

Matrix of Monitoring Activities

The following table describes in broad terms some of the monitoring activities typically performed by volunteers. This matrix is intended to help direct the selection of monitoring activities according to data objectives and available resources. The table is arranged with the monitoring activities that generally require less effort and resources at the top, increasing in complexity toward the bottom. Within each monitoring activity, there is also often a range of data objectives and resources needed, with more intense data objectives requiring more resources.

Monitoring Activities	Data Objectives	Examples of Activities	Resources Needed			
			Equipment & Supplies	Education & Training	Frequency of monitoring	QA/QC Level & Standards
Shoreline Survey	Educational; General awareness; Gross problem identification or screening; Baseline data; Targeting sites for additional study	Field observations; shoreline land use assessment; I.D. potential sources of pollutants	Map of waterbody, field data sheets Optional: Camera, GPS unit	Understanding of maps and features of concern. Can be self taught or training on how to complete maps and data sheets	Annually	No formal QA/QC plan required. Field Observations on standard forms.
Watershed Assessment	Educational; General awareness; Gross problem identification or screening; Baseline data; Targeting sites for additional study	Field observations, watershed wide land use assessment, I.D. potential sources of pollutants	Map of watershed, field data sheets Optional: camera; permission to access private property, GPS unit	Understanding of maps and features of concern. Can be self taught or training on how to complete maps and data sheets	Annually or less often	No formal QA/QC plan required. Field Observations on standard forms.
Habitat Assessment	Educational; General awareness; Gross problem identification or screening; Baseline data; Targeting sites for additional study/restoration	Visual assessment of critical habitat features; may include measurements of some features. Intensive surveys measure channel depths, sinuosity, etc.	Map of waterbody, field data sheets, measuring tape, measuring stick Optional: camera; permission to access private property, GPS unit	Understanding of maps and features of concern. Training in evaluating habitat features and in how to complete maps and data sheets recommended	Several times a year during different seasons or less is typical, many programs assess habitat annually	Basic written plan – assessment purpose, methods, sites, and schedule.

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Physical Characteristics	Educational; Baseline data collection; Trend analysis; Local decision-making; 305(b) Reports; Targeting sites for additional study/restoration.	Measurements of parameters such as stream flow, turbidity or sedimentation in streams; water clarity, depth, or basin features in lakes and ponds	Map of waterbody, field data sheets, for streams: measuring tape, measuring stick, stopwatch or flow meter, turbidity meter or tube, sample bottles for total suspended solid, or settling dishes for sedimentation. Lakes: access (boat or dock) onto the water, Secchi disk, boating safety equipment Optional: camera; GPS unit depth meter	Training in protocols used to collect water samples and in using any field testing kits or meters is required, as well as in how to complete field data sheets. Training in calibration and maintenance procedures is also necessary for projects using field meters.	Depends upon data needs. Typically at least monthly, with weekly monitoring common during the 'growing season'	Basic written plan – monitoring purpose, methods, sites, and schedule. A formal Q.A. plan, the use of specific protocols and indices, and/or use of certified laboratories may be required by some data users
Exotic Species (covers a wide range of potential activities) <i>See Manager's Tool Kit – NIS Information Center</i> for more information https://www.invasivespeciesinfo.gov/toolkit/detgrcrab.shtml	Educational; General awareness; Gross problem identification or screening; Baseline data; 305(b) Reports; Targeting sites for additional study/restoration	Identification of specific aquatic species; can be simple presence/absence or mapping or other quantitative methods	Identification card or key Optional: collection or preservation materials, data sheet or maps, GPS unit	Training in identification of the target organisms and differentiation from similar non-target species is required. Optional training: collection and preservation methods, and field data sheet/map	Species dependent: May be part of regular water activities, or a more formal monitoring effort	Depends upon the data objectives. Can range from none to formal QA plan with adherence to approved monitoring methods.

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Biotic Survey (covers a wide range of potential activities)	Educational; Awareness; Problem identification or screening; Baseline data; Trend analysis; Local decision-making; 305(b) Reports; Targeting sites for additional study/restoration.	Qualitative and/or quantitative survey of organisms, typically includes macroinvertebrates frogs, fish, or macrophytes	Nets or rakes, buckets or bags, identification keys, field data sheets Optional: maps, camera, GPS unit	Training in protocols used to collect and identify the organisms is required, as well as in how to complete field data sheets	Several times a year during different seasons or flow regimes is preferred	Basic written plan – assessment purpose, methods, sites, and schedule. A formal QA plan and the use of specific protocols and indices may be required by some data users
Water chemistry	Educational; Baseline data collection; Trend analysis; Local decision-making; 305(b) Reports; Targeting sites for additional study/restoration.	Using calibrated meters for field measures; collecting water samples for lab or field analyses	Sample bottles appropriate for analyses; water collection samplers, cooler & ice packs, field data sheets Optional: Field testing kit(s), Field meters	Training in protocols used to collect water samples and in using any field testing kits or meters is required, as well as in how to complete field data sheets. Training in calibration and maintenance procedures is also necessary for projects using field meters.	Depends upon data needs. Typically at least monthly, with weekly monitoring common during the 'growing season'	Basic written plan – monitoring purpose, methods, sites, and schedule. A formal Q.A. plan, the use of specific protocols and indices, and/or use of certified laboratories may be required by some data users

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Sediment analysis	Educational; Baseline data collection; Trend analysis; Local decision-making; 305(b) Reports; Targeting sites for additional study/restoration.	Using calibrated meters for field measures; collecting sediment samples for lab or field analyses.	Sample bottles or bags appropriate for analyses; sediment collection sampler, cooler & ice packs, field data sheets Optional: Field meters	Training in sampling procedures is required. May require supervision or assistance from a professional	Depends upon data needs. May be annually, seasonally, monthly or more frequently	Basic written plan – monitoring purpose, methods, sites, and schedule. A formal QA plan, the use of specific protocols and indices, and/or use of certified laboratories may be required by some data users