Filtering Criteria: Media											Filtering Criteria: Particle Size Range							
Surface Water	Wastewater	Stormwater	Drinking Water	Groundwater	Soil	Sediment	Biosolids	Pore Water	Air	Biota	All Size Fractions	Limited Size Fractions	Sample Method	Description	Equipment	Advantages	Considerations / Disadvantages	Relative Cost
X	X	X									X		Grab (Water Body) • Surface Water • Wastewater • Stormwater	Submerge sample bottle/pail directly off the side of a boat or at edge of water body (Pivokonsky et al. 2018, Pivokonský et al. 2020)	Stainless steel pails, if desired Telescopic sampling pole, waders, or boat, if desired Sample container	Easy to collect Minimal sampling equipment needed Lower likelihood of cross-contamination during sampling due to minimal sampling equipment used	Low sample volume, resulting in discrete sample result	Low
X	X	X										X	Field-Filtered Grab (Water Body) • Surface Water • Wastewater • Stormwater	Collect sample from water body surface using telescopic sampling pole, stainless steel bucket, or submerged sample container Pour sample through stainless-steel sieves for filtration Cover sieves with aluminum foil for transport to lab (Leslie et al. 2017, Magni et al. 2019, Murphy et al. 2016, Tagg et al. 2015)	Telescopic sampling pole or stainless-steel bucket, if desired Stainless-steel sieves Aluminum foil Sample container	Easy to collect Provides more representative sample than basic grab sample due to larger sample volume	Moderate sample volume (typically 10-30 L), resulting in discrete sample result Potential for sample contamination from ambient air during sample sieving Moderately time and labor intensive depending on method Size range is limited by filter size	Low to Moderate
	X		X								X		Grab (Water Utility) • Drinking Water • Wastewater	Fill sample container directly from drinking water source or treatment plant raw water inlet or treated water outflow (Wang, Lin, and Chen 2020)	Sample container	Easy to collect Minimal sampling equipment required Lower likelihood of cross-contamination during sampling due to minimal sampling equipment used	Low sample volume, resulting in discrete sample result	Low
	X		X								X		Time-Integrated Grab (Water Utility) • Drinking Water • Wastewater	Fill sample container directly from drinking water source or treatment plant raw water inlet or treated water outflow Collect samples every 8 hours over a 24-hour period	Sample containers	Easy to collect Provides a more representative result using multiple grab samples collected over an extended time period	Moderately time and labor intensive	Low to Moderate
X	X	X										X	Volumetric Reduction with Net • Surface Water • Wastewater • Stormwater	Drag net behind boat or place in flowing water (typical durations 15 to 60 minutes) Measure water velocity Rinse collected material from net into stainless steel pan/ sample container (Eriksen et al. 2013, Free et al. 2014, Lenaker et al. 2019, Sutton et al. 2016)	Neuston net, ring net, or manta trawl (for water surface); bongo net (for water column) Water velocity measurement device Boat, depending on location Stainless steel pan Sample container	Provides a larger sample volume, resulting in a more representative concentration Can target specific depth intervals	Potential for sample contamination from net fibers, from incomplete net decontamination between sampling, from ambient air during sample processing, or from rinse water Sample processing is time consuming and labor intensive Size range limited by net mesh size (typically 333 um)	Moderate to High
X												X	Volumetric Reduction with Net (Autonomous Drone) • Surface Water	Portable drone autonomously samples a user-defined area, dragging manta-style net Measure water velocity Rinse collected material from net into stainless steel pan/ sample container (Norwegian University of Science and Technology 2022)	Portable autonomous drone, with manta-style net Boat, depending on location Stainless steel pan Sample container	Provides a larger sample volume, resulting in a more representative concentration	Potential for sample contamination from net fibers, from incomplete net decontamination between sampling, from ambient air during sample processing, or from rinse water Sample processing is time consuming and labor intensive Size range limited by net mesh size (typically 333 um)	Moderate to High
X	X		X	X								X	Volumetric Reduction with Sieves • Surface Water • Wastewater • Groundwater • Drinking Water	Install/submerge piping/tubing to desired sample depth Pump water through flow meter and record flow rate/duration Direct water flow through stainless steel sieves Cover sieves with aluminum foil for transport to lab for analysis (ASTM 2020, Mason et al. 2016, Okoffo et al. 2019)	Pump Flow meter Piping/tubing (ideally non- polymer-based material, such as copper tubing) Stainless steel sieves (355, 125, 63, and 43 µm) Aluminum foil	Provides a larger sample volume, resulting in a more representative concentration Can target specific depth intervals Can install sampling system set-up for routine sampling Relatively easy to collect once sampling set-up is installed	Large volume needed (400 – 1,400 gallons) Upfront sample system set-up required More sampling equipment needed than other options Potential for sample contamination from ambient air during sample sieving Size range limited by sieve size	Moderate to High
	X											X	Volumetric Reduction with Sieves (Submerged) • Wastewater	Install sampling device placed at desired sampling point in wastewater treatment plant Allow water to flow through submerged device Cover sieves with aluminum foil for transport to lab for analysis (Dyachenko, Mitchell, and Arsem 2017, Sutton et al. 2016, Ziajahromi et al. 2017)	Stainless steel sieves installed inside a cover Water velocity measurement device, if desired Aluminum foil	Provides a larger sample volume, resulting in a more representative concentration Can target specific depth intervals Can install sampling system set-up for routine sampling Relatively easy to collect once sampling set-up is installed	Large volume needed (typically 1,500 gallons) Upfront sample system set-up required More sampling equipment needed than other options Size range limited by sieve size	Moderate to High

	X		X									X	Volumetric Reduction with In-Line Filters • Wastewater • Drinking Water	Install stainless-steel filters/containment to inlet tube attached directly to a water tap or hydrant Filter drinking water samples in parallel through filter containment (Coffin 2022, Kirstein et al. 2021, Yuan et al. 2022)	Stainless steel filters placed in custom modified stainless steel filter holders attached via stainless steel pipes Sample containers	In-line filtration minimizes potential for contamination Provides a larger sample volume, resulting in a more representative concentration Can install sampling system set-up for routine sampling Relatively easy to collect once sampling set-up is installed	Large volume needed (200-1,100 liters) Upfront sample system set-up required Size range limited by sieve size	Moderate
		X									X		Grab (Stormwater) • Stormwater	Submerge sample container beneath flowing water surface at center of stormwater outfall Allow water to enter directly into sample container If sampling for compliance with National Pollutant Discharge Elimination System (NPDES) permit, sampling within 30 minutes of a Qualifying Storm Event may be required Record sampling conditions (e.g., precipitation event intensity, presence of floating/suspended/settled solids etc.)	Telescopic sampling pole, if desired Sample container	Easy to collect Low likelihood of cross-contamination during sampling due to minimal sampling equipment used	Low sample volume, resulting in discrete sample result	Low
					X	X	X				X		Grab (Solids) • Soil • Sediment • Biosolids	Collect sample from top of surface Remove gross vegetation, if present Transfer to sample container	Stainless steel sampling tool (e.g., shovel, stainless steel spoon), if desired Sample container	Easy to collect Minimal sampling equipment needed	Limited to top of soil/sediment column Less discrete sample depth interval Higher loss/suspension of sediment into surrounding water column for sediment sampling	Low
					X						X		Hand Auger • Soil	Push auger into soil surface Remove sample from auger and isolate desired sample interval Transfer to sample container	Hand auger Stainless steel tray Sample container	Can collect discrete sample intervals at deeper portions of soil column Can be collected using hand tools	Moderately time and labor intensive, depending on field conditions Requires slightly more specialized sampling equipment May generate excess investigation-derived waste that requires management	Low to Moderate
						X		X			X		Direct Push Sampler/Probe • Sediment • Pore Water	Push auger into soil/sediment surface Remove sample from auger and isolate desired sample interval Transfer to sample container	Stainless steel direct push sampler/probe/modified piezometer Stainless steel tray Sample container Waders or boat, depending on location	Can collect discrete sample intervals at deeper portions of sediment column Can be collected using hand tools	Moderately time and labor intensive, depending on field conditions Requires slightly more specialized sampling equipment May generate excess investigation-derived waste that requires management	Low to Moderate
					X	X					X		Drill Rig • Soil • Sediment	Drill rig pushes split spoon sampler into soil column Open split spoon sampler Collect sample from desired depth interval Transfer to sample container	Drill rig Split spoon sampler Stainless steel tray Sample container	Can collect discrete sample intervals at deeper portions of soil/sediment column Allows for deeper sample collection than hand auger methods Minimally time and labor intensive Faster drilling rates/sample collection than hand methods	Requires specialized sampling equipment Sample locations may be limited due to drill rig access Higher quantity of excess investigation-derived waste that requires management	High
						X		X			X		Sediment Grab Sampler Devices • Sediment • Pore Water	Submerge sampler into sediment surface and close sampler bucket Release sample into pan to process Transfer to sample container (Lenaker et al. 2019)	Ponar, Van Veen, Ekman, Smith McIntyre, or Hammon sampler Stainless steel tray Sample container	Relatively easy to collect Can collect samples in deeper water columns than standard grab sampling Reduces sediment loss/suspension into water column	Moderately time and labor intensive, depending on field conditions Requires slightly more specialized sampling equipment May generate excess investigation-derived waste that requires management	Low to Moderate

									X		X		Passive Atmospheric Dust • Air	Place aluminum tray/funnel and weather station in desired study area Allow ambient deposition for desired study period Record meteorological data Pour deionized water along aluminum tray/funnel surface to rinse Pour rinsate back into deionized rinse water bottle (Wright et al. 2020)	Aluminum tray/funnel Weather station Deionized rinse water Sample container	Easy to collect	Assesses deposits only rather than suspended particles May underestimate low-density microplastic polymers Units are correlated to surface area rather than air volume, resulting in less meaningful data with respect to risk assessments	Low
									X			X	Active Pump Sampler • Air	Place total suspended particulate sampler in desired study area Allow sampler to pump air through filter Record flow rate and duration Using metal forceps, remove filters and immediately transfer into non-plastic, sealed sample collection container (Brander et al. 2020, Liao et al. 2021)	Total suspended particulate sampler, equipped with glass microfiber filters Metal tripod, pending sample location Inline flow meters or totalizer Metal forceps Sample container	Provides a larger sample volume, resulting in a more representative concentration Provides more meaningful volumetric data than passive air sampling methods	Requires more specialized sampling equipment Size range limited by filter size	Moderate to High
									X			X	Cascade Impactor • Air	Place cascade impactor sampler in desired study area Allow sampler to pump air through cascade impactor Record flow rate and duration Cover sieves with aluminum foil for transport to lab for analysis (Velimirovic et al. 2021)	Cascade impactor sampler Metal tripod, pending sample location Inline flow meters or totalizer Aluminum foil	Allows for simultaneous collection of airborne particles of different size fractions Provides a larger sample volume, resulting in a more representative concentration Provides more meaningful volumetric data than passive air sampling methods Can be adapted for stationary or personal air sampling	Method currently used to sample indoor dust, so may require further development for specific application to MP sampling Requires more specialized sampling equipment Size range limited by sieve size	Moderate to High
									X			X	Transmission Electron Microscopy Grid • Air	Place transmission electron microscopy (TEM) grid sampler in desired study area Allow sampler to pump air through TEM grid Record flow rate and duration Using metal forceps, remove TEM grid and immediately transfer into non-plastic, sealed sample collection container (Velimirovic et al. 2021)	TEM grid sampler Metal tripod, pending sample location Inline flow meters or totalizer Metal forceps Sample container	Provides a larger sample volume, resulting in a more representative concentration Provides more meaningful volumetric data than passive air sampling methods	Method currently used to sample indoor dust, so may require further development for specific application to MP sampling Requires more specialized sampling equipment Size range limited by grid size	Moderate to High
										X	X		Fish (Whole) • Biota	Capture fish in net, use of electrofishing optional; or direct collection from fish farms or from commercial fish markets Euthanize Remove externally adhered plastics prior to treatment by washing the study organism with water, saline water or using forceps Wrap in aluminum foil and place on ice Choice of preservation technique depends on the research question being considered, 4% formaldehyde and 70% ethanol are commonly used fixatives (Bessa et al. 2019, Lusher et al. 2017, Parker et al. 2020)	Trammel, seine, or gill net; bottom trawl; or electrofishing gear Euthanasia solution Aluminum foil Ice Preservative	Provides data applicable to determine human health risk from ingestion	Handling stress, physical movement, and the physiological and behavior of the sampled organism may result in the loss of microplastics prior to animal preservation; some animals might egest microplastic debris prior to analysis	Moderate to High

										X	X		Fish (tissue/parts) • Biota	Capture fish in net, use of electrofishing optional; or direct collection from fish farms or from commercial fish markets Euthanize Remove externally adhered plastics prior to treatment by washing the study organism with water, saline water or using forceps Wrap in aluminum foil and place on ice Choice of preservation technique depends on the research question being considered, 4% formaldehyde and 70% ethanol are commonly used fixatives Dissect in lab for target tissue/parts (Bessa et al. 2019, Lusher et al. 2017, Parker et al. 2020)	Trammel, seine, or gill net; bottom trawl; or electrofishing gear Euthanasia solution Aluminum foil Ice Preservative	Provides data useful for toxicity studies and risk assessments	Tissue fixative can affect the structure, microbial surface communities, chemical composition, color, or analytical properties of any microplastics within the sample	Moderate to High
										X	X		Invertebrates • Biota	Capture invertebrate; or direct collection from shellfish farms or from commercial markets Euthanize Remove externally adhered plastics prior to treatment by washing the study organism with water, saline water or using forceps Where dissection is prohibitive (e.g., mussels) fluorescent microplastics can be quantified by physically homogenizing tissues Choice of preservation technique depends on the research question being considered, 4% formaldehyde and 70% ethanol are commonly used fixatives (Bessa et al. 2019, Lusher et al. 2017)	Grabs, traps, and creels; Kick or D-net; Bottom trawl; or Manta or bongo nets (planktonic and nektonic invertebrates) Euthanasia solution Aluminum foil Ice Preservative	Relatively easy to collect or purchase from biological supply vendors	Handling stress, physical movement, and the physiological and behavior of the sampled organism may result in the loss of microplastics prior to animal preservation; some animals might egest microplastic debris prior to analysis	Moderate to High
										X	X		Vertebrates • Biota	Capture vertebrate, or direct collection from commercial markets Euthanize Remove externally adhered plastics prior to treatment by washing the study organism with water, saline water or using forceps Wrap in aluminum foil and place on ice Choice of preservation technique depends on the research question being considered, 4% formaldehyde and 70% ethanol are commonly used fixatives Dissect in lab for target tissue/parts (Bessa et al. 2019, Lusher et al. 2017, Parker et al. 2020)	Traps Euthanasia solution Aluminum foil Ice Preservative	Provides data useful for toxicity studies and risk assessments	Tissue fixative can affect the structure, microbial surface communities, chemical composition, color, or analytical properties of any microplastics within the sample	High
										X	X		Plants • Biota	Purchase vegetables and fruits from local markets or collect from the environment Wash, peel as needed, weigh, process in blender Heat to reduce water content Sample aliquots (0.1 g) and transfer into transparent glass tubes Mineralize, digest, and extract (Oliveri Conti et al. 2020)	Blender Oven Glass tubes Centrifuge	Easy to collect	Low sensitivity of the method	Moderate

										X	X		Biofilm • Biota	Prepare batch reactors in duplicate to continuously stir 100 mL batches Add polystyrene beads to batch reactors Sieve into two size classes Incubate composited wastewater influent or freshwater grab samples Incubate duplicate reactors for two days Recover beads and rinse Transfer to lysing tubes for biofilm DNA extraction Extract DNA from the microparticles and concentrated filtrate samples (Glaser 2020, Parrish and Fahrenfeld 2019)	Series of batch reactors Polystyrene and glass beads Sieves Oven Lysing tubes Commercial DNA extraction kit	Formation of biofilms on microplastics is widely observed and can significantly alter properties important to environmental and human health Useful for determining fate and effect of microplastics on environmental and human health	Methods to identify plastics may not be simultaneously compatible with methods used to study biofilms Oxidation and density separation remove biofilm	Moderate to High