

	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
1	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Agricultural	Aquaculturists	Coral Nurseries	Will algae overgrow juvenile corals?	4/6	Flora	Flora Community	Presence
2	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Agricultural	Aquaculturists	Coral Nurseries	Is there enough substrate to transplant new corals onto or need room for man-made structures?	6/6	Soil/Substrate	Substrate Quality	Substrate Type
3	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Agricultural	Aquaculturists	Coral Nurseries	Is there enough substrate to transplant new corals onto or need room for man-made structures?	5/6	Soil/Substrate	Substrate Quantity	Presence
4	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Agricultural	Aquaculturists	Coral Nurseries	Is WQ sufficient to grow juvenile corals?	2/6	Water	Water Quality	Chemicals & Contaminants
5	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Agricultural	Aquaculturists	Coral Nurseries	Is temp sufficient to grow juvenile corals?	3/6	Water	Water Quality	Temperature
6	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Agricultural	Aquaculturists	Coral Nurseries	Is there sufficient visibility to grow corals?	1/6	Water	Water Quality	Water Clarity
7	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Is there a chance of novel discoveries	1/6	Fauna	Fauna Community	Diversity, Richness & Abundance
8	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Is there a chance of novel discoveries	2/6	Flora	Flora Community	Diversity, Richness & Abundance

	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
1	Abundance	Abundance	Observational surveys by nursery owners	NA	Sporadic	No	No	
2	Type of bare substrate	Reef type	Monitoring by nursery owners	Local	Sporadic	No	No	
3	Quantity of bare substrate	Percent uncovered	Monitoring by nursery owners	Local	Sporadic	No	No	
4	Contaminant concentrations	Coliforms, enterococci , vibrios (CFUs). Microbial toxins, heavy metals & chemicals: $\mu\text{mol l}^{-1}$)	Local beach water quality, NOAA, monitoring by nursery owners	Local Observations Aggregated to States Regions and the Nation	Seasonal	No	Yes	
5	Temperature	Temperature	NOAA	Regional	Seasonal	Yes	Yes	
6	Turbidity values, Secchi disk, Satellite imagery, light meter	Turbidity: FTU & NTU, ppm. Visibility: m. Satellite chlorophyll a: relative concentrations. Light penetration: Kd, PAR	NOAA: satellite, monitoring by nursery owners	Local Observations Aggregated to States Regions and the Nation	Daily	No	No	
7	Diversity, Richness, Species	Diversity, Richness	Published Literature, EPA, NOAA, State	Local Observations Aggregated to States Regions and the Nation	Annual to decadal	No	No	
8	Diversity, Richness, Species	Diversity, Richness	Published Literature	Local Observations Aggregated to States Regions and the Nation	Annual to decadal	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
9	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Is there a chance of novel discoveries	4/6	Fauna	Commercially Important Fauna	Diversity, Richness & Abundance
10	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Is there a chance of novel discoveries	3/6	Fauna	Medicinal Fauna	Diversity, Richness & Abundance
11	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Is there a chance of novel discoveries	6/6	Flora	Commercially Important Flora	Diversity, Richness & Abundance
12	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Is there a chance of novel discoveries	5/6	Flora	Medicinal Flora	Diversity, Richness & Abundance
13	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Extractors	Are the materials there & are they usable?	2/6	Fauna	Commercially Important Fauna	Diversity, Richness & Abundance
14	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Extractors	Are the materials there & are they usable?	1/6	Fauna	Medicinal Fauna	Diversity, Richness & Abundance
15	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Extractors	Are the materials there & are they usable?	4/6	Flora	Commercially Important Flora	Diversity, Richness & Abundance
16	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Extractors	Are the materials there & are they usable?	3/6	Flora	Medicinal Flora	Diversity, Richness & Abundance

	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
9	Diversity, Richness, Species	Diversity, Richness	Published Literature, EPA, NOAA, State	Local Observations Aggregated to States Regions and the Nation	Sporadic	No	No	
10	Diversity, Richness, Species	Diversity, Richness	Published Literature, EPA, NOAA, State	Local Observations Aggregated to States Regions and the Nation	Sporadic	No	No	
11	Diversity, Richness, Species	Diversity, Richness	Published Literature	Local Observations Aggregated to States Regions and the Nation	Sporadic	No	No	
12	Diversity, Richness, Species	Diversity, Richness	Published Literature	Local Observations Aggregated to States Regions and the Nation	Sporadic	No	No	
13	Abundance, Health, Size, Species	Abundance, Size, Species	Published Literature, EPA, NOAA, State	Local Observations Aggregated to States Regions and the Nation	Annual to decadal	No	No	
14	Abundance, Health, Size, Species	Abundance, Size, Species	Published Literature, EPA, NOAA, State	Local Observations Aggregated to States Regions and the Nation	Annual to decadal	No	No	
15	Abundance, Health, Size, Species	Abundance, Size, Species	Published Literature	Local Observations Aggregated to States Regions and the Nation	Annual to decadal	No	No	
16	Abundance, Health, Size, Species	Abundance, Size, Species	Published Literature	Local Observations Aggregated to States Regions and the Nation	Annual to decadal	No	No	

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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
17	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Extractors	Are the materials there & are they usable?	5/6	Soil/Substrate	Substrate Quality	Diversity, Richness & Abundance
18	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Extractors	Are the materials there & are they usable?	6/6	Soil/Substrate	Substrate Quantity	Diversity, Richness & Abundance
19	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Timber, Fiber, and Ornamental Extractors	Ornamental Extractors	Will I find what I am expecting?	1/4	Fauna	Commercially Important Fauna	Aquarium Species
20	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Timber, Fiber, and Ornamental Extractors	Ornamental Extractors	Are the materials there & are they usable?	2/4	Fauna	Commercially Important Fauna	Organisms used for products
21	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Timber, Fiber, and Ornamental Extractors	Ornamental Extractors	Will I find what I am expecting?	3/4	Flora	Commercially Important Flora	Aquarium Species
22	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Commercial / Industrial	Timber, Fiber, and Ornamental Extractors	Ornamental Extractors	Are the materials there & are they usable?	4/4	Flora	Commercially Important Flora	Organisms used for products
23	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Government, Municipal, Residential	Residential Property Owners	Coastal Property Owners	Will my property be damaged?	1/2	Composite and Extreme Events	Extreme Events	Flooding
24	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Government, Municipal, Residential	Residential Property Owners	Coastal Property Owners	Is this location aesthetically enjoyable?	2/2	Composite and Extreme Events	Site Appeal	Sounds & Viewscapes
25	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Non-Use	Existence	Existence	Is the health the way it is supposed to be?	4/6	Composite and Extreme Events	Ecological Condition	--
26	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Non-Use	Existence	Existence	Is the reef as appealing as it should be?	6/6	Composite and Extreme Events	Site Appeal	--

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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
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	

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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
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

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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	

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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

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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	

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47	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Subsistence	Food Subsisters	Anglers	Risk of sickness when eating caught fish?	1/5	Fauna	Edible Fauna	Conc. Of Pathogens/ Toxins/ Contaminants/ Parasites
48	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Subsistence	Food Subsisters	Anglers	Risk of sickness when eating caught fish?	4/4	Fauna	Edible Fauna	Conc. Of Pathogens/ Toxins/ Contaminants/ Parasites
49	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Subsistence	Food Subsisters	Anglers	Will I catch what I am expecting?	1/4	Fauna	Edible Fauna	Taxa
50	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Subsistence	Food Subsisters	Anglers	Will I catch what I am expecting?	4/5	Fauna	Edible Fauna	Taxa
51	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Subsistence	Food Subsisters	Anglers	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
52	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Subsistence	Food Subsisters	Anglers	Is there a chance hazardous species will get caught or scooped up in net & pose a threat to beneficiary?	2/5	Fauna	Fauna Community	Hazardous Species
53	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Subsistence	Food Subsisters	Anglers	Will hook or net get stuck?	3/4	Soil/Substrate	Substrate Quality	Reef Structure
54	Aquatic	Estuaries and Near Shore Marine	Coral Reefs	Subsistence	Food Subsisters	Anglers	Will hook or net get stuck?	3/5	Soil/Substrate	Substrate Quality	Reef Structure
55	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Is the biological habitat conducive to shellfish growth	7/11	Fauna	Pest predator/ depredator fauna/Parasites	Abundance
56	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Will there be a chance of sickness when eating my shellfish?	8/11	Fauna	Pest predator/ depredator fauna/Parasites	Abundance

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47	Concentration of toxins (Ciguatera, tetrotoxin), metals, pathogens & parasites from raw fish	Alerts from the FDA as well as state and local authorities	FDA, USDA	Local Observations Aggregated to States Regions and the Nation	Seasonal	No	Yes	
48	Concentration of toxins (Ciguatera, tetrotoxin), metals, pathogens & parasites from raw fish	Alerts from the FDA as well as state and local authorities	FDA, USDA	Local Observations Aggregated to States Regions and the Nation	Seasonal	No	Yes	
49	Species, size, abundance, diversity	Presence/ absence	State, Federal	Local Observations Aggregated to States Regions and the Nation	Seasonal/Annual	Yes	Yes	
50	Species, size, abundance, diversity	Presence/ absence	State, Federal	Local Observations Aggregated to States Regions and the Nation	Seasonal/Annual	Yes	Yes	
51	Species, abundance, virulence of toxin in species	Presence/ absence	Beach Flags, Online Posting	NA	Seasonal	No	Yes	
52	Species, abundance, virulence of toxin in species	Presence/ absence	Beach Flags, Online Posting	NA	Seasonal	No	Yes	
53	Reef complexity, grooves & spurs, caves	Local reports	Online Posting	Local	Annual	No	No	
54	Reef complexity, grooves & spurs, caves	Local reports	Online Posting	Local	Annual	No	No	
55	Abundance, species	Abundance, species	Observational surveys by shellfish growers	Local	Sporadic	No	No	
56	Abundance, species	Abundance, species	Observational surveys by shellfish growers	Local	Sporadic	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
57	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Are my shellfish going to die?	11/11	Fauna	Protists, viruses, bacteria	Disease organisms
58	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Is the biological habitat conducive to shellfish growth	6/11	Flora	Flora Community	Presence
59	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Will HABs close down my operations?	9/11	Flora	Flora Community	Presence
60	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Is there sufficient area for shellfish operations?	10/11	Soil/Substrate	Substrate Quantity	Permitted area
61	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Is there sufficient flushing to clean out byproducts	5/11	Water	Water Movement	Water exchange
62	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Will my shellfish get contaminated?	2/11	Water	Water Quality	Chemicals & Contaminants
63	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Will people get sick if they eat my shellfish?	3/11	Water	Water Quality	Chemicals & Contaminants
64	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Is the physical habitat conducive to shellfish growth	4/11	Water	Water Quality	Salinity, Temperature, pH, DO,
65	Aquatic	Estuaries and Near Shore Marine	Estuaries	Agricultural	Aquaculturists	Shellfish Growers	Will this SPM clog my shellfish gills?	1/11	Water	Water Quality	Suspended Sediment
66	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Commercial Anglers	--	Is this area closed to shellfishing?	3/8	Fauna	Area closures	Area closures

	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
57	Disease organisms	Shellfish closures	Monitoring by shellfish growers, State postings	Local	Sporadic	No	No	
58	Abundance of Flora of interest	Chlorophyl a	Observational surveys by nursery owners	Local	Sporadic	No	No	
59	HAB	HAB (outbreak frequency)	Observational surveys by shellfish growers	Local	Sporadic	No	No	
60	Area open for permits	Permitted area	Municipal records	Local	Sporadic	No	No	
61	Tide, weather, wind speed & direction	Tides, wind speed & direction	Data from meteorological reporting stations & marine buoys, NOAA	Local	Daily	No	Yes	
62	Contaminant concentrations	Coliforms, enterococci, vibrios (CFUs). Microbial toxins, heavy metals & chemicals: $\mu\text{mol l}^{-1}$	Local beach water quality, NOAA, monitoring by nursery owners	Local	Seasonal	No	Yes	
63	Contaminants, human pathogens	Shellfish closures	Local beach water quality, NOAA, monitoring by nursery owners	Local	Seasonal	No	Yes	
64	--	--	--	--	--	--	--	
65	Turbidity values, Secchi disk, Satellite imagery, light meter, SPM	Turbidity: FTU & NTU, ppm. Visibility: m. Light penetration: Kd, PAR	NOAA: satellite, monitoring by shellfish growers	Local	Daily	No	No	
66	Extent of contamination	Area closures	Monitoring by shellfish growers, State postings	Local	Daily	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
67	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Commercial Anglers	--	Will there be a chance of sickness when eating caught fish?	6/8	Fauna	Edible Fauna	Conc. Of Pathogens/ Toxins/ Contaminants/ Parasites
68	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Commercial Anglers	--	Will I catch what I am expecting?	5/8	Fauna	Edible Fauna	Taxa
69	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Commercial Anglers	--	Is there a chance hazardous species will get caught or scooped up in net & pose a threat to beneficiary?	7/8	Fauna	Fauna Community	Hazardous Species
70	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Commercial Anglers	--	Will hook or net get stuck?	8/8	Soil/Substrate	Substrate Quality	Bottom Structure
71	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Commercial Anglers	--	If in a boat, do I have to anchor?	1/8	Water	Water Movement	Currents
72	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Commercial Anglers	--	Is it safe to go out? Do fishermen/boat captains need to be of a certain level of experience?	2/8	Water	Water Movement	Wave Intensity
73	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Is there a chance of novel relationships for new bioprospecting?	3/6	Fauna	Fauna Community	Diversity, Richness & Abundance
74	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Are the materials there & are they usable?	5/6	Flora	Commercially Important Flora	Presence
75	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Is there a chance of novel relationships for new bioprospecting?	6/6	Flora	Flora Community	Diversity, Richness & Abundance

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67	Toxins (Ciguatera, tetrotoxin), metals, pathogens & parasites from raw fish, contaminants	Alerts from the FDA	FDA, USDA	Local	Seasonal	No	Yes	
68	Species, size, abundance, diversity	Presence/ absence	State, Federal	Local	Seasonal/Annual	Yes	Yes	
69	Species, abundance, virulence of toxin in species	Presence/ absence	Beach Flags, Online Posting	Local	Seasonal	No	Yes	
70	Shoreline/ benthos complexity	Local reports	Online Posting	Local	Annual	No	No	
71	Tide, surge, wind speed & direction	Tide, surge, wind speed & direction	NOAA, Weather channel	Local	Daily	Yes	Yes	
72	Wave height, speed & direction	Wave height, speed & direction	NOAA, Weather channel	Local	Daily	Yes	Yes	
73	Diversity, richness of extractable source	Diversity, richness of extractable source	Published Literature, EPA, NOAA, State	Local Observations Aggregated to States Regions and the Nation	--	No	No	
74	Diversity, richness of extractable source	Abundance, size, species	Published Literature	Local/ Regional	--	No	No	
75	Diversity, richness of extractable source	Diversity, richness of extractable source	Published Literature	Local Observations Aggregated to States Regions and the Nation	--	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
76	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Are the materials there & are they usable?	4/6	Flora	Medicinal Flora	Presence
77	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Are the materials there & are they usable?	2/6	Fauna	Commercially Important Fauna	Presence
78	Aquatic	Estuaries and Near Shore Marine	Estuaries	Commercial / Industrial	Pharmaceutical and Food Supplement Suppliers	Bioprospectors	Are the materials there & are they usable?	1/6	Fauna	Medicinal Fauna	Presence
79	Aquatic	Estuaries and Near Shore Marine	Estuaries	Government, Municipal, Residential	Residential Property Owners	Coastal Property Owners	Will my property be damaged?	1/2	Composite and Extreme Events	Extreme Events	Flooding
80	Aquatic	Estuaries and Near Shore Marine	Estuaries	Government, Municipal, Residential	Residential Property Owners	Coastal Property Owners	Is this an appealing location?	2/2	Composite and Extreme Events	Site Appeal	Viewscales
81	Aquatic	Estuaries and Near Shore Marine	Estuaries	Government, Municipal, Residential	Transporters	--	Is it safe to go out?	5/5	Atmosphere	Wind strength/speed	Wind speed & direction
82	Aquatic	Estuaries and Near Shore Marine	Estuaries	Government, Municipal, Residential	Transporters	--	If in a boat, do I have to anchor?	1/5	Water	Water Movement	Currents
83	Aquatic	Estuaries and Near Shore Marine	Estuaries	Government, Municipal, Residential	Transporters	--	Is it safe to go out? Do fishermen/boat captain need to be of a certain level of experience? Will customers get sea sick?*	2/5	Water	Water Movement	Wave Intensity
84	Aquatic	Estuaries and Near Shore Marine	Estuaries	Government, Municipal, Residential	Transporters	--	Is there sufficient water for my vessel? Can I maneuver around obstructions?	4/5	Water	Water Quantity	Nautical Hazards

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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
76	Diversity, richness of extractable source	Abundance, size, species	Published Literature	Local	--	No	No	
77	Abundance, health, size, species	Abundance, size, species	Published Literature, EPA, NOAA, State	Local/ regional	--	No	No	
78	Abundance, health, size, species	Abundance, size, species	Published Literature, EPA, NOAA, State	Local/ regional	--	No	No	
79	Probability of flooding	Probability of flooding	FEMA Maps and EnviroAtlas	Local Observations Aggregated to States Regions and the Nation	Generally annual probability	No	Yes	https://msc.fema.gov
80	--	--	--	--	--	--	--	
81	Marine advisory report based on wind speed, direction, wave height	Local/ Regional	Data from meteorological reporting stations & marine buoys, NOAA	Local/ Regional	Near Real Time	No	Yes	
82	Marine advisory report based on wind speed, direction, tides	Local/ Regional	Data from meteorological reporting stations & marine buoys, NOAA	National	Near Real Time	Yes	Yes	
83	Marine advisory report based on wind speed, direction, tides	Local/ Regional	Data from meteorological reporting stations & marine buoys, NOAA	National	Near Real Time	Yes	Yes	
84	NOAA charts	Local/ Regional	NOAA charts	National	Decadal?	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
85	Aquatic	Estuaries and Near Shore Marine	Estuaries	Non-Use	Existence	Existence	Is the health the way it is supposed to be?	4/6	Composite and Extreme Events	Ecological Condition	--
86	Aquatic	Estuaries and Near Shore Marine	Estuaries	Non-Use	Existence	Existence	Is the area as appealing as it should be?	6/6	Composite and Extreme Events	Site Appeal	--
87	Aquatic	Estuaries and Near Shore Marine	Estuaries	Non-Use	Existence	Existence	Is the fauna community the way it is supposed to be?	2/6	Fauna	Fauna Community	Diversity, Richness & Abundance
88	Aquatic	Estuaries and Near Shore Marine	Estuaries	Non-Use	Existence	Existence	Is the flora community the way it is supposed to be?	3/6	Flora	Flora Community	Diversity, Richness & Abundance
89	Aquatic	Estuaries and Near Shore Marine	Estuaries	Non-Use	Existence	Existence	Is the quality of the structure the way it is supposed to be?	5/6	Soil/Substrate	Substrate Quality	Bottom Structure
90	Aquatic	Estuaries and Near Shore Marine	Estuaries	Non-Use	Existence	Existence	Is the WQ the way it is supposed to be?	1/6	Water	Water Quality	--
91	Aquatic	Estuaries and Near Shore Marine	Estuaries	Recreational	Boaters	Kayakers, SUPs, and Boaters	Is this location aesthetically enjoyable?	2/2	Composite and Extreme Events	Site Appeal	Scents & Viewscapes
92	Aquatic	Estuaries and Near Shore Marine	Estuaries	Recreational	Boaters	Kayakers, SUPs, and Boaters	Will I see what im expecting or any interesting plants or animals?	1/2	Fauna	Charismatic Fauna	Taxa & Presence
93	Aquatic	Estuaries and Near Shore Marine	Estuaries	Recreational	Anglers	Catch & Release	Is this area aesthetically enjoyable?	3/3	Composite and Extreme Events	Site Appeal	Scents & Viewscapes
94	Aquatic	Estuaries and Near Shore Marine	Estuaries	Recreational	Anglers	Catch & Release	Will I catch something interesting?	1/3	Fauna	Charismatic Fauna	Taxa & Presence
95	Aquatic	Estuaries and Near Shore Marine	Estuaries	Recreational	Anglers	Catch & Release	Is there a chance hazardous species will get caught or scooped up in net & pose a threat to beneficiary?	2/3	Fauna	Fauna Community	Hazardous Species

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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
85	--	--	--	--	--	--	--	
86	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	--	No	No	
87	Diversity, Richness & Abundance	Diversity, Richness & Abundance	Published Literature, EPA, NOAA, State	Local/ regional	--	No	No	
88	Diversity, Richness & Abundance	Diversity, Richness & Abundance	NASA Satellite/ Online Posting, NOAA, State	Regional	--	No	No	
89	Bentic/ shoreline complexity	Shoreline Type	NOAA, NASA, Coast Guard, local shops	Local	--	No	No	
90	Fecal matter, pathogens, & toxins	Common water quality tests	Local beach water quality, NOAA mussel watch	Local	--	No	No	
91	Site appeal	Field crew opinion	Word of mouth, local bait & tackle shops, local radio & TV fish reports	Local	Daily	No	No	
92	Species, size, abundance, diversity	Species, size, abundance, diversity	US FWLS, NOAA, State fisheries departments (FWC)	Local	Seasonal	No	Yes	
93	Color of water, algae, clarity & smell, lack of sound	Local reports	Online Posting	Local	Seasonal	No	No	
94	Species of Charismatic Fauna, size, abundance, diversity	Presence/ absence	State, Federal	Local Observations Aggregated to States Regions and the Nation	Seasonal	No	Yes	
95	Species, abundance, virulence of toxin in species	Presence/ absence	Beach Flags, Online Posting	Local	Seasonal	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
96	Aquatic	Estuaries and Near Shore Marine	Estuaries	Subsistence	Food Subsisters	Anglers	Is this area aesthetically enjoyable?	4/4	Composite and Extreme Events	Site Appeal	Scents & Viewscapes
97	Aquatic	Estuaries and Near Shore Marine	Estuaries	Subsistence	Food Subsisters	Anglers	Will there be a chance of sickness when eating caught fish?	2/4	Fauna	Edible Fauna	Conc. Of Pathogens/ Toxins/ Contaminants/ Parasites
98	Aquatic	Estuaries and Near Shore Marine	Estuaries	Subsistence	Food Subsisters	Anglers	Will I catch something edible?	1/4	Fauna	Edible Fauna	Taxa
99	Aquatic	Estuaries and Near Shore Marine	Estuaries	Subsistence	Food Subsisters	Anglers	Is there a chance hazardous species will get caught or scooped up in net & pose a threat to beneficiary?	3/4	Fauna	Fauna Community	Hazardous Species
100	Aquatic	Lakes and Ponds	All lentic	Agricultural	Livestock grazers	Livestock grazers	Can I safely water my stock in my pond?	1/1	Water	Water quality	Salinity
101	Aquatic	Lakes and Ponds	All lentic	Government, Municipal, Residential	Residential property owners	Lakeshore property owners	Does owning lakeshore property increase my families well being?	1/2	Composite and Extreme Events	Site Appeal	Viewscapes
102	Aquatic	Lakes and Ponds	All lentic	Government, Municipal, Residential	Residential property owners	Lakeshore property owners	Does owning lakeshore property increase my families well being?	2 / 2	Flora	Flora Community	Nuisance species presence
103	Aquatic	Lakes and Ponds	All lentic	Non-use	Existence	Existence	Does the existence of the lake increase my well being?	2/ 2	Composite and Extreme Events	Ecological Condition	--
104	Aquatic	Lakes and Ponds	All lentic	Non-use	Existence	Existence	Does the existence of the lake increase my well being?	1/2	Fauna	Fauna Community	Condition
105	Aquatic	Lakes and Ponds	All lentic	Recreational	Anglers	Catch & Eat	Will I catch fish I can eat	3 / 3	Fauna	Edible fauna	Tissue contamination

	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
96	Color of water, algae, clarity & smell, lack of sound	Local reports	Online Posting	Local	Seasonal	No	No	
97	Concentrations of Toxins (Ciguatera, tetroxin), metals, pathogens & parasites from raw fish, contaminants or risk of illness from	Alerts from the FDA as well as state and local authorities	FDA, USDA	Local Observations Aggregated to States Regions and the Nation	Seasonal	No	Yes	
98	Species, size, abundance, diversity	Presence/ absence	State, Federal	Local Observations Aggregated to States Regions and the Nation	Seasonal/Annual	Yes	Yes	
99	Species, abundance, virulence of toxin in species	Presence/ absence	Beach Flags, Online Posting	Local	Seasonal	No	Yes	
100	Total dissolved solids or total soluble salts	Conductivity	EPA National Lakes Assessment	National and Regional	Quinquennial, index period	No	No	Quality of water (e.g., total dissolved solids) varies by stock species
101	Lake appeal score (high, medium, low)	Appealingness score (1-5 scale)	EPA National Lakes Assessment	National and Regional	Quinquennial, index period	No	No	Combine with other subjective NLA metrics
102	Nuisance species abundance (ha, percent coverage)	Presence/absence of nuisance species, total macrophyte abundance (0-4 scale)	EPA National Lakes Assessment	National and Regional	Quinquennial, index period	No	No	
103	Degree of human disturbance	Pristineness (1-5 scale)	EPA National Lakes Assessment	National and Regional	Quinquennial, index period	No	No	Combine with other subjective NLA metrics
104	Biotic condition of macroinvertebrate assemblage (score)	MMI score (0-100), or condition class (good, fair, poor)	EPA National Lakes Assessment	National and Regional	Quinquennial, index period	No	No	Include biotic assemblages additional assemblages (fish, birds, dragonflies)
105	Contaminant concentration (ppb)	Fish consumption advisories by water body (y/n)	State websites	State	Annual	No	No	Add fish tissue to NLA

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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
106	Aquatic	Lakes and Ponds	All lentic	Recreational	Anglers	Catch & Eat	Will I catch fish I can eat	2 / 3	Fauna	Edible fauna	Tissue contamination
107	Aquatic	Lakes and Ponds	All lentic	Recreational	Anglers	Catch & Release	Will I catch desirable sport fish	1 / 3	Fauna	Fauna Community	Abundance
108	Aquatic	Lakes and Ponds	All lentic	Recreational	Boaters	Power boaters	Will I have a safe and satisfactory boating experience?	2/2	Flora	Flora Community	Nuisance species presence
109	Aquatic	Lakes and Ponds	All lentic	Recreational	Boaters	Power boaters	Will I have a safe and satisfactory boating experience?	1/2	Water	Water Quality	Water Clarity
110	Aquatic	Lakes and Ponds	All lentic	Recreational	Waders, Swimmers, and Divers	Swimmers	Will I have a safe and satisfactory swimming, experience?	3 / 5	Water	Water Movement	Currents
111	Aquatic	Lakes and Ponds	All lentic	Recreational	Waders, Swimmers, and Divers	Swimmers	Will I have a safe and satisfactory swimming, experience?	2 / 5	Water	Water Quality	Composite
112	Aquatic	Lakes and Ponds	All lentic	Recreational	Waders, Swimmers, and Divers	Swimmers	Will I have a safe and satisfactory swimming, experience?	4 / 5	Water	Water Quality	Pathogens and parasites
113	Aquatic	Lakes and Ponds	All lentic	Recreational	Waders, Swimmers, and Divers	Swimmers	Will I have a safe and satisfactory swimming, experience?	5 / 5	Water	Water Quality	Pathogens and parasites
114	Aquatic	Lakes and Ponds	All lentic	Recreational	Waders, Swimmers, and Divers	Swimmers	Will I have a safe and satisfactory swimming, experience?	1 / 5	Water	Water Quality	Water Clarity
115	Aquatic	Lakes and Ponds	All lentic	Subsistence	Food Subsisters	Anglers	Can I collect food for my family to use?	3 / 3	Fauna	Edible fauna	Abundance
116	Aquatic	Lakes and Ponds	All lentic	Subsistence	Food Subsisters	Wild rice harvesters	Can I collect food for my family to use?	1 / 3	Flora	Edible flora	Wild rice presence
117	Aquatic	Lakes and Ponds	All lentic	Subsistence	Food Subsisters	Wild rice harvesters	Can I collect food for my family to use?	2 / 3	Flora	Edible flora	Wild rice presence

	Biophysical Metrics		Datasets					
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106	Contaminant concentration (ppb)	Mercury, PCBs, PAHs, concentration (ppb)	EPA National Lake Fish Tissue Study	National	Periodic	No		Add fish tissue to NLA
107	Abundance of target species (number of biomass/ km2)	Presence/absence, lake survey, creel survey	State websites	State	Annual	No	No	Add fish assemblages to NLA
108	Unboatable area (%)	Coverage (%)	State websites	State	Periodic updates	No	No	Need reporting network to scale up metrics
109	Secchi depth (m)	Secchi depth (m)	EPA National Lakes Assessment	National and Regional	Quinquennial, index period	Yes	No	
110	Risk of rip currents (high, medium, low)	Beach hazard warnings (red, yellow, green)	State and local websites	Local	Daily	No	No	Need reporting network to scale up risk
111	Aesthetics of swimming score	Swimmability (good, fair, not swimmable)	EPA National Lakes Assessment	National and Regional	Quinquennial, index period	Yes	No	
112	Probability of adverse health effects (high, moderate, low)	Cyanobacterial cells/ml	EPA National Coastal Conditon Assessment	Regional (Great Lakes)	Quinquennial, index period	Yes	Yes	
113	Probability of adverse health effects (high, moderate, low)	Microcystin concentration (ug/L)	EPA National Coastal Conditon Assessment	Regional (Great Lakes)	Quinquennial, index period	Yes	Yes	
114	Secchi depth (m)	Secchi depth (m)	EPA National Lakes Assessment	National and Regional	Quinquennial, index period	Yes	No	
115	Catchable biomass (kg/ha)	Recruited biomass (kg/ha)	State websites	State	Annual	No	No	If all species acceptable, it could be a presence/absence metric: .
116	Wild rice present in harvestable amount (y/n)	Recognized wild rice lake (y/n)	State websites	State	Periodic updates	No	No	Regional issue
117	Wild rice present in harvestable amount (y/n)	Wild rice area (ha)	Landsat 7	Regional	Summer	Yes	No	Regional issue

	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
118	Aquatic	Rivers and Streams	Rivers and Streams	Commercial / Industrial	Private Energy Generators	Thermo-electric Cooling	What is the risk of pipes failing due to biofouling?	4/4	Fauna	Fauna Community	Presence of invasives/ nuisance species
119	Aquatic	Rivers and Streams	Rivers and Streams	Commercial / Industrial	Private Energy Generators	Thermo-electric Cooling	What is the risk of pipes failing due to corrosion or scaling?	2/4	Water	Water Quality	Chemicals
120	Aquatic	Rivers and Streams	Rivers and Streams	Commercial / Industrial	Private Energy Generators	Thermo-electric Cooling	Is there adequate water quantity and quality available at suitable locations on or near rivers and streams to provide cooling water?	1/4	Water	Water Quality	Water temperature
121	Aquatic	Rivers and Streams	Rivers and Streams	Commercial / Industrial	Private Energy Generators	Thermo-electric Cooling	Is there adequate water quantity and quality available at suitable locations on or near rivers and streams to provide cooling water?	3/4	Water	Water Quantity	water availability for consumption
122	Aquatic	Rivers and Streams	Rivers and Streams	Government, Municipal, Residential	Residential Property Owners	Riverfront property owner	If my property includes or is adjacent to a stream or river, How safe is my property from flooding and other environmental risks, and how much does the stream/river add to the site appeal of the property?	3/4	Composite and Extreme Events	Extreme Events	Flooding
123	Aquatic	Rivers and Streams	Rivers and Streams	Government, Municipal, Residential	Residential Property Owners	Riverfront property owner	If my property includes or is adjacent to a stream or river, How safe is my property from flooding and other environmental risks, and how much does the stream/river add to the site appeal of the property?	4/4	Composite and Extreme Events	Site Appeal	Viewscapes

	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
118	Density of fouling organisms (e.g., Asian clam, zebra mussels)	Density of fouling organisms (e.g., Asian clam, zebra mussels)	NARS	National, Regional	--	No	No	
119	Langlier Saturation Index or Ryznar Stability Index; Chloride-Sulfate mass ratio (CSMR); Larson Ratio (LR)	pH; Calcium hardness; Alkalinity; Water temperature; Total dissolved solids; Chloride; Sulfate; Alkalinity; Water temperature	NARS	National, Regional	--	No	No	
120	Long-term measurements of water temperature; Predicted annual and seasonal water temperatures	Long-term measurements of water temperature; Predicted annual and seasonal water temperatures	NARS; StreamCat	National, Regional	--	No	No	
121	Monthly minimum water flow	Mean Annual Flow	NARS; StreamCat	National, Regional	--	No	No	
122	Risk of flooding	Probability of flooding	NARS; EnviroAtlas	National, Regional	--	No	Yes	Woznicki et al 2019; https://msc.fema.gov
123	Presence or extent of surface films; types and extent/severity of odors in water	Observations of presence or extent of surface films or odors in water	NARS	National, Regional	--	No	No	

	Ecosystem			Beneficiary				Attributes			
			Column #/label in Tables 6-12:	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
124	Aquatic	Rivers and Streams	Rivers and Streams	Government, Municipal, Residential	Residential Property Owners	Riverfront property owner	If my property includes or is adjacent to a stream or river, How safe is my property from flooding and other environmental risks, and how much does the stream/river add to the site appeal of the property?	1/4	Water	Water Quality	Chemicals & Contaminants
125	Aquatic	Rivers and Streams	Rivers and Streams	Government, Municipal, Residential	Residential Property Owners	Riverfront property owner	If my property includes or is adjacent to a stream or river, How safe is my property from flooding and other environmental risks, and how much does the stream/river add to the site appeal of the property?	2/4	Water	Water Quality	Pathogens in water
126	Aquatic	Rivers and Streams	Rivers and Streams	Non-Use	Existence	Existence	Is the river or stream condition similar to what would be expected if human disturbance intensity was minimal or absent?	1/1	Fauna	Fauna Community	--
127	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Anglers	Catch & Eat	Are the right kinds of fish present in sufficient numbers?	3/5	Fauna	Edible Fauna	Potential for edible species to be present
128	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Anglers	Catch & Eat	Are the right kinds of fish present in sufficient numbers?	4/5	Fauna	Edible Fauna	Potential for edible species to be present
129	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Anglers	Catch & Eat	Are the fish safe to eat?	5/5	Fauna	Edible Fauna	Presence and severity of fish anomalies / contaminant levels in fish tissue / presence or frequency of fish consumption

	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
124	Contaminant concentrations	Contaminant concentrations (mg/L)	NARS	National, Regional	Single sample during baseflow of selected target species	No	No	
125	Concentrations of harmful bacteria (e.g., enterococci, E. coli); Concentrations of microcystin and/or cylindrospermopsin	Concentrations of harmful bacteria (e.g., enterococci, E. coli); Presence and/or concentration of cyanobacteria in water (cells/mL)	NARS	National, Regional	Single sample during baseflow of selected target species	No	No	
126	Multimetric index (MMI) scores for benthic macroinvertebrate assemblage / Invertebrate O/E scores / Presence ab of species	Taxonomic count data with autecological and tolerance assignments / O/E scores / species richness	NARS	National, Regional	Single sample during baseflow	No	Yes	
127	Presence, richness, and abundance of edible fish species	Collection data with edible fish species and relative abundance	NARS	National, Regional	Single sample during baseflow	No	No	
128	Relative abundance (or biomass) of edible fish species	Relative abundance (or biomass) of edible fish species	NARS	National, Regional	Single sample during baseflow	No	No	
129	Fish collection data with anomalies observed and classified, risk of illness from consuming fish, consumption advisories	Presence and severity of fish anomalies, contaminat levels in fish tissue (ng/g wet wt), potential risk from consuming	NARS, State/Federal fish consumption advisory databases	National, Regional	Single sample during baseflow of selected target species, various times depending on data source	No	No	Proportion of fish collected with observable anomalies, limited to mercury and some PCPPs from

	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
130	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Anglers	Catch & Eat	Is WQ sufficient to be safe for angling?	1/5	Water	Water Quality	Chemicals & Contaminants
131	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Anglers	Catch & Eat	Is WQ sufficient to be safe for angling?	2/5	Water	Water Quality	Pathogens in water
132	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Anglers	Catch & Release	Site-level aesthetics (i.e., is this an enjoyable location to fish?)	5/5	Composite and Extreme Events	Site Appeal	Viewscapes
133	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Anglers	Catch & Release	Are the right kinds of fish present in sufficient numbers?	4/5	Fauna	Fauna Community	Potential for desired fish to be present
134	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Anglers	Catch & Release	Is WQ sufficient to be safe for angling?	1/5	Water	Water Quality	Chemicals & Contaminants
135	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Anglers	Catch & Release	Is WQ sufficient to be safe for angling?	2/5	Water	Water Quality	Pathogens in water
136	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Anglers	Catch & Release	Is the site appealing?	3/5	Water	Water Quality	Water Clarity
137	Aquatic	Rivers and Streams	Rivers and Streams	Recreational	Waders, Swimmers, and Divers	Swimmers	Can I safely wade, swim, or dive here?	1/5	Water	Water Quality	Chemicals & Contaminants

	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
130	Potential for risk from contact	Contaminant concentrations in water	NARS; EMAP	National, Regional	Single sample during baseflow	No	No	Risk classes based on human health or recreational water quality criteria are desired translation of metric; Potential for large-scale modeling via EnviroAtlas
131	Potential for risk from contact	Enterococci / cyanobacteria / microcystin and/or cylindrospermopsin concentrations in water	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.
132	Measurement data on overall rating for site appeal	Measurement data on overall rating for site appeal	NARS	National, Regional	Single sample during baseflow of selected target species	No	No	
133	Presence, richness, and abundance of desirable fish species/Number of "trophy" game fish or other charismatic species	Presence, richness, and abundance of desirable fish species/Number of "trophy" game fish or other charismatic species	NARS	National, Regional	Single sample during baseflow	No	No	
134	Personal contact with contaminants from water	Contaminant concentrations in water	NARS; EMAP	National, Regional	Single sample during baseflow	No	No	Risk classes based on human health or recreational water quality criteria are desired translation of metric
135	Personal contact with contaminants from water	Enterococci / Cyanobacteria / Microcystin and/or cylindrospermopsin concentrations in water	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.
136	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)
137	Potential for risk from contact	Contaminant concentrations in water	NARS	National, Regional	Single sample during baseflow	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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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
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	

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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
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. Soil/Substrate Science 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. Proceedings of the National Academy of Sciences, 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. PNAS 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

	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
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. <i>Proceedings of the National Academy of Sciences</i> , 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	

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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
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

	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
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			
			<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
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.

	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
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	

	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
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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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
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