
State Water Resources Control Board

The Office of Information Management and Analysis

Analytics Memo Series

Performed by the Data Integration and Analysis Unit (Bennett/Maag)

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California Dairy Quality Assurance Program Fee Discount Analysis

Objective

This paper will present an analysis of the California Dairy Quality Assurance Program (CDQAP) fee discount and its correlation, if any, to the regulatory performance of dairies and the Water Board's cost to regulate dairies.

Background

Dairies regulated by the Water Boards receive a 50% discount on their annual fees if their facility is certified through CDQAP's Environmental Stewardship Program. The Environmental Stewardship Program helps dairy operators understand environmental regulations, familiarizes them with best management practice options, and supplies detailed record-keeping tools for both regulatory purposes and for farm management. Dairies that incorporate the Environmental Stewardship Program principles into the daily operations of the facility should present a lower threat to water quality, thereby requiring less regulatory oversight by the Water Boards. The resulting savings in Water Board regulatory resources is passed on to the dairy through the fee discount. The fee discount is also a means of incentivizing dairies to pursue the Environmental Stewardship Program certification, which should result in less degradation of water quality.

Methodology

To identify if dairies that receive the CDQAP fee discount have a better regulatory performance or lower regulatory cost, an analysis of Water Board Dairy Program data contained in the California Integrated Water Quality System (CIWQS) database was performed. Determining the true regulatory performance and cost of any facility is complex and difficult. For the purposes of this paper, a simplified analysis was chosen. The regulatory performance of dairies was reviewed based on the average number of violations per dairy. The regulatory cost of dairies was examined based on the average number of inspections

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performed per dairy. These averages were calculated for dairies receiving the CDQAP fee discount and dairies not receiving the CDQAP fee discount with the results being compared to each other to determine if any conclusions could be drawn.

The amount of violation and inspection data for the Dairy Program is significant and covers many decades of work by the Water Boards. For the purposes of this analysis, only data from work in the Central Valley Regional Water Board (R5), which contains approximately 80% of all regulated dairies, over the past five years were considered. The data were separated into two different time periods for comparison purposes: FY 2014-2015 and FYs 2010-2015. The averages obtained from the FYs 2010-2015 data were adjusted to yearly averages to allow for comparison to the FY 2014-2015 averages.

Results

The regulatory performance of dairies was analyzed in terms of the average number of violations per dairy. Figure 1 shows the average number of violations per dairy in R5 for FY 2014-2015 for dairies that did and did not receive the fee discount. The total number of dairies that received the fee discount was 582. The average number of violations per dairy for this group was 0.19. The total number of dairies that did not receive the fee discount was 636. The average number of violations per dairy for this group was 0.33.

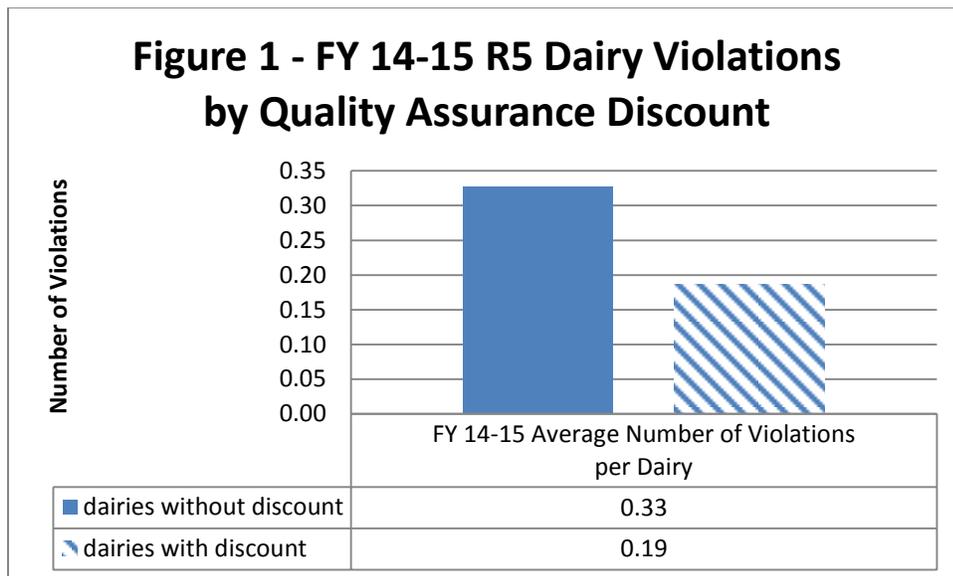
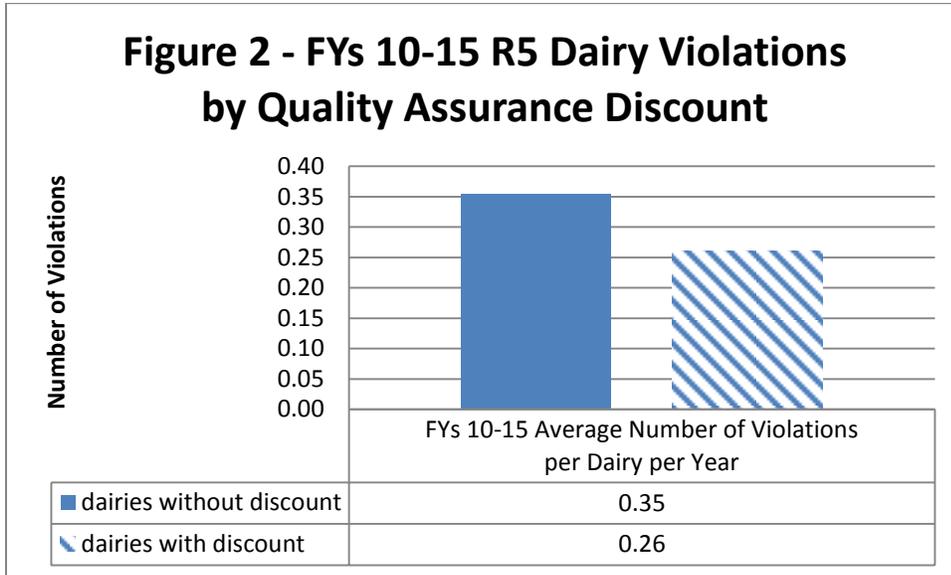


Figure 2 shows the average number of violations per dairy per year in R5 for FYs 2010-2015 for dairies that did and did not receive the fee discount. The total number of dairies that received the fee discount was 550. The average number of violations per dairy per year for this group was 0.26. The total number of dairies that did not receive the fee discount was 712. The average number of violations per dairy per year for this group was 0.35.



The Water Board's cost to regulate dairies was analyzed in terms of the average number of inspections per dairy. Figure 3 shows the average number of inspections per dairy in R5 for FY 2014-2015 for dairies that did and did not receive the fee discount. The total number of dairies that received the fee discount was 582. The average number of inspections per dairy for this group was 0.29. The total number of dairies that did not receive the fee discount was 636. The average number of inspections per dairy for this group was 0.34.

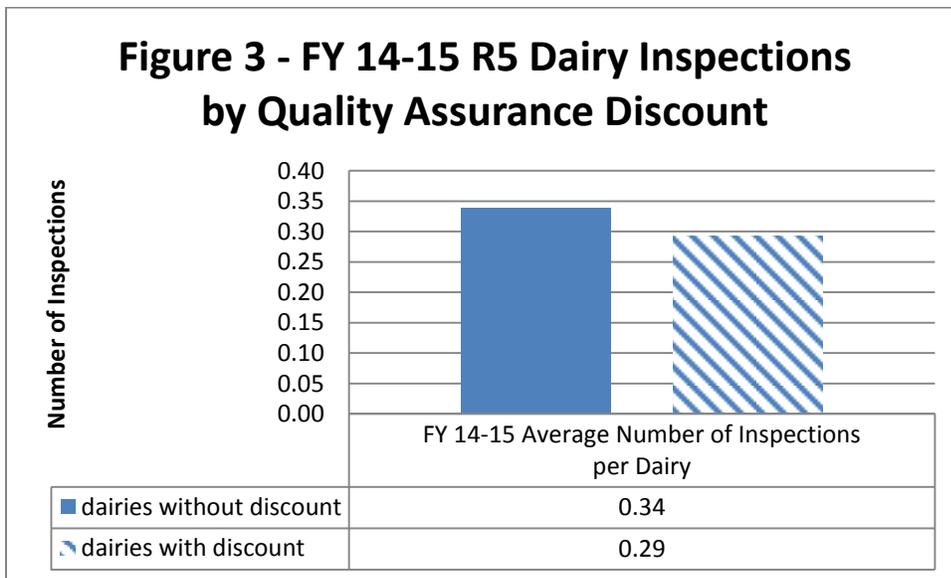
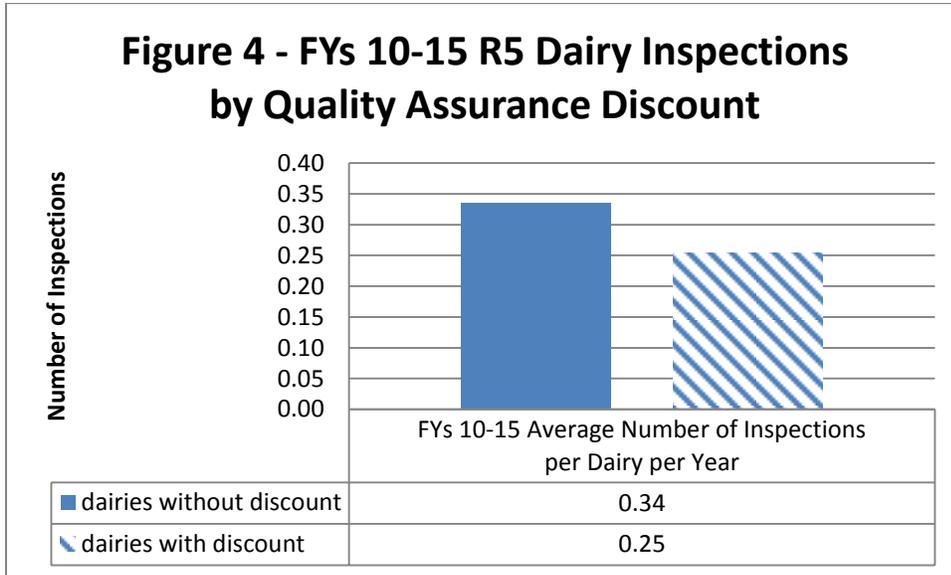


Figure 4 shows the average number of inspections per dairy per year in R5 for FYs 2010-2015 for dairies that did and did not receive the fee discount. The total number of dairies that received the fee discount was 550. The average number of inspections per dairy per year for this group was 0.25. The total number of dairies that did not receive the fee discount was 712. The average number of inspections per dairy for this group was 0.34.



Statistical Evaluation of Results

An independent samples t-test was performed on the results to determine whether there is substantial evidence that the associated population averages are significantly different. The outcome of the independent samples t-test evaluation is presented in Table 1 below:

Table 1 – Statistical Evaluation of CDQAP Fee Discount Results

Averages Evaluated	Significance Level	T ¹	P ²	Result Significant (Y/N)
FY 14-15 Violations	0.05	3.1	0.0018	Y
FYs 10-15 Violations	0.05	3.7	0.0014	Y
FY 14-15 Inspections	0.05	1.3	0.2	N
FYs 10-15 Inspections	0.05	5.9	0.00001	Y

¹ T is the measure of the size of the difference between averages relative to the variation in the sample data.

² P is the probability of obtaining a result equal to or greater than what was actually observed, assuming that the null hypothesis is true.

The statistical evaluation demonstrates that there is substantial evidence to conclude a significant difference between the average number of violations for dairies receiving the fee discount and dairies not receiving the fee discount for both FY 2014-2015 and FYs 2010-2015. The statistical evaluation also shows that the average number of inspections for dairies receiving the fee discount and dairies not receiving the fee discount are significantly different for FYs 2010-2015. However, the average number of inspections for dairies receiving the fee discount and dairies not receiving the fee discount are not significantly different for FY 2014-2015.

Impact of Dairy Size on Regulatory Performance

Another factor that may contribute to the observed difference in regulatory performance between dairies that receive the CDQAP fee discount and those that do not is the size of the dairy. Large dairies have more operating resources available which potentially could result in better regulatory performance.

To determine if size was a factor in the observed difference in regulatory performance of dairies, an analysis was done of the average number of violations per dairy in FY 2014-2015 for large and small dairies within the categories of dairies receiving the CDQAP fee discount and those that do not receive the fee discount. The size of a dairy was defined by the number of mature cows involved in the operation. A large dairy was defined as having more than 826 (the median size for all dairies in R5) mature cows. A small dairy was defined as having 826 or fewer mature cows. The results of the analysis are presented in Table 2 below:

Table 2 – FY 14-15 Regulatory Performance by Dairy Size

Dairy Size	Number of Dairies	Average Number of Violations per Dairy
Small Dairies without Fee Discount	397	0.26
Large Dairies without Fee Discount	239	0.42
Small Dairies with Fee Discount	212	0.15
Large Dairies with Fee Discount	370	0.21

The results in Table 2 demonstrate that large dairies do not have a better regulatory performance than small dairies, irrespective of CDQAP fee discount status. For dairies that do not receive the fee discount, large dairies had a greater average number of violations per dairy, 0.42, than did small dairies, 0.26. For dairies that do receive the fee discount, large and small dairies had similar average number of violations per dairy values at 0.21 and 0.15, respectively.

The conclusion of this analysis is that dairy size is not a contributing factor in the observed difference in regulatory performance between dairies that receive the CDQAP fee discount and those that do not.

Conclusions

Based on the data reviewed for R5, dairies that receive the fee discount (certified through CDQAP's Environmental Stewardship Program) have a better performance with respect to regulatory compliance than dairies that do not receive the discount. The FY 2014-2015 average number of violations per dairy results show a 42% drop in the violation rate for dairies with the fee discount versus those without the fee discount. The FYs 2010-2015 average number of violations per dairy per year results also show a

reduction in violation rate for dairies with the discount at 26%. Both of these reductions in the average number of violations per dairy were found to be statistically significant. These reductions in average number of violations per dairy demonstrate that certification through CDQAP's Environmental Stewardship Program helps dairy operators improve their compliance with Water Board regulations.

After a review of R5 dairy inspection data, dairies that receive the fee discount likely have a lower regulatory cost for the Water Boards as compared to dairies that do not receive the discount based on the FYs 2010-2015 results. The FYs 2010-2015 average number of inspections per dairy per year results show a reduction of 26% in the inspection rate for dairies with the discount, which was determined to be statistically significant. This outcome indicates that certification through CDQAP's Environmental Stewardship Program reduces the Water Board's regulatory oversight cost of dairies.

However, the FY 2014-2015 average number of inspections per dairy results show only a 15% lower inspection rate for dairies with the discount as compared to dairies without the discount and this difference was found to not be statistically significant. This outcome indicates that a detailed review of each fiscal year average number of inspections per dairy for FYs 2010-2015 may be warranted to provide additional support for any conclusion regarding the impact of certification through CDQAP's Environmental Stewardship Program on the Water Board's regulatory oversight cost of dairies.

Considerations

The methodology used in this paper was chosen to allow for a relatively quick analysis with readily available data. Here is a list of considerations to keep in mind when evaluating the conclusions of this analysis:

1. Dairies can have their CDQAP Environmental Stewardship Program certification status change over time which could not be accounted for in this analysis. The impact of this could not be quantified with the available data.
2. While violations are a measure of regulatory performance, it is extremely difficult to assign a monetary cost to violations. Therefore, comparing the average number of violations and a corresponding fee discount is even more difficult. This analysis does not make that calculation. A similar situation exists for the savings achieved by conducting fewer inspections of certain dairies.
3. Additional analyses could be conducted to provide a more detailed picture of this question. For example, the type of violation could be examined to determine if dairies receiving the fee discount had fewer discharge violations versus reporting violations.
4. As noted statistician Edward Tufte said, "Correlation is not causation but it sure is a hint."