

	Biophysical Metrics		Datasets					
	not shown	(5) Available FECS Metric	(6) Suggested Source	not shown	not shown	(7) Remotely Sensed?	(8) Model Available?	not shown
Row #	Ideal	Currently Available	Data Source	Scale (National, regional, local) Extent	Temporal dimensions	Currently described over large areas via remote sensing? (yes/no)	Existing capacity to model over large extents? (yes/no)	Additional information
17	Abundance, Size, Species of Dead Coral Skeleton	Habitat Type	Published Literature, benthic habitat maps	Local Observations Aggregated to States Regions and the Nation	Decadal	No	No	
18	Abundance, Size, Species of Dead Coral Skeleton	Habitat Type	Published Literature, benthic habitat maps	Local Observations Aggregated to States Regions and the Nation	Decadal	Yes	Yes	
19	Species, size, abundance, health, specific look	Commercially important live aquarium (species, size, abundance)	Published Literature, EPA, NOAA, State	Local Observations Aggregated to States Regions and the Nation	Annual to decadal	No	No	
20	Species, size, abundance, health, specific look	Organisms used for products (species, size, abundance)	Published Literature, EPA, NOAA, State	Local Observations Aggregated to States Regions and the Nation	Annual to decadal	No	No	
21	Species, size, abundance, health, specific look	Commercially important aquarium (species, size, abundance)	NOAA, State, NPS	Local Observations Aggregated to States Regions and the Nation	Annual to decadal	No	No	
22	Species, size, abundance, health, specific look	Organisms used for products (species, size, abundance)	NOAA, State, NPS	Local Observations Aggregated to States Regions and the Nation	Annual to decadal	No	No	
23	Probability of flooding	Probability of flooding	NOAA SLOSH model, FEMA flood risk maps, EnviroAtlas	Local Observations Aggregated to States Regions and the Nation	Annual	No	Yes	https://msc.fema.gov
24	Water clarity	Water clarity	Survey data and satellite	Local Observations Aggregated to States Regions and the Nation	Daily	No	Yes	
25	--	--	--	--	--	--	--	
26	Color of water, algae, clarity & smell, lack of sound	Field crew opinion, secchi depth, algal abundance	Word of mouth, local bait & tackle shops, local radio & TV fish reports	Local	Decadal	No	No	

	Ecosystem			Beneficiary				Attributes			
			<i>Column #/label in Tables 6-12:</i>	not shown	(1) General Beneficiary	(2) Specific Beneficiary	not shown	not shown	(3) General Attribute	(4) Specific Attribute	not shown
Row #	Environmental Class	Environmental Sub-Class	Ecosystem	Beneficiary 1	Beneficiary 2	Specific Beneficiary	What matters directly to this beneficiary?	FEGS Set #	Attribute Category	Attribute Subcategory	Specific Attribute
27	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Non-Use	Existence	Existence	Is the fauna community the way it is supposed to be?	2/6	Fauna	Fauna Community	Diversity, Richness & Abundance
28	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Non-Use	Existence	Existence	Is the flora community the way it is supposed to be?	3/6	Flora	Flora Community	Diversity, Richness & Abundance
29	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Non-Use	Existence	Existence	Is the quality of the structure the way it is supposed to be?	5/6	Soil/Substrate	Substrate Quality	Reef Structure
30	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Non-Use	Existence	Existence	Is the WQ the way it is supposed to be?	1/6	Water	Water Quality	--
31	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Boaters	Kayakers, SUPs, and Boaters	Is this reef aesthetically enjoyable?	2/2	Composite and Extreme Events	Site Appeal	Scents & Viewscapes
32	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Boaters	Kayakers, SUPs, and Boaters	Will I see what im expecting or any interesting animals?	1/2	Fauna	Charismatic Fauna	Taxa & Presence
33	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Waders, Swimmers, and Divers	Scuba Divers and Snorkelers	Is there interesting enough viewscape to entertain divers?	9/9	Composite and Extreme Events	Site Appeal	Viewscapes
34	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Waders, Swimmers, and Divers	Scuba Divers and Snorkelers	Do these species attract the beneficiary?	3/9	Fauna	Charismatic Fauna	Taxa & Presence
35	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Waders, Swimmers, and Divers	Scuba Divers and Snorkelers	Do these species make the reef more interesting?	5/9	Fauna	Fauna Community	Coral Community Metrics
36	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Waders, Swimmers, and Divers	Scuba Divers and Snorkelers	Do these species attract the beneficiary?	4/9	Fauna	Fauna Community	Fish Community Metrics

	Biophysical Metrics		Datasets					
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27	Diversity, Richness & Abundance	Diversity, Richness & Abundance	Published Literature, EPA, NOAA, State	Local Observations Aggregated to States Regions and the Nation	Decadal	No	No	
28	Diversity, Richness & Abundance	Diversity, Richness & Abundance	NASA Satellite/ Online Posting, NOAA, State	Local Observations Aggregated to States Regions and the Nation	Decadal	No	No	
29	Reef complexity, grooves & spurs, swimthroughs, caves	Reef type, rugosity	NOAA, NASA, Coast Guard, local shops	Local Observations Aggregated to States Regions and the Nation	Decadal	No	No	
30	Fecal matter, pathogens, & toxins	Common water quality tests	Local beach water quality, NOAA mussel watch	Local Observations Aggregated to States Regions and the Nation	Decadal	No	No	
31	Water clarity	Field crew opinion	Word of mouth, local bait & tackle shops, local radio & TV fish reports	NA	Daily	No	No	
32	Species, size, abundance, diversity	Species, size, abundance, diversity	US FWLS, NOAA, State fisheries departments (FWC)	Local Observations Aggregated to States Regions and the Nation	Seasonal	No	Yes	
33	Colors, shapes, diversity, movement	Local reports	Online posting	NA	--	No	No	
34	Large marine organisms	Presence/ absence	EPA, NOAA, State	Regional	Seasonal	Depends- species	Yes	
35	Type, color, shape, rarity, diversity, richness, abundance, contribution to reef structure	% Coral cover, species name, morphotype, abundance, size (cm), health, rugosity	EPA, NOAA	Regional	Seasonal/Annual	No	Yes	
36	Species, size, color, richness, abundance, rarity, diversity, unique behavior & morphology	Biomass, size, abundance, diversity, richness, species name, feeding guilds, species description	EPA, NOAA	Regional	Annual	No	Yes	

	Ecosystem			Beneficiary				Attributes			
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Row #	Environmental Class	Environmental Sub-Class	Ecosystem	Beneficiary 1	Beneficiary 2	Specific Beneficiary	What matters directly to this beneficiary?	FEGS Set #	Attribute Category	Attribute Subcategory	Specific Attribute
37	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Waders, Swimmers, and Divers	Scuba Divers and Snorkelers	Are there interesting algae species present?	6/9	Flora	Charismatic Flora	Algal Taxa
38	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Waders, Swimmers, and Divers	Scuba Divers and Snorkelers	Are there interesting algae species present?	7/9	Flora	Flora Community	Presence of invasives/nuisance species
39	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Waders, Swimmers, and Divers	Scuba Divers and Snorkelers	Is there enough structure to entertain divers?	8/9	Soil/Substrate	Substrate Quality	Reef Structure
40	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Waders, Swimmers, and Divers	Scuba Divers and Snorkelers	Is WQ sufficient to be safe for diving?	2/9	Water	Water Quality	Chemicals & Contaminants
41	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Waders, Swimmers, and Divers	Scuba Divers and Snorkelers	Is there sufficient visibility to be pleasurable to divers?	1/9	Water	Water Quality	Water Clarity
42	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Anglers	Catch & Release	Is this reef aesthetically enjoyable?	1/4	Composite and Extreme Events	Site Appeal	Scents & Viewscapes
43	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Anglers	Catch & Release	Will I catch something interesting?	4/4	Fauna	Charismatic Fauna	Taxa & Presence
44	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Anglers	Catch & Release	Is there a chance hazardous species will get caught or scooped up in net & pose a threat to beneficiary?	2/4	Fauna	Fauna Community	Hazardous Species
45	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Recreational	Anglers	Catch & Release	Will hook or net get stuck?	3/4	Soil/Substrate	Substrate Quality	Reef Structure
46	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Subsistence	Food Subsisters	Anglers	Is this reef aesthetically enjoyable?	5/5	Composite and Extreme Events	Site Appeal	Scents & Viewscapes

	Biophysical Metrics		Datasets					
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Row #	Ideal	Currently Available	Data Source	Scale (National, regional, local) Extent	Temporal dimensions	Currently described over large areas via remote sensing? (yes/no)	Existing capacity to model over large extents? (yes/no)	Additional information
37	Rarity, color, size, amount of, unique morphology	Abundance, species name, size, diversity, % cover	Published Literature	NA	Sporadic	No	Yes	
38	Density, taxa, extent, duration	Density, taxa, extent, presence	NASA Satellite/ Online Posting, NOAA, State	Local Observations Aggregated to States Regions and the Nation	Daily/ Seasonal	Yes	Yes	
39	Reef complexity, grooves & spurs, swimthroughs, caves	Reef type, rugosity	EPA, NOAA	NA	Annual	No	No	
40	Fecal matter, pathogens, & toxins	Common water quality tests	Local beach water quality, NOAA mussel watch	Local Observations Aggregated to States Regions and the Nation	Daily	No	No	
41	Secchi disk	Diver recorded visibility	Online posting: diver recorded visibility; NOAA: satellite	Local	Daily	No	No	
42	Water clarity	Local reports	Online Posting	NA	Seasonal	No	No	
43	Species, size, abundance, diversity	Presence/ absence	State, Federal	Local Observations Aggregated to States Regions and the Nation	Seasonal	No	Yes	
44	Species, abundance, virulence of toxin in species	Presence/ absence	Beach Flags, Online Posting		Seasonal	No	Yes	
45	Reef complexity, grooves & spurs, caves	Local reports	Online Posting	Local	Annual	No	No	
46	Water clarity	Local reports	Online Posting	NA	Seasonal	No	No	

	Ecosystem			Beneficiary				Attributes			
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Row #	Environmental Class	Environmental Sub-Class	Ecosystem	Beneficiary 1	Beneficiary 2	Specific Beneficiary	What matters directly to this beneficiary?	FEGS Set #	Attribute Category	Attribute Subcategory	Specific Attribute
138	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Waders, Swimmers, and Divers	Swimmers	Can I safely wade, swim, or dive here?	2/5	Water	Water Quality	Pathogens in water
139	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Waders, Swimmers, and Divers	Swimmers	Is this an enjoyable location to wade, swim, or dive?	4/5	Water	Water Quality	Water Clarity
140	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Waders, Swimmers, and Divers	Swimmers	Is this an enjoyable location to wade, swim, or dive?	3/5	Water	Water Quality	Water temperature
141	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Waders, Swimmers, and Divers	Swimmers	Is it shallow enough to wade or swim, or deep enough to dive?	5/5	Water	Water Quantity	Water Depth
142	Aquatic	Wetlands	Wetlands	Agricultural	Farmers	Cranberry Farmers	Is there a reasonable chance that this land can be used to farm cranberries?	2/2	Soil/Substrate	Soil quality	Soil quality
143	Aquatic	Wetlands	Wetlands	Agricultural	Farmers	Cranberry Farmers	Is there enough water during the growing season to farm cranberries?	1/2	Water	Water Quantity	Water quantity
144	Aquatic	Wetlands	Wetlands	Non-use	Existence	Existence	Is the wetland in natural condition?	1/1	Composite and Extreme Events	Ecological Condition	Ecological condition
145	Aquatic	Wetlands	Wetlands	Recreational	Boaters	Kayakers, SUPs, and Boaters	Is the wetland an appealing place to kayak?	4/4	Composite and Extreme Events	Site Appeal	Viewscapes
146	Aquatic	Wetlands	Wetlands	Recreational	Boaters	Kayakers, SUPs, and Boaters	Is the water in the wetland safe for recreational boating?	3/4	Water	Water Quality	Contaminant from water exposure (chemical & biological)

	Biophysical Metrics		Datasets					
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138	Potential for risk from contact	Cyanobacteria concentrations in water (cells/mL)	NARS	National, Regional	Single sample during baseflow	No	No	Risk classes based on human health or recreational water quality criteria are desired translation of metric.
139	Predicted Secchi transparency (m)	Turbidity (NTU); color (PCU)	NARS	National, Regional	Single sample during baseflow	No	No	Transparency in streams predicted from lake Secchi depth, turbidity, and color data. Regional application for lakes described by Angradi et al. (2018)
140	Temperature	Temperature (F/C)	NARS	National, Regional	Single sample during baseflow	No	No	
141	Measurement data on water depth	Depth measurements (m or cm); either crosssectional or thalweg	NARS	National, Regional	Single sample during baseflow	No	No	
142	Soil suitability	Soil pH; Soil type; percent sand	2011 NWCA	National	Measured quinquennially by Soil/Substrate horizon from the Soil/Substrate surface to a depth of 125 cm in 48 contiguous US states	No	No	
143	Water quantity	--	--	--	--	Yes	Yes	Availability of water during the growing and harvesting seasons - usually diverted from nearby streams and rivers (but could also come from groundwater and rainfall)
144	Wetland condition	vegetation multimetric index or condition class	2011 NWCA	National	Measured quinquennially in 48 contiguous US states	No	Perhaps (using WetCat)	
145	Site appeal	--	--	--	--	No	No	
146	Individual wetland contamination metrics	Levels of harmful bacteria; levels of chemical contamination	2011 NWCA; EPA sources	National	--	No	No	

Row #	Ecosystem			Beneficiary				Attributes			
	Environmental Class	Environmental Sub-Class	Column #/label in Tables 6-12: Ecosystem	not shown Beneficiary 1	(1) General Beneficiary Beneficiary 2	(2) Specific Beneficiary Specific Beneficiary	not shown What matters directly to this beneficiary?	not shown FEGS Set #	(3) General Attribute Attribute Category	(4) Specific Attribute Attribute Subcategory	not shown Specific Attribute
147	Aquatic	Wetlands	Wetlands	Recreational	Boaters	Kayakers, SUPs, and Boaters	Is the wetland large enough to kayak?	1/4	Water	Water Quantity	Water quantity
148	Aquatic	Wetlands	Wetlands	Recreational	Boaters	Kayakers, SUPs, and Boaters	Is the wetland deep enough to kayak?	2/4	Water	Water Quantity	Water quantity
149	Aquatic	Wetlands	Wetlands	Recreational	Hunters	Waterfowl hunters	Is there a reasonable chance that I can hunt ducks (for consumption) in this wetland?	3/3	Composite and Extreme Events	Site Appeal	Viewscapes
150	Aquatic	Wetlands	Wetlands	Recreational	Hunters	Waterfowl hunters	Is the waterfowl safe to eat (free of chemical and biological contamination)?	2/3	Fauna	Edible fauna	Biological and chemical contaminants in meat for human consumption
151	Aquatic	Wetlands	Wetlands	Recreational	Hunters	Waterfowl hunters	Is there a reasonable chance that I can hunt ducks (for consumption) in this wetland?	1/3	Fauna	Edible fauna	Waterfowl abundance
152	Aquatic	Wetlands	Wetlands	Subsistence	Medicine Subsisters	Native American Medicine Subsisters	Are the plants from the wetlands free from contaminants (bacterial & chemical)?	2/2	Flora	Medicinal flora	Contaminant from water exposure/harvesting plants in wetlands (chemical & biological)
153	Aquatic	Wetlands	Wetlands	Subsistence	Medicine Subsisters	Native American Medicine Subsisters	Is there a reasonable chance that the beneficiary can find plants from the wetland that are medicinal in nature?	1/2	Flora	Medicinal flora	Medicinal/cultural plant species

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147	Wetland size	--	--	--	--	Yes	No	NLCD does not specifically include wetlands, and the optimal source for this information, NWI (National Wetland Inventory) has varying degrees of accuracy and age depending on state - either way this information has to be calculated (WetCat may be doing that)
148	Water depth	surface water depth	2011 NWCA	National	Measured quinquennially within the Assessment Area in 48 contiguous US states	No	No	Maximum surface water depth is measured only in the AA - not for the whole wetland.
149	Site appeal	--	--	--	--	No	No	
150	State-based	Levels of harmful bacteria; levels of chemical contamination	2011 NWCA; EPA sources	National	Measured quinquennially within the Assessment Area in 48 contiguous US states	No	No	
151	Abundance of waterfowl taxa for specific wetlands	State-based catch rates	State-based wildlife agency; USFWS	Regional	Often annual assessments for bag limits	No	No	USFWS does breeding ground surveys. State-based assessments of catch rates from hunters. Example: https://www.dfw.state.or.us/resources/hunting/upland_bird/docs/2016_Game_Bird_Hunting_Stats.pdf
152	Metrics for contaminants from consumption of medicinal taxa that is contaminated	Levels of harmful bacteria; levels of chemical contamination	2011 NWCA; EPA sources	National	--	No	No	
153	Abundance of medicinal plants	plant species composition; plant species richness; plant mean relative cover	2011 NWCA; Native American Ethnobotany Database1	National	Measured quinquennially at the height of the growing season (Apr-Sep) in 48 contiguous US states	No	No	Medicinal uses are generalized for the whole US (i.e., not spatial)

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Row #	Environmental Class	Environmental Sub-Class	Ecosystem	Beneficiary 1	Beneficiary 2	Specific Beneficiary	What matters directly to this beneficiary?	FEGS Set #	Attribute Category	Attribute Subcategory	Specific Attribute
154	Terrestrial	Agriculture	Field/Pasture/Riparian	Agricultural	Farmers	Farmers	Is the soil productive?	1/2	Soil/Substrate	Soil quantity	Soil productivity
155	Terrestrial	Agriculture	Field/Pasture/Riparian	Agricultural	Farmers	Pollinator-dependent Crop Farmer	Are there wild bees to serve as pollinator?	2/2	Fauna	Pollinators	Native pollinator abundance
156	Terrestrial	Agriculture	Field/Pasture/Riparian	Government, Municipal, Residential	Residential Property Owners	Property Owners	Is there an abundance of harmful contaminants/pollutants present?	4/5	Atmosphere	Air quality	Does the air contain contaminants or pollutants?
157	Terrestrial	Agriculture	Field/Pasture/Riparian	Government, Municipal, Residential	Residential Property Owners	Property Owners	What is the likelihood of a property to flood during a heavy rain or storm?	5/5	Composite and Extreme Events	Extreme Events	Flooding
158	Terrestrial	Agriculture	Field/Pasture/Riparian	Government, Municipal, Residential	Residential Property Owners	Property Owners	What makes a surrounding environment appealing/valuable?	3/5	Composite and Extreme Events	Site Appeal	Viewscapes
159	Terrestrial	Agriculture	Field/Pasture/Riparian	Government, Municipal, Residential	Residential Property Owners	Property Owners	Is the groundwater safe for consumption?	1/5	Water	Water quality	Presence/absence of contaminants

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154	Crop-specific index of productivity	Generic Productivity index	USDA & MSU Productivity Index (https://foresthealth.fs.usda.gov/Soil/Substrates/PIMap)	National, regional	No	Yes	Yes	Source: Schaetzl, R.J. Krist, F.J. Jr., and B.A. Miller. 2012. A Taxonomically Based, Ordinal Estimate of Soil/Substrate Productivity for Landscape-Scale Analyses. <i>Soil/Substrate Science</i> 177:288-299
155	Abundance and richness of all native insect pollinators	Population estimates of wild bees	Koh, I., Lonsdorf, E. V., Williams, N. M., Brittain, C., Isaacs, R., Gibbs, J., & Ricketts, T. H. (2016). Modeling the status, trends, and impacts of wild bee abundance in the United States. <i>Proceedings of the National Academy of Sciences</i> , 113(1), 140-145	National	No	No	Yes	Source: Koh, Insu, et al. 2016. Modeling the status, trends, and impacts of wild bee abundance in the United States. <i>PNAS</i> 113: 140-145.
156	Air contaminants present and parameters measured.	Air monitoring data summaries.	Multiple data links and sources http://www.in.gov/idem/airquality/2346.htm	Local	By states, Indiana.	No	No	Limited by location.
157	Annual risk of flooding	Probability of flooding	FEMA Flood Map Service Center: National Flood Hazard Layer	National	No	No	Yes	Woznicki et al 2019; https://msc.fema.gov
158	--	Natural Amenities Index (7 point scale)	USDA Economic Research Service Natural Amenities Index	National, regional	No	Yes	Yes	https://www.ers.usda.gov/data-products/natural-amenities-scale.aspx
159	Contaminant concentrations	Groundwater monitoring summary.	State agencies	Regional	Variable	No	No	Does not include potential point source. Example: https://in.gov/idem/cleanwater/files/gw_monitoring_network_report_2016.pdf

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Row #	Environmental Class	Environmental Sub-Class	Ecosystem	Beneficiary 1	Beneficiary 2	Specific Beneficiary	What matters directly to this beneficiary?	FEGS Set #	Attribute Category	Attribute Subcategory	Specific Attribute
160	Terrestrial	Agriculture	Field/Pasture/Riparian	Government, Municipal, Residential	Residential Property Owners	Property Owners	Water availability for owner?	2/5	Water	Water Quantity	Is water available for my home and crops?
161	Terrestrial	Agriculture	Field/Pasture/Riparian	Learning	Agricultural Landscape	Educators/ Researchers	Invasive species population for crop protection.	8/8	Fauna	Fauna Community	Invasive/pest species abundance
162	Terrestrial	Agriculture	Field/Pasture/Riparian	Learning	Agricultural Landscape	Educators/ Researchers	Pollinators	6/8	Fauna	Pollinators	Native pollinator abundance
163	Terrestrial	Agriculture	Field/Pasture/Riparian	Learning	Agricultural Landscape	Educators/ Researchers	Pollinators	7/8	Fauna	Spiritually/culturally important fauna	Monarch butterfly abundance
164	Terrestrial	Agriculture	Field/Pasture/Riparian	Learning	Agricultural Landscape	Educators/ Researchers	Pollution control and the environment	4/8	Soil/Substrate	Soil quality	Run-off pollution
165	Terrestrial	Agriculture	Field/Pasture/Riparian	Learning	Agricultural Landscape	Educators/ Researchers	What is the Soil/Substrate quality of a particular area?	5/8	Soil/Substrate	Soil quality	Soil quality contaminants

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160	Water availability/annual rainfall.	Iowa groundwater survey, mapped area of drought conditions and average annual rainfall in U.S.	Figure 2. Public water supply wells map. Figure 4. Drought conditions http://s-iuhr34.iuhr.uiowa.edu/publications/uploads/2015-06-23_11-06-38_tis-57.pdf	Regional	No	No	No	
161	Invasive species population.	Invasive species presence	https://www.invasivespeciesinfo.gov/animals/main.shtml	National	Nationwide, U.S.	No	No	Desired invasive species data may not be available.
162	Abundance and richness of all native insect pollinators	Population estimates of wild bees	Koh, I., Lonsdorf, E. V., Williams, N. M., Brittain, C., Isaacs, R., Gibbs, J., & Ricketts, T. H. (2016). Modeling the status, trends, and impacts of wild bee abundance in the United States. Proceedings of the National Academy of Sciences, 113(1), 140-145	National	Nationwide, U.S.	Yes	Yes	Actual pollination and population numbers would be helpful but may be unattainable.
163	Monarch Butterfly abundance and pollination occurrence.	Monarch Butterfly Monitoring.	Monarch sightings and migration map https://www.fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/documents/Monarch-Monitoring_en.pdf	National	Nationwide, U.S.	No	Yes	Actual numbers not available but may not be attainable.
164	Pollution source and Soil/Substrate types.	Soil quality release surveys by location and date, USGS.	Soil/Substrate Surveys https://www.nrcs.usda.gov/wps/portal/nrcs/Soil/Substratesurvey/Soil/Substrates/survey/state/	National	Nationwide, U.S.	Yes	Yes	
165	Soil/Substrate types and contaminants.	Web Soil quality survey and Soil quality quality: Area of interest	Interactive webpage https://webSoil/Substratesurvey.sc.egov.usda.gov/App/WebSoil/SubstrateSurvey.aspx	National	Nationwide, U.S.	Yes	Yes	

	Ecosystem			Beneficiary				Attributes			
			<i>Column #/label in Tables 6-12:</i>	not shown	(1) General Beneficiary	(2) Specific Beneficiary	not shown	not shown	(3) General Attribute	(4) Specific Attribute	not shown
Row #	Environmental Class	Environmental Sub-Class	Ecosystem	Beneficiary 1	Beneficiary 2	Specific Beneficiary	What matters directly to this beneficiary?	FEGS Set #	Attribute Category	Attribute Subcategory	Specific Attribute
166	Terrestrial	Agriculture	Field/Pasture/Riparian	Learning	Agricultural Landscape	Educators Researchers	What are the water quality conditions?	3/8	Water	Water Quality	Contaminants
167	Terrestrial	Agriculture	Field/Pasture/Riparian	Learning	Agricultural Landscape	Educators/ Researchers	What is the quality of the water?	2/8	Water	Water Quality	Contaminants
168	Terrestrial	Agriculture	Field/Pasture/Riparian	Learning	Agricultural Landscape	Educators/ Researchers	Are the contaminants within acceptable limits?	1/8	Water	Water Quality	Surrounding environment
169	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Deer hunters	Is the meat safe to eat or are there parasites and contaminants?	6/7	Fauna	Edible fauna	CWD and EHD prevalence.
170	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Deer hunters	How abundant are the deer for harvest?	1/7	Fauna	Edible fauna	Deer abundance
171	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Deer hunters	How abundant are the deer for harvest?	4/7	Fauna	Edible fauna	Deer abundance
172	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Deer hunters	How abundant are the deer for harvest?	5/7	Fauna	Edible fauna	Deer abundance
173	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Deer hunters	How abundant are the deer for harvest?	3/7	Fauna	Edible fauna	Deer abundance

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166	Water quality and contaminant conditions.	Current conditions map- Water Quality.	Water Quality Watch - Continuous Real Time Water - Quality of Surface Water https://waterwatch.usgs.gov/wqwatch/	National	Nationwide, U.S.	Yes	Yes	Not all data is available for every county/town.
167	Water quality and contaminant conditions.	Water quality reports and findings in the area.	Several data sets https://in.water.usgs.gov/	Regional	Ohio, Kentucky, Indiana.	Yes	Yes	Limited by location.
168	Contaminants and limitations.	Nationwide findings of nutrients in streams and groundwater, limitations, and effects.	SEVERAL data sets https://pubs.usgs.gov/circ/1350/	National	Nationwide, U.S.	Yes	Yes	Focuses more on point source than non-point.
169	Frequency of CWD.	Data for CWD deer surveillance statewide by zone and year.	2015 Illinois County Deer Harvest by Sex for Each Season http://dnr.wi.gov/topic/wildlifehabitat/documents/wiill.pdf	Regional	By state, Wisconsin and Illinois.	No	No	CWD may need defined or translated.
170	Deer density	Deer density status and trends monitoring	Table 1 and Figure 2	Regional	Annual (generally)	No	No	Deer populations are usually managed by state agencies. For example: https://files.dnr.state.mn.us/wildlife/deer/reports/popmodel/popmodel_2016.pdf
171	Deer density	Deer density United States, 2008	Several data sets and resources https://gfp.sd.gov/hunt/	Regional	By state, South Dakota	No	No	May not be up to date.
172	Harvest statistics for desired traits of deer.	Deer harvest report by season. Minnesota, 1995-2015.	Table 2. Deer Harvest by Season, 2015; http://files.dnr.state.mn.us/wildlife/deer/reports/harvest/deerharvest_2015.pdf	Regional	By state, Minnesota.	No	No	May not be up to date.
173	Deer density	Range-wide status of Mule Deer and Black Tailed Deer.	Table 1. Range-wide estimation of population size for mule deer	Regional	Western region os U.S.	No	No	http://www.wafwa.org/Documents%20and%20Settings/37/Site%20Documents/Working%20Groups/Mule%20Deer/Publications2/2016_Mule_Deer_and_BTD_Status_Update_Final.pdf

	Ecosystem			Beneficiary				Attributes			
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Row #	Environmental Class	Environmental Sub-Class	Ecosystem	Beneficiary 1	Beneficiary 2	Specific Beneficiary	What matters directly to this beneficiary?	FEGS Set #	Attribute Category	Attribute Subcategory	Specific Attribute
174	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Deer hunters	How abundant are the deer for harvest?	2/7	Fauna	Edible fauna	Deer abundance
175	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Deer hunters	Likelihood for presence of parasites and pathogens.	7/7	Fauna	Edible fauna	Type of contaminant and level of concern.
176	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Small game hunters	How abundant is the small game population?	2/4	Fauna	Edible fauna	Abundance
177	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Small game hunters	How abundant is the small game population?	1/4	Fauna	Edible fauna	Abundance
178	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Small game hunters	Ideal environments for specific small game.	4/4	Fauna	Edible fauna	Land cover
179	Terrestrial	Agriculture	Field/Pasture/Riparian	Recreational	Recreational hunters	Small game hunters	Pathogen/parasite reported cases.	3/4	Fauna	Edible fauna	Pathogens/parasites
180	Terrestrial	Agriculture	Field/Pond/Wetland	Recreational	Recreational hunters	Waterfowl hunters	Is there a preferred time of year for hunting?	6/7	Fauna	Edible fauna	Abundance by season.

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174	Deer density	Summary of Illinois Deer Seasons	2015-2016 Season Results (organized by season) http://files.dnr.state.mn.us/wildlife/deer/reports/harvest/deerharvest_2015.pdf	Regional	By state, Illinois	No	No	
175	Contaminant abundance and occurrence.	Nationwide diagnosis (interactive map).	Interactive webpage https://www.nwhc.usgs.gov/whispers/	National	Nationwide, U.S.	Yes	Yes	Translations and definitions of diseases or diagnosis may be needed.
176	Harvest data and reports.	Hunter activity and harvest for small game.	Several data sets. http://ksoutdoors.com/Services/Research-Publications http://www.michigan.gov/dnr/0,4570,7-153-10363_48664---,00.html	Local	By state, Kansas, Michigan	No	No	May not include desired data for all small game.
177	Population reports/abundance	Population data and range maps for small game.	Several data sets http://www.dnr.state.mn.us/hunting/smallgame/more.html http://files.dnr.state.mn.us/publications/wildlife/population2012/1-farmland-wildlife.pdf	Local	By state, Minnesota.	No	No	Limited by location.
178	Area layout and geographical characteristics.	Small game distribution maps.	2016 Game Distribution http://www.iowadnr.gov/Portals/idnr/uploads/Hunting/2016_distribution_map.pdf	Local	1 state, Iowa	Yes	Yes	Limited by location.
179	Nationwide diagnosis (interactive map of reported cases).	Presence/ absence	Event Reporting System https://www.nwhc.usgs.gov/whispers/	National	Nationwide, U.S.	Yes	Yes	Limited data on pathogens.
180	Waterfowl hunting survey data for Kansas.	Preferred season dates from hunter survey and activity based off of time of year.	Season Preferences by those who hunted http://ksoutdoors.com/content/download/41892/399356/version/4/file/KDWP+Waterfowl+Hunter+Survey+Report+2014+FINAL.pdf	Local	By state, Kansas.	No	Yes	

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Row #	Environmental Class	Environmental Sub-Class	Ecosystem	Beneficiary 1	Beneficiary 2	Specific Beneficiary	What matters directly to this beneficiary?	FEGS Set #	Attribute Category	Attribute Subcategory	Specific Attribute
181	Terrestrial	Agriculture	Field/Pond/Wetland	Recreational	Recreational hunters	Waterfowl hunters	Are males or females harvested more?	5/7	Fauna	Edible fauna	Abundance male vs. female
182	Terrestrial	Agriculture	Field/Pond/Wetland	Recreational	Recreational hunters	Waterfowl hunters	Are males or females harvested more?	4/7	Fauna	Edible fauna	Abundance male vs. female
183	Terrestrial	Agriculture	Field/Pond/Wetland	Recreational	Recreational hunters	Waterfowl hunters	How abundant are waterfowl for hunting?	2/7	Fauna	Edible fauna	Abundance of waterfowl
184	Terrestrial	Agriculture	Field/Pond/Wetland	Recreational	Recreational hunters	Waterfowl hunters	How abundant are waterfowl for hunting?	1/7	Fauna	Edible fauna	Abundance of waterfowl
185	Terrestrial	Agriculture	Field/Pond/Wetland	Recreational	Recreational hunters	Waterfowl hunters	Are the waterfowl safe from pathogens or parasites to eat?	3/7	Fauna	Edible fauna	Reported cases of pathogens/parasites.
186	Terrestrial	Agriculture	Field/Pond/Wetland	Recreational	Rereational hunters	Waterfowl hunters	Is the water safe for boating and hunting Presence/absence of waterbourne pathogens or parasites.	7/7	Fauna	Edible fauna	Water Quality

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181	Male vs. female harvest	Migratory bird hunting activity and harvest during the 2014-15 hunting seasons.	Table 11. Weighted sex ratios of ducks harvested. https://www.fws.gov/migratorybirds/pdf/surveys-and-data/HarvestSurveys/MBHActivityHarvest2014-15and2015-16.pdf	National	United States (49 states)	No	Yes	
182	Central flyway harvest data and sex ratio data.	Sex ratios of harvested waterfowl to determine if male or female is preferred.	Mallard Sex Ratios in the U.S. Harvest https://www.fws.gov/migratorybirds/pdf/surveys-and-data/HarvestSurveys/MBHActivityHarvest2014-15and2015-16.pdf https://www.fws.gov/migratorybirds/pdf/surveys-and-data/DataBooks/CentralFlywayDataBook.pdf	Regional	Atlantic and Central flyways of U.S.	No	No	Limited by location.
183	Waterfowl habitat, population, and historical data.	Harvest reports for harvest success for hunters vs. population.	Illinois DNR - Hunting - Waterfowl https://www.fws.gov/migratorybirds/pdf/surveys-and-data/Population-status/Waterfowl/WaterfowlPopulationStatusReport16.pdf	National	Nationwide, U.S.	Yes	Yes	Population numbers may not be up to date.
184	Table data for waterfowl populations by date and region.	Population reports for abundance information for hunters.	Several data sets. https://www.dnr.illinois.gov/hunting/waterfowl/surveys/Pages/OlderSurveys.aspx https://www.leg.state.mn.us/docs/2016/other/160136.pdf	Regional	By state, Illinois.	No	No	Limited by location.
185	Diagnosis and occurrences (interactive map). Data for WN virus.	Pathogen/parasite information for potential to harm consumer.	Interactive webpage https://www.nwhc.usgs.gov/whispers/	National	Nationwide, U.S.	Yes	Yes	
186	Nationwide diagnosis (interactive map of reported cases).	Reported cases of affected waterfowl.	Event Reporting System https://www.nwhc.usgs.gov/whispers/	National	Nationwide, U.S.	Yes	Yes	

	Ecosystem			Beneficiary				Attributes			
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Row #	Environmental Class	Environmental Sub-Class	Ecosystem	Beneficiary 1	Beneficiary 2	Specific Beneficiary	What matters directly to this beneficiary?	FEGS Set #	Attribute Category	Attribute Subcategory	Specific Attribute
187	Terrestrial	Forests	Forest	Agricultural	Foresters	Timberland owner/timber grower	What is the quality of merchantable trees?	3/3	Other Natural components	Fiber material quality	Tree species, size, defect, health
188	Terrestrial	Forests	Forest	Agricultural	Foresters	Timberland owner/timber grower	What is the quantity of merchantable trees?	2/3	Other Natural components	Fiber material quantity	Tree volume
189	Terrestrial	Forests	Forest	Agricultural	Foresters	Timberland owner/timber grower	What is the potential productivity of the site for growing timber?	1/3	Soil/Substrate	Soil quantity	Maximum potential tree growth
190	Terrestrial	Forests	Forest	Commercial / Industrial	Timber, Fiber, and Ornamental Extractors	Timber extractor	What is the quality of merchantable trees?	2/2	Other Natural components	Fiber material quality	Tree species, size, defect, health
191	Terrestrial	Forests	Forest	Commercial / Industrial	Timber, Fiber, and Ornamental Extractors	Timber extractor	What is the quantity of merchantable trees?	1/2	Other Natural components	Fiber material quantity	Tree volume
192	Terrestrial	Forests	Forest	Government, Municipal, Residential	Residential Property Owners	Home owner with some trees living next to forested area	What is the risk of a forest disturbance damaging life or property?	1/3	Composite and Extreme Events	Extreme Events	Fire
193	Terrestrial	Forests	Forest	Government, Municipal, Residential	Residential Property Owners	Home owner with some trees living next to forested area	How pretty is the area?	3/3	Composite and Extreme Events	Site Appeal	Viewscapes
194	Terrestrial	Forests	Forest	Government, Municipal, Residential	Residential Property Owners	Home owner with some trees living next to forested area	What is the risk of forest wildlife damaging life or property?	2/3	Fauna	Pest predator/depredator fauna/Parasites	Predators, browsers, trampers, dam-builders/tree cutters
195	Terrestrial	Forests	Forest	Non-Use	Existence	Existence	Are the forests healthy?	1/1	Composite and Extreme Events	Ecological Condition	--

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187	Quality of merchantable volume	Quality of merchantable volume	Forest Inventory and Analysis	National, regional	continuous (annual)	no	no	Spatial models not very good or necessary; data are comprehensive sample
188	Quantity of merchantable volume	Quantity of merchantable volume (m3 or board-ft/ha)	Forest Inventory and Analysis	National, regional	continuous (annual)	yes	yes	Spatial models not very good or necessary; data are comprehensive sample
189	Potential tree growth	Site class: estimated potential wood production for "normal" stand (m3/ha/yr)	Forest Inventory and Analysis	National, regional	continuous (annual)	yes	yes	Spatial models not very good or necessary; data are comprehensive sample
190	Quality of merchantable volume	Quality of merchantable volume	Forest Inventory and Analysis	National, regional	continuous (annual)	no	no	
191	Quantity of merchantable volume	Quantity of merchantable volume (m3 or board-ft/ha)	Forest Inventory and Analysis	National, regional	continuous (annual)	yes	yes	Spatial models not very good or necessary; data are comprehensive sample
192	Risk of severe fire	Modeled fire risk given climatic fire regime	LANDFIRE program	National	Periodically assessed (every 5 yrs?)	yes	yes	True risk will depend on local forest and defensive space management, no comprehensive data on that
193	Ranking of typically attractive features within visual, auditory, olfactory range	--	--	--	--	No	No	site appeal includes multiple ecosystems and attributes
194	Risk of animal damage or attack	General ideas of local fauna	Expert opinion	Local	--	no	no	This category was not in NESCS but it seems like a real concern
195	Abundance of forest conditions that people value	Terrestrial condition assessment scores (1-5)	Cleland et al. (2017)	National	No	Yes	Yes	

	Ecosystem			Beneficiary				Attributes			
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Row #	Environmental Class	Environmental Sub-Class	Ecosystem	Beneficiary 1	Beneficiary 2	Specific Beneficiary	What matters directly to this beneficiary?	FEGS Set #	Attribute Category	Attribute Subcategory	Specific Attribute
196	Terrestrial	Forests	Forest	Recreational	Food Pickers and Gatherers	Recreational huckleberry picker	How pretty is the area?	2/2	Composite and Extreme Events	Site Appeal	Viewscapes
197	Terrestrial	Forests	Forest	Recreational	Food Pickers and Gatherers	Recreational huckleberry picker	How many huckleberry plants are there?	1/3	Flora	Edible flora	Huckleberry
198	Terrestrial	Forests	Forest	Recreational	Food Pickers and Gatherers	Recreational huckleberry picker	How many ripe huckleberries are there?	1/2	Flora	Edible flora	Huckleberry
199	Terrestrial	Forests	Forest	Subsistence	Food and Medicinal Subsisters	Elk hunter	How many elk are there?	1/2	Fauna	Edible fauna	Elk population
200	Terrestrial	Forests	Forest	Subsistence	Food and Medicinal Subsisters	Elk hunter	How tasty are the elk that are present?	1/2	Fauna	Edible fauna	Elk quality

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196	Ranking of typically attractive features within visual, auditory, olfactory range	--	--	National	--	No	No	Although this will be part of a recreational berry picker's decision of where to go, maybe it belongs to a different "beneficiary" category
197	Quantity of huckleberry plants	Cover of huckleberry species	Forest Inventory and Analysis	National, regional	continuous (annual)	no	no	Spatial models not very good or necessary; data are comprehensive sample
198	Quantity of huckleberries	Cover of huckleberry species in different forest conditions	Forest Inventory and Analysis	National, regional	continuous (annual)	no	no	There are some studies on berry production but no comprehensive data. Some geographic and stand-level attributes can predict berry prediction, but they're not terribly strong
199	Elk populations size	Occasional estimates of game populations for selected areas	State game department population estimates	regional	inconsistent	no	no	Population estimates are difficult and inconsistent; harvest reports are more reliable, but not a true FECS
200	Elk size, sex, and/or age	Occasional estimates of game populations for selected areas	State game department population estimates	regional	inconsistent	no	no	Population estimates are difficult and inconsistent; harvest reports are more reliable, but not a true FECS