

## Streamkeepers of Clallam County—Sampling Plan Revision Inquiry—Sept. 2004

Our program has been recognized for the quality of data we've gathered over the past 5 years. However, in that time we've come to see weaknesses in our sampling plan, and those weaknesses have especially been highlighted in the work we've done toward creating a Water Quality Index and a Physical Habitat Index (see [www.clallam.net/streamkeepers](http://www.clallam.net/streamkeepers)). These problems, which go beyond the type of procedural improvements we make on an annual basis, are summarized in the table below. You may have items of your own to add. It's time to consider major program revision.

<b>Sampling Plan Component &amp; Current Strategy</b>	<b>Problems with Current Strategy</b>	<b>Possible Revisions to Sampling Plan?</b>
<b>Site distribution:</b> Targeted, with sites suggested by technical advisors or volunteers	No overall sampling-plan design, so distribution of sites along the disturbed-undisturbed gradient and among ecoregions is lacking	<ul style="list-style-type: none"> <li>• Establish more reference sites</li> <li>• Consider additional sites for possible broader interpretation of data (e.g., using EPA ecoregions)</li> </ul>
<b>Site reach locations:</b> Suggested by technical advisors or volunteers	No stream classification system used to identify and characterize reaches	Implement a classification system so that reaches are coherent and data is comparable
<b>Site length:</b> Older sites are 100' long; newer sites are often longer, ~200'	Scientists recommend sampling 500' or more to characterize the physical habitat of a reach	Extend the length of monitored reaches to current scientific standards
<b>Site width:</b> Most sites have a width of 100', primarily for conifer stem count (see below)	Often time-consuming and difficult to establish corners; measurements are taken along the slope, so correction factors are needed to calculate conifer density	Eliminate "width" dimension and replace Conifer Stem Count (see below).
<b>Reach map:</b> Major current uses are: <ul style="list-style-type: none"> <li>• boundaries for conifer stem count, and average bankfull width for Conifer Stem Density PHI metric;</li> <li>• site monument identification;</li> <li>• general sense of status &amp; trends</li> </ul>	<ul style="list-style-type: none"> <li>• Conifer Stem Count may be eliminated (see below)</li> <li>• Measurements are not orthographic (see above)</li> <li>• A simpler map could ID monuments</li> <li>• Photos may give an adequate sense of status &amp; trends</li> </ul>	<ul style="list-style-type: none"> <li>• Substitute maps that deal only with monument locations (possibly only a zero-point and cross-section monuments)</li> <li>• GPS reach locations wherever possible</li> <li>• Use surveying techniques when a detailed map is needed</li> </ul>
<b>Conifer stem count:</b> All conifer stems of any size are counted within site length & width	Sites are too short for adequate reach characterization (see above); stems aren't measured, so resulting riparian habitat information is coarse. Also, this is the only current parameter that requires a reach map, which has its own problems (see above).	Replace the Conifer Stem Count with a random-sampling riparian-vegetation procedure, which could assess species & size (as well as deadfall and noxious weeds, e.g.) by category

<b>Pebble count:</b> Surface sediment sampled annually in half-phi size classes	Measures surface armoring only, not substrate, which is critical for spawning/rearing; and cannot accurately measure fines below 8 mm	Create special team to perform core-sampling in selected cases; also, EPA samples pebbles at regular intervals along their longer reach
<b>Large woody debris:</b> Tallied by minimum-size threshold and channel intrusion	LWD volume data is needed to accurately calculate Relative Bed Stability for our PHI. (We currently estimate this factor.)	Measure LWD volume within the bankfull channel (per EPA)
<b>Pools:</b> Tallied along with residual depth, by minimum-depth threshold according to stream size	Residual-pool volume data is needed to accurately calculate Relative Bed Stability for our PHI. (We currently estimate this factor.)	Eliminate pools tally and add a thalweg-profile component in order to calculate residual-pool area (per EPA)
<b>Cross section:</b> Measured annually at one spot per site, between permanent monuments	Micro-location may impact the stability or instability of the particular spot; monuments can go missing	Eliminate permanent monuments and measure multiple cross sections at regular intervals along the monitoring reach (per EPA)
<b>Gradient:</b> Measured annually along a 50-100' line within the monitoring reach	The site selected may poorly reflect overall gradient within the larger reach	Measure gradient (along with thalweg profile) along the entire length of longer monitoring reaches (per EPA)
<b>Canopy closure:</b> Measured biannually at a single point within the reach	Single point may bias the data	Measure canopy closure at regular intervals along the monitoring reach (per EPA)
<b>Temperature:</b> Quarterly grab samples only	The monitoring community and state standards favor continuous data-loggers	Purchase, install, maintain, and process data for temperature loggers, to be maintained in the field by regular and/or special teams
<b>Turbidity:</b> Quarterly grab samples	Data is difficult to interpret because it needs to be compared with "background"	<ul style="list-style-type: none"> <li>• Stop quarterly sampling and create a separate "stormwater team"</li> <li>• Install continuous turbidity samplers at reference sites (depends on funding)</li> </ul>
<b>Water chemistry replicates:</b> Each team does replicates at one site per quarter; these replicates are compared with their paired samples, and QC downgrades are applied as necessary to all of the team's site-visits for that qtr.	Teams' quarterly samples are difficult to track and apply QC downgrades to; special projects often don't involve teams with multiple sites or quarterly samples, and therefore require special replicate consideration	If turbidity is eliminated from quarterly sampling, have teams perform replicates at every site-visit—this would make QC tracking easy