Checklist for Review of Vital Signs Monitoring Plans

	Overall Organization and Presentation of Monitoring Plan
	Did you read, and closely follow, the guidance in the "Outline for Vital Signs Monitoring Plans"
	Is the overall monitoring plan well organized and clearly written?
	Does the plan have 11 chapters with the required chapter headings, plus an executive summary, a glossary, and either a set of appendices and/or hyperlinks to supporting documents?
	If you produced a separate report for the water quality monitoring component, did you closely follow the five-part guidance developed by WRD? If the water quality section was integrated, did you provide QA/QC details and other needed water quality pieces considered important to WRD somewhere in the plan, protocols, or appendices, attachments, or "pointed to" references?
	Is there a completed (and accurate) table of contents with page numbers?
	Is there a glossary, and are the definitions of terms such as "vital signs" and "indicator" consistent with the glossary on the monitoring program website?
	Are all of the appendices and supporting documents that are referenced ("pointed to") in the monitoring plan available on an internet website or CD such that they are all readily available to the reviewers and readers of the plan?
	Chapter 1 – Introduction and Background
	Does the monitoring plan (and any supporting documents or appendices) include a good and thorough summary of legislation, NPS policy and guidance, Servicewide and network-specific strategic goals for performance management relative to VS monitoring, and elements from park enabling legislation relevant to VS monitoring?
	Is the material clearly presented such that the average reader will understand why long-term monitoring is being done and be convinced that it is important?
	All networks are required to use the 5 Servicewide monitoring goals (not the I&M programmatic goals) as THE goals for monitoring, as opposed to developing its own goals. Did they clearly present the Servicewide goals as the goals for monitoring? If any additional goals are presented, is there a darn good/convincing reason for them?
	Is there either a list of monitoring objectives, or a list of monitoring questions, that have an obvious connection to the monitoring goals and provide additional focus and understanding of the purpose of the network's monitoring program?
	Does the monitoring plan include a good and thorough overview of park and network natural resources and describe their local, regional, and broader significance?
	For air quality monitoring, is there a table or some clear, thorough presentation of all existing air quality monitoring within the network? Are Class I air quality parks in the network identified?
	For water quality monitoring, is there a table or some clear, thorough presentation of all waterbodies within the network that are listed on State 303d list, or are Outstanding Natural Resource Waters or have other special protective status?
	For water quality monitoring, has information content of available past aquatic data (for each waterbody being considered for monitoring) been adequately summarized in terms of hints of trends or other important issues of concern?
	Does the monitoring plan include a good and thorough summary of important natural resource management and research issues for each park, the network, and surrounding landscapes?
	Does the monitoring plan include a good and thorough summary of existing natural resource monitoring work in the parks, the network, and surrounding landscapes?
	Does the monitoring plan well describe the process that was used to determine monitoring objectives or questions, develop potential vital signs, and then prioritize and select vital signs to be monitored (additional detail on the process and criteria for ranking vital signs should be put in Chapter 3)?

	Chapter 2 – Conceptual Ecological Models
	Has the network effectively used conceptual models to help organize, summarize, and communicate complex information?
	Have the major ecosystems within the network of parks been identified?
	Have the major ecosystem drivers been identified?
	Have both biotic and abiotic (air, water, and geological resources) ecosystem components/drivers been identified?
	Are the conceptual models sufficiently detailed to provide support for selecting, justifying, and interpreting potential vital signs?
	Are the tables and figures, and the narrative supporting the tables and figures in this chapter, clear, complete, and understandable?
	Is relevant literature cited; do citations provide valid, credible, and sufficient scientific justification for the models?
	Is the treatment and presentation of conceptual models systematic, synthetic and integrative such that interactions within and linkages among ecosystems are described?
	Chapter 3 – Vital Signs
	Does this chapter clearly describe the structured decision-making process and the criteria used by the network to identify, prioritize, and select the vital signs or monitoring questions to be monitored?
	Is there a single list of vital signs that is consistent with the vital signs framework scheme and clearly shows the resulting "short list" of vital signs, including vital signs monitored by other programs and agencies? The list may include vital signs that the network hopes to implement in the foreseeable future, but may not currently be able to fund.
	Is there some obvious connection between the conceptual models and the high-priority vital signs that were selected for implementation?
	Are the high-priority vital signs all adequately justified through either the narrative or conceptual models, such that the average reader will be convinced of the value of them being monitored?
	Chapter 4 – Sampling Design
	Has the network provided an overall sampling design that promotes integration of the various monitoring components over the long term and allows inferences to be made beyond the areas actually sampled?
	Is there an adequate description of any decisions to stratify or not stratify the park for various monitoring components?
	For water quality monitoring, does the plan contain a network map that shows the location of waterbodies to be sampled and an accompanying table that briefly summarizes the parameter(s) to be sampled at each site, sample frequencies, who will collect the samples, and the protocol(s) to be used? Additional protocol-specific details (such as a map that shows the detailed location sampling sites within each waterbody) should be placed in each protocol, but a brief overview of the overall sampling design (within the network as a whole) should be included in this chapter.
	For water quality monitoring, data representativeness typically must be documented as a quality assurance basic. Does the plan (or the protocol for water quality monitoring that is referenced by the plan) adequately explain how the sampling scheme chosen will insure that the values obtained will be representative of the target population being studied? Is the sampling design appropriate to help answer previously identified questions?
	Chapter 5 – Sampling Protocols
	Is there a well-organized table or list that clearly shows which protocols the network plans to implement within the next 5 years and in which parks?
	Does the chapter, at a minimum, include a table that summarizes key information from the protocols or Protocol Development Summary documents for each protocol to be developed? Key information should include the name of the protocol, a brief justification statement, the specific

	measurable objectives of the protocol, a list of the parks where it will be implemented, and a link to the protocol or PDS document.
	The content and format of protocols MUST closely follow the NPS standards published Oakley et al. 2003 (see http://science.nature.nps.gov/im/monitor/protocols/ProtocolGuidelines.pdf). Do they?
	Do the Protocol Development Summary documents for protocols that are still in development follow the program guidance and include (1) a strong justification statement, (2) a set of objectives that meet the test of being realistic, measurable and specific, (3) the approach to be followed, (4) a list of parks where the protocol will be implemented, (5) a schedule and budget for protocol development, and (6) the name and contact information for the cooperator/contractor who will conduct the work and the lead NPS person responsible for ensuring that the work is done? See (http://science.nature.nps.gov/im/monitor/ProtocolDevelopmentSummary.doc).
	For each protocol, has the target population or "sampling frame", and the sampling units, been identified?
	For water quality monitoring, is there a quality control SOP associated with each protocol that adequately documents QC objectives for measurement sensitivity (detection limits), measurement precision, measurement systematic error (bias as percent recovery), data completeness (including adequacy of planned sample sizes and statistical power), and (if applicable for lab measurements only) blank control? Are instrument calibration details included either in the QC SOP or in a separate calibration SOP?
	Do water quality sections of the plan or protocols sections include an explanation of how data comparability (a quality assurance basic) was considered in choosing which protocols and chemical labs to utilize? Do protocol SOPs contain enough field and lab method details to allow others to determine if data produced is comparable enough to other regional data sets to be considered credible by regulatory agencies interested in the data?
	Do the aquatic protocol SOPs adequately describe the details of all Sampling Protocols (Field and Laboratory), as well as equipment needs and operation, sampling techniques, sample preservation and handling and logistics?
	Do each of the protocols include a narrative and one or more SOPs for data management and analysis that describe how data will be managed from the field to its final permanent repository? Do the protocols contain examples of field forms that will be used, and describe how data will be entered, managed and archived in a relational database or GIS?
	Chapter 6 – Data Management and Archiving
	Does the plan provide an overview of the agreed-upon process for entering, editing, storing, and archiving data collected by the various components of the monitoring program, including metadata procedures? For most networks, this chapter will duplicate or be largely the same as the executive summary of the network's data management plan. The full Data Management Plan should be posted on a website or attached as an appendix.
	Is the full data management plan for the network attached as an appendix or supporting document? Specifically for water quality monitoring data, does the plan specify how that data will be reported to WRD for entry into the Environmental Protection Agency's STORET database?
	Does Chapter 6 provide an overview of the network's role in overall management of I&M and other datasets, as well as summarize the key aspects of data management that are presented in more detail in the data management plan and individual protocols?
	Chapter 7 – Data Analysis and Reporting
	Does this chapter give a good summary of the various reports and other products of the monitoring effort, including a summary of the intended audience for each report, content, reporting schedule, and who is responsible for ensuring that data are analyzed and reported in a timely manner?
	Is there a summary table or brief narrative (details should be in the individual protocols) that describes who is responsible for analyzing the data for each vital sign, and the basic approach that will be followed?

	Chapter 8 – Administration/Implementation of the Monitoring Program
	Does the plan include a brief listing of the members of the network Board of Directors and Technical Committee (and Science Advisory Committee if it exists), and describe their roles?
	Is there a staffing plan for the network that summarizes the role and responsibilities and duty station of staff involved in the monitoring program?
	Is there a brief description of how the monitoring program integrates with other park operations such as interpretation, law enforcement, and maintenance?
	Is there a listing or other summary of key partnerships with agencies and individuals that are part of the monitoring program, and a list of relevant cooperative agreements and other partnership agreements?
	Does the plan discuss the need for periodic reviews of the overall monitoring program as well as individual protocols or other components?
	Chapter 9 – Schedule
	Is there a schedule that identifies the target completion dates for protocols still to be developed, or for other tasks that have not yet been completed?
	Is there a figure or table that summarizes the frequency of sampling for each of the protocols, and identifies key events for the monitoring program?
	Chapter 10 – Budget
	Is there an overall budget that summarizes the annual and periodic costs of the monitoring program? (the budget should use the same categories as in the annual administrative reports and work plans). At least 30% of the funding the network receives from the monitoring program, in terms of funding and network staff time, must be directed to data management, analysis, and reporting. Do the staffing plan and budget demonstrate that adequate resources have been allocated to these activities?
	Chapter 11 – Literature Cited
	Are all of the literature citations placed in this single chapter and consistently formatted? (We recommend that literature citations follow the format and punctuation style used in the journal Ecology).