

# Evaluation of Producer Surveys to Identify and Inventory Agricultural Conservation Practices for the Bay Model

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# Evaluation of Producer Surveys

## PSU/DEP Conservation Practice Inventory

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- Survey Population and Sample Size
- Surveys mailed to 20,000 farms
- 6,782 surveys returned (34%)
- ~10% post-stratified sampling by county (n=710) for on-site verification

## Previous Presentations to AgWG

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### March 2017

- Evaluated producer surveys that include follow-up verification
- Verification using a stratified random sample of the returned surveys
- Tt components
  - Measures of accuracy and completeness (PC, HR, FAR)
  - Estimate state and county BMP acreage with confidence intervals (GLM)

### September 2017

- Update on developing recommendation report

# AgWG decision from January 26, 2017

**The AgWG approved the following proposed methodology for setting statistical confidence standards for BMPs submitted through alternative verification methods:**

- Two-step process
- First step
  - Sample size greater than or equal to 20
  - False Alarm Rate (FAR) threshold of 0.2 or below (upper 90% confidence limit value)
  - Hit Rate (HR) threshold of 0.7 or greater (lower 90% confidence limit value)
- Second step
  - Correct for bias in the BMP quantity
  - Ratio of Post-Agreement Rate (PAG)/Hit Rate (HR) (lower 90% confidence limit value)

# Application of January 26, 2017 decision

- **Relatively high PC**
  - 71-97 percent
  - Large fraction of surveys where it was verified that the operation correctly reported that a practice was not in use
- **HR and FAR were more varied**
  - Low HR values are associated with higher FAR and vice versa
- **26 of 30 BMPs would be rejected**

Practice	Subcategory	Percent Correct	Hit Rate	False Alarm Rate
Nutrient Management Plan Acres	Row Crop Acres	0.85	0.77	0.13
Nutrient Management Plan Acres	Pasture Acres	0.81	0.62	0.19
Nutrient Management Plan Acres	Hay Acres	0.80	0.67	0.24
Nutrient Management Plan Acres	Privately Funded Act 38 Row Crop Acres	0.93	0.26	0.46
Nutrient Management Plan Acres	Privately Funded Act 38 Pasture Acres	0.94	0.14	0.60
Nutrient Management Plan Acres	Privately Funded Act 38 Hay Acres	0.93	0.09	0.69
Nutrient Management Plan Acres	Acres	0.95	0.21	0.68
Nutrient Management Plan Acres	Privately Funded NRCS 590 Pasture Acres	0.97	0.24	0.71
Nutrient Management Plan Acres	Privately Funded NRCS 590 Hay Acres	0.95	0.23	0.75
Nutrient Management Plan Acres	Acres	0.84	0.61	0.39
Nutrient Management Plan Acres	Acres	0.84	0.49	0.40
Nutrient Management Plan Acres	Manure Management Plans on Hay Acres	0.85	0.60	0.43
Nutrient Management Plan Acres	Advanced Nutrient Management	0.83	0.35	0.69
E&S Plans	Row Crop Acres	0.90	0.30	0.46
E&S Plans	Pasture Acres	0.92	0.30	0.48
E&S Plans	Hay Acres	0.93	0.27	0.44
E&S Plans	Barnyard Acres	0.96	0.17	0.73
NRCS Plans (privately funded)	Row Crop Acres	0.81	0.35	0.57
NRCS Plans (privately funded)	Pasture Acres	0.86	0.28	0.58
NRCS Plans (privately funded)	Hay Acres	0.85	0.31	0.58
NRCS Plans (privately funded)	Barnyard Acres	0.94	0.16	0.78
Stream Bank Fencing	Fencing Length (Ft.)	0.88	0.71	0.15
Stream Bank Fencing	Distance from Stream to Fence (Ft.)	0.87	0.74	0.19
Stream Bank Fencing	Public Funded Fencing (Ft.)	0.93	0.69	0.25
Stream Bank Fencing	Privately Funded Fencing (Ft.)	0.87	0.53	0.30
Stream Bank Fencing	Acres of Buffer	0.87	0.70	0.19
Stream Bank Fencing	Acres of Privately Funded Buffer	0.87	0.53	0.34
Riparian Buffers	Buffer Acres	0.71	0.45	0.50
Riparian Buffers	Privately Funded Buffer Acres	0.77	0.29	0.70
Riparian Buffers	Buffer Width	0.71	0.48	0.49

# Confidence Interval on Extent

## Mean Difference

- State watershed wide estimates
- Simpler to apply

## GLM

- Smaller standard error & confidence interval

Practice	Reported Results	Expected Results	90% Confidence Interval Half Width	90% Confidence Interval Half Width as % of Expected	95% Confidence Interval Half Width	95% Confidence Interval Half Width as % of Expected
Nutrient Management Plans – Row Crops (Ac)	335,250	350,103	28,483	8.1	33,953	9.7
Enhanced Nutrient Mgt (ac)	97,562	82,303	36,414	44.2	43,407	52.7
Agricultural E&S Plans – Row crops (ac)	40,170	60,380	26,808	44.4	31,957	52.9
Conservation Plans – Row crops (ac)	173,481	229,636	104,998	45.7	125,163	54.5
Stream Bank Fencing (linear feet)	1,336,100	2,293,651	377,437	23.0	464,296	26.8
Watercourse Access Control (ac)	795	1730	444	60.8	588	69.2
Riparian Buffers (ac)	9,013	6,770	1,688	60.9	2,246	69.1

# Proposed Two-Step Process

## First step:

- Only the results from producer surveys that include follow-up, independent verification using a stratified random sample of the returned mail surveys may be used.
- Any statistical adjustments made to the survey results only apply to the data set of returned surveys and cannot be used to extrapolate to non-respondents.
- Follow-up verification must be made using a 10 percent (or greater) random sample for each stratum (e.g., county) and a minimum of two (2) samples per BMP and stratum\*.
- The 90% confidence interval half-width cannot exceed the greater of 10% of the predicted total or 200 acres (or linear feet) for any state watershed-wide or stratum-specific estimate.

## Second step:

- Adjust the survey data based on field verification data.

\*Variability in agricultural systems across the survey area may indicate a need for more samples per stratum.

# AgWG Review and Comment

## **AgWG draft report review process:**

- Comment period: Now-March 1, 2018
- Send comments to:
  - Mark Dubin: [mdubin@chesapeakebay.net](mailto:mdubin@chesapeakebay.net)
  - Lindsay Gordon: [Gordon.Lindsey@epa.gov](mailto:Gordon.Lindsey@epa.gov)
- Revised report with comments posted: March 5, 2018
- Revised report presentation for AgWG decision: March 15, 2018
- Recommendation report finalized for posting: March 30, 2018