## Data Analysis

### Effort and Harvest (Primary Objective)

The number of permits issued (*N*) can be divided into 2 groups:

|  |  |
| --- | --- |
|  | (1) |

where:

|  |  |  |
| --- | --- | --- |
|  | = | the number of households (permits) that responded before the second reminder letter (compliant), and |
|  | = | the number of households (permits) that responded after the second reminder or did not respond (noncompliant) |

Each of those 2 groups can be further divided into 2 additional groups:

|  |  |
| --- | --- |
|  | (2) |

where:

|  |  |  |
| --- | --- | --- |
|  | = | the number of compliant households who reported fishing, |
|  | = | the number of compliant households who reported they did not fish, |
|  | = | the estimated number of noncompliant permits that fished, and |
|  | = | the estimated number of noncompliant households who did not fish |

where

|  |  |
| --- | --- |
|  | (3) |

where

|  |  |  |  |
| --- | --- | --- | --- |
|  | = | the estimated proportion of noncompliant permits that fished | |
|  | | | (4) |

and where

|  |  |  |
| --- | --- | --- |
| *ndf* | = | the number of noncompliant households responding to the second reminder that reported fishing, |
| *nd* | = | the number of noncompliant households responding to the second reminder, |

Harvest or effort is estimated by the following procedure (with subscripts denoting parameter of estimation deleted for simplicity):

|  |  |
| --- | --- |
|  | (5) |

where:

|  |  |  |
| --- | --- | --- |
|  | = | estimated total harvest or effort, |
|  | = | harvest or effort reported by compliant households, and |
|  | = | estimated harvest or effort for noncompliant households, |

where:

|  |  |
| --- | --- |
|  | (6) |

and where

|  |  |  |
| --- | --- | --- |
|  | = | the estimated mean harvest or participation per household for noncompliant households that fished |

or

|  |  |
| --- | --- |
|  | (7) |

where

|  |  |  |
| --- | --- | --- |
| *hdfj* | = | reported harvest by noncompliant household *j* |

Variance of  was calculated as follows ([Goodman 1960](#_ENREF_1)):

|  |  |
| --- | --- |
|  | (8) |

and from Equation 6

|  |  |
| --- | --- |
|  | (9) |

where from Equation 3

|  |  |
| --- | --- |
|  | (10) |

and from Equation 4

|  |  |
| --- | --- |
|  | (11) |

and from Equation 7

|  |  |
| --- | --- |
|  | (12) |

for which  is the sample variance for the mean reported harvest by responding noncompliant households:

|  |  |
| --- | --- |
| . | (13) |

Standard errors were calculated from the square root of the variance estimates.