest Risk Teams need to:

- Explore varying solutions to gathering additional data in a statistical sound format
- Raise AQIM questions, such as, what additional data is needed
- Share successes and experiences with other Pest Risk Teams

Once these teams set issues into context, they need to establish a stakeholder collaboration process to begin risk communication. Stakeholders do not define the risk, but must be involved from the beginning to ensure cooperation and compliance.

Outcome of Risk Analysis

The Risk Management Teams can use risk analysis to answer basic operating questions such as:

- What can go wrong (if we do nothing)?
- What is the probability of an adverse action happening?
- What is or will be the magnitude of the outcome of the adverse action?
- How certain can we be that our predictions are correct?

The outcome of a risk analysis is a risk characterization. A risk characterization should respond to these questions:

- Considering the hazard, what is the nature and likelihood of the pest disease damage to agriculture?
- Which markets or groups are at risk: are some groups more likely to be a risk than others?
- How severe are the anticipated adverse impacts or effects? Are the effects reversible?
- What scientific evidence supports the conclusions about risk? How strong is the evidence? What is uncertain about the nature or magnitude of the risk?
- What is the range of informed views about the nature and probability of the risk? How confident are the analysts about their predictions for risk?
- What other sources cause the same type of effect?
- Does the risk have impacts besides those on agriculture or the environment, such as social or cultural consequences?

NOTICE

The level of detail considered in a risk assessment and included in a risk characterization should be commensurate with the problem's importance (local, regional, national), expected impact, and level of controversy. Risk characterizations must include information that is useful for all stakeholders.

Pest Risk Teams:

1. Analyze AQIM survey data to develop estimates of agricultural pest risk approach rates for each major mode of entry at the work location.
2. Use the estimated approach rates to calculate the number of agricultural pests and diseases and high-risk quarantine materials approaching the work location.
3. Compare these numbers with the number of agricultural pests and diseases and high risk quarantine materials actually intercepted at the work location.
4. Use the comparisons from Step 3 above, to draw some conclusions about how well the work location manages the agricultural threat approaching the work location.
5. Report its findings to work location management and PPQ officers. The group recommends actions to take at the work location to improve risk management effectiveness at the work location and recommends risk management targets for the upcoming year. The recommended actions can be based on AQIM analysis or other information collected at the work location. For example, if monitoring data shows a certain commodity to be

carrying more agricultural pests than previously suspected or reported, then the work location can inspect that commodity more carefully for interceptions.

6. Then, as the work location continues its baseline monitoring, at the end of the following year (or other time frame) the Teams check to see if the actions initiated in Step 5 above, lead to meeting risk management targets.

1 Introduction

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AQIM Sampling Process

Information Versus Detection

There are two types of sampling that can be used to determine the characteristics of a population. **Sampling for information**, also known as objective or random sampling, is used to **e**stimate characteristics for a population. On the other hand, **sampling for detection**, is used to detect characteristics of a population. The two types of sampling are fundamentally different in their approach to bias.

Sampling For Information

When sampling to estimate for information, bias in selection must be avoided in order to ensure objectivity in the selection of representative samples from the population. Each member of the population must have a known probability (greater than 0) of being sampled. The result is a high degree of confidence that the sample represents the population, thus useful inference can be made about the population based upon the sample.

The most effective way to eliminate bias is to **randomize** the sampling process and design unbiased selection mechanisms. Mathematical, mechanical, or automated (computerized) systems and random number generators or random number tables are characteristic of the tools commonly used when sampling for information.

Sampling For Detection

Sampling for detection uses bias in order to discover if a specific characteristic occurs in the population. When sampling for detection, the objective is to use prior knowledge to ensure that certain members of the population have a higher probability of being sampled; whenever, prior knowledge indicates that detectable factors or patterns distinguish members of the population.

Using selective criteria based on profiling and similar subjective techniques and drawing from prior knowledge are characteristic of methodologies used when sampling for detection. It is important that such techniques are based on firm information or valid assumptions and applied as consistently as possible in order to detect the largest number of target items.

Summary

Based on the example in **Figure 1-7**, it would seem that there is a subtle difference between sampling for information and sampling for detection. In fact, it may be argued that sampling for detection, utilizing bias and subjective sampling, will result in better information concerning the amount of prohibited agricultural material carried by vehicles. This may be true, provided the assumptions used for biasing the samples are 100 percent accurate. However, sampling for information would be necessary to determine the soundness of the assumptions. Therefore, the soundness of a scheme sampling for detection cannot be adequately measured without a baseline level of knowledge provided through sampling for information.

Question: What amount of prohibited agricultural material is carried by vehicles?

Sampling for information would require a randomized sample of vehicles over a period of time suitable for the degree of confidence required.

However, if the objective were to detect as much quarantine material as possible, then a sampling **for detection** would be designed based on prior information about the vehicles believed most likely to carry prohibited items.

If no such information is available or the information does not allow for sound assumptions, then a random sample without bias is necessary.

FIGURE 1-7: Example of Sampling for Information Versus for Detection

There are critical, although sometimes subtle, differences between sampling for information and sampling for detection. The use and legitimacy of each is dependent upon the reason sampling is needed (the objective) and the kind of prior information available.

Important

It is important to note that the results of sampling for detection can provide some information about the existence for a characteristic within a population but cannot be used to infer information concerning the entire population. In situations where there is insufficient knowledge from which to develop biases, sampling must be randomized as in sampling for information.

Sampling for information can be more resource intensive than sampling for detection; and it can be difficult to execute in an environment that is focused on detection. Using the same mechanisms (personnel, work areas, etc.) Designed for detection tends to encourage the use of the same biases used for detection. Sampling for information under such conditions requires a special effort to overcome the psychological and logistical tendencies to bias for detection.

Figure 1-8 provides a summary comparison that can be used to quickly determine which type of sampling is most appropriate for a given situation.

Characteristic	Sampling for Information	Sampling for Detection
Type of sampling	Random, objective	Non-random or random; subjective or objective
Randomness	Essential	Not important unless a lack of knowledge prevents sampling from being biased
Bias	Eliminate	Use to advantage

FIGURE 1-8: Summary Comparison To Determine The Most Appropriate Type of Sampling

Random Sampling

A basic introduction to sampling was provided in the subsection titled, Statistics and AQIM beginning on **page-1-23**. This section will further explain the sampling that is used in AQIM and contrast it to the other types of sampling used by APHIS.

Sampling

First, sampling consists of selecting some part of a larger population to observe so that you can estimate something about the whole population. Sampling is used in a wide variety of situations, some of which you may be very familiar with. Political polls use a random sample of voters to predict who will win an election. A random sample of households with televisions is used to produce the Nielson ratings of television shows. Gallup polls use samples to produce estimates on wide ranging social and political issues. In almost any newspaper, magazine, or broadcast of the evening news you can see information based on some type of sample.

So why do we use samples? Because they provide a practical as well as an economical way to gather needed information. We can't afford (either the time or money) to inspect every person or piece of cargo entering the United States, so a properly chosen random sample can provide an 'estimate' for the sample that is representative of the population. Political polls commonly use around 1,000 voters to predict who is ahead in an election - even in national elections! Remember that with random sampling we can also measure the accuracy of the estimate. Therefore, we use random samples to gather information in a timely and economical manner.

How do we get a representative sample--one which we will be comfortable using to make an inference about the larger population? The answer is, by using the statistical properties of random sampling.

Statistical Criteria For Random Sampling

For a sample to be random, it has to satisfy some statistical criteria:

1. Each unit has an equal chance of being selected. An example from AQIM would be that every air passenger baggage has an equal chance of being in the sample.
2. Each unit is selected independently of other units. An example of this might be that the usual inspection of air passenger baggage from flight X does not influence the selection of the next air passenger baggage to be in the sample.

Random Sampling Contrasted to Other APHIS Sampling Processes

Other sampling being done by APHIS is as follows:

- Haphazard sampling--where an officer points out a number of boxes without any specific knowledge.
- Convenience sampling--officer chooses X number of boxes from the rear of a sea container to do a tailgate inspection.
- Selection criteria (authoritative or intuitive) sampling--based on knowledge and skill of the officer (or sampler).

Each of these types of sampling violate one or both of the statistical criteria for random sampling. Can you determine why these aren't random samples? Would any of the above samples produce a representative sample? Probably not. A selection criteria should have a higher rate of pest and quarantine material interceptions than would a truly random sample, since you are choosing air passenger baggage most likely to have pest and quarantine material interceptions. A convenience sample only looks at the tailgate, so boxes at the front of a container would have no chance of selection. Haphazard sampling may appear to be random, but if the officer knowingly (or unknowingly) excludes any part of the cargo from inspection, then it would not be truly random. An example of haphazard sampling is conducting a blitz of a low risk flight causing misguided random selection to complicate the recovery process.

One of the things that makes random sampling so attractive is that it allows you to attach some measure of confidence or certainty to the data. (Or we can measure some of the error involved with sampling). Why is that important? Remember we took just **one** random sample from our population. If we took another sample, we would end up with different units from the population in the sample. This second sample could give us data that could be very different from the first sample, or it could give us data that is very similar. That's one of the problems of using samples - there are no money-back guarantees. However, we can measure the accuracy of the information we gather. This accuracy

is expressed in the form of a confidence interval. Using random sampling allows us to pick a confidence level, say 95 percent, and express how confident we are that our estimate is within the confidence interval. An example would be that our monitoring data shows that 2 percent of the vehicles crossing at a land border site had interceptions of quarantine material.

Given we used random sampling, we could compute a confidence interval that would allow us to say we were 95 percent certain that the true percentage of vehicles crossing the border at that work location was between 1.4 percent and 2.8 percent.

Telling a work location that their samples HAVE to be random is the easy part. Developing a sampling scheme to suit each work location and pathway is much more difficult. This is why each work location has developed its own sampling process. Some work locations are cooperating with U.S. Customs in sampling. Other locations have set up their own schemes to reflect the unique aspects and abilities of its location and personnel. The important thing is that the samples are random, not that every sample is chosen in a like fashion.

If you have some prior knowledge about the population you are interested in, there can be better (more efficient and cost effective) ways to do the sampling. If the population can be broken up into homogenous groups, then the sample can be drawn from each of the groups. Separate samples are drawn from each strata and inspected. If the stratification was done properly and the samples in each strata are more similar to each other than to the samples in other strata, the resulting confidence interval should be smaller. This doesn't always happen, but if the stratification is done properly, the chances are pretty good you will end up with a better estimate. Refer to **Figure 1-9** for a simplistic example about the importance of knowing your population.

For Example: You have often wondered how many red M & M's are in the 1 lb. bag of candy. Instead of counting all of them, you measure out 4 ounces and count each color and record the results. Your counts reveal:

3 reds, 17 browns, 10 greens, and 14 blues

You then multiply these numbers by four to get your final counts for the entire bag:

12 reds, 68 browns, 40 greens, and 56 blues

Based on your findings, you write a letter to the candy maker to complain; red is your favorite color. Little did you know that the reds are slightly heavier and put in the bag first. Your 4 ounce sample, however, came from the top of the bag and you did not shake it up first. This non-random sample provided inaccurate information about the population.

FIGURE 1-9: Example of Importance of Knowing Your Population

One Final Word on Sampling

As explained above, we could potentially decrease the error in our estimate by using stratified sampling. There is another, more direct, way to control the error (which controls the width of the confidence interval). Increasing the sample size can decrease the error associated with an estimate, regardless of the population size. The error is inversely proportion to the square root of the sample size. So, the larger the sample the narrower the confidence interval around the estimate.

An example of this concept is illustrated in **Figure 1-10**. If we keep the proportion of pest and quarantine material interceptions constant at 5 percent, watch how changing the sample size changes the width of the confidence interval. If your random sampling unit is only 60 of a population, the confidence interval is between 7 and 20—a very broad interval representing a greater possibility of error. But where the random sampling unit is 600 of the population, the confidence interval is between 3.2 and 7.3—much narrower. So, the larger the sample the narrower the confidence interval will be representing a smaller possibility of error.

Sample Size	Width of the Confidence Level
60	.7 - 20
100	1.1 - 13.5
200	1.8 - 10.4
400	2.6 - 8.5
600	3.2 - 7.3

FIGURE 1-10: Example of How Sample Size Changes the Width of the Confidence Interval

AQIM uses this statistical relationship to determine the different sample sizes for each estimate. To generate the sample size, you need to have some information on the approximate population size and the expected proportion in the population. You also have to choose a confidence level and set the absolute precision at some level. Then, you have to look at the practicality of the situation. Is the sample size realistic in terms of time and money? If not, what sample size would be realistic and would the resulting changes lead to acceptable estimates?

The bottom line is we use random sampling because it allows us to use statistical principles to make assumptions about the resulting sample. It should be an independent, representative part of the population from which we can generate estimates and confidence intervals around the estimate. We can then take the data from AQIM and compare it to other data that is available or combine it with data available from other sources to make more informed decisions.

The random sampling process of AQIM is probably the trickiest part of this effort. Work locations must give considerable thought to a sampling process to ensure the gathering of valid and useful information about pathway risk and program performance. Several sections in this Handbook provide the basic information about sampling methodology to assist work locations produce valid data. The AQIM national and regional coordinators can offer help in setting up a random sampling process that is practical and sustainable at a new work location (see **Appendix B** for a list of key contacts).

Data Collection and Use

AQIM uses ongoing random sample monitoring to estimate the amount and kind of agricultural materials and pests approaching a work location via various known pest entry **pathways**. A work location may have monitoring estimates on how many pests, contaminants, and smuggled prohibited materials are approaching via air, maritime, or truck cargo. These estimates serve as baseline data to help work locations answer several important questions:

1. How much cargo approaching the work location is carrying actionable pests? What is the level of infestation of the pests in the cargo?
2. Which transportation pathway has the greatest pest risk for the work location?
3. How effective are the current regulations in managing the risk of introduction of pests and diseases?
4. How effective is the work location in managing the pests and quarantine material threats which were identified in the monitoring?
5. How effective is the current cargo hold process for managing the pest threat at the work location?

AQIM data for each entry pathway is collected and entered into AQAS. The work location AQIM data is forwarded to PPQ's QPAS staff, who are currently managing a central database and analyzing national trends. The Center for Plant Health Science and Technology (CPHST) has access to this central database for risk assessments and pathway risk modeling.

2 Start-Up

AQIM Handbook

Work Location Set-Up for AQIM

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Roles and Responsibilities **page 2-5**
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Introduction

AQIM activities provide useful data on AQI program activities to local, regional, and national employees.

Success of results monitoring activities requires the following:

- Adequate assistance from internal support groups--processes, requirements, facilitation, training, electronic support systems
- Commitment of managers and employees at all levels
- Involvement of stakeholders and customers including Congressional views and co-providers
- Strategic and performance planning throughout the organization

The activities outlined in this section and the procedures for data collection (under each pathway section of the Handbook) will help set up a work location to begin AQIM. The process selected for AQIM at each work site will become part of the ongoing operational activities for that location.

Activities for Implementing AQIM

Initially, a work location must make a commitment to follow the Agency's strategic course. This commitment is not just a set of prescribed activities, but is a new way of doing business.

Next, work locations should establish an AQIM coordinator to develop processes that are used to collect and analyze information. (See "Roles and Responsibilities" on **page-2-5**, for what a work location must do to implement AQIM.) Results should be shared and published for all

employees to benchmark process and performance. AQIM Coordinators and teams should continue the fluid process of improving AQIM systems locally.

Based upon the analysis of the information, work locations set performance targets. These targets would have an overall goal to improve AQI performance. Work locations must:

- Determine actual results,
- Develop analysis process for measuring goals and results.
- Develop strategies for closing the gaps, and
- Identify goals and align them with regional and national goals,
- Measure the gaps,

Collecting information becomes an ongoing activity with the processes being continually evaluated and revised. There must be a continual cycle of:

- Assessing and evaluating process,
- Identifying other relevant sources of information,
- Implementing and coordinating work change activities.
- Recommending risk management options, and

Use the following start-up activities along with the roles and responsibilities and the checklist in this section as guides when implementing AQIM.

1. Develop a common understanding of AQIM. Work with local management teams and employee representatives to conduct meetings or use other ways of communicating to all employees at the work location. Introduce the who, why, when, and where of results monitoring and AQIM. For help, contact the Regional or National AQIM Coordinators.
2. Inform brokers, other government agencies, and representatives from private industry that they will be included. Use a positive approach about their involvement and explain the advantages of monitoring. But, be realistic about how the new procedures affect timeliness, and holds on imports for monitoring that may not have been held in the past.
3. Select specific individuals for the local AQIM coordinator roles at each work site. Refer to **Roles and Responsibilities** in this section beginning on **page 2-5**. Refer to **Appendix B** for additional roles. The primary roles are:
   - AQIM Coordinator
   - Assistant AQIM Coordinator, if needed

4. Prepare and document a standard operating procedure (SOP) that details selected sampling processes, joint inspection procedures (if applicable), steps to resolve issues and concerns, etc. Document these details in the SOP. Keep a copy of the SOP in this Handbook. Refer to **Appendix D** for samples or examples of standard operating procedures. Use **Appendix D** as a guide for format and suggested content. The standard components of an SOP are:
   - ❖ Purpose
   - ❖ Background
   - ❖ Guidelines (unit of inspection, sample size, operational norms)
   - ❖ Sampling procedures
   - ❖ Data collection and entry procedures
   - ❖ Personnel and resources
   - ❖ Quality control
5. Meet with the pest identifier for each work site. If not already "URGENT," establish details of a "PROMPT" pest identification process when pests are encountered from AQIM sampling.
6. Acquire the necessary equipment and supplies to support AQAS.
7. AQIM Handbook, (The AQIM Handbook can be accessed electronically on the Internet at the following URL:

   http://www.aphis.usda.gov/ppq/manuals/port/AQIM_Chapters.htm
8. Data entry forms for AQIM with instructions for specific pathways. See examples of data entry forms behind each pathway section of this Handbook.
   - ❖ Implementation package for the AQIM sampling process
9. Currently, the AQIM Handbook is only updated on the Internet, and paper editions may include old information. Always check the electronic version of the AQIM Handbook on the Internet for the most current information.

2

AQIM Handbook

Start-Up

Roles and Responsibilities

Introduction

Given that AQI monitoring is a key component to conducting statistically sound risk assessments, it is essential to form internal structures to ensure that monitoring activities continue. Port managers (i.e. supervisors, Port Directors) should become involved with results monitoring activities and should take an active role in the tasks, issues, and goals of AQIM. The following roles and responsibilities are suggested for collecting, recording, organizing, storing, and analyzing results monitoring data as part of the AQIM program. The numbers and roles may vary among work locations based on the size and activity of a work location.

AQIM Coordinator

The roles and responsiblities of the AQIM Coordinators are:

- Work with management and personnel at the work location to produce a standard operating procedure (SOP) for implementing AQIM at each work site.
- Help with training of employees.
- Work with management to communicate to all personnel at the work location the importance of AQIM and the sampling process.
- Implement and coordinate the established sampling process, and monitor the sampling for adherence to proper sampling techniques.
- Help resolve work site concerns and issues that directly or indirectly involve AQIM activities.
- Coordinate and facilitate with local managers, supervisor(s), employee representatives, any change or revision (major or minor) to the AQIM activities.
- Serve as the first contact point for answering basic questions about AQAS software and data entry. This responsibility requires that the AQIM coordinator be familiar with the basics of AQAS software such as, starting the program and knowing what data entry screens are needed, how data entry occurs, and basic data analysis procedures. At larger work locations, serves as the central collection point from multiple work sites.

- Arrange and coordinate data entry of AQIM records for all work sites, including collecting data, maintaining data, analyzing data, and preparing reports.
- Report survey results to work location personnel. This responsibility involves running analysis procedures on AQAS and facilitating meetings to discuss implications for AQI risk decision-making.
- Serve as the main contact point for PPQ, QPAS in Riverdale, Maryland, and for regional personnel involved with AQIM activities.

Assistant AQIM Coordinator

The Assistant AQIM Coordinator helps an AQIM Coordinator perform their responsibilities as needed. Large ports with multiple work sites may have more than one Assistant AQIM Coordinator.

Checklist

The following checklist provides a general guide for starting AQIM. All listed activities may not apply to all work locations. These activities have contributed to the successful implementation of AQIM at many sites.

TABLE 2-1: Checklist for Roles and Responsibilities

Start-Up Activities	Who Is Involved?	Date/ Time Line Determined By Work Location
Meet and develop a common understanding of AQIM.	◆ Port management initiates meetings ◆ Work with employee representatives and Port management. ◆ Use Regional or National AQIM Coordinators for assistance (see **Appendix B** for a list).	
Inform and include external customers and stakeholders.	◆ Port managers and officers ◆ Impacted brokers, government agencies, private industry	
Select an AQIM coordinator and assistant.	Port management	
Establish a risk management team to review local operations based on monitoring results.	◆ Port managers ◆ AQIM Coordinator ◆ Employee representatives	
Write standard operating procedures. (Refer to **Appendix D**)	◆ AQIM Coordinator and Pest Risk Management Team ◆ AQIM Coordinator and the AQIM National Team may assist	
Develop a training plan for the employees at work locations.	◆ Port management, AQIM Coordinator and Pest Risk Management Team	
Train employees to carry out AQI monitoring.	◆ Those individuals specified in a training plan. ◆ Regional Coordinators and AQIM National Coordinator may be involved.	
Set a date to begin monitoring and collecting data.	AQIM Coordinator and Pest Risk Management Team.	
Begin monitoring and collecting data	◆ Port Officers ◆ AQIM Coordinator	
Enter information into AQAS ◆ Enter data data worhksheets into AQAS ◆ Transfer Pest Identification numbers to AQAS, as necessary.	◆ Individual responsible for data entry ◆ Port Identifier and AQIM Coordinator	
Analyze data and prepare report.	AQIM Coordinator (or others)	Monthly
Communicate monitoring results to work location personnel. Facilitate discussion of what results mean and implications for work location decisions.	AQIM Coordinator and Port managers	Quarterly

TABLE 2-1: Checklist for Roles and Responsibilities (continued)

Start-Up Activities	Who Is Involved?	Date/ Time Line Determined By Work Location
Set port performance targets based on monitoring feedback.	◆ Port managers ◆ Port officers ◆ AQIM Coordinator ◆ Employee representatives	Annually

3 Air Passenger Baggage

AQIM Handbook

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Background

The arrival of international passengers by air has increased significantly in the past decade. The various agricultural items that air passengers can potentially carry is staggering. These items can pose a significant pest and exotic disease risk to agriculture in the United States.

The pathway "Air Passenger Baggage" encompasses all aspects of baggage movement into the United States by way of various aircraft (passenger, charter, corporate, private, etc.). AQIM activities randomly samples air passengers baggage to better determine this pathway's potential threat to agriculture.

Each designated work location will randomly sample air passenger baggage arriving at that location. The data collected from the random sampling will help to answer the following questions:

1. What is the threat of agricultural pests approaching the work location?
2. How effective is the AQI program at managing this threat?

The origin and destination of the passenger is important to determine risk levels. Just as important is whether the baggage carried by the passenger carries an agriculture pest.

While each work location will have differing rates of quantity of passengers, similar criteria for sampling will apply to all work locations. Through consistent random sampling a depiction of the pest threat of air passenger baggage movement will emerge. Combined data from all work locations will help determine the pest risk for baggage carried by the universe of air passengers.

Monitoring of air passenger baggage is an ongoing function and is an integral part of the AQI program. The ongoing sampling of air passenger baggage will allow work locations to adjust their passenger selection or targeting criteria for the present and the future. Monitoring helps measure how well the mission of pest and exotic disease exclusion is accomplished.

Procedures for All Air Passenger Pathways

A sampling protocol of 300 Customs Declarations (and all passengers associated with these declarations) per month is needed at most airports. Ensure that samples are taken from the ENTIRE passenger population; do not exclude any passenger or crew member. Predeparture locations do not have declarations and will develop and implement a sampling protocol that selects passengers and passenger family units.

Important

PPQ National and Regional AQIM coordinators have made special arrangements with several smaller to medium size airports to conduct a minimum sampling protocol of only 150 Customs Declarations per month (5 per day). These are reviewed annually and subject to change.

All other airports, assuming a 7 day work week, will follow the sampling protocol:

1. Properly select 10 samples per day per airport OR terminal. Some airports with multiple terminals will do either 5 or 10 samples per terminal. Contact Regional or National AQIM contact for specific sampling numbers per terminal.
2. Apply appropriate AQIM inspection procedures for each sample.
3. Record all needed data on appropriate AQIM data worksheet.
4. Report the data using AQAS.

Foreign Arrival Air Passenger Pathway

The following ports are participating in AQIM monitoring:

- Atlanta, GA
- Baltimore, MD
- Boston, MA
- Charlotte, NC
- Chicago, IL
- Cincinnati, OH
- Dallas, TX
- Denver, CO
- Dulles, VA
- Newark, NJ
- Erlanger, KY
- Ft. Lauderdale, FL
- Honolulu, HI
- Houston, TX
- Jamaica, NY
- Los Angeles, CA
- Miami, FL
- Minneapolis, MN
- Orlando, FL
- Philadelphia, PA
- Phoenix, AZ
- Romulus, MI
- San Antonio, TX
- San Fransisco, CA
- San Juan, PR
- Sanford, FL
- Seattle, WA
- Tampa, FL

US Foreign Arrival Air Passenger Baggage Worksheet

There is one worksheet and associated instructions for recording information gathered from the inspection of foreign arrival air passenger baggage for the purpose of AQIM. The form is available at:

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/air_passenger_baggage.pdf

Predeparture Air Passenger Pathway

The following predeparture ports are participating in AQI monitoring:

- Honolulu, HI
- Kona, HI
- Kahului, HI
- Lihue, HI
- San Juan, PR

Predeparture Air Passenger Worksheet for Hawaii

There is one worksheet and associated instructions for recording information gathered from the inspection of Predeparture air passenger baggage in Hawaii for the purpose of AQIM. The form is available at:

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/predepartureairhi.pdf

Predeparture Air Passenger Worksheet for Puerto Rico

There is one worksheet and associated for recording information gathered from the inspection of Predeparture air passenger baggage in Puerto Rico for the purpose of AQIM. The form is available at:

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/predepartureairpr.pdf

Preclearance Air Passenger Pathway

The following preclearance ports are participating in AQI monitoring:

- Aruba, Aruba
- Bermuda, Bermuda
- Freeport, Bahama
- Nassau, Bahama
- Montreal, Canada
- Toronto, Canada
- Vancouver, Canada

Preclearance Air Passenger Worksheet

There is one worksheet and associated instructions for recording information gathered from the inspection of Preclearance air passenger baggage for the purpose of AQIM. The form is available at:

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/preclearance_air_pass.pdf

AQIM Pathway Quality and Maintenance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed properly. To help with reviewing the status of monitoring activities, refer to "A Checklist of Monitoring Review Questions" on **page-E-2—Quality Assurance Questions**. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work stations. The questions review the following topics:

- Accurate and complete data
- Adequate sampling
- Local support
- Proportional sampling
- Random sampling
- Working risk committees

Agriculture Quarantine Activity Systems (AQAS)

The AQIM data collected must be entered into the AQAS database. This is web-based and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp.

A user name and password is required to enter data into the database. This can be obtained by contacting your immediate supervisor.

Questions to Guide Data Analysis

Use the following questions to guide your data analysis:

For preclearance, foreign arrival and predeparture (predeparture analysis begins with question #4):

1. How many declarations were selected for sampling during the survey period?
2. How many declarations sampled required an action (seizure or other action required as a condition of entry) during the survey period?
3. What is the action approach rate of the sampled declarations (number of declarations, with one or more items categorized as seized or clean/treatment, divided by the total number of declarations sampled)?
4. How many passengers were represented by all samples?
5. How many seizures (QMIs) came from the samples?
6. What is the QMI approach rate of passengers with prohibited agricultural material (total number of QMIs divided by total passengers sampled during the survey period)?
7. How many pest interceptions (actionable pests) were made from survey samples?
8. Pest Approach Rate: What is the rate of pest interceptions in relation to number of passengers (number of actionable pests divided by number of passengers in the sample)?
9. How many QMIs were plant material? Meat or animal products?
10. What is the rate of QMIs for plant material and meat/animal products?
11. Is there a greater risk from plant material or animal products at the work location?

12. Generate a list of all the origins of passengers transiting the work location. Produce a list of origins of passengers **with QMIs** transiting the work location?
13. Which countries of origin have a higher rate of QMIs than passengers? Have these countries always been recognized as high risk countries at the work location? (Example: 10 percent of all passengers surveyed were from Italy. Passengers from Italy were responsible for 20 percent of the QMIs seized. Passengers from Italy carried double the amount of QMIs expected as based on the volume of passengers from that country.)
14. Generate a list of the state destinations of passengers transiting the work location. What are the top five destinations of passengers? What are the top five destinations of passengers **with QMIs**?
15. Which States are considered high risk States?
16. What is the action approach rate for each month of the survey period?
17. Do these monthly rates correlate with traditional peak and off-peak travel times?
18. Are there easily identified trends when the rate of QMIs transiting the work location are higher?
19. Are there seasonal trends or do higher rates correlate with national or religious holidays, beginning or end of the school year, vacation periods, etc.?
20. Generate a listing and frequency of items seized. What are the top five most frequently seized items? Which QMI items present the greater risk?
21. Generate a list of flights.
22. Which flights were most likely carrying passengers with QMIs (top five flights)? Where were the most seized items found--hand carried bags or checked luggage? Did the passenger declare all prohibited items? Was the passenger traveling alone, as a couple, or family? What was the reason for travel--business, vacation, visit family, tour group, school? What is the passenger's citizenship and residency?
23. What targeting factors are currently used to identify passengers likely to carry prohibited agricultural items? How do these factors compare with survey results?
24. What additional targeting factors would be useful to identify passengers carrying prohibited items?
25. What percentage of resources are dedicated to staffing AQI activities for air passenger at the work location?

26. What is the relative risk of air passenger compared with other pathways in the work location?

27. Should resources be reallocated among all the pathways in the work location to better address the relative risk of the pathways?

28. Apply the AQIM results to the total passenger population to estimate the number of QMIs and interceptions likely to transit the work location during the survey period.

29. How many (total) passengers/crew arrived at the airport during the survey period? Using WADS data and using the QMI approach rate and rate of pest interceptions on QMIs, calculate estimates of the number of QMIs and actionable pests transiting the work location.

30. How does the estimated number of QMIs compare with the reported number of QMIs in WADS?

31. What percentage of all QMIs transiting the work location were seized as a result of regular AQI inspections?

32. How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests in WADS

4 Air Cargo

AQIM Handbook

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Background

The cargo population, or sampling universe, for AQI monitoring is now defined perishable agricultural cargo. Random samples can be taken from this population with more intensive (hypergeometric) inspections completed and necessary data recorded about these commodities.

In order to properly monitor cargo, you need to have a good understanding of two key statistical principles:

1. It is important that the sample selected be representative of the commodity. Random selection helps ensure this.
2. Once the sample is selected, it is necessary to inspect the sample thoroughly and according to hypergeometric sampling procedures if applicable.

If you want your port to produce quality risk information, then each person participating must have a clear understanding of the sampling universe, the unit of sampling, and inspection consistency issues.

The Sampling Universe

You estimate the number of actions due to pests or smuggling in a cargo entry pathway by taking random samples from the cargo in the pathway. It is key to good statistics to carefully define this universe from which you want to draw your random sample. The following questions need answers in order select the sample correctly and to make statistical inferences for the entire universe.

- How are commodities transported?
- How many shipments of these commodities are arriving at a work location?
- What is the seasonality of the commodity?

For cargo AQIM, the sampling universe is defined by a commodity grouping in each of the major cargo pathways such as airplane, ship, or truck. The following commodities or commodity types are **excluded** from the sampling universe:

- Commodities which are pre-cleared at foreign sites
- Commodities admissible under the National Agriculture Release Program (NARP)
- Commodities which undergo some type of mandatory treatment, other than cold treatment (for example, fumigation, irradiation, hot water treatment) at work locations
- Frozen commodities
- Oil, salt, iron ore, coal, etc., which have no pest risk
- Seed shipments

Cargo Strata and Stratifying the Sample

The sampling and inspection processes for AQIM were designed to be compatible with typical cargo inspection groupings. The cargo universe is divided into several homogeneous and distinctly separate groups. Each group contains commodities that will be sampled in order to estimate the action and pest approach rates in each group. A port may be sampling one or more of the commodities in a group or across groups. With air cargo, the sampling universe is perishable agricultural cargo. This perishable category is defined as any commercial shipment of fresh fruit or vegetables.

By sampling this category, PPQ is able to get precise estimates of the number of containers with pests approaching or other needed actions. This risk information helps the work location understand how effectively it manages the pest risk for this category, as well as for the entire cargo universe at the port.

It's very important that each commodity in the category selected be representative of all other units of that category. All shipments of a category should have a chance of being selected as a sample. One way to ensure that the sample is representative is to choose a shipment of the commodity at random (either random time, or random number, etc.). This random selection process eliminates the bias of the Agriculture Specialist who is selecting the sample. The Agriculture

Specialist's experience (bias) might lead to choosing a shipment that is more likely to be harboring a pest. This bias would make the sample not representative of the entire commodity universe. The survey results would be skewed and this kind of bias would hamper the port's ability to make the best decisions based on risk analysis.

Setting Up A Process

Setting up a process of selecting representative samples for each of the commodities will be one of the biggest challenges in AQIM. Because each port has its own unique set of circumstances in cargo operations, the port must individualize its random sampling process. It will be necessary to document the process and possibly ask for feedback from other air cargo ports, regional AQIM coordinators or Port Operations staff who have experience in selecting random samples in the cargo environment. The port may even decide that the Port Risk Management Team determine and review the random sampling process on a regular basis.

The Unit of Sampling

For air cargo, the sample unit is the air waybill. It is crucial that the sample unit is inspected closely enough to detect any actionable pests and any smuggling of prohibited agriculture commodities. Air cargo sampling and inspection procedures are detailed in **Table 4-2 on page 4-4-6**. Procedures for sampling multiple commodities within the selected air waybill are detailed in **Table 4-3 on page 4-4-7**.

The procedures must be followed exactly in order for the monitoring estimates to be valid and useful.

Consistency of Data Collection

It is crucial that the monitoring results from the inspection of a random sample unit are recorded accurately and consistently. Because each sample represents many other units, all Agriculture Specialist's must be as consistent as possible in following the inspection procedures.

Regulated commodities pose a special challenge. If the sample selected is a regulated commodity, it is important to understand the following:

Cargo monitoring estimates the number of air waybills approaching the work location with pest infestation levels requiring action by PPQ. AQIM uses risk-based inspection procedures for detecting a 10 percent or more pest infestation rate. This initial threshold is used to estimate the number of containers approaching a work location with a pest threat.

NOTICE

This 10 percent infestation level may change as the data for AQIM is collected and analyzed

To be 95 percent sure that the Agriculture Specialist inspecting the sampled container will find the pest, when the shipment is infested at a 10 percent infestation or more level, the Agriculture Specialist must select, at random, a specific number of boxes in the shipment. Determine this number of boxes by using the hypergeometric table illustrated in **Table 4-1: Hypergeometric Table For Random Sampling In Commodity Inspection.** Each of these boxes must be inspected at level of intensity to ensure that:

- No hitchhiker pests are present in the box,
- No internal feeding insects are present in randomly selected fruit in the box, and
- No mismanifested or smuggled items are present.

Total Number of Boxes on Air waybill	Number of Boxes to Select at Random From the Air Waybill and to Inspect to Detect Pests
1-10	10
11-12	11
13	12
14-15	13
16-17	14
18-19	15
20-22	16
23-25	17
26-28	18
29-32	19
33-38	20
39-44	21
45-53	22
54-65	23
66-82	24
83-108	25
109-157	26
158-271	27
272-885	28
886-200,000	29

TABLE 4-1: Hypergeometric Table For Random Sampling In Commodity Inspection

Agriculture Specialist's should follow normal inspection procedures of the commodities to determine pests. For example, Agriculture Specialist's should cut fruit to detect internal feeders if external evidence is present.

Air Cargo Procedures Summary

The following ports are participating in air cargo AQIM monitoring of perishable agriculture cargo[1]:

- Atlanta, GA
- Boston, MA
- Chicago, IL
- Dallas, TX
- Dulles, VA
- Honolulu, HI
- Houston, TX
- Jamaica, NY
- Los Angeles, CA
- Miami, FL
- Newark, NJ
- Romulus, MI
- San Francisco, CA
- San Juan, PR

The following port should **EXCLUDE** cut flowers:

- Miami, FL

1 Perishable is defined as fresh fruit, vegetables and cut flowers.

AIR CARGO AQIM PROCEDURES	
Commodity	(1) Random Sample of perishable (non-frozen) agricultural cargo commodities (2) Cutflowers, except in the port of Miami, FL
Cargo Population Definition	All air waybills carrying the above category destined to US. This does not include precleared and frozen commodities, commodities with mandatory treatments at port of entry, seed shipments and commodities admissible under the National Agriculture Release Program (NARP.) Note: Commodities with mandatory cold treatments are included.
Sample Size	Two (2) Air Way Bills (AWBs) per week per airport at ALL ports that can sustain this sampling. **Contact Regional AQIM Risk Mgmt Program Mgr. for assistance.**[1]
Sample Selection	Port discretion, random time, skip intervals, etc. May need to first determine the total number of shipments of a category received at a port in one year.
Inspection Methodology	Each selected shipment requires a physical inspection at port or consignee premise. Refer to **Table 4-3 on page 4-4-7** before beginning inspection process. Boxes for inspection must be taken from random locations throughout the container to detect a 10 percent level of infestation (at 95% confidence). The number of boxes shall be set using **Table 4-1 on page 4-4-4**. Entire contents of boxes selected and available floor space of the container shall be inspected for agricultural pests or mismanifested or smuggled items.
Other Issues	Inspections shall be conducted during the normal business hours at the port. Costs for OT clearance will be paid by the shipper/broker/consignee or government as per port management. Need to advise shippers, importers, and brokers that random sampling and inspection will be part of day-to-day operations. They should understand that there is a probability that their shipment will be intensely inspected.

TABLE 4-2: Air Cargo Procedures Summary

1 Regional AQIM Risk Mgmt. Mgrs: Western Region - Judy Pasek: 970-494-7580 Eastern Region - Mikell Tanner: 919-855-7317

If the randomly selected AQIM consignment is:	Then:	Which Creates:
All the same perishable commodity from one origin	◆ APPLY hypergeometric inspection sampling to whole shipment, AND; ◆ SELECT the appropriate number of units for inspection	One AQIM record for AQAS data input
Different perishable commodities from one or multiple origins (other than CUT FLOWERS)	◆ SELECT the single commodity with the most quantity (boxes, cartons, etc.) AND; ◆ SELECT the single commodity with the least quantity units (must be a minimum of 5 quantity units[1] ◆ APPLY hypergeometric inspection sampling separately to **each** of these selections and inspect as **separate AQIM samples**	Two different AQIM records (one for each of the commodities selected) for AQAS data input[2]
Different CUT FLOWER genera/varieties from one or multiple origins	Consider ONLY boxes of single variety cut flowers OR boxes of same flower composition bouquets: ◆ SELECT the cut flower genus/variety with the most quantity units (boxes, cartons, etc.) AND; ◆ SELECT the cut flower genus/variety with the least quantity units (must be a minimum of 5 quantity units[1] ◆ APPLY hypergeometric inspection sampling separately to **each** of these selections and inspect as **separate AQIM samples**	Two different AQIM records (one for each of the cut flower genera selected) for AQAS data input. Record cut flower variety name and origin of the cut flower (NOT origin of flight or vessel)[2]

TABLE 4-3: AQIM Sampling Procedures for Multiple Commodities in Cargo

1 If there are multiple commodities/cut flower varieties with five boxes each, then port discretion is used to select the 5 box commodity to be sampled and inspected.

2 The two separate inspections count as two AQIM inspections towards the weekly minimum cargo sampling requirements for that cargo pathway.

Pathway Monitoring Maintenance and Quality Assurance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and performed properly. To help with reviewing the status of monitoring activities, refer to "Quality Assurance Questions" on **page-E-E-1**. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Random sampling
- Proportional sampling
- Adequate sampling
- Accurate and complete data
- Working risk committees
- Local support

Air Cargo Worksheet

There is one worksheet for recording information gathered from your inspection of air cargo for the purpose of AQIM. Be sure to properly record the commodity being inspected.

Click on the link below to access the Air Cargo data worksheet.

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/air_cargo.pdf

Data Collection and Maintenance

The movement of international cargo by aircraft can pose a significant exotic pest and disease risk to agriculture in the United States. The pathway "Air Cargo" encompasses all aspects of cargo movement into the United States by the use of various types of aircraft (cargo freighter, passenger aircraft, etc.). AQIM is designed to randomly sample air cargo shipments to determine the potential threat to agriculture.

Each work location will randomly sample air cargo arriving at that work location. The data collected from the random sampling will help to answer the following questions:

1. What is the threat of agricultural pests approaching the work location?

2. How effective is the AQI program at managing this threat?

The origin and destination of air cargo shipments is important to determine risk. Just as important is if the air cargo shipment carries an actual agriculture pest. While each work location will have different rates of quantity and variety of cargo, the same criteria for sampling will apply to all work locations. Through consistent random sampling a depiction of the pest threat of each type of cargo will emerge. Combined data from all work locations will help determine the pest risk posed by various air cargo items.

AQIM of air cargo shipments is an ongoing function and is an integral part of the AQI program. The ongoing sampling of air cargo shipments will allow work locations to adjust their selection criteria and will ultimately help accomplish our mission.

Agriculture Quarantine Activity Systems (AQAS)

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

A user name and password is required to enter and access the data. These can be obtained by contacting your immediate supervisor.

Survey Results and How to Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching ports? What is the level of infestation of the pests in the cargo?
2. How effective is the AQI program at managing this threat?

Preliminary results for air cargo surveys provides a general answer for question 1. That is, there are varying rates at which prohibited agricultural materials or cargo units infested with an agricultural pest approach the ports. Surveys show that at some ports about 1.5 percent of the cargo units carried actionable pests in the past year, while other work locations show rates as high as 10 percent.

These percentages are an approximation of agricultural pest threat. Further analysis of the monitoring data is needed to determine the risk associated with air cargo approaching the work location. The

origin and destination of the cargo are important to determine risk levels. Also, whether or not the cargo carries an actual agricultural pest or smuggled item is crucial in analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the ports, PPQ personnel need to study what the data means and answer the first question for their specific location. At some ports, teams Risk Management Teams are formed to look at monitoring data and other data, which is normally collected at the location.

At other locations, analyses of monitoring data occur to establish rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location must conduct this type of analysis. AQIM provides a framework which work locations can use to carry out the analysis.

Questions to Guide Data Analysis

The following questions are a guide for managers and Risk Management Teams to formulate information around. With the answers, valid decisions can be made based on the potential risk of quarantined material and exotic pests and diseases entering a specific pathway. The value of using the monitoring data for decision making is better understood.

1. How many air way bills were selected for sampling during the survey period?

   How many actions were required on air waybills sampled?

   How many actions by strata category sampled were there?

   What is the action approach rate of air waybills that require action (number of air waybills requiring action divided by total air waybills in the sample)? What are the action approach rates by strata category?

2. How many pest interceptions (actionable pests) were made from survey samples?

Pest Approach Rate: What is the rate of pest interceptions in relation to the total sampled number of air waybills (number of air waybills with actionable pests divided by total air waybills in the sample)?

3. Compare the rate of actions required for each month of the survey.

DISCUSSION:

Are there easily identified trends when the rate of QMI's transiting the work location are higher?

Are there seasonal trends?

Do higher rates correlate with national or religious holidays, certain types of containers, cargo, or importers?

4. Generate a listing and frequency of shipments requiring action. Which commodities present the greater risk?

Which commodities are most likely to require action? Where were the agricultural pests found? Which commodities involved solid wood packing (SWP) actions? What is the rate of air waybills with smuggled or mismanifested items?

DISCUSSION:

How effective is the current inspection process in detecting pests and/or smuggled cargo?

5. What types of shipments (refrigerated, mixed vegetables, dry containers, empties, cut flowers, express carriers, etc.) require higher rates of action?

DISCUSSION:

What selectivity factors are currently used to identify shipments likely to require action?

What additional selectivity factors would be used to identify shipments likely to require action?

Do the survey results indicate additional factors that help identify shipments most likely to require action?

6. Using monitoring data, apply the survey results to the cargo universe at the work location to estimate the number of actions required and interceptions likely to transit the work location during the same time the survey period took place.

How many air waybills arrived at the port during the survey period? Using the action approach rate for air waybills requiring action, calculate an estimate of the number of air waybills transiting the work location that are likely to require action. What are the estimates per strata category?

Using WADS data, how does the estimated number of actions required compare with the reported number of actions taken?

How many additional actions may have been required during the survey period?

How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WADS?

DISCUSSION:

What percentage of resources are dedicated to staffing AQI activities for air cargo at the work location?

What is the relative risk of air cargo compared with other pathways in the work location?

Should resources be reallocated among all the pathways in the work location to better address the relative risk of the pathways?

5 Maritime Cargo

AQIM Handbook

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Background

The cargo population, or sampling universe, for AQI monitoring is now defined as specific categories. Random samples can be taken from these populations with more intensive (hypergeometric) inspections completed and necessary data recorded about these commodities

In order to properly monitor cargo, you need to have a good understanding of two key statistical principles:

1. It is important that the sample selected be representative of the category. Random selection helps ensure this.
2. Once the sample is selected, it is necessary to inspect the sample thoroughly and according to hypergeometric sampling procedures if applicable.

If you want your port to produce quality risk information, then each person participating must have a clear understanding of the sampling universe, the unit of sampling, and consistency issues.

The Sampling Universe

The number of actions due to pests or smuggling in a cargo entry pathway are estimated by taking random samples from the cargo in the pathway. It is key to good statistics to carefully define this

universe from which you want to draw your random sample. The following questions need answers in order to select the sample correctly and to make statistical inferences for the entire universe.

- How are commodities transported?
- How many shipments of these commodities are arriving at a work location?
- What is the seasonality of the commodity?

For AQIM, the universe is defined by the mode of transport of the cargo such as airplane, ship, or truck. Initially, PPQ has decided to limit the universe. The following commodities or commodity types are **excluded** from the sampling universe:

- Commodities which are pre-cleared at foreign sites
- Commodities which are admissible under the National Agriculture Release Program (NARP)
- Commodities which undergo some type of mandatory treatment, other than cold treatment (for example, fumigation, irradiation, hot water treatment) at work locations
- Frozen commodities
- Oil, salt, iron ore, coal, etc., which have no pest risk
- Seed shipments

Cargo Strata and Stratifying the Sample

The sampling and inspection processes for AQIM were designed to be compatible with typical cargo inspection groupings. The cargo universe is divided into several homogeneous and distinctly separate groups. Each group contains commodities that will be sampled in order to estimate the action and pest approach rates in each group. A port may be sampling one or more of the commodities in a group or across groups. The following cargo categories are to be monitored:

- Commercial Perishable Agricultural Cargo (defined as any commercial shipment of fresh fruit or vegetables or cutflowers)
- Wood Packing Material (WPM)
- Italian Tile Container Cargo

By selecting a set number from these categories, PPQ is able to get precise estimates of the number of containers with pests approaching or other needed actions. This risk information helps the work location understand how effectively it manages the pest risk for each commodity, as well as for the entire cargo universe at the port.

It's very important that each commodity in a category selected be representative of all other units of that commodity. All shipments of a category should have a chance of being selected as a sample. One way to ensure that the sample is representative is to choose a shipment of the commodity at random (either random time, or random number, etc.). This random selection process eliminates the bias of the Agriculture Specialist who is selecting the sample. The Agriculture Specialist's experience (bias) might lead to choosing a shipment that is more likely to be harboring a pest. This bias would make the sample not representative of the entire commodity universe. The survey results would be skewed and this kind of bias would hamper the port's ability to make the best decisions based on risk analysis.

Setting Up a Process

Setting up a process of selecting representative samples for each of the commodities will be one of the biggest challenges in AQIM. Because each port has its own unique set of circumstances in cargo operations, the port must individualize its random sampling process. It will be necessary to document the process and possibly ask for feedback from other maritime cargo ports, regional AQIM coordinators or Port Operations staff who have experience in selecting random samples in the cargo environment. The port may even decide that the Port Risk Management Team determine and review the random sampling process on a regular basis.

The Unit Of Sampling

For maritime cargo, the sample unit is the container or container equivalent of the commodity. A container equivalent is defined as the number of pallets of a commodity (20) that would fill a 40 foot container. It is crucial that the sample unit is inspected closely enough to detect any actionable pests and any smuggling of prohibited agriculture commodities. Maritime cargo sampling and inspection procedures are detailed in **Table 5-2 on page 5-5-8**. Procedures for sampling multiple commodities within the seleced container are detailed in **Table 5-3 on page 5-5-9**.

The procedures must be followed exactly in order for the monitoring estimates to be valid and useful.

Consistency of Data Collection

It is crucial that the monitoring results from the inspection of a random sample unit are recorded accurately and consistently. Because each sample represents many other units, all Agriculture Specialist's must be as consistent as possible in following the inspection procedures.

Regulated commodities pose a special challenge. If the sample selected is a regulated commodity, it is important to understand the following:

Cargo monitoring estimates the number of containers approaching the work location with commodity pest infestation levels requiring action by PPQ. AQIM uses risk-based inspection procedures for detecting a 10 percent or more pest infestation rate. This initial threshold is used to estimate the number of containers approaching a work location with a pest threat.

NOTICE

This 10 percent infestation level may change as the data for AQIM is collected and analyzed

To be 95 percent sure that the Agriculture Specialist inspecting the sampled container will find the pest, when the shipment is infested at a 10 percent infestation or more level, the Agriculture Specialist must select, at random, a specific number of boxes in the shipment. Determine this number of boxes by using the hypergeometric table illustrated in **Table 5-1.** Each of these boxes must be inspected at level of intensity to ensure that:

- No hitchhiker pests are present in the box
- No internal feeding insects are present in randomly selected fruit in the box
- No mismanifested or smuggled items are present

Total Number of Boxes Inside Sample Container	Number of Boxes to Select at Random From the Container and to Inspect to Detect Pests
1-10	10
11-12	11
13	12
14-15	13
16-17	14
18-19	15
20-22	16
23-25	17
26-28	18
29-32	19
33-38	20
39-44	21
45-53	22
54-65	23
66-82	24
83-108	25
109-157	26
158-271	27
272-885	28
886-200,000	29

TABLE 5-1: Hypergeometric Table For Random Sampling In Commodity Inspection

Agriculture Specialists should follow normal inspection procedures of the commodities to determine if pests are present. For example, Agriculture Specialists should cut fruit to detect internal feeders if external evidence is present.

Maritime Cargo Procedures Summary

The following ports are participating in Maritime Cargo AQIM data collection:

Commercial Perishable Agricultural Cargo

- Brooklyn, NY
- Port Everglades, FL
- Houston, TX
- Long Beach, CA
- Miami, FL
- Newark, NJ
- Philadelphia, PA
- Wilmington, DE

Wood Packing Material (WPM)

- Baltimore, MD
- Boston, MA
- Brooklyn, NY
- Charleston, SC
- Gulfport, MS
- Honolulu, HI
- Long Beach, CA
- Miami, FL
- Newark, NJ
- New Orleans, LA
- Norfolk, VA
- Oakland, CA
- Philadelphia, PA
- Port Everglades, FL (effective May 01, 2009)
- San Juan, PR
- Savannah, GA
- Seattle, WA
- Tacoma, WA
- West Palm Beach, FL

Italian Tile Container Cargo

- Baltimore, MD
- Charleston, SC
- Houston, TX
- Miami, FL
- Newark, NJ
- Norfolk, VA
- Savannah, GA

MARITIME CARGO AQIM PROCEDURES	
Commodity	Random sample of one or more of the following categories (non-frozen cargo & excluding pre-cleared cargo): ◆ **Commercial Perishable Agricultural Cargo** ◆ **Wood Packing Material (WPM)** ◆ **Italian Tile Container Cargo**
Cargo Population Definition	All containers (or container equivalents) carrying the above commodities destined to US. This does not include precleared and frozen commodities, seed shipments, commodities with mandatory treatments at port of entry and commodities admissible under the National Agriculture Release Program (NARP.) Note: Commodities with mandatory cold treatments are included.
Sample Size	For **Commercial Perishable Agricultural Cargo,** select two (2) containers (or container equivalent) per week per port. For **WPM,** select two (2) containers per week per port. For **Italian Tile Container Cargo,** select two (2) containers per week per port required (and as tile seasonality allows.) **Contact Regional AQIM Representatives for assistance**[1]
Sample Selection	Port discretion, random time, skip intervals, etc. May need to first determine the total number of shipments of a commodity received at a port in one year. If commodity is seasonal, then sampling should be planned to occur during the full import season of commodity, if reasonable for the number of samples needed.
Inspection Methodology	Each selected shipment requires a physical inspection at port or consignee premise. Boxes for inspection must be taken from random locations throughout the container to detect a 10 percent level of infestation (at 95% confidence). The number of boxes shall be set using **Table 5-1**. Entire contents of boxes selected and available floor space of the container shall be inspected for agricultural pests or mismanifested or smuggled items. For **Commercial Perishable Agricultural Cargo**: 1. Refer to **Table 5-3 on page 5-5-9** before beginning the inspection process. 2. Inspect cargo using appropriate AQIM hypergeometric inspection procedures for each sample. 3. Record all needed data on appropriate AQIM data worksheet and report data using AQAS. For **WPM** and **Italian Tile Container Cargo**: 1. Inspection of cargo and WPM is to assure observation of as much WPM as cargo will allow. Partial or full de-vanning may be necessary based on situation and judgement of inspector. 2. Record all needed data on appropriate AQIM data worksheet and report data using AQAS.
Other Issues	Inspections shall be conducted during the normal business hours at the port. Costs for OT clearance will be paid by the shipper/broker/consignee. Need to advise shippers, importers, and brokers that random sampling and inspection will be part of day-to-day operations. They should understand that there is a probability that their shipment will be intensely inspected.

TABLE 5-2: Maritime Cargo Procedures Summary

1 Eastern Region: Mikell Tanner: 919-855-7317 or mikell.tanner@aphis.usda.gov; Western Region: Judy Pasek: 970-494-7580 or judith.e.pasek@aphis.usda.gov

If the randomly selected AQIM consignment is:	Then:	Which Creates:
All the same perishable commodity from one origin	◆ APPLY hypergeometric inspection sampling to whole shipment, AND; ◆ SELECT the appropriate number of units for inspection	One AQIM record for AQAS data input
Different perishable commodities from one or multiple origins (other than CUT FLOWERS)	◆ SELECT the single commodity with the most quantity (boxes, cartons, etc.) AND; ◆ SELECT the single commodity with the least quantity units (must be a minimum of 5 quantity units[1] ◆ APPLY hypergeometric inspection sampling separately to **each** of these selections and inspect as **separate AQIM samples**	Two different AQIM records (one for each of the commodities selected) for AQAS data input[2]
Different CUT FLOWER genera/ varieties from one or multiple origins	Consider ONLY boxes of single variety cut flowers OR boxes of same flower composition bouquets: ◆ SELECT the cut flower genus/ variety with the most quantity units (boxes, cartons, etc.) AND; ◆ SELECT the cut flower genus/ variety with the least quantity units (must be a minimum of 5 quantity units[1] ◆ APPLY hypergeometric inspection sampling separately to **each** of these selections and inspect as **separate AQIM samples**	Two different AQIM records (one for each of the cut flower genera selected) for AQAS data input. Record cut flower variety name and origin of the cut flower (NOT origin of flight or vessel)[2]

TABLE 5-3: AQIM Sampling Procedures for Multiple Commodities in Cargo

1 If there are multiple commodities/cut flower varieties with five boxes each, then port discretion is used to select the 5 box commodity to be sampled and inspected.

2 The two separate inspections count as two AQIM inspections towards the weekly minimum cargo sampling requirements for that cargo pathway.

Pathway Monitoring Maintenance and Quality Assurance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and performed properly. To help with reviewing the status of monitoring activities, refer to "Quality Assurance Questions" on **page-E-E-1**. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Accurate and complete data
- Adequate sampling
- Local support
- Proportional sampling
- Random sampling
- Working risk committees

Maritime Cargo Worksheet

There is one worksheet for recording information gathered from your inspection of Maritime cargo for the purpose of AQIM. Be sure to record the commodity being inspected properly.

Click on the link below to access the Maritime Cargo data worksheet.

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/maritime_cargo.pdf

Data Collection and Maintenance

Traditionally, PPQ based port work on how much cargo was inspected and on the number of pest interceptions found on cargo. Ports inspected cargo, found pests, and tallied them to justify good job performance. AQIM emphasizes work efforts based on the potential threat posed by foreign pests and quarantine material.

By sampling a set number of samples from each cargo stratum, PPQ is able to get precise estimates of the number of cargo containers with pests approaching. It is then easier to make comparisons which help the port understand how effectively it manages the pest risk in each cargo grouping, and therefore, for the cargo universe.

Every port needs to be involved in AQIM. Each port has a group of managers, supervisors, and Agriculture Specialists who manage results monitoring and the subsequent risk management functions at the port. All CBP personnel are involved and supportive of the process.

The expected results are that PPQ will have results monitoring systems in place that will meet the needs of management and the requirements of the GPRA.

Agriculture Quarantine Activity Systems (AQAS)

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

A user name and password is required to enter and access the data. These can be obtained by contacting your immediate supervisor.

Survey Results and How To Use Them

AQIM Activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching ports? What is the level of infestation of the pests in the cargo?
2. How effective is the AQI program at managing this threat?

Preliminary results for maritime cargo surveys provide a general answer for question 1. That is, there are varying rates at which prohibited agricultural materials or cargo units infested with an agricultural pest approach the ports. Surveys show that at some ports about 1.5 percent of the container units carried actionable pests in the past year, while other work locations show rates as high as 20 percent.

These percentages are an approximation of agricultural pest threat. Further analysis of the monitoring data is needed to determine the risk associated with maritime cargo approaching the work station. The origin and destination of the cargo are important to determine risk levels. Also, whether or not the cargo carries an actual agricultural pest or smuggled item is crucial in analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the ports, PPQ personnel need to study what the data means and answer the first question for their specific location. Analysis tools are

available to help with these analyses, which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some ports, Risk Management Teams are formed to look at monitoring data and other data, which are normally collected at the location.

At other locations, analyses of monitoring data occur to establish rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location must conduct this type of analysis. AQIM provides a framework which work locations can use to carry out the analysis.

Questions to Guide Data Analysis

1. How many containers were selected for sampling during the survey period?

   How many actions were required on containers sampled?

   How many actions by strata category sampled were there?

   What is the action approach rate of containers that require action (number of containers requiring action divided by total containers in the sample)? What are the action approach rates by strata category?

2. How many pest interceptions (actionable pests) were made from survey samples?

   Pest approach rate: What is the rate of pest interceptions in relation to the total sampled number of containers (number of containers with actionable pests divided by number of containers total in the sample)?

3. Compare the rate of actions required for each month of the survey.

   DISCUSSION:

   Are these easily identified trends when the rate of QMIs transiting the port are higher?

   Are there seasonal trends?

Do higher rates correlate with national or religious holidays, certain types of containers, cargo, or importers?

4. Generate a listing and frequency of shipments requiring action. Which commodities present the greater risk?

   Which commodities most likely require action? Where were the agricultural pests found? Which commodities involved solid wood packing (SWP) actions? What is the rate of containers with smuggled or mismanifested items?

   DISCUSSION:

   How effective is the current tailgate inspection process in detecting pests and/or smuggled cargo?

5. What types of shipments (refrigerated, mixed vegetables, dry containers, empties, cut flowers, express carriers, etc.) require higher rates of action?

   DISCUSSION:

   What selectivity factors are currently used to identify shipments likely to require action?

   What additional selectivity factors would be used to identify shipments likely to require action?

   Do the survey results indicate additional factors that help identify shipments most likely to require action?

6. Using monitoring data, apply the survey results to the cargo universe at the port to estimate the number of actions required and interceptions likely to transit the port during the same time the survey period took place.

   How many containers arrived at the port during the survey period? Using the action approach rate for containers requiring action, calculate an estimate of the number of containers transiting the port that are likely to require action. What are the estimates per strata category?

   Using WADS data, how does the estimated number of actions required compare with the reported number of actions taken?

   How many additional actions may have been required during the survey period?

   How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WADS?

DISCUSSION:

What percentage of resources are dedicated to staffing AQI activities for maritime cargo at this port?

What is the relative risk of maritime cargo compared with other pathways in the port?

Should resources be reallocated among all the pathways in the port to better address the relative risk of the pathways?

6 Mail Facility

AQIM Handbook

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Background

During the past decade, the arrival of air and surface foreign mail has increased significantly. The various agricultural items that foreign mail can potentially carry is staggering. These agricultural items can pose significant exotic pest and disease risks to U.S. agriculture. Therefore, PPQ is using AQIM to randomly sample foreign mail enabling it to determine the potential threat of foreign mail. For monitoring purposes, this pathway does not include packages moving via express carrier services such as DHL and Federal Express.

Each work location that services a mail facility will randomly sample air and surface foreign mail arriving at that location. The data collected from the random sampling will help to answer the following questions:

1. What is the threat of agricultural pests approaching the work location via this pathway?
2. How effective is the AQI program at managing this threat?

In order to determine risk levels, the origin and destination of foreign mail is important, as well as, whether agriculture items in foreign mail carry any pest or disease.

While each mail facility has a differing amount of foreign mail, the same criteria for sampling foreign mail applies to all mail facilities. By consistently taking random samples of foreign mail, PPQ will be able to depict any emerging pest threat by this pathway. The combined data from all work locations that service mail facilities will help PPQ determine the pest risk of agricultural items carried in the universe of foreign mail.

Monitoring foreign mail is an ongoing PPQ function and is an integral part of the AQI program. The ongoing sampling of foreign mail will allow work locations to adjust their selection criteria for the present and the future. Also, monitoring helps PPQ measure how well its workforce is accomplishing the mission to exclude exotic pests and diseases.

Pathway Monitoring Maintenance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and being performed properly. To help with reviewing the status of monitoring activities, refer to "Quality Assurance Questions" on **page E-1**.

This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Random sampling
- Proportional sampling
- Adequate sampling
- Accurate and complete data
- Working risk committees
- Local support

Mail Facility Worksheet

There is one data worksheet to record the information gathered for AQIM purposes from inspecting foreign mail.

Click on the link below to access the Mail Facility data worksheet.

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/mail_facility.pdf

Agriculture Quarantine Activity Systems (AQAS)

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

A user name and password is required to enter and access the data. These can be obtained by contacting your immediate supervisor.

Survey Results and How To Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching work locations?
2. How effective is the AQI program at managing this threat?

Preliminary results for foreign mail surveys provide a general answer for Question 1. That is, there are varying rates at which prohibited agricultural materials approach work locations. These prohibited agricultural materials are what could have agricultural pests. Surveys show that at some work locations about 2 percent of the foreign mail had prohibited items. At other work locations, surveys show that the rate of prohibited items in foreign mail occurred near 6 percent.

These percentages are a rough approximation of agricultural pest threat. Further analysis of the monitoring data is needed to determine the risk associated with the prohibited items approaching the work location. The origin and destination of the prohibited items are important to determine risk levels. Also, whether or not the prohibited item carries an actual agricultural pest is analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the work locations, PPQ personnel need to study what the data means and answer the first question for their specific location. Analysis tools are available to help with these analyses, which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some work locations, Risk Management Teams are formed to look at monitoring data and other data, which are normally collected at the location.

At other locations, analyses of monitoring data occur to establish rates at which quarantine items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location must conduct this type of analysis. AQIM provides a framework which work locations can use to carry out the analysis.

Questions to Guide Data Analysis

1. How many foreign mail packages were selected for sampling during the survey period?

   How many mail packages sampled required an action (seizure or other action required as a condition of entry) during the survey period?

   What is the action approach rate of mail packages requiring action (number of mail packages, with one or more items categorized as seized or clean/treatment, divided by the total number of mail packages sampled)?

   How many seizures (QMIs) came from the samples?

   What is the QMI approach rate of mail packages with prohibited agricultural material (total number of QMIs divided by total mail packages sampled during the survey period)?

2. How many pest interceptions (actionable pests) were made from survey samples?

   Pest Approach Rate: What is the rate of pest interceptions in relation to number of mail packages (number of actionable pests divided by number of mail packages in the sample)?

3. How many QMIs were plant material? Meat or animal products?

   What is the rate of QMIs for plant material and meat/animal products?

   DISCUSSION:

   Is there a greater risk from plant material or animal products at the work location?

4. Generate a list of all the origins of mail packages transiting the work location. Produce a list of origins of mail packages **with QMIs** transiting the work location?

5. Generate a list of the destinations of mail packages transiting the work location. What are the top five destinations of mail packages? What are the top five destinations of mail packages **with QMIs**?

   DISCUSSION:

   Which States are considered high risk States?

6. What is the action approach rate for each month of the survey period?

   DISCUSSION:

   Do these monthly rates correlate with traditional peak and off-peak mailing periods?

   Are there easily identified trends when the rate of QMIs transiting the work location are higher?

   Are there seasonal trends or do higher rates correlate with national or religious holidays, beginning or end of the school year, vacation periods, etc.?

7. Generate a listing and frequency of items seized. What are the top five most frequently seized items? Which QMI items present the greater risk?

8. Apply the survey results to the total mail package population to **estimate** the number of QMIs and interceptions likely to transit the work location during the survey period.

   How many (total) mail packages arrived at the mail facility during the survey period? Using WADS data and using the QMI approach rate and rate of pest interceptions on QMIs, calculate estimates of the number of QMIs and actionable pests transiting the work location.

   DISCUSSION:

   How does the estimated number of QMIs compare with the reported number of QMIs on WADS?

   What percentage of all QMIs transiting the work location were seized as a result of the AQI program?

   How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WADS?

   What percentage of all actionable pests transiting the work location were intercepted as a result of the AQI program?

7 Northern Border Vehicles

AQIM Handbook

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Standard Operating Procedures

Each Field Office will be responsible for their respective random sampling schedules at their work locations. Each work location should develop standard operating procedures (SOP) and provide copies to the PPQ Regional Representative[1] in order to:

- Ensure random selection prevails over selective criteria
- Provide specific inspection criteria
- Stress the degree of inspection for pests

AQIM sampling for vehicles on the northern border is based on the current number of CBP Agriculture Specialists assigned to the port. Refer to **Table 7-1** for the correct AQIM sample numbers per port per month.

Port	Number of Samples per Month
Alex Bay, NY	150
Blaine, WA	300
Buffalo, NY	300
Calais, ME	150
Derby Line, VT	150
Detroit, MI	300
Dunseith, ND	150
Eastport, ID	150
Grand Portage, MN	150
Highgate Springs, VT	150
Houlton, ME	150
International Falls, MN	150
Jackman, ME	150
Lyden, WA	100
Oroville, WA	150
Pembina, ND	150
Portal, ND	150
Port Huron, MI	300
Raymond, MT	150
Rooseville, MT	150
Rouses Pt./Champlain, NY	150
Sumas, WA	150
Sweetgrass, MT	150
Van Buren, ME	150

TABLE 7-1 AQIM Norther Border Vehicle Sample Numbers

1 Eastern Region AQIM Representative: Mikell Tanner: 919-855-7317; Western Region AQIM Representative: Judy Pasek: 970-494-7580

If COMPEX samples are not available, then apply an alternate sampling procedure that selects a minimum of 10 vehicles per day per staffed border crossing.

For each AQIM sample:

- Use the 7-point inspection procedures on all vehicles and 100% inspection procedures on all passenger baggage and personal effects.
- Record all needed data on the appropriate AQIM data worksheet.
- Report data using AQAS.

Passenger Vehicle Universe

Passenger vehicle includes automobiles, vans, recreational vehicles, cab area of all types of non-commercial trucks, and other similar passenger type vehicles.

Inspection Criteria for the 7-Point Inspection

The following areas of all randomly selected vehicles should be inspected:

1. Under hood
2. Glove compartment
3. Trunk area including side panel compartment
4. Under spare tire compartment
5. Under seats
6. All luggage and handbags
7. Other interior side panel compartments

Pest Interception Procedures

Pest interception information resulting from random sample surveys is an important factor with regard to risk management. All quarantine material found needs to undergo 100 percent inspection for pests. All pest types and quantities found on quarantine material must be recorded on pest interception form(s).

Pest interceptions from seized items should be sent to port or area identifiers. Mark the interception **"PROMPT: NORTHERN BORDER MONITORING."**

Safety

Safe working conditions must be maintained at all times. When a condition develops that challenges the safety of the Agriculture Specialist, the inspection should be terminated until the hazardous condition is corrected. The exercise of good judgement will dictate when these situations need to be addressed and how acceptable alternatives can be employed.

Pathway Monitoring Maintenance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and being performed properly. To help with reviewing the status of monitoring activities, refer to "Quality Assurance Questions" on **page E-1**. This appendix contains a checklist of question port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Random sampling
- Proportional sampling
- Adequate sampling
- Accurate and complete data
- Working risk committees
- Local support

Northern Border– Vehicle Worksheet

There is one worksheet for recording information gathered from the inspection of vehicles at Northern border crossings for the purpose of AQIM.

Click on the link below to access the Norther Border vehicle data worksheet.

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/northern_border_vehicle.pdf

Agriculture Quarantine Activity System (AQAS)

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

A user name and password is required to enter and access the data. These can be obtained by contacting your immediate supervisor.

Survey Results And How To Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agriculture pests approaching work locations?
2. How effective are the AQI operations managing this threat?

Preliminary results for Northern border vehicle surveys provide a general answer for Question 1. That is, there are varying rates at which prohibited agricultural materials approach the Northern border crossings. These prohibited agricultural materials are what could have agricultural pests.

Further analysis of the monitoring data is needed to determine the risk associated with the specific agricultural items approaching the work location. The origin and destination of the agricultural items are important to determine risk levels. Also, whether or not the agricultural items carry an actual agricultural pest is crucial to analyzing risk.

Analysis of the monitoring data needs to occur to answer the first question for specific work locations. Analysis tools are available to help with these analyses, which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some work locations, Risk Management Teams are formed to look at monitoring data and other data which is normally collected. Those locations that contribute to a group sample may want to form an interstate risk management group.

At all other locations, analyses of monitoring data occur to understand the rates at which prohibited items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, port managers can use the monitoring data as a baseline to answer the second basic question: How effective are the AQI operations at managing the risk of introduction of agricultural pests and diseases? Again, each work location must conduct this type of analysis. AQIM provides a framework which work locations can use to carry out the analysis.

Questions to Guide Data Analysis

1. How many vehicles were selected for the sampling during the survey period?

   How many vehicles sampled required an action (seizure or other action required as a condition of entry) during the survey period?

   What is the action approach rate of vehicles requiring action (number of vehicles with one or more items categorized as seized or clean/treatment divided by the total number of vehicles sampled)?

   What is the total number of QMIs seized during the survey period?

   How many seizures (QMIs) came from the samples during the survey period?

   What is the QMI approach rate of vehicles with prohibited agricultural material (total number of QMIs divided by total vehicles sampled during the survey period)?

2. How many pest interceptions (actionable pests) were made from survey samples?

   Pest approach rate: What is the rate of pest interceptions in relation to number of vehicles (number of actionable pests divided by number of vehicles in the sample)?

3. How many QMIs were plant material? Meat or animal products?

   What is the rate of QMIs for plant material and meat or animal products?

   Is there a greater risk from plant material or animal products at the work location?

4. How many vehicles were sampled at each crossing? What is the rate of QMI seizures at each crossing? Which crossings have a higher rate of QMIs than vehicles?

DISCUSSION:

Are these crossings staffed accordingly? (Example: 30 percent of all vehicles surveyed crossed at Bridge A, 20 percent crossed at Bridge B, and 50 percent crossed at Bridge C. Fifteen (15) percent of the QMIs seized in the work location were seized at Bridge A, 35 percent were seized at Bridge B, and 50 percent were seized at Bridge C.) Vehicles crossing Bridge B could represent the greater risk at the work location and staffing should be reviewed based on this risk.

5. What are the destinations of vehicles transiting the work location? Is local traffic (less than 25 miles from the work location) considered a high risk? What are the number of QMIs traveling to local locations versus distant locations?

DISCUSSION:

Which states are considered high risk States? How can you best select vehicles destined to these high risk States to protect U.S. agriculture?

6. Compare the **action** approach rate for each month of the survey period.

DISCUSSION:

Are there easily identified monthly trends when the rate of QMIs transiting the work location are higher?

Are there seasonal trends or do higher rates correlate with national or religious holidays, beginning or end of the school year, vacation periods, etc.?

Do these rates correlate with traditional peak and off-peak travel times?

7. Generate a listing and frequency of items seized. What are the top five items most frequently seized? Which QMIs present the greatest risk?

8. Which vehicles (and at which crossing) were carrying prohibited items? Where were the items found, hand carried bags, passenger compartment, glove box, truck, luggage? Did the passenger declare all prohibited items? Was the passenger traveling alone, as a couple, or family? What was the reason for travel business, vacation, visit family, tour group, school? What type of vehicle was used to transport prohibited items?

DISCUSSION:

How do current selective targeting factors compare with survey results?

What selectivity factors could be changed or added to identify vehicles carrying prohibited items?

What percentage of resources are dedicated to staffing AQI activities for northern border vehicles at the work location?

What is the relative risk of northern border vehicles compared with other pathways in the work location?

Should resources be reallocated among all the pathways in the work location to better address the relative risk of the pathways?

9. Apply the monitoring results to the total approaching population to estimate the number of QMIs and pest interceptions likely to transit the port during the survey period by answering:

How many total vehicles entered the port during the survey period? Using the rate of QMIs and pest interceptions from AQIM, calculate estimates of the number of QMIs and actionable pests transiting the port.

DISCUSSION:

What percentage of all QMIs transiting the port were seized as a result of the AQI program, use WADS data?

How does the estimated number of QMIs compare with the reported number of QMIs on WADS?

How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WADS?

What percentage of all actionable pests transiting the port were intercepted as a result of the AQI program?

8 Northern Border Truck Cargo

AQIM Handbook

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Background

In order to properly monitor cargo, you need to have a good understanding of two key statistical principles:

1. It is important that the sample selected be representative of the universe. Random selection helps ensure this.
2. Once the sample is selected, it is necessary to inspect the sample thoroughly.

If you want your work location to produce quality risk information, then each person participating must have a clear understanding of the sampling universe, cargo strata and stratifying the sample, the unit of sampling, and consistency issues.

The Sampling Universe

You estimate the number and kinds of pests or improperly manifested items in a cargo entry pathway by taking a random sample from the universe of all cargo in the pathway. It is key to good statistics to carefully define this universe from which you want to draw your random sample. The following questions need answers in order to be able to select the sample correctly and make statistical inferences for the entire universe.

- How are commodities transported?
- How many commodities are arriving at a work location?

- What kinds of commodities are arriving?
- Are certain types of commodities of more interest to PPQ than others?

For AQIM, the universe is defined by the mode of transport of the cargo such as truck. Initially, PPQ has decided to limit the universe. The following commodities or commodity types will be **excluded** from the sampling universe:

- Commodities which are pre-cleared at foreign sites
- Commodities which are admissible under the National Agriculture Release Program (NARP)
- Commodities which undergo some type of mandatory treatment, other than cold treatment (for example, fumigation, irradiation, hot water treatment) at work locations
- Frozen commodities
- Oil, salt, iron ore, coal, etc., which have no pest risk
- Seed shipments

Cargo Strata and Stratifying the Sample

The survey processes for AQIM were designed to be compatible with typical cargo inspection groupings. The surveys divide the cargo universe into several homogeneous and distinctly separate groups, in order to estimate the pest approach rates in each group.

By sampling a set number of samples from each cargo group, PPQ is able to get precise estimates of cargo containers with pests. It is then easier to make comparisons, which help the work location understand how effectively it manages the pest risk for cargo strata, as well as for the cargo universe

It is very important that each sample selected be representative of all other units in the stratum being sampled. One way to ensure that the sample is representative is to choose a truck at random (either random time, or random number). This random selection process eliminates the bias of the Agriculture Specialist selecting the sample. The Agriculture Specialist's experience (bias) might lead to choosing a truck that is carrying a commodity that is more likely to be harboring a pest. This bias would make the sample not represent the entire stratum of trucks. The monitoring results would be skewed toward those commodities likely to harbor a pest. This kind of bias would hamper the work location's ability to make the best decisions based on risk analysis.

Setting Up a Process

Setting up a process of selecting representative samples in each group will be one of the biggest challenges in AQIM. Because each work location has its own unique set of circumstances in cargo operations, the work location must individualize its random sampling process. It will be necessary to document the process and ask for feedback from other work locations and headquarters staff who have experience in selecting random samples in the cargo environment. Work locations may even decide that this particular part of the monitoring is important enough to form a Northern Border Risk Management Team to review the random sampling process on a regular basis.

The Unit of Sampling

For Northern border truck cargo, the sample unit is a truck box, not including the cab. It is crucial that the sample unit is inspected closely enough to detect any actionable pests or improperly manifested items. Northern border truck cargo sampling and inspection procedures are detailed in **Table 8-2 on page-8-8-6**. Procedures for sampling multiple commodities on the selected truck are detailed in **Table 8-3 on page-8-8-7**.

The procedures must be followed exactly in order for the monitoring estimates to be valid, and useful.

Consistency of Data Collection

It is crucial that the monitoring results from the inspection of a random sample unit are recorded accurately and consistently. Because each sample represents many other units, all Agriculture Specialists must be as consistent as possible in following the inspection procedures.

The group containing regulated commodities pose a special challenge. If the sample selected is a regulated commodity, it is important to understand the following:

Cargo monitoring estimates the number of trucks approaching the work location with pest infestation levels requiring action by PPQ. AQIM uses risk-based inspection procedures for detecting 10 percent pest infestation rate. This initial threshold is used to estimate the number of trucks approaching a work location and to mitigate a pest threat.

NOTICE

This 10 percent infestation level may change as the data for AQIM is collected and analyzed.

To be 95 percent sure that the Agriculture Specialist inspecting the sample truck will find the pest, when the shipment is infested at a 10 percent infestation level, the Agriculture Specialist must select, at random, a specific number of boxes in the shipment. Determine this number of boxes by using the hypergeometric table illustrated in **Table 8-1**. Each of these boxes must be inspected at a level of intensity to ensure that:

- No hitchhiker pests are present in the box,
- No internal feeding insects are present in randomly selected fruit in the box, and
- No mismanifested or smuggled items are present.

Total number of boxes on the truck:	Randomly Select This Number of Boxes to Inspect:
1-10	10
11-12	11
13	12
14-15	13
16-17	14
18-19	15
20-22	16
23-25	17
26-28	18
29-32	19
33-38	20
39-44	21
45-53	22
54-65	23
66-82	24
83-108	25
109-157	26
158-271	27
272-885	28
886-200,000	29

TABLE 8-1: Hypergeometric Table For Random Sampling

Agriculture Specialists should follow normal inspection procedures of fruits or vegetables to make these determinations. For example, fruit should be cut to detect for internal feeders if external evidence is present.

AQIM provides information about the relative risk of various entry pathways. To do this, the AQIM activities will follow a qualitative risk assessment model. The survey analysts will "plug into the model" the estimated number of specific actionable pests identified in the samples. Therefore, when a regulated sample shipment is being inspected for AQIM, the Agriculture Specialist needs to inspect every box required by the hypergeometric table. The number of pest specimens that are actually observed should be recorded on PPQ Form 309, Pest Interception Record.

For the relative pathway risk model to be useful, monitoring at all work locations must report the number of pest specimens accurately and consistently. It is necessary to follow the inspection guidelines, sampling processes, User Guides, and sampling protocols.

Northern Border–Truck Cargo Procedures Summary

For this fiscal year, Northern Border truck cargo AQIM sampling must occur at the following ports (and the staffed crossings managed by these ports):

- Alex Bay, NY
- Blaine, WA
- Buffalo, NY
- Detroit, MI
- Port Huron, MI
- Rouses Point/Champlain, NY

The survey processes provide the sample sizes for each work location monitoring the pathway strata. The following is a summary of the stratified sample design and sizes in Northern border truck cargo:

Northern Border Truck Cargo Procedures Summary	
Commodity	**Commercial Plant, Perishable Agricultural Cargo** (This category is defined as any commercial shipment of fresh fruit, vegetables, and plants that are perishable, even if stated as Canadian origin.) **Reefer Equipped Containers (includes whether the reefer unit is running or not)**
Sample Size	For **Commercial Plant, Perishable Agricultural Cargo,** select six (6) trucks per week per port. (This excludes Border Release Advance Screening and Selectivity (BRASS) released cargo, seed shipments, National Agriculture Release Program (NARP) cargo and mandatory treatment cargo.) For **Reefer Equipped Containers (includes whether reefer unit is running or not),** select six (6) random samples per week per port for checking compliance. **Contact Regional AQIM Representatives for assistance.**[1]
Inspection Methodology	For **Commercial Plant, Perishable Agricultural Cargo**: Each truck requires a physical inspection at port or consignee premise. Refer to **Table 8-3 on page-8-8-7** before beginning the inspection process. Inspect cargo using appropriate AQIM hypergeometric inspection procedures. The number of boxes shall be determined using the hypergeometric sampling rates from **Table 8-1**. Boxes for inspection must be taken from random locations throughout the truck to detect a 10 percent level of infestation (at 95% confidence). Entire contents of boxes selected and available floor space of the truck shall be inspected for agricultural pests or mismanifested or smuggled items. IF A **BULK SHIPMENT** is randomly selected for AQIM inspection then determine best estimate of total number of box equivalents as if this was a boxed cargo shipment. (Using an average 10 Kg (appx. 22 lbs.) box or carton as reference.) Based on the estimated number of boxes, use the hypergeometric table to determine the number of box equivalents that must be randomly inspected. For example: if a bulk shipment contains 16 bins of jalapeno peppers with total weight of 14400 Kg (31,746 lbs.), then the estimated box equivalent of this shipment is 1440 boxes or cartons. In this instance, the hypergeometric table indicates that a total of 29 box or carton equivalents must be randomly selected from the entire shipment and inspected for AQIM. For **Reefer Equipped Containers (Includes whether reefer unit is running or not)**: (excludes the reefers of plant perishables already monitored in the above category. (Note: Inspection of this cargo can be predominantly tailgate, with occasional climb in or de-van, **as long as the inspector is satisfied that the cargo is the same as what the documents state**.) 1. Need to monitor primarily for smuggling of agricultural and other prohibited items. 2. Record all needed data on appropriate AQIM data worksheet and report data using AQAS.
Other Issues	Inspections shall be conducted during the normal business hours at the port. Costs for OT clearance will be paid by the shipper/broker/consignee, or government. Need to advise shippers, importers, and brokers that random sampling and inspection will be part of day-to-day operations. They should understand that there is a probability that their shipment will be intensely inspected.

TABLE 8-2: Northern Border Truck Cargo Procedures Summary

1 Eastern Region: Mikell Tanner: 919-855-7317 or mikell.tanner@aphis.usda.gov; Western Region: Judy Pasek: 970-494-7580 or judith.e.pasek@aphis.usda.gov

If the randomly selected AQIM consignment is:	Then:	Which Creates:
All the same perishable commodity from one origin	◆ APPLY hypergeometric inspection sampling to whole shipment, AND; ◆ SELECT the appropriate number of units for inspection	One AQIM record for AQAS data input
Different perishable commodities from one or multiple origins (other than CUT FLOWERS)	◆ SELECT the single commodity with the most quantity (boxes, cartons, etc.) AND; ◆ SELECT the single commodity with the least quantity units (must be a minimum of 5 quantity units[1] ◆ APPLY hypergeometric inspection sampling separately to **each** of these selections and inspect as **separate AQIM samples**	Two different AQIM records (one for each of the commodities selected) for AQAS data input[2]
Different CUT FLOWER genera/varieties from one or multiple origins	Consider ONLY boxes of single variety cut flowers OR boxes of same flower composition bouquets: ◆ SELECT the cut flower genus/variety with the most quantity units (boxes, cartons, etc.) AND; ◆ SELECT the cut flower genus/variety with the least quantity units (must be a minimum of 5 quantity units[1] ◆ APPLY hypergeometric inspection sampling separately to **each** of these selections and inspect as **separate AQIM samples**	Two different AQIM records (one for each of the cut flower genera selected) for AQAS data input. Record cut flower variety name and origin of the cut flower (NOT origin of flight or vessel)[2]

TABLE 8-3: AQIM Sampling Procedures for Multiple Commodities in Cargo

1 If there are multiple commodities/cut flower varieties with five boxes each, then port discretion is used to select the 5 box commodity to be sampled and inspected.

2 The two separate inspections count as two AQIM inspections towards the weekly minimum cargo sampling requirements for that cargo pathway.

Pathway Monitoring Maintenance and Quality Assurance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and being performed properly. To help with reviewing the status of monitoring activities, refer to "Quality Assurance Questions" on **page E-1**. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations.

The questions review the following topics:

- Random sampling
- Proportional sampling
- Adequate sampling
- Accurate and complete data
- Working risk committees
- Local support

Northern Border–Truck Cargo Worksheets

There is are two worksheets for recording information gathered from the inspection of Northern border truck cargo for the purpose of AQIM. The data worksheet for Reefer Truck Compliance checks is available at:

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/northern_border_cargorfrtrk.pdf

The data worksheet for Perishable cargo is available at:

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/northern_border_cargo_perishables.pdf

Agriculture Quarantine Activity System (AQAS)

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

A user name and password is required to enter and access the data. These can be obtained by contacting your immediate supervisor.

Survey Results and How To Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching work locations?
2. How effective is the AQI program at managing this threat?

Results of surveys for Norther border truck cargo provided a general answer for question 1. There are varying rates at which prohibited agricultural materials and pests approach the work locations. These prohibited agricultural materials are what can have agricultural pests.

Further analysis of the monitoring data is needed to determine the risk associated with the prohibited items approaching the work location. The origin and destination of the prohibited items is important to determine risk levels. Also, whether or not the prohibited item carries an actual agricultural pest is crucial in analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the work locations, PPQ personnel need to study what the data means and answer the first question for their specific work location. Analysis tools are available to help with these analyses, which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some work locations, Risk Management Teams are formed to look at monitoring data and other data, which are normally collected at the work location.

At other locations, analyses of monitoring data occur to establish the rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location must conduct this type of analysis. AQIM provides a framework which work location can use to carry out the analysis.

Questions To Guide Data Analysis

1. How many trucks were selected for sampling during the survey period?

How many actions were required on the trucks sampled?

How many actions by strata category sampled were there? (Previous data has multiple strata.)

What is the action approach rate of trucks that require action (number of trucks requiring action divided by total trucks in the sample)?

2. How many pest interceptions (actionable pests) were made from survey samples?

Pest Approach Rate: What is the rate of pest interceptions in relation to the total sampled number of trucks (number of trucks with actionable pests divided by total trucks in the sample)?

3. Compare the rate of actions required for each month of the survey.

DISCUSSION

Are there easily identified trends when the rate of cargo actions transiting the work location are higher?

Are there seasonal trends?

Do higher rates correlate with national or religious holidays, certain types of trucks, cargo, or importers?

4. Generate a listing and frequency of shipments requiring action. Which commodities present the greater risk?

9 Southern Border–Vehicles

AQIM Handbook

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Standard Operating Procedures **page 9-1**
Passenger Vehicle Universe **page 9-3**
Pest Interception Procedures **page 9-3**
Safety **page 9-3**
Pathway Monitoring Maintenance **page 9-4**
Southern Border– Vehicles Worksheet **page 9-4**
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Survey Results and How To Use Them **page 9-5**
Questions to Guide Data Analysis **page 9-6**

Background

This pathway covers passenger vehicles entering the United States via Southern border crossings. Information must be recorded on a worksheet even if no agricultural item(s) are found.

Standard Operating Procedures

Each Field Office will be responsible for their respective random sampling schedules at their work locations. Each work location should develop standard operating procedures (SOP) to:

- Ensure random selection prevails over selective criteria
- Provide specific inspection criteria
- Stress the degree of inspection for pests

Each work location should provide copies of the random sampling schedules and the SOP to the PPQ Regional Representative.[1]

AQIM sampling for vehicles on the southern border is based on the number of personnel available. Refer to **Table 9-1** for the correct sampling protocol.

1 Eastern Region AQIM Representative: Mikell Tanner: 919-855-7317
Western Region AQIM Representative: Judy Pasek: 970-494-7580

TABLE 9-1: Sampling Protocol based on number of personnel

If the number full time Agriculture Specialists is/are:	Then the sampling protocol is:
0	20[1] per month
1	Minimum of 5 per day (100 per month)[2]
2 or more	All COMPEX samples or a minimum of 300 per month[3]

1 Field Offices may decide to sample other unstaffed crossings on less than a monthly frequency. However, the minimum monitoring sample should remain at 20 per monitoring period.

2 These locations are encouraged to sample more than the minimum.

3 If COMPEX samples are not available, then apply an alternate sampling procedure that selects a minimum of 10 vehicles per day per staffed border crossing.

For each AQIM sample:

- Use the 7-point inspection procedures on all vehicles and 100% inspection procedures on all passenger baggage and personal effects.
- Record all needed data on the appropriate AQIM data worksheet.
- Report data using AQAS.

For this fiscal year, Southern Border vehicle AQIM sampling must occur at the following ports (and the staffed crossings managed by these ports):

- Brownsville, TX
- Calexico, CA
- Douglas, AZ
- Eagle Pass, TX
- El Paso, TX
- Hidalgo, TX
- Laredo, TX
- Los Indios, TX
- Nogales, AZ
- Otay Mesa, CA
- Pharr, TX
- Progreso, TX
- Roma, TX
- San Luis, AZ
- San Ysidro, CA
- Tecate, CA

Passenger Vehicle Universe

Passenger vehicle includes automobiles, vans, recreational vehicles, cab area of all types of non-commercial trucks, and other similar passenger type vehicles.

Inspection Criteria for the 7-Point Inspection

The following areas of all randomly selected vehicles should be inspected:

1. Under hood
2. Glove compartment
3. Trunk area including side panel compartment
4. Under spare tire compartment
5. Under seats
6. All luggage and handbags
7. Other interior side panel compartments

Pest Interception Procedures

Pest interception information resulting from random sample surveys is an important factor with regard to risk management. All quarantine material found needs to undergo 100 percent inspection for pests. All pest types and quantities found on quarantine material must be recorded on pest interception form(s).

Pest interceptions from seized items should be sent to port or area identifiers. Mark the interception **"PROMPT: SOUTHERN BORDER MONITORING."**

Safety

Safe working conditions must be maintained at all times. When a condition develops that challenges the safety of the Agriculture Specialist, the inspection should be terminated until the hazardous condition is corrected. The exercise of good judgement will dictate when these situations need to be addressed and how acceptable alternatives can be employed.

Pathway Monitoring Maintenance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and being performed properly. To help with reviewing the status of monitoring activities, refer to "Quality Assurance Questions" on **page E-1**. This appendix contains a checklist of question port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Random sampling
- Proportional sampling
- Adequate sampling
- Accurate and complete data
- Working risk committees
- Local support

Southern Border– Vehicles Worksheet

There is one worksheet for recording information gathered from your inspection of Southern Border Vehicles for the purpose of AQIM.

Click on the link below to access the Southern Border vehicle data worksheet.

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/southern_border_vehicle.pdf

Agriculture Quarantine Activity System (AQAS)

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

A user name and password is required to enter and access the data. These can be obtained by contacting your immediate supervisor.

Survey Results and How To Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching work locations?
2. How effective is the AQI program at managing this threat?

Preliminary results for Southern border vehicle surveys provide a general answer for Question 1. That is, there are varying rates at which prohibited agricultural materials approach the work locations. These prohibited agricultural materials are what can have agricultural pests. Surveys show that at some work locations about 1 percent of the vehicles carried prohibited items in the past year. At other ports, surveys show that passengers and vehicles are carrying prohibited items at a higher rate, sometimes near 6 percent.

These percentages are a rough approximation of agricultural pest threat. Further analysis of the monitoring data is needed to determine the risk associated with the prohibited items approaching the work location. The origin and destination of the prohibited items is important to determine risk levels. Also, whether or not the prohibited item carries an actual agricultural pest is analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the work locations, PPQ personnel need to study what the data means and answer the first Question for their specific location. Analysis tools are available to help with these analyses which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some work locations, Risk Management Teams are formed to look at monitoring data and other data, which are normally collected at the location.

At other locations, analyses of monitoring data occur to establish rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location must conduct this type of analysis. AQIM provides a framework which work location can use to carry out the analysis.

Questions to Guide Data Analysis

The following questions are a guide for managers and Risk Management Teams to formulate information around. With the answers, valid decision can be made based on the potential risk of quarantined material and exotic pests and diseases entering a specific pathway. The value of using the monitoring data for decision making is better understood.

1. How many vehicles were selected for the sampling during the survey?

   How many vehicles sampled required an action (seizure or other action required as a condition of entry) during the survey?

   What is the action approach rate of vehicles requiring action (number of vehicles with one or more items categorized as seized or clean/treatment divided by the total number of vehicles sampled)?

   What is the total number of QMIs seized during the survey?

   How many seizures (QMIs) came from the samples during the survey?

   What is the QMI approach rate of vehicles with prohibited agricultural material (total number of QMIs divided by total vehicles sampled during the survey)?

2. How many pest interceptions (actionable pests) were made from survey samples?

   Pest approach rate: what is the rate of pest interceptions in relation to number of vehicles (number of actionable pests divided by number of vehicles in the sample)?

3. How many QMIs were plant material? Meat or animal products?

   What is the rate of QMIs for plant material and meat or animal products?

   DISCUSSION

   Is there a greater risk from plant material or animal products at this work location?

4. How many vehicles were sampled at each crossing? What is the rate of QMI seizures at each crossing? Which crossings have a higher rate of QMIs than vehicles?

DISCUSSION

Are these crossings staffed accordingly? (Example: 30 percent of all vehicles surveyed crossed at Bridge A, 20 percent crossed at Bridge B, and 50 percent crossed at Bridge C. Fifteen (15) percent of the QMIs seized in the work location were seized at Bridge A, 35 percent were seized at Bridge B, and 50 percent were seized at Bridge C.) Vehicles crossing Bridge B could represent the greater risk at the work location and staffing should be reviewed based on this risk.

5. What are the destinations of vehicles transiting the work location? Is local traffic (less than X miles from the work location) considered a high risk? What are the number of QMIs traveling to local locations versus distant locations?

DISCUSSION

Which states are considered high risk States? How can you best select vehicles destined to these high risk States to protect U.S. agriculture?

6. Compare the **action** approach rate for each month of the survey period.

DISCUSSION

Are there easily identified monthly trends when the rate of QMIs transiting the work location are higher?

Are there seasonal trends or do higher rates correlate with national or religious holidays, beginning or end of the school year, vacation periods, etc.?

Do these rates correlate with traditional peak and off-peak travel times?

7. Generate a listing and frequency of items seized. What are the top five items most frequently seized? Which QMIs present the greatest risk?

8. Which vehicles (and at which crossing) were carrying prohibited items? Where were the items found in carried bags, passenger compartment, glove box, truck, luggage? Did the passenger declare all prohibited items? Was the passenger traveling alone, as a couple, or family? What was the reason for travel? Business, vacation, visit family, tour group, school? What type of vehicle was used to transport prohibited items?

DISCUSSION

How do current selectively factors compare with survey results?

What selectivity factors could be changed or added to identify vehicles carrying prohibited items?

What percentage of resources are dedicated to staffing AQI activities for southern border vehicles at the work location?

10 Southern Border—Truck Cargo

AQIM Handbook

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Cargo Strata and Stratifying the Sample **page 10-2**
The Unit of Sampling **page 10-3**
Consistency of Data Collection **page 10-3**
Southern Border–Truck Cargo Procedures Summary **page 10-5**
Pathway Monitoring Maintenance **page 10-8**
Southern Border–Truck Cargo Worksheet **page 10-8**
Agriculture Quarantine Activity Systems (AQAS) **page 10-8**
Survey Results and How To Use Them **page 10-9**
Questions To Guide Data Analysis **page 10-9**

Background

The cargo population, or sampling universe, for AQI monitoring is defined as commercial plant perishable agricultural cargo. Random samples can be taken from this population with more intensive (hypergeometric) inspections completed and necessary data recorded about these commodities.

In order to properly monitor cargo, you need to have a good understanding of two key statistical principles:

1. It is important that the sample selected be representative of the commodity. Random selection helps ensure this.
2. Once the sample is selected, it is necessary to inspect the sample thoroughly and according to hypergeometric sampling procedures if applicable.

If you want your port to produce quality risk information, then each person participating must have a clear understanding of the sampling universe, the unit of sampling, and inspection consistency issues.

The Sampling Universe

You estimate the number of actions due to pests or smuggling in a cargo entry pathway by taking random samples from the cargo in the pathway. It is key to good statistics to carefully define this universe

from which you want to draw your random sample. The following questions need answers in order select the sample correctly and to make statistical inferences for the entire universe.

- How are commodities transported?
- How many shipments of these commodities are arriving at a work location?
- What is the seasonality of the commodity?

For AQIM, the universe is defined by the mode of transport of the cargo such as truck. Initially, PPQ has decided to limit the universe. The following commodities or commodity types will be excluded from the sampling universe:

- Commodities which are pre-cleared at foreign sites
- Commodities which are admissible under the National Agriculture Release Program (NARP)
- Commodities which undergo some type of mandatory treatment, other than cold treatment (for example, fumigation, irradiation, hot water treatment) at work locations
- Frozen commodities
- Oil, salt, iron ore, coal, etc., which have no pest risk.
- Seed shipments

Cargo Strata and Stratifying the Sample

The sampling and inspection processes for AQIM were designed to be compatible with typical cargo inspection groupings. The cargo universe is divided into several homogeneous and distinctly separate groups. Each group contains commodities that will be sampled in order to estimate the action and pest approach rates in each group. A port may be sampling one or more of the commodities in a group or across groups. With Southern border cargo, the universe is the Commercial Plant Perishable Agricultural Cargo. This category is defined as any commercial formal or informal entry of fresh fruit, vegetables or other non processed or non refined plant product.

By sampling this category, PPQ is able to get precise estimates of the number of trucks with pests approaching or other needed actions. This risk information helps the work location understand how effectively it manages the pest risk for this category, as well as for the entire cargo universe at the port.

It is very important that each commodity in the category selected be representative of all other units of that category. All shipments of a category should have a chance of being selected as a sample. One way to ensure that the sample is representative is to choose a shipment of the commodity at random (either random time, or random number, etc.). This random selection process eliminates the bias of the Agriculture Specialist who is selecting the sample. The experience of the Agriculture Specialist (bias) might lead to choosing a shipment that is more likely to be harboring a pest. This bias would make the sample not representative of the entire commodity universe. The survey results would be skewed and this kind of bias would hamper the port's ability to make the best decisions based on risk analysis.

Setting Up a Process

Setting up a process of selecting representative samples for each of the commodities will be one of the biggest challenges in AQIM. Because each port has its own unique set of circumstances in cargo operations, the port must individualize its random sampling process. It will be necessary to document the process and possibly ask for feedback from other southern border ports, regional AQIM coordinators or Port Operations staff who have experience in selecting random samples in the cargo environment. The port may even decide that the Port Risk Management Team determine and review the random sampling process on a regular basis.

The Unit of Sampling

For Southern border truck cargo, the sample unit is the truck box containing the commodity, not including the cab. It is crucial that the sample unit is inspected closely enough to detect any actionable pests and any smuggling of prohibited agriculture commodities. Truck border cargo sampling and inspection procedures are detailed in **Table 10-2 on page-10-10-6**. Procedures for sampling multiple commodities on the selected truck are detailed in **Table 10-3 on page-10-10-7**.

The procedures must be followed exactly in order for the monitoring estimates to be valid and useful.

Consistency of Data Collection

It is crucial that the monitoring results from the inspection of a random sample unit are recorded accurately and consistently. Because each sample represents many other units, all Agriculture Specialists must be as consistent as possible in following the inspection procedures.

Regulated commodities pose a special challenge. If the sample selected is a regulated commodity, it is important to understand the following:

Cargo monitoring estimates the number of trucks approaching the work location with commodity pest infestation levels requiring action by PPQ. AQIM uses risk-based inspection procedures for detecting a 10 percent or more pest infestation rate. This initial threshold is used to estimate the number of containers approaching a work location with a pest threat.

NOTICE

This 10 percent infestation level may change as the data for AQIM is collected and analyzed.

To be 95 percent sure that the Agriculture Specialist inspecting the sampled truck will find the pest, when the shipment is infested at a 10 percent infestation or more level, the Agriculture Specialist must select, at random, a specific number of boxes in the shipment. Determine this number of boxes by using the hypergeometric table illustrated in **Table 10-1**. Each of these boxes must be inspected at level of intensity to ensure that:

- No hitchhiker pests are present in the box
- No internal feeding insects are present in randomly selected fruit in the box.
- No mismanifested or smuggled items are present.

Total Number of Boxes on Truck	Number of Boxes to Select at Random From the Truck and to inspect to Detect Pests
1-10	10
11-12	11
13	12
14-15	13
16-17	14
18-19	15
20-22	16
23-25	17
26-28	18
29-32	19
33-38	20
39-44	21
45-53	22
54-65	23
66-82	24
83-108	25
109-157	26
158-271	27
272-885	28
272-885	28
886-200,000	29

TABLE 10-1: Hypergeometric Table For Random Sampling

Agriculture Specialists should follow normal inspection procedures of the commodities to determine if pests are present. For example, fruit should be cut to detect internal feeders if external evidence is present.

Southern Border–Truck Cargo Procedures Summary

For this fiscal year, Southern Border truck cargo AQIM sampling must occur at the following ports (and the staffed crossings managed by these ports):

- Brownsville, TX
- Calexico, CA
- El Paso, TX
- Laredo, TX
- Los Indios, TX
- Nogales, AZ

- Otay Mesa, CA
- Pharr, TX
- San Luis, AZ

Use the procedures outlined in **Table 10-2** as an aid when sampling and inspecting southern border truck cargo commodities for AQIM.

SOUTHERN BORDER TRUCK CARGO PROCEDURES SUMMARY	
Cargo Population Definition	**Commercial plant perishable commodities**. (This excludes precleared and frozen commodities, seed shipments, commodities with mandatory treatments at port of entry, and commodities that are admissible under the National Agriculture Release Program (NARP.)) Note: Commodities with mandatory cold treatments are included.
Sample Size	Select six (6) trucks per week per port that receives this category of cargo. **Contact Regional AQIM Representatives for assistance.**[1]
Sample Selection	Port discretion, random time, skip intervals, etc. May need to first determine the total number of shipments of a commodity received at a port in one year. If commodity is seasonal, then sampling should be planned to occur during the full import season of commodity, if reasonable for the number of samples needed.
Inspection Methodology	Each truck requires a physical inspection at port or consignee premise. Refer to **Table 10-3 on page 10-10-7** before beginning the inspection process. Inspect cargo using appropriate AQIM hypergeometric inspection procedures. The number of boxes shall be determined using the hypergeometric sampling rates from **Table 10-1**. Boxes for inspection must be taken from random locations throughout the truck to detect a 10 percent level of infestation (at 95% confidence). Entire contents of boxes selected and available floor space of the truck shall be inspected for agricultural pests or mismanifested or smuggled items. IF A **BULK SHIPMENT** is randomly selected for AQIM inspection then determine best estimate of total number of box equivalents as if this was a boxed cargo shipment. (Using an average 10 Kg (appx. 22 lbs.) box or carton as reference.) Based on the estimated number of boxes, use the hypergeometric table to determine the number of box equivalents that must be randomly inspected. For example: if a bulk shipment contains 16 bins of jalapeno peppers with total weight of 14400 Kg (31,746 lbs.), then the estimated box equivalent of this shipment is 1440 boxes or cartons. In this instance, the hypergeometric table indicates that a total of 29 box or carton equivalents must be randomly selected from the entire shipment and inspected for AQIM.
Other Issues	Inspections shall be conducted during the normal business hours at the port. Costs for OT clearance will be paid by the shipper/broker/consignee, or government. Need to advise shippers, importers, and brokers that random sampling and inspection will be part of day-to-day operations. They should understand that there is a probability that their shipment will be intensely inspected.

TABLE 10-2: Southern Border Truck Cargo Procedures Summary

1 Eastern Region: Mikell Tanner: 919-855-7317 or mikell.tanner@aphis.usda.gov; Western Region: Judy Pasek: 970-494-7580 or judith.e.pasek@aphis.usda.gov

If the randomly selected AQIM consignment is:	Then:	Which Creates:
All the same perishable commodity from one origin	◆ APPLY hypergeometric inspection sampling to whole shipment, AND; ◆ SELECT the appropriate number of units for inspection	One AQIM record for AQAS data input
Different perishable commodities from one or multiple origins (other than CUT FLOWERS)	◆ SELECT the single commodity with the most quantity (boxes, cartons, etc.) AND; ◆ SELECT the single commodity with the least quantity units (must be a minimum of 5 quantity units[1] ◆ APPLY hypergeometric inspection sampling separately to **each** of these selections and inspect as **separate AQIM samples**	Two different AQIM records (one for each of the commodities selected) for AQAS data input[2]
Different CUT FLOWER genera/varieties from one or multiple origins	Consider ONLY boxes of single variety cut flowers OR boxes of same flower composition bouquets: ◆ SELECT the cut flower genus/variety with the most quantity units (boxes, cartons, etc.) AND; ◆ SELECT the cut flower genus/variety with the least quantity units (must be a minimum of 5 quantity units[1] ◆ APPLY hypergeometric inspection sampling separately to **each** of these selections and inspect as **separate AQIM samples**	Two different AQIM records (one for each of the cut flower genera selected) for AQAS data input. Record cut flower variety name and origin of the cut flower (NOT origin of flight or vessel)[2]

TABLE 10-3: AQIM Sampling Procedures for Multiple Commodities in Cargo

1 If there are multiple commodities/cut flower varieties with five boxes each, then port discretion is used to select the 5 box commodity to be sampled and inspected.

2 The two separate inspections count as two AQIM inspections towards the weekly minimum cargo sampling requirements for that cargo pathway.

Pathway Monitoring Maintenance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and performed properly. To help with reviewing the status of monitoring activities, refer to "Quality Assurance Questions" on **page E-1**. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. The questions review the following topics:

- Random sampling
- Proportional sampling
- Adequate sampling
- Accurate and complete data
- Working risk committees
- Local support

Southern Border–Truck Cargo Worksheet

There is one worksheet for recording information gathered from your inspection of Southern Border cargo for the purpose of AQIM. Be sure to record the commodity being inspected properly.

Click on the link below to access the Southern Border Truck Cargo data worksheet.

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/southern_border_cargo.pd

Agriculture Quarantine Activity Systems (AQAS)

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

A user name and password is required to enter and access the data. These can be obtained by contacting your immediate supervisor.

Survey Results and How To Use Them

AQIM activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching work locations?
2. How effective is the AQI program at managing this threat?

There are varying rates at which prohibited agricultural materials and pests approach the work locations. These prohibited agricultural materials are what can have agricultural pests.

Further analysis of the monitoring data is needed to determine the risk associated with the prohibited items approaching the work location. The origin and destination of the prohibited items is important to determine risk levels. Also, whether or not the prohibited item carries an actual agricultural pest is crucial in analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the work locations, PPQ personnel need to study what the data means and answer the first question for their specific work location. Analysis tools are available to help with these analyses, which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some work locations, Risk Management Teams are formed to look at monitoring data and other data, which are normally collected at the work location.

At other locations, analyses of monitoring data occur to establish the rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location must conduct this type of analysis. AQIM provides a framework which work location can use to carry out the analysis.

Questions To Guide Data Analysis

1. How many trucks were selected for sampling during the survey period?

   How many actions were required on the trucks sampled?

How many actions by strata category sampled were there? (Previous data has multiple strata.)

What is the action approach rate of trucks that require action (number of trucks requiring action divided by total trucks in the sample)?

2. How many pest interceptions (actionable pests) were made from survey samples?

Pest Approach Rate: What is the rate of pest interceptions in relation to the total sampled number of trucks (number of trucks with actionable pests divided by total trucks in the sample)?

3. Compare the rate of actions required for each month of the survey.

DISCUSSION:

Are there easily identified trends when the rate of cargo actions transiting the work location are higher?

Are there seasonal trends?

Do higher rates correlate with national or religious holidays, certain types of trucks, cargo, or importers?

4. Generate a listing and frequency of shipments requiring action. Which commodities present the greater risk?

Which commodities most likely to require action? Where were the agricultural pests found? What is the rate of trucks with smuggled or mismanifested items?

DISCUSSION:

How effective is the current tailgate inspection process in detecting pests and/or smuggled cargo?

5. What types of shipments (refrigerated, mixed vegetables, dry containers, empties, cut flowers, express carriers, etc.) require higher rates of action?

DISCUSSION:

What selectivity factors are currently used to identify shipments likely to require action?

What additional selectivity factors would be used to identify shipments likely to require action?

Do the survey results indicate additional factors that help identify shipments most likely to require action?

6. Using monitoring data, apply the survey results to the cargo universe at the work location to estimate the number of actions required and interceptions likely to transit the work location during the same time the survey period took place.

How many trucks arrived at the work location during the survey period? Using the action approach rate for trucks requiring action, calculate an estimate of the number of trucks transiting the work location that are likely to require action.

Using WADS data, how does the estimated number of actions required compare with the reported number of actions taken?

How many additional actions may have been required during the survey period?

How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WADS for truck cargo?

DISCUSSION:

What percentage of resources are dedicated to staffing AQI activities for southern border truck cargo at the work location?

What is the relative risk of this pathway compared with other pathways in the work location?

Should resources be reallocated among all the pathways in the work location to better address the relative risk of the pathways?

11 Southern Border Pedestrian

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Southern Border Pedestrian Worksheet **page 11-2**
Agriculture Quarantine Activity Systems (AQAS) **page 11-3**

Background

This pathway covers AQIM activities for the southern border pedestrian pathway. APHIS, PPQ recommends that rather than routine targeting inspection for pedestrians, AQIM be the established operational norm for this pathway. Historical data has indicated that the agricultural risk of the pedestrian pathway is minimal; therefore, no other CBP Agriculture Specialist inspections need to occur (some exceptions may be required on a case-by-case basis due to emergency activities).

Periodic analysis of AQIM data will be conducted by CPHST in order to detect any increase in risk that warrants a change in inspection processes.

Standard Operating Procedures

Each Field Office will be responsible for their respective random sampling schedules at their work locations. Each work location should develop standard operating procedures (SOP) to:

- Ensure random selection prevails over selective criteria
- Provide specific inspection criteria
- Stress the degree of inspection for pests

Assuming a 7-day work week, properly select 10 pedestrian samples per day per pedestrian border crossing from the entire pedestrian population. Selection of samples is to be aligned with pedestrian population proportions (i.e. if on Mondays, 60% of the pedestrian population cross between 0600 and 1200, then 6 of the 10 daily random samples are to be taken during that time period.)

Each work location should provide copies of the random sampling schedules and the SOP to the PPQ Regional Representative.[1]

For this fiscal year, Southern Border pedestrian AQIM sampling must occur at the following ports (and the staffed crossings managed by these ports):

- Brownsville, TX
- Calexico, CA
- Douglas, AZ
- El Paso, TX
- Hidalgo, TX
- Laredo, TX
- Nogales, AZ
- Otay Mesa, CA
- San Luis, AZ
- San Ysidro, CA
- Tecate, CA

Southern Border Pedestrian Worksheet

There is one worksheet for recording information gathered from the inspection of Southern border pedestrians for the purpose of AQIM.

Click on the link below to access the Southern Border Pedestrian data worksheet.

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/border_pedestrian.pdf

1 Eastern Region AQIM Representative: Mikell Tanner: 919-855-7317
Western Region AQIM Representative: Judy Pasek: 970-494-7580

Agriculture Quarantine Activity Systems (AQAS)

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp.

A user name and password is required to enter data. This can be obtained by contacting your immediate supervisor.

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Predeparture Air Passenger

The information in this chapter has moved. **See "Air Passenger Baggage" on page-3-3-1**.

13 Rail Cargo

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Agriculture Quarantine Activity System (AQAS) **page 13-1**

Rail Cargo Worksheet

Record the information gathered for AQIM purposes from inspecting rail cars on the following form.

Click on the link below to access the Rail Cargo data worksheet.

http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/aqim_worksheets_pdf/rail_cargo.pdf

Agriculture Quarantine Activity System (AQAS)

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

A user name and password is required to enter and access the data. These can be obtained by contacting your immediate supervisor.

14 Glossary

AQIM Handbook

Acceptable risk—A judgement (management decision) regarding the permissibility of a hazard; a decision made in the risk management process about the safety of an option or the acceptability of a hazardous event.

Analysis—Determining the nature or proportion of one or more data elements or sets of data.

Approach rate—The total prohibited agricultural items seized or total PPQ cargo actions per the respective, total sampled population.

AQIM—Initials representing Agricultural Quarantine Inspection Monitoring.

Confidence interval—A level of belief that the true value of the population was captured. For AQIM, the numbers of samples taken at each work location were designed to ensure that by detecting the presence of certain pests and quarantine materials during the monitoring, PPQ could be 95 percent sure that it would happen again.

Data—Raw information that provides values for any characteristic of a larger population. For AQIM, these would be all the entries on the data collection form (i.e., flight number, origin, contaminant codes, etc.).

Decision-making—The final choice or commitment to action. Decisions are impacted by the risk analysis process, resource issues and political implications.

Hazard—Elements or events which represent potential harm; an adverse event or adverse outcome. In risk analysis, hazard is specified by describing what might go wrong and how this might happen.

Mean—This term is also referred to as the average. It is computed by adding all the values for a characteristic and dividing by the number of observations. For example, the mean of passengers going through an airport in a day would be the total number of passengers in one year divided by 365 days.

Mitigation—Deliberate action(s) taken to reduce the risk associated with a pest organism or plant disease. Consistent with risk management strategies.

Monitoring—To watch, check, or regulate the performance of a process or activity.

Negligible Risk—A risk value so low (or reasonable) that most parties agree to accept risk at or below this level under most circumstances (also known as tolerable, not significant or minimal risk).

Pest Risk Assessment—Determination of whether a pest organism is of quarantine significance, and the evaluation of the likelihood and consequences of its introduction, including discussions of the uncertainty associated with the estimates.

Pest Risk Management—The decision-making process concerned with mitigating the risk of introduction or spread of a plant quarantine pest.

Probability—The statistical prediction of the likelihood of possible outcomes.

Proportions—Shows the relative frequency of an event, e.g. percentage of passengers with a QMI.

QMI—Quarantine material intercepted.

Quarantine Security—A management decision concerning the safety at a defined level of pest risk. Additional mitigation is not required when quarantine security is achieved.

Random Sampling—Each member of the population must have a known probability of being sampled (greater than 0).

Risk—The likelihood and magnitude (of the consequence) of occurrence of an adverse event.

Risk Analysis—The process which includes risk assessment, risk management, and risk communication.

Risk Assessment—The process of identifying a hazard and evaluating the risk of a specific hazard in qualitative or quantitative terms. This process should include estimates of uncertainty and should be objective, repeatable, and scientific.

Risk Communication—Open, two-way exchange of information and opinion about risk, leading to a better understanding and better risk management decisions.

Risk Management—The pragmatic process concerned with developing options for mitigating or eliminating the risk.

Risk Management Implementation—Implementing the programs, monitoring, and evaluating program effectiveness; and adjusting and improving program conduct to meet continual needs.

Risk Management Recommendations—Identifying options for intervention; evaluation of benefits and down-sides of each option; recommending final option(s) for implementation.

Safety—The degree to which risks are judged acceptable; a subjective measure of the acceptability of risk.

Sample—The part (or a subset) of a population that has been selected for monitoring.

Simple Random Sampling—A selection process where each member of the population must have a known probability (greater than 0) of being sampled.

Strata—Homogeneous and distinctly different groups created for the purpose of dividing cargo.

Unrestricted Risk Estimate—The measure of risk without the application of mitigation.

Variable—Any characteristic on which the elements of a sample differ from each other (i.e., height versus weight, cargo destinations versus type).

WADS—Initials representing the Work Accomplishment Data System.

A

AQIM Handbook

Appendix A

Government Performance Results Act of 1993

The following is a complete version of the Government Performance Results Act (GPRA) of 1993 and was obtained from http://www.whitehouse.gov/omb/mgmt-gpra/gplaw2m.html.

Government Performance Results Act of 1993

Contents

- SECTION 1. SHORT TITLE.
- SECTION 2. FINDINGS AND PURPOSES.
- SECTION 3. STRATEGIC PLANNING.
- SECTION 4. ANNUAL PERFORMANCE PLANS AND REPORTS.
- SECTION 5. MANAGERIAL ACCOUNTABILITY AND FLEXIBILITY.
- SECTION 6. PILOT PROJECTS.
- SECTION 7. UNITED STATES POSTAL SERVICE.
- SECTION 8. CONGRESSIONAL OVERSIGHT AND LEGISLATION.
- SECTION 9. TRAINING.
- SECTION 10. APPLICATION OF ACT.
- SECTION 11. TECHNICAL AND CONFORMING AMENDMENTS.

Return to OMB Title page of guidance to agencies

[Although there are minor coding and format problems that resulted from the translation of the original code into ASCII, these should not interfere with the use of this file to gain an understanding of the content of the law.]

One Hundred Third Congress
of the
United States of America

Begun and held at the City of Washington on Tuesday, the fifth day of January, one thousand nine hundred and ninety-three.

An Act

To provide for the establishment of strategic planning and performance measurement in the Federal Government, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Government Performance and Results Act of 1993".

SECTION 2. FINDINGS AND PURPOSES.

(a) Findings.-The Congress finds that-

(1) waste and inefficiency in Federal programs undermine the confidence of the American people in the Government and reduces the Federal Government's ability to address adequately vital public needs;

(2) Federal managers are seriously disadvantaged in their efforts to improve program efficiency and effectiveness, because of insufficient articulation of program goals and inadequate information on program performance; and

FIGURE A-1:The Government Performance Results Act (page 1 of 11)

(3) congressional policymaking, spending decisions and program oversight are seriously handicapped by insufficient attention to program performance and results.

(b) Purposes.-The purposes of this Act are to-

(1) improve the confidence of the American people in the capability of the Federal Government, by systematically holding Federal agencies accountable for achieving program results;

(2) initiate program performance reform with a series of pilot projects in setting program goals, measuring program performance against those goals, and reporting publicly on their progress;

(3) improve Federal program effectiveness and public accountability by promoting a new focus on results, service quality, and customer satisfaction;

(4) help Federal managers improve service delivery, by requiring that they plan for meeting program objectives and by providing them with information about program results and service quality;

(5) improve congressional decisionmaking by providing more objective information on achieving statutory objectives, and on the relative effectiveness and efficiency of Federal programs and spending; and

(6) improve internal management of the Federal Government.

SECTION 3. STRATEGIC PLANNING.

Chapter 3 of title 5, United States Code, is amended by adding after section 305 the following new section:

"Sec. 306. Strategic plans

"(a) No later than September 30, 1997, the head of each agency shall submit to the Director of the Office of Management and Budget and to the Congress a strategic plan for program activities. Such plan shall contain-

"(1) a comprehensive mission statement covering the major functions and operations of the agency;

"(2) general goals and objectives, including outcome- related goals and objectives, for the major functions and operations of the agency;

"(3) a description of how the goals and objectives are to be achieved, including a description of the operational processes, skills and technology, and the human, capital, information, and other resources required to meet those goals and objectives;

"(4) a description of how the performance goals included in the plan required by section 1115(a) of title 31 shall be related to the general goals and objectives in the strategic plan;

"(5) an identification of those key factors external to the agency and beyond its control that could significantly affect the achievement of the general goals and objectives; and

"(6) a description of the program evaluations used in establishing or revising general goals and objectives, with a schedule for future program evaluations.

"(b) The strategic plan shall cover a period of not less than five years forward from the fiscal year in which it is submitted, and shall be updated and revised at least every three years.

"(c) The performance plan required by section 1115 of title 31 shall be consistent with the agency's strategic plan. A performance plan may not be submitted for a fiscal year not covered by a current strategic plan under this section.

"(d) When developing a strategic plan, the agency shall consult with the Congress, and shall solicit and consider the views and suggestions of those entities potentially affected by or interested in such a plan.

NOTE: The Government Performance Results Act (page 2 of 11)

"(e) The functions and activities of this section shall be considered to be inherently Governmental functions. The drafting of strategic plans under this section shall be performed only by Federal employees.

"(f) For purposes of this section the term 'agency' means an Executive agency defined under section 105, but does not include the Central Intelligence Agency, the General Accounting Office, the Panama Canal Commission, the United States Postal Service, and the Postal Rate Commission.".

SECTION 4. ANNUAL PERFORMANCE PLANS AND REPORTS.

(a) Budget Contents and Submission to Congress.-Section 1105(a) of title 31, United States Code, is amended by adding at the end thereof the following new paragraph:

"(29) beginning with fiscal year 1999, a Federal Government performance plan for the overall budget as provided for under section 1115.".

(b) Performance Plans and Reports.-Chapter 11 of title 31, United States Code, is amended by adding after section 1114 the following new sections:

"Sec. 1115. Performance plans

"(a) In carrying out the provisions of section 1105(a)(29), the Director of the Office of Management and Budget shall require each agency to prepare an annual performance plan covering each program activity set forth in the budget of such agency. Such plan shall-

"(1) establish performance goals to define the level of performance to be achieved by a program activity;

"(2) express such goals in an objective, quantifiable, and measurable form unless authorized to be in an alternative form under subsection (b);

"(3) briefly describe the operational processes, skills and technology, and the human, capital, information, or other resources required to meet the performance goals;

"(4) establish performance indicators to be used in measuring or assessing the relevant outputs, service levels, and outcomes of each program activity;

"(5) provide a basis for comparing actual program results with the established performance goals; and

"(6) describe the means to be used to verify and validate measured values.

"(b) If an agency, in consultation with the Director of the Office of Management and Budget, determines that it is not feasible to express the performance goals for a particular program activity in an objective, quantifiable, and measurable form, the Director of the Office of Management and Budget may authorize an alternative form. Such alternative form shall-

"(1) include separate descriptive statements of-

"(A)(i) a minimally effective program, and

"(ii) a successful program, or

"(B) such alternative as authorized by the Director of the Office of Management and Budget, with sufficient precision and in such terms that would allow for an accurate, independent determination of whether the program activity's performance meets the criteria of the description; or

"(2) state why it is infeasible or impractical to express a performance goal in any form for the program activity.

"(c) For the purpose of complying with this section, an agency may aggregate, disaggregate, or consolidate program

FIGURE A-1:The Government Performance Results Act (page 3 of 11)

activities, except that any aggregation or consolidation may not omit or minimize the significance of any program activity constituting a major function or operation for the agency.

"(d) An agency may submit with its annual performance plan an appendix covering any portion of the plan that-

"(1) is specifically authorized under criteria established by an Executive order to be kept secret in the interest of national defense or foreign policy; and

"(2) is properly classified pursuant to such Executive order.

"(e) The functions and activities of this section shall be considered to be inherently Governmental functions. The drafting of performance plans under this section shall be performed only by Federal employees.

"(f) For purposes of this section and sections 1116 through 1119, and sections 9703 and 9704 the term-

"(1) 'agency' has the same meaning as such term is defined under section 306(f) of title 5;

"(2) 'outcome measure' means an assessment of the results of a program activity compared to its intended purpose;

"(3) 'output measure' means the tabulation, calculation, or recording of activity or effort and can be expressed in a quantitative or qualitative manner;

"(4) 'performance goal' means a target level of performance expressed as a tangible, measurable objective, against which actual achievement can be compared, including a goal expressed as a quantitative standard, value, or rate;

"(5) 'performance indicator' means a particular value or characteristic used to measure output or outcome;

"(6) 'program activity' means a specific activity or project as listed in the program and financing schedules of the annual budget of the United States Government; and

"(7) 'program evaluation' means an assessment, through objective measurement and systematic analysis, of the manner and extent to which Federal programs achieve intended objectives.

"Sec. 1116. Program performance reports

"(a) No later than March 31, 2000, and no later than March 31 of each year thereafter, the head of each agency shall prepare and submit to the President and the Congress, a report on program performance for the previous fiscal year.

"(b)(1) Each program performance report shall set forth the performance indicators established in the agency performance plan under section 1115, along with the actual program performance achieved compared with the performance goals expressed in the plan for that fiscal year.

"(2) If performance goals are specified in an alternative form under section 1115(b), the results of such program shall be described in relation to such specifications, including whether the performance failed to meet the criteria of a minimally effective or successful program.

"(c) The report for fiscal year 2000 shall include actual results for the preceding fiscal year, the report for fiscal year 2001 shall include actual results for the two preceding fiscal years, and the report for fiscal year 2002 and all subsequent reports shall include actual results for the three preceding fiscal years.

"(d) Each report shall-

"(1) review the success of achieving the performance goals of the fiscal year;

"(2) evaluate the performance plan for the current fiscal year relative to the performance achieved toward the performance goals in the fiscal year covered by the report;

FIGURE A-1:The Government Performance Results Act (page 4 of 11)

"(3) explain and describe, where a performance goal has not been met (including when a program activity's performance is determined not to have met the criteria of a successful program activity under section 1115(b)(1)(A)(ii) or a corresponding level of achievement if another alternative form is used)-

"(A) why the goal was not met;

"(B) those plans and schedules for achieving the established performance goal; and

"(C) if the performance goal is impractical or infeasible, why that is the case and what action is recommended;

"(4) describe the use and assess the effectiveness in achieving performance goals of any waiver under section 9703 of this title; and

"(5) include the summary findings of those program evaluations completed during the fiscal year covered by the report.

"(e) An agency head may include all program performance information required annually under this section in an annual financial statement required under section 3515 if any such statement is submitted to the Congress no later than March 31 of the applicable fiscal year.

"(f) The functions and activities of this section shall be considered to be inherently Governmental functions. The drafting of program performance reports under this section shall be performed only by Federal employees.

"Sec. 1117. Exemption

"The Director of the Office of Management and Budget may exempt from the requirements of sections 1115 and 1116 of this title and section 306 of title 5, any agency with annual outlays of $20,000,000 or less.".

SECTION 5. MANAGERIAL ACCOUNTABILITY AND FLEXIBILITY.

(a) Managerial Accountability and Flexibility.-Chapter 97 of title 31, United States Code, is amended by adding after section 9702, the following new section:

"Sec. 9703. Managerial accountability and flexibility

"(a) Beginning with fiscal year 1999, the performance plans required under section 1115 may include proposals to waive administrative procedural requirements and controls, including specification of personnel staffing levels, limitations on compensation or remuneration, and prohibitions or restrictions on funding transfers among budget object classification 20 and subclassifications 11, 12, 31, and 32 of each annual budget submitted under section 1105, in return for specific individual or organization accountability to achieve a performance goal. In preparing and submitting the performance plan under section 1105(a)(29), the Director of the Office of Management and Budget shall review and may approve any proposed waivers. A waiver shall take effect at the beginning of the fiscal year for which the waiver is approved.

"(b) Any such proposal under subsection (a) shall describe the anticipated effects on performance resulting from greater managerial or organizational flexibility, discretion, and authority, and shall quantify the expected improvements in performance resulting from any waiver. The expected improvements shall be compared to current actual performance, and to the projected level of performance that would be achieved independent of any waiver.

"(c) Any proposal waiving limitations on compensation or remuneration shall precisely express the monetary change in compensation or remuneration amounts, such as bonuses or awards, that shall result from meeting, exceeding, or failing to meet performance goals.

"(d) Any proposed waiver of procedural requirements or controls imposed by an agency (other than the proposing agency or the Office of Management and Budget) may not be included in a performance plan unless it is endorsed by the agency that established the requirement, and the endorsement included in the proposing agency's performance plan.

FIGURE A-1:The Government Performance Results Act (page 5 of 11)

"(e) A waiver shall be in effect for one or two years as specified by the Director of the Office of Management and Budget in approving the waiver. A waiver may be renewed for a subsequent year. After a waiver has been in effect for three consecutive years, the performance plan prepared under section 1115 may propose that a waiver, other than a waiver of limitations on compensation or remuneration, be made permanent.

"(f) For purposes of this section, the definitions under section 1115(f) shall apply.".

SECTION 6. PILOT PROJECTS.

(a) Performance Plans and Reports.-Chapter 11 of title 31, United States Code, is amended by inserting after section 1117 (as added by section 4 of this Act) the following new section:

"Sec. 1118. Pilot projects for performance goals

"(a) The Director of the Office of Management and Budget, after consultation with the head of each agency, shall designate not less than ten agencies as pilot projects in performance measurement for fiscal years 1994, 1995, and 1996. The selected agencies shall reflect a representative range of Government functions and capabilities in measuring and reporting program performance.

"(b) Pilot projects in the designated agencies shall undertake the preparation of performance plans under section 1115, and program performance reports under section 1116, other than section 1116(c), for one or more of the major functions and operations of the agency. A strategic plan shall be used when preparing agency performance plans during one or more years of the pilot period.

"(c) No later than May 1, 1997, the Director of the Office of Management and Budget shall submit a report to the President and to the Congress which shall-

> "(1) assess the benefits, costs, and usefulness of the plans and reports prepared by the pilot agencies in meeting the purposes of the Government Performance and Results Act of 1993;
>
> "(2) identify any significant difficulties experienced by the pilot agencies in preparing plans and reports; and
>
> "(3) set forth any recommended changes in the requirements of the provisions of Government Performance and Results Act of 1993, section 306 of title 5, sections 1105, 1115, 1116, 1117, 1119 and 9703 of this title, and this section.".

(b) Managerial Accountability and Flexibility.-Chapter 97 of title 31, United States Code, is amended by inserting after section 9703 (as added by section 5 of this Act) the following new section:

"Sec. 9704. Pilot projects for managerial accountability and flexibility

"(a) The Director of the Office of Management and Budget shall designate not less than five agencies as pilot projects in managerial accountability and flexibility for fiscal years 1995 and 1996. Such agencies shall be selected from those designated as pilot projects under section 1118 and shall reflect a representative range of Government functions and capabilities in measuring and reporting program performance.

"(b) Pilot projects in the designated agencies shall include proposed waivers in accordance with section 9703 for one or more of the major functions and operations of the agency.

"(c) The Director of the Office of Management and Budget shall include in the report to the President and to the Congress required under section 1118(c)-

> "(1) an assessment of the benefits, costs, and usefulness of increasing managerial and organizational flexibility, discretion, and authority in exchange for improved performance through a waiver; and
>
> "(2) an identification of any significant difficulties experienced by the pilot agencies in preparing proposed waivers.

"(d) For purposes of this section the definitions under section 1115(f) shall apply.".

FIGURE A-1:The Government Performance Results Act (page 6 of 11)

(c) Performance Budgeting.-Chapter 11 of title 31, United States Code, is amended by inserting after section 1118 (as added by section 6 of this Act) the following new section:

"Sec. 1119. Pilot projects for performance budgeting

"(a) The Director of the Office of Management and Budget, after consultation with the head of each agency shall designate not less than five agencies as pilot projects in performance budgeting for fiscal years 1998 and 1999. At least three of the agencies shall be selected from those designated as pilot projects under section 1118, and shall also reflect a representative range of Government functions and capabilities in measuring and reporting program performance.

"(b) Pilot projects in the designated agencies shall cover the preparation of performance budgets. Such budgets shall present, for one or more of the major functions and operations of the agency, the varying levels of performance, including outcome-related performance, that would result from different budgeted amounts.

"(c) The Director of the Office of Management and Budget shall include, as an alternative budget presentation in the budget submitted under section 1105 for fiscal year 1999, the performance budgets of the designated agencies for this fiscal year.

"(d) No later than March 31, 2001, the Director of the Office of Management and Budget shall transmit a report to the President and to the Congress on the performance budgeting pilot projects which shall-

> "(1) assess the feasibility and advisability of including a performance budget as part of the annual budget submitted under section 1105;
>
> "(2) describe any difficulties encountered by the pilot agencies in preparing a performance budget;
>
> "(3) recommend whether legislation requiring performance budgets should be proposed and the general provisions of any legislation; and
>
> "(4) set forth any recommended changes in the other requirements of the Government Performance and Results Act of 1993, section 306 of title 5, sections 1105, 1115, 1116, 1117, and 9703 of this title, and this section.

"(e) After receipt of the report required under subsection (d), the Congress may specify that a performance budget be submitted as part of the annual budget submitted under section 1105.".

SECTION 7. UNITED STATES POSTAL SERVICE.

Part III of title 39, United States Code, is amended by adding at the end thereof the following new chapter:

"CHAPTER 28-STRATEGIC PLANNING AND PERFORMANCE MANAGEMENT

"Sec.

"2801. Definitions.

"2802. Strategic plans.

"2803. Performance plans.

"2804. Program performance reports.

"2805. Inherently Governmental functions.

"Sec. 2801. Definitions

"For purposes of this chapter the term-

FIGURE A-1:The Government Performance Results Act (page 7 of 11)

"(1) 'outcome measure' refers to an assessment of the results of a program activity compared to its intended purpose;

"(2) 'output measure' refers to the tabulation, calculation, or recording of activity or effort and can be expressed in a quantitative or qualitative manner;

"(3) 'performance goal' means a target level of performance expressed as a tangible, measurable objective, against which actual achievement shall be compared, including a goal expressed as a quantitative standard, value, or rate;

"(4) 'performance indicator' refers to a particular value or characteristic used to measure output or outcome;

"(5) 'program activity' means a specific activity related to the mission of the Postal Service; and

"(6) 'program evaluation' means an assessment, through objective measurement and systematic analysis, of the manner and extent to which Postal Service programs achieve intended objectives.

"Sec. 2802. Strategic plans

"(a) No later than September 30, 1997, the Postal Service shall submit to the President and the Congress a strategic plan for its program activities. Such plan shall contain-

"(1) a comprehensive mission statement covering the major functions and operations of the Postal Service;

"(2) general goals and objectives, including outcome- related goals and objectives, for the major functions and operations of the Postal Service;

"(3) a description of how the goals and objectives are to be achieved, including a description of the operational processes, skills and technology, and the human, capital, information, and other resources required to meet those goals and objectives;

"(4) a description of how the performance goals included in the plan required under section 2803 shall be related to the general goals and objectives in the strategic plan;

"(5) an identification of those key factors external to the Postal Service and beyond its control that could significantly affect the achievement of the general goals and objectives; and

"(6) a description of the program evaluations used in establishing or revising general goals and objectives, with a schedule for future program evaluations.

"(b) The strategic plan shall cover a period of not less than five years forward from the fiscal year in which it is submitted, and shall be updated and revised at least every three years.

"(c) The performance plan required under section 2803 shall be consistent with the Postal Service's strategic plan. A performance plan may not be submitted for a fiscal year not covered by a current strategic plan under this section.

"(d) When developing a strategic plan, the Postal Service shall solicit and consider the views and suggestions of those entities potentially affected by or interested in such a plan, and shall advise the Congress of the contents of the plan.

"Sec. 2803. Performance plans

"(a) The Postal Service shall prepare an annual performance plan covering each program activity set forth in the Postal Service budget, which shall be included in the comprehensive statement presented under section 2401(g) of this title. Such plan shall-

"(1) establish performance goals to define the level of performance to be achieved by a program activity;

FIGURE A-1:The Government Performance Results Act (page 8 of 11)

"(2) express such goals in an objective, quantifiable, and measurable form unless an alternative form is used under subsection (b);

"(3) briefly describe the operational processes, skills and technology, and the human, capital, information, or other resources required to meet the performance goals;

"(4) establish performance indicators to be used in measuring or assessing the relevant outputs, service levels, and outcomes of each program activity;

"(5) provide a basis for comparing actual program results with the established performance goals; and

"(6) describe the means to be used to verify and validate measured values.

"(b) If the Postal Service determines that it is not feasible to express the performance goals for a particular program activity in an objective, quantifiable, and measurable form, the Postal Service may use an alternative form. Such alternative form shall-

"(1) include separate descriptive statements of-

"(A) a minimally effective program, and

"(B) a successful program,

with sufficient precision and in such terms that would allow for an accurate, independent determination of whether the program activity's performance meets the criteria of either description; or

"(2) state why it is infeasible or impractical to express a performance goal in any form for the program activity.

"(c) In preparing a comprehensive and informative plan under this section, the Postal Service may aggregate, disaggregate, or consolidate program activities, except that any aggregation or consolidation may not omit or minimize the significance of any program activity constituting a major function or operation.

"(d) The Postal Service may prepare a non-public annex to its plan covering program activities or parts of program activities relating to-

"(1) the avoidance of interference with criminal prosecution; or

"(2) matters otherwise exempt from public disclosure under section 410(c) of this title.

"Sec. 2804. Program performance reports

"(a) The Postal Service shall prepare a report on program performance for each fiscal year, which shall be included in the annual comprehensive statement presented under section 2401(g) of this title.

"(b)(1) The program performance report shall set forth the performance indicators established in the Postal Service performance plan, along with the actual program performance achieved compared with the performance goals expressed in the plan for that fiscal year.

"(2) If performance goals are specified by descriptive statements of a minimally effective program activity and a successful program activity, the results of such program shall be described in relationship to those categories, including whether the performance failed to meet the criteria of either category.

"(c) The report for fiscal year 2000 shall include actual results for the preceding fiscal year, the report for fiscal year 2001 shall include actual results for the two preceding fiscal years, and the report for fiscal year 2002 and all subsequent reports shall include actual results for the three preceding fiscal years.

"(d) Each report shall-

FIGURE A-1:The Government Performance Results Act (page 9 of 11)

"(1) review the success of achieving the performance goals of the fiscal year;

"(2) evaluate the performance plan for the current fiscal year relative to the performance achieved towards the performance goals in the fiscal year covered by the report;

"(3) explain and describe, where a performance goal has not been met (including when a program activity's performance is determined not to have met the criteria of a successful program activity under section 2803(b)(2))-

"(A) why the goal was not met;

"(B) those plans and schedules for achieving the established performance goal; and

"(C) if the performance goal is impractical or infeasible, why that is the case and what action is recommended; and

"(4) include the summary findings of those program evaluations completed during the fiscal year covered by the report.

"Sec. 2805. Inherently Governmental functions

"The functions and activities of this chapter shall be considered to be inherently Governmental functions. The drafting of strategic plans, performance plans, and program performance reports under this section shall be performed only by employees of the Postal Service.".

SECTION 8. CONGRESSIONAL OVERSIGHT AND LEGISLATION.

(a) In General.-Nothing in this Act shall be construed as limiting the ability of Congress to establish, amend, suspend, or annul a performance goal. Any such action shall have the effect of superseding that goal in the plan submitted under section 1105(a)(29) of title 31, United States Code.

(b) GAO Report.-No later than June 1, 1997, the Comptroller General of the United States shall report to Congress on the implementation of this Act, including the prospects for compliance by Federal agencies beyond those participating as pilot projects under sections 1118 and 9704 of title 31, United States Code.

SECTION 9. TRAINING.

The Office of Personnel Management shall, in consultation with the Director of the Office of Management and Budget and the Comptroller General of the United States, develop a strategic planning and performance measurement training component for its management training program and otherwise provide managers with an orientation on the development and use of strategic planning and program performance measurement.

SECTION 10. APPLICATION OF ACT.

No provision or amendment made by this Act may be construed as-

(1) creating any right, privilege, benefit, or entitlement for any person who is not an officer or employee of the United States acting in such capacity, and no person who is not an officer or employee of the United States acting in such capacity shall have standing to file any civil action in a court of the United States to enforce any provision or amendment made by this Act; or

(2) superseding any statutory requirement, including any requirement under section 553 of title 5, United States Code.

SECTION 11. TECHNICAL AND CONFORMING AMENDMENTS.

(a) Amendment to Title 5, United States Code.-The table of sections for chapter 3 of title 5, United States Code, is amended by adding after the item relating to section 305 the following:

FIGURE A-1:The Government Performance Results Act (page 10 of 11)

"306. Strategic plans.".

(b) Amendments to Title 31, United States Code.-

(1) Amendment to chapter 11.-The table of sections for chapter 11 of title 31, United States Code, is amended by adding after the item relating to section 1114 the following:

"1115. Performance plans.

"1116. Program performance reports.

"1117. Exemptions.

"1118. Pilot projects for performance goals.

"1119. Pilot projects for performance budgeting.".

(2) Amendment to chapter 97.-The table of sections for chapter 97 of title 31, United States Code, is amended by adding after the item relating to section 9702 the following:

"9703. Managerial accountability and flexibility.

"9704. Pilot projects for managerial accountability and flexibility.".

(c) Amendment to Title 39, United States Code.-The table of chapters for part III of title 39, United States Code, is amended by adding at the end thereof the following new item:

"28. Strategic planning and performance management 2801".

Speaker of the House of Representatives.

Vice President of the United States and President of the Senate.

FIGURE A-1:The Government Performance Results Act (page 11 of 11)

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Appendix B

Key Contacts

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Responsibilities of Work Locations

Work locations where AQIM is conducted are responsible for the following AQIM activities:

- Analyze the data collected.
- Collect all results monitoring data.
- Develop performance target, using selected indicators.
- Ensure quality data and analysis.
- Enter all data into AQAS.
- Prepare budget documents and reports request by other USDA offices.
- Set program and meeting end-results.

Key Information Sources and Contacts

Agriculture Quarantine Activity System (AQAS)

For assistance using the AQAS web based system contact:

AQAS Helpdesk: (toll free) 866-636-4503
(8:30am - 5:00 pm Eastern Time)

or email the helpdesk at: AQASHelpdesk@aphis.usda.gov

AQAS is available at the following Internet address:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

PPQ Regional AQIM Representatives

Eastern Region (covering most states east of the Mississippi)

Mikell Tanner: 919-855-7317 or email:
mikell.tanner@aphis.usda.gov

Western Region (covering most states west of the Mississippi)

Judy Pasek: 970-494-7580 or email:
judith.e.pasek@aphis.usda.gov

PPQ AQIM Headquarters Office

Michael Pucciarelli: 301-734-5925 or email:
michael.pucciarelli@aphis.usda.gov

Ron Komsa: 301-734-8514 or email:
ronald.komsa@aphis.usda.gov

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Appendix C

Trade Articles

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Use this appendix to obtain information and criteria on risk management. Contained here are the:

- APHIS Trade Risk Analysis Position (**page C-3**), and
- GATT Agreement on the Application of Sanitary and Phytosanitary Measure (**page C-11**)

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Appendix C

APHIS Trade Risk Analysis Position[1]

Introduction

The Animal and Plant Health Inspection Serviced (APHIS) anticipates and responds to U.S. issues that involve animal and plant health, conflicts with wildlife, environmental stewardship, and animal well-being. With our customers and stakeholders, we promote the health of animal and plant resources to facilitate their movement in the global marketplace and to ensure abundant agricultural products and services for American consumers.

An important component of the APHIS mission is to facilitate the safe movement of import and export commodities. APHIS uses risk analysis to make trade decisions in a risk assessment (the scientific evaluation of the biological risks and potential consequences), risk management (a process of determining appropriate mitigation measures to reduce risk), and risk communication (the sharing of risk information). The results of risk analyses provide well supported recommendations to APHIS decision makers to achieve the objective of facilitating safe trade.

The Agreement on Sanitary and Phytosanitary Measure of the General Agreement on Tariffs and Trade requires that countries base their animal, plant, and human health requirements related to trade on relevant international standards. If appropriate standards do not exist, or a country chooses not to use the existing international standards, then the Agreement requires that the regulatory authorities of the importing country base their import requirements on a scientific risk analysis.

Like many in the international trade community, APHIS holds the view that mutually accepted standards will help ensure safe trade that is consistent, fair, enhances economic prosperity and reduces trade tensions. APHIS is committed to an active role in the International Office of Epizootics, the International Plant Protection Convention, and other international standard setting bodies to further the development of risk analysis standards and guidelines.

1 APHIS Trade Committee, Trade Risk Analysis Core Team. 1996

APHIS recognizes that risk analysis is a dynamic process and therefore must retain sufficient flexibility to incorporate scientific advances. APHIS is committed to revising risk analysis procedures, as appropriate, to continually take advantage of the best available science.

The Agreement on Sanitary and Phytosanitary (SPS) Measures of the General Agreement on Tariffs and Trade (GATT) requires members to base their animal, plant, and human health requirements related to trade on an objective analysis of risk. The SPS Agreement also requires that members make their risk analysis procedures transparent and available to other interested members.

To address the issue of transparency under the SPS Agreement, this document provides an overview of the risk analysis process used by the Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture.

APHIS has a long history of practical experience and knowledge related to risk analysis. Considerable time and resources have been invested in refining risk analysis models and techniques as well as developing new ones. APHIS also actively supports and participates in international discussions to further the development of risk analysis standards and procedures related to trade.

APHIS and Risk Assessment

Risk analysis, as defined by APHIS, is equivalent to risk assessment as defined in the SPS Agreement. The APHIS risk analysis definition and subsequent explanations provide additional detail and interpretation of the SPS risk assessment definition.

The SPS Agreement defines risk assessment as:

> “The evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of an importing Member according the sanitary or phytosanitary measure which might be applied, and of the associated potential for adverse effects on human or animal health arising from the presence of additives, contaminants, toxins, or disease-causing organisms in food, feedstuffs and beverages."

APHIS defines risk analysis as a process comprised of risk assessment (the scientific evaluation of the biological risks and potential consequences), risk management (a process of determining appropriate mitigation measures to reduce risk), and risk

communication (the sharing of risk information). The results of APHIS risk analyses provide well supported recommendations to APHIS decision makers to achieve the objective of facilitating safe trade.

APHIS believes its definition is fully consistent with the SPS Agreement. The documentation of this process provides risk analysts with guidance in the preparation of recommendations for decision makers and makes the process more transparent to our trading partners.

APHIS Risk Analysis Principles

APHIS recognizes that there are various approaches to risk analysis. The selection of the approach depends on the particular circumstances associated with the commodity and the current pest or disease information.

Regardless of the approach, APHIS believes that a credible risk analysis process must embody the following principles:

- GATT Consistent
- Science-based
- Well-documented
- Flexible
- Open to Review

GATT Consistent

APHIS risk analysts understand and comply with GATT SPS terms and principles and produce Agency recommendations that can withstand ATT/World Trade Organization (WTO) challenges. Compliance with the SPS Agreement also means that APHIS is committed to using relevant standards of the International Office of Epizootics, the International Plant Protection Convention, or other relevant international or regional organizations recognized by the WTO. Alternatives to the standards may be used when supported by objective risk analyses.

Science-based

Data used in APHIS risk analyses are collected and evaluated using the best available scientific methods. Also, APHIS analysts recognize the importance of describing uncertainty and identifying data gaps. APHIS analysts actively solicit input and review from the scientific community to the extent necessary to confirm the scientific integrity of risk analysis.

Well-documented

Data used in the risk analysis are organized, evaluated, and referenced in a systematic manner and in sufficient detail to allow interested parties to understand the process.

Flexible

Because of the pest and disease situations evaluated using risk analysis, methods that apply to one situation may be irrelevant or misleading in evaluating another. While acknowledging that various methods can be used, APHIS analysts are able to articulate the rationale for the choice of a method. Flexibility also means that the risk analysis process is dynamic and able to accommodate new information and technology.

Open to Review

APHIS acknowledges its responsibility to document the risk analysis process and allow interested parties to provide relevant scientific information and comments on the process and results.

Components of the APHIS Process for Risk Analysis

When initiating a risk analysis because action is proposed, such as a commodity importation or other relevant event, APHIS analysis will identify and record background information and situation-specific details, such as the source of the request, the origin, proposed destination, and intended use for the commodity. The analysis then proceeds following the general process outlined below.

Risk Assessment

APHIS defines risk assessment as the evaluation of the likelihood and the biological and economic consequences of entry, establishment or spread of a pest or disease agent within the territory of an importing country. Risk assessments also consider the degree of uncertainty associated with a proposed action.

The degree of uncertainty depends upon the availability and quality of pest/disease data. An agent for which little is known cannot be as precisely assessed as one for which much more relevant information is available. A high degree of biological uncertainty, because of limited scientific information, may justify conservative estimate. However, APHIS also recognized the importance of updating risk assessments as additional scientific information becomes available.

A risk assessment evaluates the unmitigated pest or disease risk in order to determine if there is sufficient risk to warrant mitigation. The focus is on establishing the existence of biological and economic consequences and the likelihood of their occurrence. In many cases, there is broad agreement concerning this risk, negating the need for formal risk assessment.

Formal risk assessments are conducted when the unmitigated risk is not clearly understood to be wither acceptable or unacceptable. These assessments are also important when assumptions concerning the level of unmitigated risk are challenged or when new information concerning the unmitigated risk has been provided. The assessment of risk at this level typically involves the evaluation of origin, commodity, and destination factors.

Origin Risk Factors: The evaluation of the exports are to estimate the likelihood that agents of sanitary or phytosanitary concern are associated with a commodity importation, including:

- Prevalence of a pest or disease agent in the exporting area
- Geographic and environmental characteristics
- Sanitary and Phytosanitary status of the adjoining or neighboring areas
- Trading partners and practices
- Regulatory infrastructure of the exporting country
- Surveillance system(s)
- Previous risk assessments (including foreign country) on commodity and related commodities from the same origin.

Commodity Risk Factors: APHIS analysts consider information about the commodity to estimate the likelihood of introduction of a particular pest or disease agent. Commodity factor include:

- Type of class of commodity
- Nature of raw material used to produce commodity
- Intended use of the product
- Pest or disease agent survival in transit
- Interception data

Destination Risk Factor: An evaluation of the likelihood and consequences of a particular pest or disease agent surviving, multiplying, establishing, and spreading in the territory of the importing country. Destination factors include:

- Distribution of the commodity
- Availability of susceptible host and/or competent vectors
- Geographical and environmental characteristics

Risk Management

APHIS defines risk management as the process of analyzing and recommending options for mitigating pest and disease agents of concern identified through risk assessment.

In determining appropriate levels of protections, the SPS Agreement requires that countries base their animal, plant, and human health requirements on relevant international standards. If an appropriate standard does not exist or a country chooses not to use an existing standard, then the Agreement requires regulatory authorities of the importing country to base their health requirements on a scientific analysis of the risks to animal, plant, or human health and to share information regarding the analyses with interested parties.

The analysis risk mitigation options may vary due to the differing nature of animal, plant, and human health issues.

Consistent with SPS Agreement, APHIS maintains transparent processes for objectively evaluating new risk mitigation alternatives in situations where an international standard may not exist or may not be appropriate. In evaluating these alternatives, APHIS will consider biological as well as economic factors including, but not limited to, potential damage in terms of loss of production or sales in the event of entry, establishment or spread of a pest or disease; the costs of control or eradication in the territory of the importing Member; and the relative cost effectiveness of alternative approaches to risk eradication.

APHIS recognizes the responsibility of the exporting country to address the importing country's sanitary and Phytosanitary issues of concern. APHIS approves risk management options based on a comprehensive evaluation of the efficacy and feasibility of the option in reducing the likelihood and magnitude of the biological and economic consequences identified in the risk assessment.

Efficacy: The degree to which a mitigation option reduces the likelihood magnitude of adverse biological and economic consequences is a measure of its efficacy. Evaluating mitigation options for efficacy is an iterative process that involves revisiting risk assessment to determine the degree to which risk is reduced by the implementation of the option. In cases where an acceptable efficacious option exists, the efficacy of new options needs to compare favorable with existing options.

Feasibility: The evaluation of mitigation options for feasibility normally focuses on technical, operational, and economical factors affecting the implementation of mitigation options. It is in this level of evaluation that factors relevant to industry needs and practices are considered, as well as the potential for applying new technologies.

This level of evaluation is a responsibility shared primarily by the exporting country and the commercial sector (industry). APHIS assumes that feasibility has been considered when a risk management proposal is offered by the exporting country. The role of APHIS in this

level of evaluation is to assess whether the exporting country is able to meet its obligations and to ensure that undesirable impacts are not placed upon the United States (e.g. at National level).

APHIS recognizes that information to objectively determine tolerable risk levels may not always be readily available. In accordance with the SPS Agreement, APHIS adheres to the premise that it may be necessary to institute provisional sanitary and phytosanitary measures until scientific evidence can be obtained to justify a different position. APHIS is committed to working with relevant parties to obtain and evaluate this information in a timely manner.

APHIS is committed to ensuring that recommended measure are not more trade restrictive than required to achieve their appropriate level of sanitary and phytosanitary protection.

Risk Communication

APHIS defines risk communication as the process of exchanging information concerning risk with interested parties (e.g. domestic and foreign industry groups, foreign governments, consumer groups, and other interested individuals). This includes the active exchange of information throughout the risk analysis process with involved parties and the communication of the conclusions of risk analyses to all interested and impacted parties. This process includes routine interaction with the scientific community to ensure the validity of scientific data, methods, and assumptions.

When risk analysis is used as a basis for promulgating regulations, APHIS meets risk communication goals and transparency obligations by publishing proposed and final rules in the Federal Register. APHIS demonstrates it commitment to transparency by notifying the WTO of any measure which may affect another country's trade.

New proposed regulatory changes published in the Federal Register specify the risks and the requirements which will be imposed to mitigate the risks. After public comments are received and reviewed a decision is made regarding a final result. If comments and input are compelling enough for APHIS to change its position, the proposed rules will be withdrawn and alternative courses of action may be considered. Both the proposed and final rules explain the factors supporting the Agency's choice of mitigation measures, including the Agency's geological concerns and scientific rationale to support the decision.

Conclusion

APHIS considers the product of risk analysis to be risk-based recommendations. Decision makers take those recommendations into account as well as other factors they may consider relevant.

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Appendix C

GATT Agreement on the Application of Sanitary and Phytosanitary Measures[2]

Assessment of Risk and Determination of the Appropriate Level of Sanitary or Phytosanitary Protection.

1. Members shall ensure that their sanitary or phytosanitary measures are based on an assessment, as appropriate to the circumstances, of the risk to human, animal or plant life or health, taking into account risk assessment techniques developed by the relevant international organizations.
2. In the assessment of risks, Members shall take into account available scientific evidence; relevant processes and production methods; relevant inspection, sampling and testing methods; prevalence of specific diseases or pests; existence of pest or disease-free areas; relevant ecological and environmental conditions; and quarantine or other treatment.
3. In assessing the risk to animal or plant life or health and determining the measure to be applied for achieving the appropriate level of sanitary or phytosanitary protection from such risk, Member shall take into account relevant economic factors: the potential damage in terms of loss of productions or sales in the event of the entry; establishment or spread of a pest or disease; the costs of control or eradication in the territory of the importing Member; and the relative cost-effectiveness of alternative approaches to limiting risks.
4. Member should, when determining the appropriate level of sanitary or phytosanitary protection, take into account the objective minimizing negative trade effects.
5. With the objective achieving consistency in the application of the concept of appropriate level of sanitary or phytosanitary protection against risks to human life or health, or to animal and plant life or health, each Member shall avoid arbitrary or unjustifiable distinctions in the levels it considers to be appropriate in different situations, if such distinctions result in discrimination or a disguised restriction on international trade. Member shall cooperate in the Committee, in accordance with paragraphs 1, 2, and 3 of Article 12, to develop guidelines to further the practical implementation of this provision. In

2 GATT Agreement, Article 5

developing the guidelines, the Committee shall take into account all relevant factors, including the exceptional character of human health risks to which people voluntarily expose themselves.

6. [4]Without prejudice to paragraph 2 of Article 3, when establishing or maintaining sanitary or phytosanitary measures to achieve the appropriate level of sanitary or phytosanitary protection, Members shall ensure that such measures are not more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary protection, taking into account technical and economic feasibility.

7. In cases where relevant scientific evidence is insufficient, a Member may provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information, including that from the relevant international organizations, as well as from sanitary or phytosanitary measures applied by other Members. In such circumstance, Member shall seed to obtain the additional information necessary for a more objective assessment of risk and review the sanitary or phytosanitary measure accordingly within a reasonable period of time.

8. When a Member has reason to believe that a specific sanitary or phytosanitary measure introduced or maintained by another Member is constraining, or has the potential to constrain its exports and the measure is not based on the relevant international standards, guidelines, or recommendations, or such standards, guidelines, or recommendations do not exist, an explanation of the reasons for such sanitary or phytosanitary measure may be requested and shall be provided by the Member maintaining the measure

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Appendix D

Samples Of Standard Operating Procedures (SOP'S)

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Introduction

Use the samples in this appendix as models when developing standard operating procedures (SOP) for a work location.

The models include a sample SOP for the following pathways:

- Air-Passenger Baggage(**page D-2**)
- Maritime—Cargo (**page D-3**)
- Northern Border—Vehicle (**page D-7**)

NOTICE

These sample SOP's are examples of FORMATTING only. These examples may contain outdated AQIM facts or procedures. All current SOP's should be reviewed by CBP and USDA for validity and accuracy.

Sample SOP—Air Passenger Baggage

Purpose

To help PPQ become a results-oriented unit that uses information about AQI program performance and pathway risk to make decisions. AQIM will provide "hard" data for risk-based decision-making, and meet the requirements of the Government Performance and Results Act.

Background

The National Performance Review is requiring agencies to objectively measure how well they are achieving their legislative missions. The Government Performance and Results Act requires that agencies develop accurate performance measurements as part of their budget submissions. AQIM is a valuable tool in performing risk assessment and is therefore an integral part of our selectivity approach.

Guidelines

1. Random examinations will be 100 percent hand inspection of all hand and checked baggage by office. Inspections will take place at USDA tables. All seizures shall be bagged and labeled as an AQIM seizure. The seizures shall be thoroughly inspected for pests.
2. All member of a household on the same declaration (6059-B) will be examined and counted as one sample.
3. Every declaration that approaches the work location through the FIS will be considered, excluding diplomats with A-1, A-2 status, and 'domestic' declarations.
4. Sample size: 7,300 declarations per year—3,650 declarations per year at both 'E' and 'B' (10 per day at both 'E' and 'B').
5. AQIM should not interfere with and does not replace normal passenger processing operations. Agriculture Specialists will continue to perform secondary examinations during this sampling period.

Procedures

Random times will be selected each day using SAMPLAN. Random times will be generated using previous weeks' passenger projections. The site monitoring leaders will prepare the daily schedule and notify all working on the baggage floor of the designated times. Inspections shall be rotated among all personnel. At the designated time, the Agriculture Specialist or technician at concourse 'E' responsible for selecting the passenger for inspection shall select the fifth passenger back from the checkpoint. Alternate between all open red and green lines when counting to select the fifth passenger. If the passenger

selected has already been designated to go to PPQ Secondary, the passenger shall also be included in the sample. At concourse 'B' at the designated time, the Agriculture Specialist or technician will select the first passenger that enters the baggage carousel area from immigration. The selected passenger's declaration will be marked with the random time, the work 'random' and 'USDA' with a green marker. If a random inspection is missed, a passenger may be selected using the above procedures any time prior to the next random inspection. Make a note on the data form each time an inspection is missed. Include a brief note as to why the inspection was missed.

Data Collection and Entry

1. Complete the PPQ Data Sheet for each examination.
2. Data forms will kept in a folder at the desk in PPQ secondary. Forms shall be taken to the operations office daily. Personnel assigned to the work unit shall share the task of data entry. The site leaders shall be responsible for ensuring data entry is completed within a reasonable time after inspection.

Quality Control

The Risk Management Team will ensure forms are collected and data entered. Bi-weekly reports will be forwarded to the work sites by the Team on the progress of the monitoring program.

Sample SOP—Maritime Cargo

Choosing And Inspecting The Sample

Exclusions:

- Commodities which are pre-cleared at foreign sites
- Frozen commodities, and those undergoing some type of mandatory treatment (for example: fumigation, irradiation, hot water, steam sterilization)
- Oil, salt, iron ore, coal, etc. which pose no risk
- Non-Reefer-AQI Interest that can be cleared with just a paperwork review

Exceptions: Mandatory cold treatments are **included.**

Sampling Unit: The random sampling unit is one container or container unit. A container unit is equivalent to 20 pallets or 20,000 kilograms for the purposes of AQI Monitoring when converting bulk shipments for sampling.

Reefer-AQI Interest (Refrigerated cargo normally held by PPQ)

There will be a total of 87 sample containers or container units chosen per year. This will break out to around eight per month, or two per section per month. The two for each section will be chosen on designated days of the month, about every 2 weeks. The procedure for choosing the samples will be as follows:

- Use the 'calendar chart' supplied to determine the day the sample will be chosen.
- All of the active '212's' (Hold Sheets) in the section will be used for sampling.
- Put all the 212's in a pile and count the total number of pages (like it is one big hold sheet).
- Take this number and go to your 'Random Digit Page' (this number will represent the maximum number you can choose from 1-18? Or 1-32?).
- Go down the random digit page and select the first number that is within this range.
- Use this number as the 'page number' to turn to in your pile of 212's to begin sampling.
- Put all the other 212's behind this 'chosen' 212 and start reviewing the containers.
- Look for the first refrigerated container or container units you come to as you go down the sheet.
- Turn to the next page if necessary (or to the next 212 behind the one you are reviewing).
- When you have located the 'reefer' container, verify that it is not under an exclusion.
- If no exclusion, indicate "Random Sample Reefer AQI Interest" on the line next to it.
- Notify section personnel of the 'hold' and fill in information on 'Random Sample Chart.'

These containers will be stripped 100 percent, at one of the CES sites of an off-port warehouse approved by management. The number of cartons required for inspection will be determined using the hypergeometric table and random selection of those cartons will be emphasized.

Non-Reefer AQI Interest: (Non-Refrigerated Cargo normally held by PPQ)

There will be a total of 87 sample containers or container units chosen per year. This will break out to around eight per month, or two per section per month. The two for each section will be chosen on designated days of the month, about every 2 weeks. The procedure for choosing the samples will be as follows:

- Follow the same procedures as stated above for 'Reefer' containers.
- If a container or container unit can be cleared by reviewing documents, then **choose** another container or container units.

These container units will be inspected based on the commodity, if it is regulated or not. If it is regulated, follow the 100 percent stripping procedures above. If it is unregulated, the normal inspection procedures will apply, but a more intense exam is expected. Strip 100 percent if it is a mixed load.

Hypergeometric Table for Risk-Based Sampling

A table used to determine the number of boxes an Agriculture Specialist must inspect, to reach a certain level of confidence (expressed in a percentile), that the Agriculture Specialist will find a pest, at a certain percentage of infestation rate. AQIM has chosen to use risk-based sampling protocols for detecting 10 percent pest infestation rates. This means, to be 95 percent sure that the Agriculture Specialist inspecting the sample container will find the pest when the shipment is infested at a 10 percent infestation level, the Agriculture Specialist must select at random, a specific number of boxes in the shipment. The number of boxes is determined by using the hypergeometric table.

Inspection Protocol

The inspection protocol will depend on the type of strata a container falls into. Each container is required to have a physical inspection of the commodity. Inspections shall be conducted during normal business hours at the port. Costs for overtime clearance will be paid by the shipper/broker/consignee.

The ***Reefer-AQI Interest*** will be a 100 percent strip, with the number of boxes required for inspection to be determined using the hypergeometric table (remembering that the randomness of each box chosen is very important). The container may be move to a CES site or off-port warehouse location approved by management.

The ***Non-Reefer AQI Interest*** container will be inspected based on the commodity. If it is a regulated commodity* a 100 percent strip will be done using the hypergeometric table. If it is unregulated, the normal inspection procedures may be used, but requires a more intense examination. If it is a mixed load, you will have to follow the most restrictive mode of inspection. ***An Important Note:** A non-reefer AQI interest container that can be cleared by reviewing documents, should be disregarded for monitoring purpose and another container chosen.

Documentation

During the trial period of this 'new' random sampling procedure, members of the Risk Management Team will be performing the duties involved in choosing and inspecting most of the random samples. This will be necessary so that team members can attempt to refine the process, so that it may be incorporated smoothly into a work site or section's daily function, allowing section personnel to easily and routinely perform these duties on their own in the near future.

Documentation will include: Choosing and holding random samples on the 212 or Hold Sheet; logging details about the sample chosen on a 'Random Sample chart' (including vessel, container number, date, B/L for reference, and possibly a random sample number, date held, date inspect); CES or warehouse transport form (if a container is required to be moved and stripped in another location); and finally the 'Inspection Result' forms for each strata sampled.

Charts And Forms Required

There will be certain charts and forms required by the Agriculture Specialist performing the 'random sampling' procedure. Some of them have been already provided and some will be created to specifically answer a particular need. The following is what will be necessary to bring with you:

To choose the sample:	Calendar Chart
	Random Digit Page
	Random Sampling Chart
	CES or Warehouse Transport Form
To inspect the sample:	Random Sampling Chart
	CES or Warehouse Transport Form
	Inspection Result Form (for the appropriate strata)

Samples SOP – Northern Border—Vehicles

Ensuring Random Sampling

In order to ensure that the vehicles selected are truly random. The Agriculture Specialist will sample a vehicle that arrives at the primary customs booth in 15 minute time will be inspected. If no vehicle is at the booth when the sampling time occurs, the very next one to arrive will be selected. The 15 minute cycle then begins after the selection of the previous vehicle is completed.

If more than one primary lane is open, the inspection will alternate between each lane on a successive basis.

Degree of Inspection

All randomly selected vehicles will undergo the 7 point inspection process.

All agriculture material intercepted during the border survey will be inspected. If the material is fruit, it will be brought back to the office and sliced up. The peel will also be inspected for scale insects or plant diseases.

Any plants seized during this time will also inspected. Leaves will be looked at under a microscope, as will stems, flowers, etc.

Any bulk materials seized (i.e., bags of rice, seeds, etc.) will be brought back to the lab and also put under a microscope. The entire contents of a bag will be emptied into another container and sifted through. If there are numerous bags, an appropriate number will be sampled.

Local Area

The local area will be considered 50 miles. All material seized from local travelers will be included in the survey.

TABLE D-1: Schedule of Random Sample Times Month

Month	Day	Week	Shift	Actual Date	Hours
January	Tuesday	3	2	21st	1400-2230
February	Sunday	2	1	9th	0700-1530
March	Wednesday	2	1	12th	0800-1630
April	Friday	3	1	18th	0600-1430
May	Thursday	1	3	1st	2300-0730
June	Wednesday	4	2	25th	0700-1530
July	Sunday	3	1	20th	0800-1630
August	Monday	4	2	25th	1500-2330
September	Saturday	2	1	13th	0600-1430
October	Monday	1	1	6th	0700-1530
November	Tuesday	4	1	25th	0800-1630
December	Friday	1	1	6th	0600-1430

Appendix E

Quality Assurance Questions

Introduction

This Appendix contains a checklist (**Figure E-1**)of questions that should be used to review the status of monitoring activities at work locations. Local port managers and local AQIM coordinators should periodically answer these questions to ensure proper monitoring of each designated pathway at their work locations.

1. What is being done to ensure that the samples are as random as possible?
   - ❒ Is a Standard Operating Procedure (SOP) for AQIM at the port developed, updated and available to employees?
   - ❒ What process is used?
   - ❒ What is being done to limit bias?
   - ❒ What difficulties are encountered in ensuring randomness?
   - ❒ How are these difficulties being dealt with?
2. How are samples selected so that they are proportional to the approaching population?
   - ❒ What is done to ensure that all of the appropriate population (i.e., passengers, vehicles or cargo) have a chance to be selected?
   - ❒ What system is used to select times for selecting samples?
   - ❒ How is timing of sample selection adjusted so busy times have proportionally more samples?
3. What is done to ensure that all samples are properly inspected (100 percent inspection of non-cargo baggage/mail; ensuring hypergeometric cargo inspection process is used where applicable)?
4. How are AQIM QMI's separated and marked?
5. How are QMI's inspected for pests?
   - ❒ If pests are found, what system is in place to ensure the pest interception number from the PPQ Form 309 is entered as part of the monitoring record?
   - ❒ How often is contraband fruit inspected for pests?
   - ❒ Is ALL the contraband completely searched for multiple pests?
6. Review of data:
   - ❒ Are current data worksheets and instructions used?
   - ❒ Who coordinates and ensures AQIM data entry? How is consistency ensured?
   - ❒ Is the data entry up-to-date?
   - ❒ How often is data checked for errors?
   - ❒ What does the available gap analysis information show about AQIM and port operations?
   - ❒ How reasonable are the initial results?
   - ❒ What is the port doing with the information?
7. What is the level of support at the port?
   - ❒ What is the level of understanding and support shown by the port director and supervisors?
   - ❒ Is sufficient time available for the AQIM Coordinator to do the job?
   - ❒ What is the level of understanding and support of AQIM shown by officers?
   - ❒ What could be done to improve the level of support?
8. General questions:
   - ❒ What aspects of monitoring have been the most difficult to implement? What has been done to improve the situation?
   - ❒ What changes have been made in daily operations as a result of monitoring?
   - ❒ What are the responses to the training and explanatory material provided? What could be improved? Is more training needed? Has training been requested via proper protocols?

FIGURE E-1: A Checklist of Monitoring Review Questions

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