**2016 AMOY Repeated Survey Protocols**

**Objectives**: (1) test protocols designed to estimate abundance of AMOY pairs that account for imperfect detection across all habitat types, and (2) validate use of approximate (proxy) count methods that do not require extensive nest searching.

**General Methods**:

1. Pre-season: Identify plots that can be surveyed on >3 occasions (preferably >5) during a 1-month window between peak incubation and peak hatching period (this will vary among states). Plots of similar size are preferred, but some variation in plot size is acceptable. A PLOT REPRESENTS THE SAMPLING UNIT. At a minimum plots should:
   * + Require no longer than 3 hours to survey.
     + Encompass a single habitat type. *See list of habitat types on page 3.*
     + Collectively encompass areas with low, (but >0), high (sites where AMOYs are highly likely to occur) *and* medium (in between low and high; AMOYs use these sites but abundance can vary noticeably among years) nesting densities. The objective here is to be able to calculate detectability rates for sites with low to high densities among all suitable habitat types across the range. Each state will not be expected to carry this burden alone, but rather, we are hoping that this year’s combined effort across multiple states will begin chipping away at this objective.
2. During Season: Plots will be surveyed >3 occasions (preferably >5) as close to high tide as possible (1.5 hrs before high tide to 1.5 hrs after high tide equates to a total of 3 hrs). Note: More than one plot can be surveyed in a single day provided the tide requirement can be met. Exceptions can be at locations where tide is not significant factor.
   * Surveys are considered “area searches” of nesting habitat.
     + Move through the plot relatively quickly (e.g., no need for extensive nest searching).
     + Nest (or brood) search times should be limited to <5 minutes.
     + Plots can be surveyed by walking or driving through nesting habitat or by walking along the water’s edge or boating parallel to the shoreline if available nesting habitat is visible from the shoreline or water.
     + Everyone should use a common standardized datasheet.
     + Record as much information (even beyond what is requested in the data sheet) to help with data interpretation.
     + If time allows during the <5 min. search time, look for and record band re-sights. Having a second observer devoted to looking for bands may be helpful.
     + The same observers can conduct the repeated surveys, but they should attempt to conduct each subsequent survey as if they have no prior knowledge of pair locations.
3. Pair metrics
   * Metrics that define a confirmed breeding pair: nest with eggs or an observed brood.
   * Approximate or proxy metrics for breeding pairs if a nest (or brood) is not located within 5 mins. Final list of proxy metrics that define a presumed breeding pair (italicized proxy metrics should only be used by observers well-versed in AMOY breeding biology):

Incubating adult

*Depredated egg remains*

*Hatched eggshell fragments*

Fresh scrapes

*Chick tracks*

*Small discarded mussel shells (or other prey remains indicating the presence of young)*

Copulating pair

Pairs engaged in joint territorial behavior

Single adult engaged in territorial/defensive behavior

Pair defending unseen nest or young

Single adult defending unseen nest or young

1. Plots where productivity studies are conducted should be used as possible validation trials (e.g., compare approximate measure to known number of nesting pairs).

* Observers conducting the repeated surveys cannot be the same people conducting the productivity studies.
* Each state should conduct intensive validation surveys on approximately 20% of the total area to be surveyed.

List of Nesting Habitat Types:

1. Barrier island
2. Natural mainland beach
3. Artificial mainland beach
4. Artificial or human created island (other than a dredge material deposition island)
5. Isolated ephemeral sand shoal or bar
6. Sand spit extending from a barrier island or mainland beach that has habitat features (sparse vegetation vs open sand, degree of development, etc.) different from the adjacent mainland or barrier beach
7. Saltmarsh or discrete marsh island within a marsh system (may include a variety of substrates such as shell rake, wrack, sandy beach or sand ridge)
8. Isolated nearshore ocean island
9. Island within a sound, river, inlet or bay that is not associated with a marsh system.
10. Rock jetties or revetments
11. Impoundments
12. Dredge material deposition island or site
13. Rooftop

2016 Survey Guidance

Survey coordinators should attempt to select sampling plots in geographic areas and habitats types that would provide the most useful information for their needs (e.g., obtaining a detectability rate for saltmarshes with a low density of birds or barrier beaches with high density birds, accounting for spatial bias in areas with low density birds, etc.). The number of plots should be based on how many can be feasibly surveyed a minimum of three times within a one month period between peak incubation and peak hatching preferably by observers with no prior knowledge of pair locations. Plot size should be limited to an area that can be cover within a 3 hour period (1.5 hrs. before to 1.5 hrs. after high tide). See 2015 survey protocols for additional details. Lastly, an attempt should be made to have one or more plots serve as validation plots.

States that participated in the 2013 and/or 2015 surveys are encouraged to randomize their 2016 sampling plot selections in areas or habitat types that have not been previously surveyed and/or where AMOY breeding densities are likely to be low.