

# Readiness of New England Dairy Farms for SMS: A Snapshot, 2014

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by  
**Richard P. Horwitz, Ph.D.**  
Consultant

Prepared for the  
United States Department of Agriculture,  
Animal and Plant Health Inspection Service (USDA-APHIS)  
and  
the New England Animal Agricultural Security Alliance (NESAASA)  
under  
Cooperative Agreement Number 13-9644-1245CA (FFY 2013)

**August 1, 2014**

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## BACKGROUND

One of the most effective ways to control the spread of highly contagious or zoonotic disease (FAD, “Foreign Animal Disease”) is to restrict traffic that could carry it. That is among the reasons that state and federal officials in the U.S. can issue “Stop Movement” orders, to halt trucks that could transmit disease as they transport animals or animal products from farms to market.

In the event of an outbreak of Foot-and-Mouth Disease (FMD), current response plans in the U.S. (e.g., [The Red Book](#)) include suspension of all shipments of unpasteurized (“raw”) milk within areas designed to corral infection (“Control Areas”). Insofar as warranted, exceptions – as through a [Permit for Movement of Unpasteurized Milk from a Farm to a Processing Plant](#) – may be authorized by an Incident Management Team (IMT, also known as “Incident Command”). Planned requirements for such a permit include evidence that the farm is eligible (e.g., free of disease or suspicion of infection) and that service vehicles (e.g. tires and undercarriage) will be decontaminated. Biosecurity will have to measure up to [Secure Milk Supply \(SMS\)](#) standards.

In practice, more specific requirements (the precise conditions that farms must meet to qualify for a Permit) may vary with circumstances on-the-ground, such as the severity of the outbreak, its phase, and resources available for response. For example, if infection is purely local (confined to a small, isolated Control Area) and resources plentiful, the IMT is apt to require more stringent protections than if infection and response are already continental in scope.

Because a permitting process would have to be implemented rapidly, the New England states developed a model with standard measures of SMS capability. They have been using it to assess each farm in the region, to calculate and to record its composite “Readiness Rating.” (See [Model for Rating Producer Readiness](#) and [Weighted Criteria for Rating Producer Readiness](#).) Principles and procedures for using these measures to sustain regional dairy operations have been elaborated in the [New England SMS Plan](#), exercised, and endorsed by [MOU](#) among the six states.

According to the [Plan](#), in a FMD outbreak the IMT (e.g., via recommendation of a Permits Group in the Operations Section) will identify a minimum Readiness Rating that under existing conditions would best balance inherently competing objectives: to reduce risk of disease spread (by barring milk pickup from some farms) and to promote continuity of dairy operations (by allowing milk pickup from others).

A key challenge for both FMD control and continuity of dairy operations, then, is selecting farms (their qualifications and the particular premises) that can and cannot receive a Permit. State animal health officials in the region are prepared to use Readiness Ratings to help with that task: An eligible operation may qualify for a Permit if its Readiness Rating equals or exceeds the IMT-authorized minimum. The IMT will designate a specific minimum that, in light of circumstances at the time, best distinguishes farms that present acceptable (vs. unacceptable) prospects of balancing disease-control and business-continuity objectives.

Caveat: The following generalizations apply only to New England and data available at this time. They assume that a Control Area may include all licensed farms in the region, even though in an actual outbreak some farms may well be ineligible or their assessment inadequate and the Control Area may be larger or smaller than the bounds of any or all of the six states.

With that caveat, the following snapshot of dairy production and biosecurity capacities in New England is intended to help anticipate ways that various minimum Readiness Ratings would affect SMS Permitting for continuity of dairy operations in a FMD Control Area.

## SUMMARY

This report is a select snapshot of current dairy production and biosecurity capabilities in New England. It is intended to help assess prospects for continuity of dairy operations during a FMD outbreak, using various minimum Readiness Ratings to distinguish farms that qualify for a Permit for milk pickup in a Control Area.

Among New England dairy farms that have been assessed to date, the average Readiness Rating is 0.6, indicating that producers' ability to meet SMS standards is respectable but far short of ideal. (Weights assigned to Readiness criteria are currently being updated, with the help of epidemiologists in USDA-APHIS. As detailed in the appendix, average Ratings in the region will increase slightly when the update is complete.)

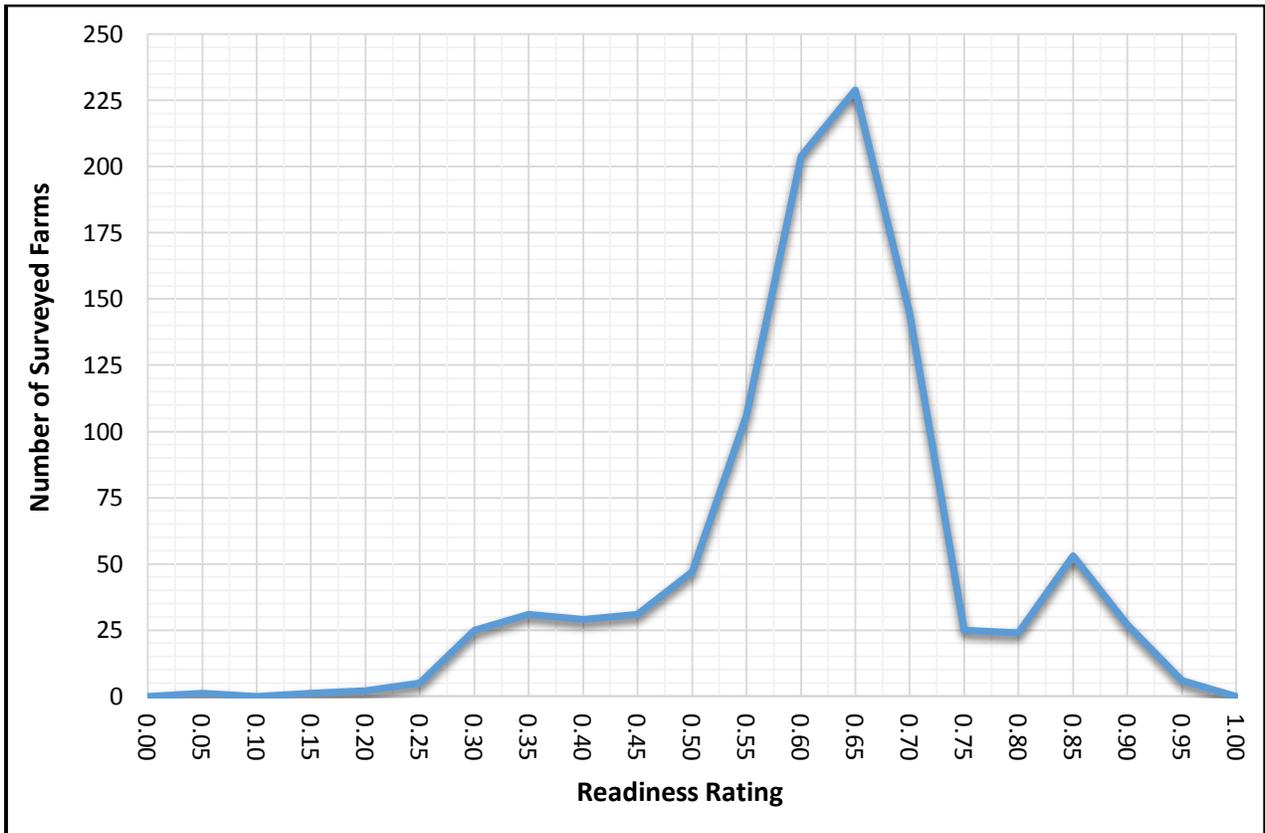
Readiness Ratings in the region do not significantly vary by farm size. In general, large and small operations are equally represented among those achieving high (and low) Ratings. So, a reliance on Ratings for issuing Permitting should not be expected to favor one size of farm over another.

The selection of any particular minimum Readiness Rating could be expected to similarly affect the share of dairy farms and the share of regional production that would be sustainable in a FMD outbreak.

FREQUENCY DISTRIBUTION

**Among New England dairy farms surveyed to date (June, 2014), the average Readiness Rating is 0.60, indicating that producers' ability to meet SMS standards is respectable but far short of ideal.**

Number of Surveyed Farms by Their Readiness Rating



Mean Rating	0.596
Standard Deviation	0.134
Median Rating	0.605
Range of Ratings	0.817
Lowest Rating	0.130
Highest Rating	0.946
Number of Rated Farms	1021
Total Number of Farms in Database	1721
Share of Farms Surveyed To Date	59.3%

## DISCUSSION OF FREQUENCY DISTRIBUTION

By design, Readiness Ratings range on a normalized scale, from 0.0 (meaning unable to meet any SMS biosecurity requirements) to 1.0 (with a full set of biosecurity precautions already verified in place). Setting a minimum Readiness Rating of 0.60 (the average) would qualify only half of the surveyed farms for a Permit.

A case could easily be made, however, for using 0.50 as the minimum. For most components of the Readiness Rating (the particular precautions that figure in its calculation), a farm would receive a score of 0.50 if it could on its own implement the required precautions within a day or two of notification. So, a composite Rating of 0.50 suggests that ideal precautions could be in place in time for most regularly scheduled pickups. Continuity of operations would be protected. In fact, the vast majority of farms (80%) have a Readiness Rating of at least 0.50. That number is consistent with the impression, widely shared among regulators and producers themselves, that with few exceptions (likely even less than 20%) dairy farmers could be counted on in an emergency to do whatever is required to care for their cattle and stay in business, if their herd and the market remained healthy and if regulatory requirements were clear.

Under appropriate conditions, the minimum could well be set yet lower (e.g., 4.0, as state animal health officials chose in the 2013 exercise of the Plan), increasing the chance that dairying could continue and that other risks of interrupted commerce (e.g., to animal welfare, consumer supply, and environmental protection) could be reduced.

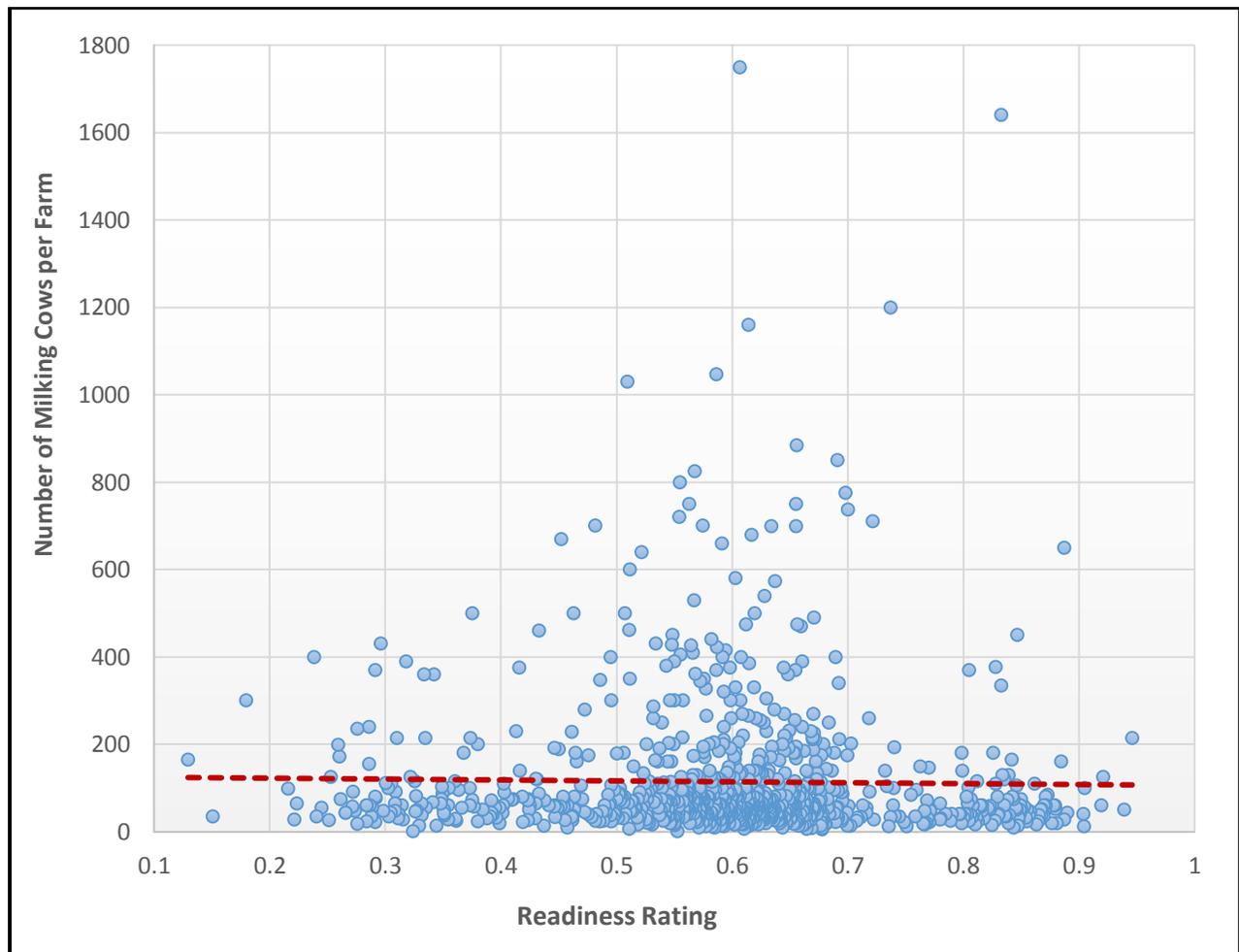
On the other hand, if evolving SMS standards were to require advance documentation that current ideals or yet more stringent biosecurity measures were already in place, not a single dairy farm in New England would currently qualify for a Permit. Less than one in ten even comes close (a Rating of 0.80 or higher).

Overall preparation from this point of view is respectable in the region, but with room for significant improvement.

## READINESS AS A FUNCTION OF FARM SIZE

**Readiness Ratings in the region do not significantly vary by farm size. In general, large and small operations are equally capable of achieving a high (or low) Rating. So, a reliance on Ratings for issuing Permitting should not be expected to favor one size of farm over another.**

Size of Dairy Herds in New England by the Farm's Readiness Rating



Pearson Correlation Coefficient ( $r$ )	-0.017
Statistical Significance ( $p$ -value)	0.581
Coefficient of Determination ( $r^2$ )	0.0003
Observations	1021

## DISCUSSION OF READINESS AS A FUNCTION OF FARM SIZE

A common complaint about government regulations, such as permits to do business, is that they can, in effect, constitute a regressive tax. If, for example, compliance requires a standard cost per premises, economies of scale can make the cost easier for bigger businesses to bear. However, judging from recent data on New England dairying, planned requirements for SMS Permitting do not have such a bias. In particular, the reliance on Reading Ratings for issuing Permits – regardless of the specific minimum – does not favor one size of farm over another.

As the chart above clearly shows, Readiness Ratings in the region do not significantly vary by farm size. So, throughout New England, large and small operations are equally capable of achieving a high (or low) Rating.

Note, for example, that the trend line in the chart is startlingly flat. The extraordinarily low correlations coefficient ( $r = -0.017$ ) indicates that there is no or negligible linear relationship between farms size and Readiness Rating. Likewise, even if less linear relations were counted, the statistical significance (p-value) remains very high, close to 60%. Likewise, the extremely low coefficient of determination ( $r^2 = 0.0003$ ) indicates that Readiness Ratings share less than 0.03% of their variability with the variability in the number of cows on the farm.

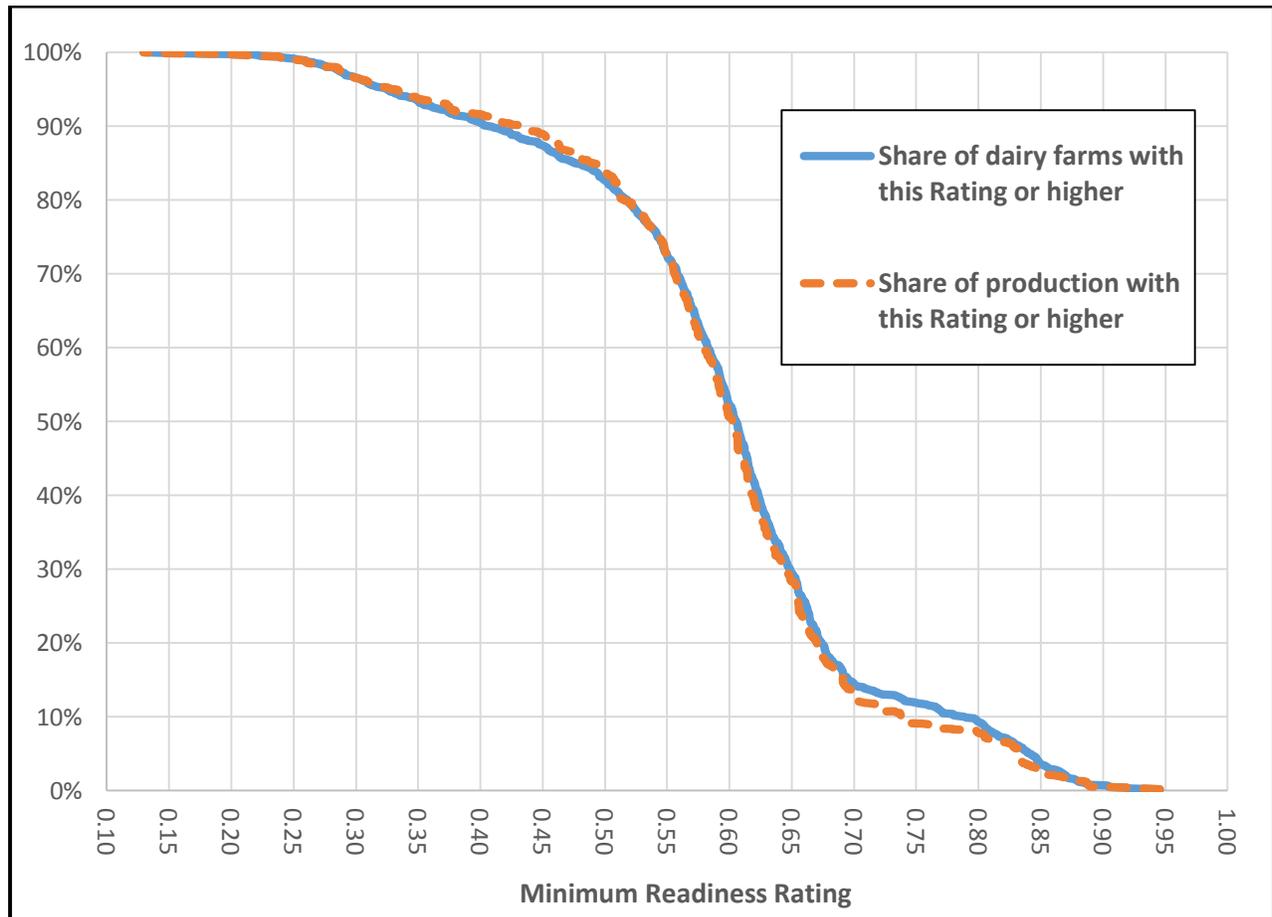
In other words, bigger farms would not have any significant advantage over smaller ones (or vice versa) in qualifying for a permit based on any Readiness Rating.

These data also suggest that the share of the total number of farms above a minimum rating is likely to be approximately equal to the total share of regional production from those farms, at least when the sample is large. That suggestion is very much confirmed in the following analysis.

## FARM AND PRODUCTION SUSTAINABILITY BY MINIMUM READINESS RATING

**The selection of any particular minimum Readiness Rating could be expected to similarly affect the share of dairy farms and the share of regional production that would be sustainable in a FMD outbreak.**

. . . . in New England



Mean Rating	0.596
Median Rating	0.605
Range of Ratings	0.817
Lowest Rating	0.130
Highest Rating	0.946
Number of Rated Farms	1021
Total Number of Farms in Database	1721
Share of Farms Surveyed To Date	59.3%

## DISCUSSION OF FARM AND PRODUCTION SUSTAINABILITY BY MINIMUM READINESS

The chart above (current at the end of June, 2014, just before a small change in weighting of Readiness criteria) is intended to help anticipate the sustainability of dairy operations as a function of the minimum Readiness Ratings selected for Permitting milk shipments. “Sustainability” in this case means the share of regional dairying (as indicated by the number of farms and cows that they milk – and hence, dairy production) that could be expected to continue, despite emergency movement restrictions. The IMT could use such a chart as a rough gauge of the continuity-of-business benefits for various minimum Readiness Ratings.

Judging from current, documented capabilities, the selection of any particular minimum Readiness Rating would affect about the same share of farms and of regional production. In other words, about the same percent of the total number of farms and of total milk production in the region could be sustained with a given minimum Readiness Rating.

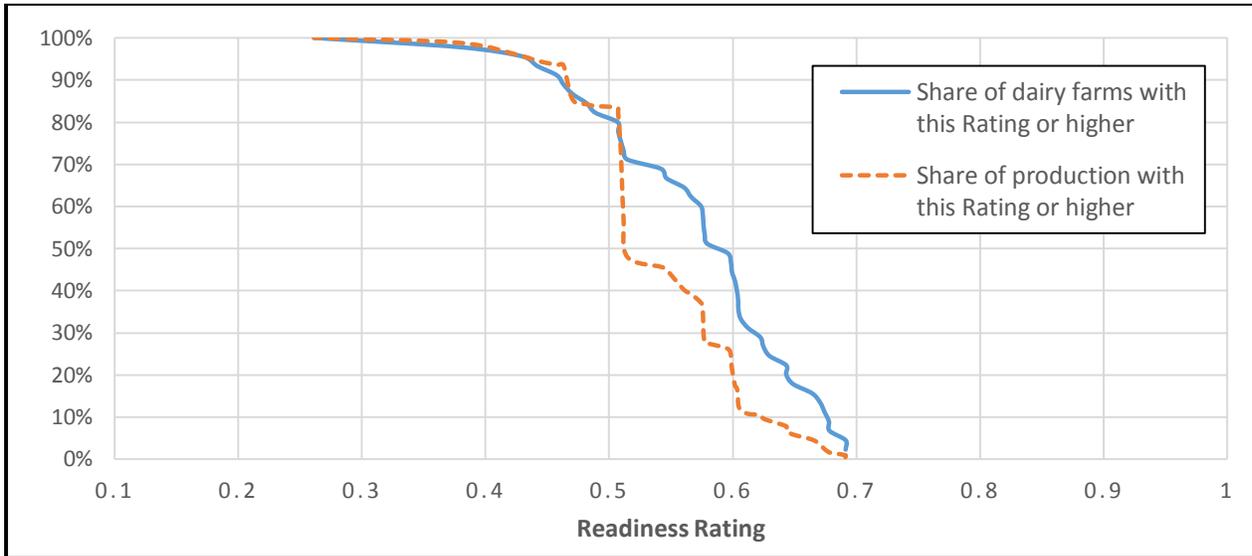
Of course, this chart is limited by the same caveat as the others. In particular, it could be less reliable in anticipating sustainability as on-farm conditions change in the future (e.g., with improving biosecurity), as regional farms are more completely documented, or as SMS standards themselves change. (See, for example, “Updating Weights of Criteria in the Readiness Rating” appended to this document.)

Maybe most of all, the specific values charted here may differ in a future outbreak if the number of eligible farms or the location and size of the Control Area were different. As the following charts show, comparable statistics (including the relationship between the minimum Readiness Rating and sustainability of farms vs. production) vary at least a bit from state to state even now.

In general, the smaller the Control Area (and fewer eligible farms) the more important it would be to set a minimum Readiness Rating by generating new charts of their likely impact on sustainability under actual conditions at the time. Likewise, the closer the actual Control Area comes to encompassing all of New England (and the larger the number of eligible farms) the more likely that the chart above would be an adequate predictor of dairy sustainability.

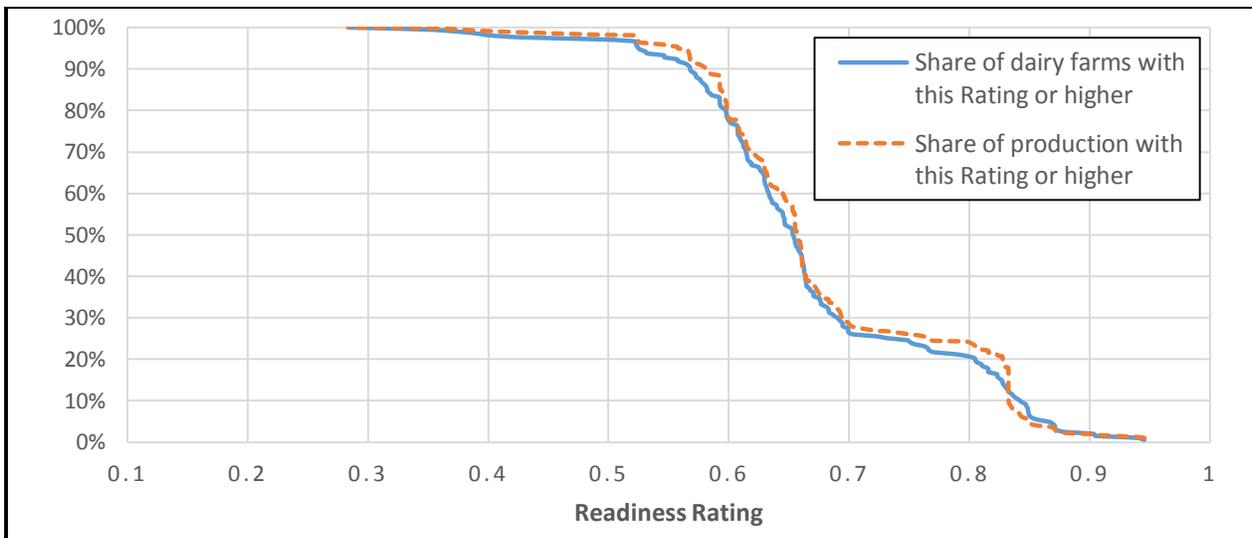
Below are similar charts for each New England state (also current at the end of June, 2014, just before a small change in weighting of Readiness criteria) that suggest modest intra-regional variation.

... in Connecticut



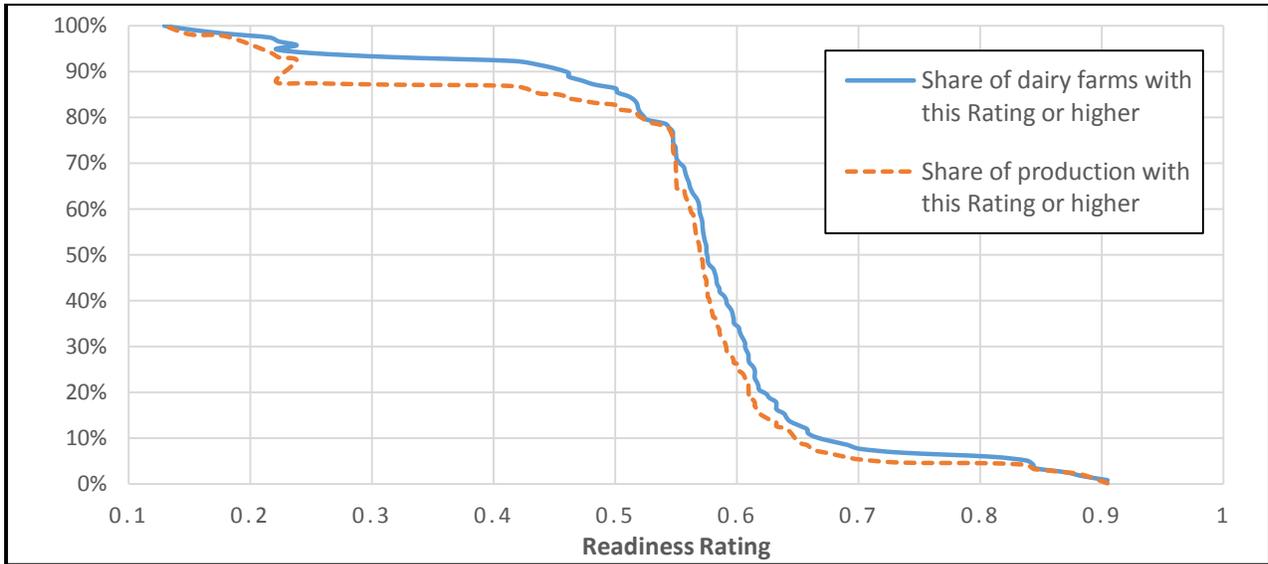
Mean Rating	0.567
Median Rating	0.579
Range of Ratings	0.430
Lowest Rating	0.261
Highest Rating	0.691
Number of Rated Farms	45
Total Number of Farms in Database	138

... in Maine



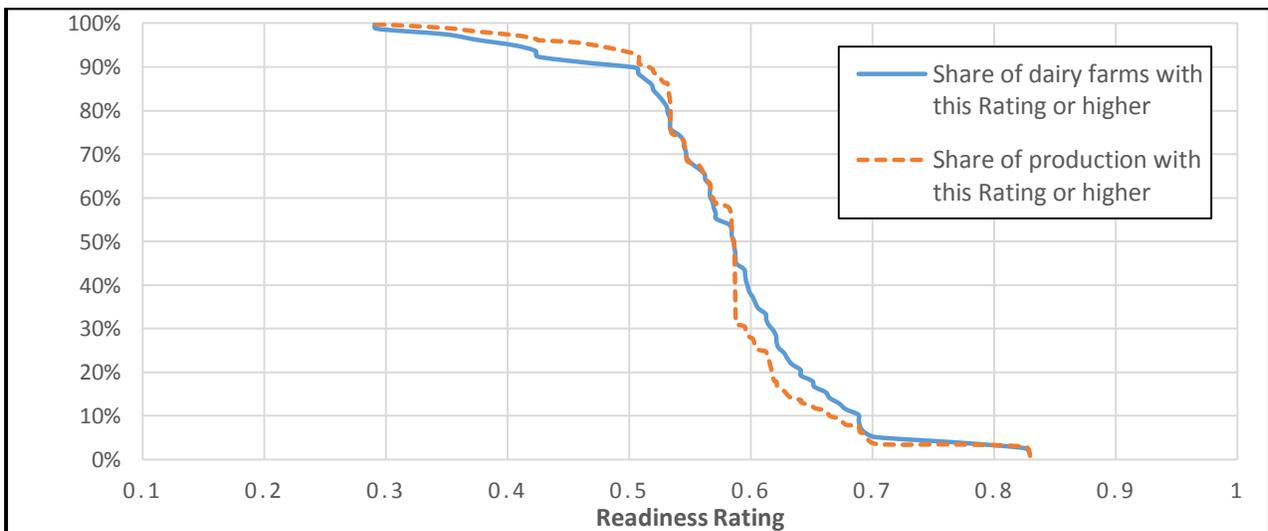
Mean Rating	0.670
Median Rating	0.653
Range of Ratings	0.662
Lowest Rating	0.284
Highest Rating	0.946
Number of Rated Farms	208
Total Number of Farms in Database	297

... in Massachusetts



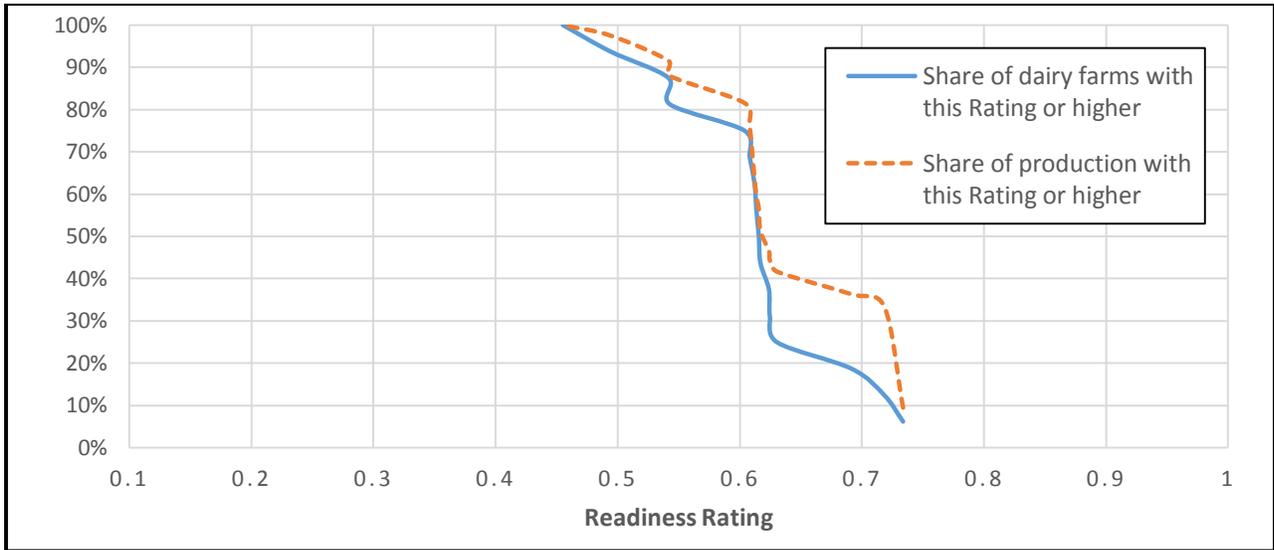
Mean Rating		0.566
Median Rating		0.575
Range of Ratings		0.776
Lowest Rating		0.129
Highest Rating		0.905
Number of Rated Farms		117
Total Number of Farms in Database		170

... in New Hampshire



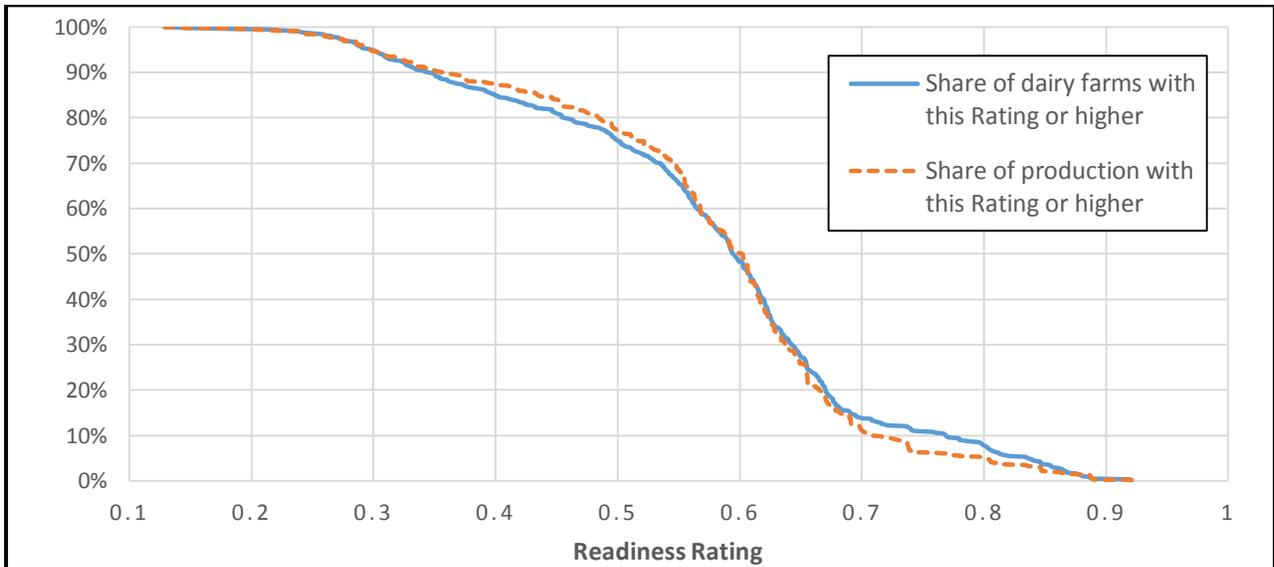
Mean Rating		0.578
Median Rating		0.586
Range of Ratings		0.538
Lowest Rating		0.291
Highest Rating		0.829
Number of Rated Farms		78
Total Number of Farms in Database		130

... in Rhode Island



Mean Rating	0.608
Median Rating	0.615
Range of Ratings	0.279
Lowest Rating	0.456
Highest Rating	0.735
Number of Rated Farms	16
Total Number of Farms in Database	16

... in Vermont



Mean Rating	0.575
Median Rating	0.595
Range of Ratings	0.792
Lowest Rating	0.129
Highest Rating	0.921
Number of Rated Farms	563
Total Number of Farms in Database	970

APPENDIX: Updating Weights of Criteria in the Readiness Rating

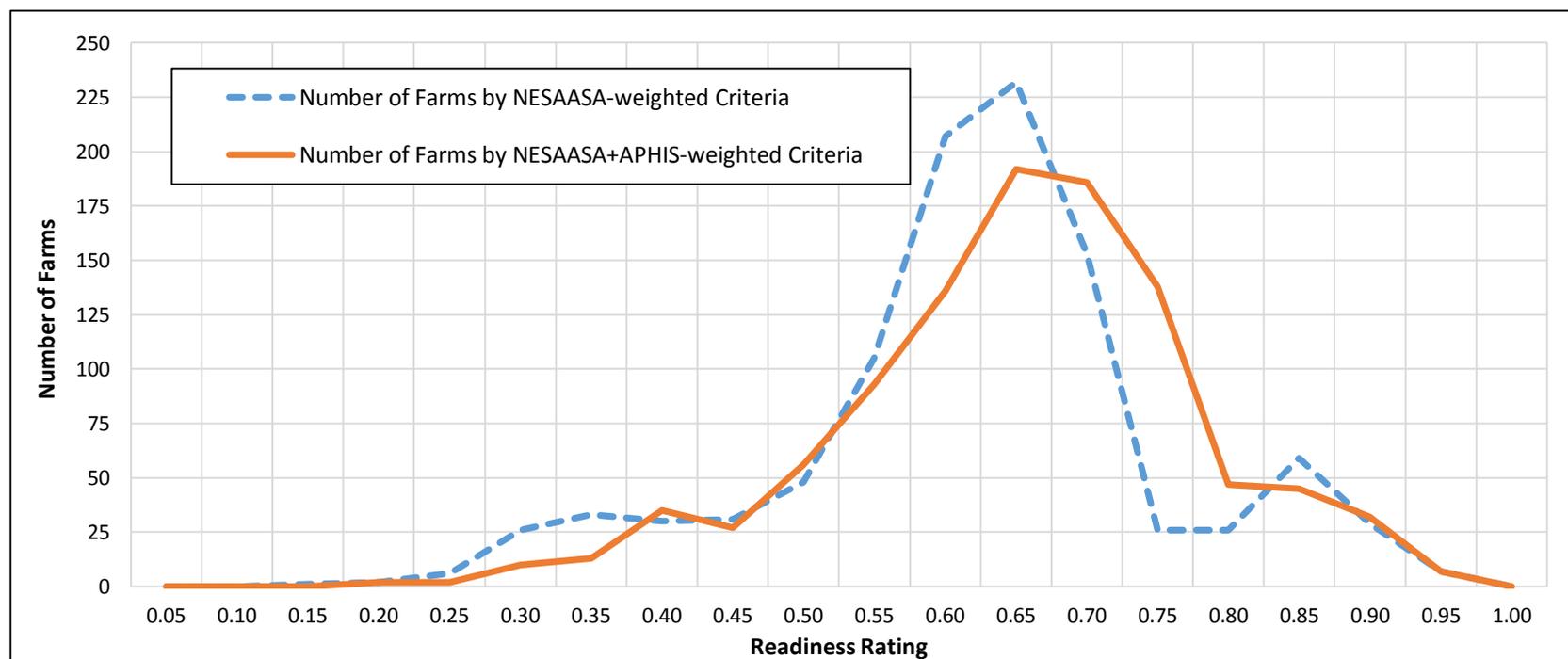
In 2012, the members of the [New England States Animal Agricultural Security Alliance \(NESAASA\)](#) assigned weights to SMS biosecurity criteria for purposes of calculating Readiness Ratings. In 2014, NESAASA welcomed the contribution of another, independent round of weighting of those criteria volunteered by four USDA-APHIS epidemiologists. Following an exercise of the plan (May, 2014), NESAASA decided to use the weights that represent the combined judgment of regional and national experts.

Criteria for determining farm "Readiness" for milk pickup in a FMD emergency		NESAASA Only	APHIS Only	COMBINED
<b>Security of the farm perimeter</b>		<b>19.00%</b>	<b>19.12%</b>	<b>19.08%</b>
	Distance to the nearest neighbor with susceptible stock	3.59%	3.23%	3.51%
	Employees also working on another farm with FMD-susceptible animals	6.29%	5.55%	6.13%
	Gate to restrict access to farm or livestock areas	4.58%	4.35%	4.55%
	Signs with biosecurity advice for visitors	1.02%	1.07%	1.04%
	Potential for milk pick-up from outside the farm perimeter.	3.51%	4.91%	3.84%
<b>Sanitation of the route from the public roadway to the milk bulk tank</b>		<b>25.59%</b>	<b>17.45%</b>	<b>23.22%</b>
	Control point at farm entry	17.73%	8.13%	15.11%
	Clean lane	7.86%	9.31%	8.11%
	Lane free of agricultural run-off (e.g., from pens and pasture)	3.56%	4.47%	3.72%
	Separation between the lane for milk pickup and the routes of other farm traffic	3.15%	3.31%	3.16%
	Separation from cattle crossing	0.85%	1.07%	0.89%
	Separation from manure hauling	0.76%	0.63%	0.73%
	Separation from livestock shipments	0.84%	0.89%	0.85%
	Separation from feed delivery	0.34%	0.40%	0.35%
	Separation from employee parking	0.16%	0.16%	0.16%
	Separation from visitor parking	0.19%	0.16%	0.18%
	Permeability of travel surfaces	1.15%	1.54%	1.23%
<b>Capacity to clean and disinfect dairy traffic</b>		<b>55.41%</b>	<b>63.43%</b>	<b>57.71%</b>
	Functioning foot baths	7.74%	9.79%	8.30%
	Functioning wash station	25.28%	31.43%	26.85%
	Site for a wash station	10.24%	6.10%	9.39%
	Large enough	1.75%	2.56%	2.00%
	Separate from farm run-off	4.62%	1.24%	3.75%
	Not draining directly into a wetland or waterway	1.15%	1.25%	1.24%
	Able to contain waste wash water	2.72%	1.06%	2.39%
	Equipment and supplies for a wash station	12.15%	16.11%	13.18%

### Readiness Ratings of Licensed Dairy Farms in New England

	NESAASA-Weighted Readiness Ratings	NESAASA+APHIS-Weighted Readiness Ratings
Mean	0.596	0.626
Median	0.605	0.635
Mode	0.612	0.701
Standard Deviation	0.135	0.125
Range	0.817	0.793
Minimum	0.129	0.156
Maximum	0.946	0.949
Count	1021	1021

### Frequency Distribution: Number of Farms by Readiness Rating, 2014



### Cumulative Frequency: Dairy Continuity by Minimum Readiness Rating

