Session C2: Site Evaluation Considerations in Probability-based Surveys

Room A106
3:30 – 5:00 pm

0048
C2-1

Demographic and Geographic Factors Affecting Access to Probabilistic Stream Sites in Kansas

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Probabilistic survey designs are built to accommodate site rejections, as long as those rejections are distributed randomly with respect to factors that might affect the final results. Several innocuous reasons that a site might be rejected include nontarget status (not part of the intended sample population), temporary inaccessibility (*e.g.*, seasonal flooding), or failure to obtain permissions. Permissions failure can be the result of outright denial, nonresponse, or inability to contact the landowner.

When it is thought or known that certain categorical factors are relevant in characterizing prospective sample sites, survey designers may use stratification and weighting to compensate. However, there may also be "invisible" factors that could affect a monitoring effort. This possibility is explored in our study using information from the Kansas Stream Probabilistic Monitoring Program. Specifically, we examine the geographic characteristics of stream sites and the demographic characteristics of their owners to look for hidden factors that might inadvertently create permissions bias in final site selection. Some of these factors include region, land use, stream size, parcel size, and landowner type and residency status.

Where significant bias factors are identified, it may provide reason to consider compensatory weighting in the interpretation of results, in subsequent survey designs, or both. Also, if biases are detected, the patterns may suggest how the permissions request process itself could be altered to neutralize or mitigate any social or geographic factors that might skew probabilistic sampling results.

The factors examined here are by no means exhaustive, and it is important to note that results from this study cannot be generalized to other survey designs, permissions processes, time periods, or geographic areas. Instead, they should serve as a reminder to managers of probabilistic programs that the permissions process is not a trivial formality but rather a significant part of the monitoring effort. Managers need to be vigilant to a variety of possible "invisible" factors that could affect their results and should, from time to time, perform post-facto testing to examine assumptions and look for hidden sources of bias.

0426
C2-2

Navigating the Site Evaluation Phase of Probability Based Surveys

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Probability based sampling surveys require an intensive site evaluation process. The randomly selected sites must be investigated thoroughly to make sure they meet the criteria for the proposed study. This can be accomplished with desktop reconnaissance when feasible, but it will often require on-site investigation to make a final determination. The sites could potentially have complicated access issues, warranting a lot of up-front work to ensure access is streamlined for the crew on the day of sampling. The randomized nature of these surveys also means that sites can fall on public or private property. Property rights, permitting issues, and liability considerations all need to be addressed well ahead of time. It is important to anticipate a realistic rate of site rejection as you begin the site evaluation process for probabilistic surveys. After analyzing data from 4 national surveys, we expect to evaluate approximately twice as many wadeable stream sites as we need to sample. Rejection rates are significantly lower for the higher order streams, rivers, and lakes, with approximately 1/3 of these sites being rejected. There is often a significant burden on time and resources when these rejections occur in the field, so spending time on preliminary site evaluation efforts can prevent major delays and added expenses during the field season. We have used our experience with six probability based, national scale surveys to devise an effective site evaluation process to help minimize wasted time in the field and maximize crew efficiency.

0229
C2-3

Probabilistic Monitoring in the Southwestern Deserts; What are the Chances of Finding Water?

Patrice Spindler

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A probabilistic monitoring design was used for the USEPA's National River and Stream Assessment (NRSA) surveys, conducted in spring 2009 in Arizona. The survey design utilized the National Hydrography Dataset-plus (NHD+) from which to select wadeable and non-wadeable stream and river point locations for the 2008-09 field surveys. While the probabilistic monitoring approach is valuable for providing statistically based statewide and nationwide assessments of water quality and ecological integrity, implementing this approach with the current National Hydrography Dataset (NHD) maps has been problematic for Arizona. A large amount of effort has been expended in office and field evaluations of selected monitoring points that fail to meet our sampling criteria, due to errors in flow attributes. This presentation discusses the site evaluations and "non-target" percentages from the recent NRSA survey in Arizona and from three other probabilistic surveys conducted in Arizona.

0318
C2-4

National River and Stream Assessment Monitoring Design & Extent Estimates

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The USEPA designed the National River and Stream Assessment (NRSA) in 2007 and field sampling was completed in 2008-9. The objective of the assessment is to estimate the ecological condition of river and streams nationally. This paper describes the national survey design and reports on the site evaluation portion of the study, including national and regional estimates of wadeable and boatable rivers and streams in the target population. For purposes of this survey, the target population includes all rivers and streams in the conterminous U.S that have flowing water during the summer. A national stratified and unequal probability survey design was used to select sites for sampling. The sample size was set to include 450 sites on Strahler order 1^{st} through 4^{th} and 900 sites on Strahler order 5^{th} and higher with 100 sites in each case being resampled. In addition, 450 sites from the 2004 Wadeable Stream Assessment were selected to be sampled again in 2008-9 to estimate change in condition in wadeable streams. An 'oversample' of additional sites was also done so that any state wishing to conduct a state scale survey could be accommodated. The survey ensured that approximately 200 sites occurred in each of nine aggregated Omernik Level 3 ecoregions and a minimum number of sites per state. All sites were evaluated to determine whether they were in the target population and also accessible to be sampled. Based on this evaluation, 62% (3% margin of error) of the river and stream length is estimated to be in the target population, 15% is presumed to be target but could not be confirmed due to inaccessibility, and 23% is estimated to not be in the target population.