GLSC Scientist Online Survey

Principal Investigator: Dan Engel, Master's candidate, University of Michigan School of Natural Resources and Environment
Faculty Advisory: Bobbi Low, Professor of Natural Resources, University of Michigan School of Natural Resources and Environment
Committee Member: Jeff Schaeffer, Fisheries Biologist, USGS Great Lakes Science Center
Committee Member: Michael Moore, Professor of Environmental Economics and Associate Dean, University of Michigan School of Natural Resources and Environment
Science Advisor: Mary Anne Evans, Research Ecologist, USGS Great Lakes Science Center.

The purpose of this research study is to evaluate the science program at the Great Lakes Science Center (hereafter GLSC) in the context of understanding ecosystem services. Thus, this survey is designed to gather background information and develop an empirical basis for analyzing whether the needs of resource managers in relation to ecosystem services are being met by the science conducted at the Great Lakes Science Center (hereafter GLSC). Data will be collected from both Great Lakes resource managers (U.S. and Canada) and GLSC scientists in relation to their consideration of ecosystem services in their respective work. Analysis will compare the information needs of resource managers and the information provided by GLSC scientists, and matches and mismatches will be highlighted.

We are interested in how scientists are thinking about ecosystem services as they conduct scientific investigations in the Great Lakes basin. With that in mind, please answer these questions with respect to **the research you are currently conducting** as a **research scientist** with the GLSC.

Part 1: Your research in the Great Lakes Basin
This section asks questions that try to determine what kind of scientific research you are conducting in the Great Lakes Basin as a **research scientist** for the GLSC.

1. Are you a research scientist for the GLSC?
   a. _____ Yes   b. _____ No

2. As an employee for the GLSC, how frequently would you estimate that you currently work with the following resource management agencies?

Agencies	Not at All	Occasionally	Frequently	I don't know
Michigan Department of Natural Resources				
Wisconsin Department of Natural Resources				
Minnesota Department of Natural Resources				
Illinois Department of Natural Resources				
Indiana Department of Natural Resources				
Ohio Depart of Natural Resources				
New York Department of Environmental Conservation				
Pennsylvania Department of Conservation and Natural Resources				
Pennsylvania Game Commission				
Pennsylvania Fish and Boat commission				
Michigan Department of Environmental Quality				
Ohio Environmental Protection Agency				
NOAA Great Lakes Environmental Research Laboratory				
Natural Resources Conservation Service				
Great Lakes Indian Fish and Wildlife Commission				
Chippewa/Ottawa Resource Authority				
Bay Mills Indian Community				
Grand Traverse Band of Ottawa and Chippewa Indians				
Little River Band of Ottawa Indians				
Sault Ste Marie Tribe of Chippewa Indians				
Great Lakes Commission				
National Park Service				
U.S. Fish and Wildlife Service				
Great Lakes Fishery Commission				
International Joint Commission				
Environment Canada				

3. At which GLSC station do you currently conduct research? (Check all that apply)
   a. ____ Ann Arbor
   b. ____ Cheboygan Vessel Base
   c. ____ Hammond Bay Biological Station
   d. ____ Lake Erie Biological Station
   e. ____ Lake Michigan Ecological Research Station
   f. ____ Lake Ontario Biological Station
   g. ____ Lake Superior Biological Station
   h. ____ Tunison Laboratory of Aquatic Sciences
   i. ____ Other _____

4. In which of the following systems do you currently conduct research? (check all that apply)
   a. ____ Lake Erie
   b. ____ Lake Huron
   c. ____ Lake Michigan
   d. ____ Lake Ontario
   e. ____ Lake Superior
   f. ____ Inland lakes
   g. ____ Huron-Erie corridor
   h. ____ Rivers and streams
   i. ____ Other connecting channels
   j. ____ Other _____

5. In which of the following ecosystems in the Great Lakes Basin do you currently conduct research? (Check all that apply)
   a. ____ Great Lakes coastal wetlands/marshes
   b. ____ Great Lakes islands
   c. ____ Great Lakes nearshore zone
   d. ____ Great Lakes open water
   e. ____ Agricultural land
   f. ____ Dunes
   g. ____ Forests
   h. ____ Inland lakes
   i. ____ Inland streams and rivers
   j. ____ Prairies
   k. ____ Urban areas
   l. ____ Other _____

Part 2: Research on Ecosystem Services
The second section of the survey asks questions that try to determine what kind of research results and related information on ecosystem services you are providing to Great Lakes resource managers.

1. How would you define ecosystem services?
   a. (Open ended)
2. How would you describe your familiarity with the concept of ecosystem services?
   a. ____ Very familiar
   b. ____ Moderately familiar
   c. ____ Vaguely familiar
   d. ____ Not at all familiar
   e. ____ Don't know
3. How would you describe your familiarity with the methods for quantifying the economic value (e.g. dollar value) of ecosystem services?
   a. ____ Very familiar
   b. ____ Moderately familiar
   c. ____ Vaguely familiar
   d. ____ Not at all familiar
   e. ____ Don't know
4. How would you describe your familiarity with the methods for quantifying ecosystem services spatially and temporally (e.g. mapping, ecological production functions, etc.)?
   a. ____ Very familiar
   b. ____ Moderately familiar
   c. ____ Vaguely familiar
   d. ____ Not at all familiar
   e. ____ Don't know

For consistency, we will use the Millennium Ecosystem Assessment's (MA) definition of ecosystem services as "the benefits people obtain from ecosystems." The MA further classifies ecosystem services according to four categories:

1) *Supporting Services* – services needed for the production of all other ecosystem services
2) *Provisioning Services* – products obtained from ecosystems
3) *Regulating Services* – benefits obtained from the regulation of ecosystems
4) *Cultural Services* – non-material benefits obtained from ecosystems

The purpose of the following questions is to find out what ecosystem services are important to **GLSC research scientists**.

5. On a scale from Strongly Unrelated to Strongly Related, how would you rate the following <u>Ecosystem Services</u> in their relation to your research? (Slide the bar to select the appropriate rating)

Ecosystem Services	Strongly Unrelated Strongly Related	I don't know (IDK)
Supporting Services (services needed for the production of all other ecosystem services)	0 ------------------------------ 2 --------------------------------- 4	IDK
Provisioning Services (products obtained from ecosystems)	0 ------------------------------ 2 --------------------------------- 4	IDK
Regulating Services (benefits obtained from regulation of ecosystems)	0 ------------------------------ 2 --------------------------------- 4	IDK
Cultural Services (Non-material benefits obtained from ecosystems)	0 ------------------------------ 2 --------------------------------- 4	IDK

6. On a scale from Strongly Unrelated to Strongly Related, how would you rate the following *supporting services* in their relation to your research? (Slide the bar to select the appropriate rating)
   <u>Supporting Services</u> – services needed for the production of all other ecosystem services

Ecosystem Services	Strongly Unrelated Strongly Related	I don't know (IDK)
Soil Formation and Retention (soil renewal, renewal of soil fertility)	0 ------------------------------ 2 --------------------------------- 4	IDK
Production of Atmospheric Oxygen	0 ------------------------------ 2 --------------------------------- 4	IDK
Water Cycling (soil moisture storage)	0 ------------------------------ 2 --------------------------------- 4	IDK
Nutrient Cycling (nutrient storage)	0 ------------------------------ 2 --------------------------------- 4	IDK
Primary Production (energy capture, food chain support, energy flow for fish, benthic food chain)	0 ------------------------------ 2 --------------------------------- 4	IDK
Provision of Habitat (biodiversity support, habitat diversity)	0 ------------------------------ 2 --------------------------------- 4	IDK

7. On a scale from Strongly Unrelated to Strongly Related, how would you rate the following *provisioning services* in their relation to your research? (Slide the bar to select the appropriate rating)
Provisioning Services – products obtained from ecosystems

Ecosystem Services	Strongly Unrelated Strongly Related	I don't know (IDK)
Fresh Water (water supply)	0 ------------------------------ 2 -------------------------------- 4	IDK
Food (wild game)	0 ------------------------------ 2 -------------------------------- 4	IDK
Fuel/energy (Hydro-electricity)	0 ------------------------------ 2 -------------------------------- 4	IDK
Genetic Resources	0 ------------------------------ 2 -------------------------------- 4	IDK
Ornamental Resources (beach glass jewelry, household decorations)	0 ------------------------------ 2 -------------------------------- 4	IDK
Biochemical, Natural Medicines, and Pharmaceuticals (medicines)	0 ------------------------------ 2 -------------------------------- 4	IDK
Fiber (timber production)	0 ------------------------------ 2 -------------------------------- 4	IDK

8. On a scale from Strongly Unrelated to Strongly Related, how would you rate the following <u>Regulating Services</u> in their relation to your research? (Slide the bar to select the appropriate rating)
<u>Regulating Services</u> - benefits obtained from the regulation of ecosystems

Ecosystem Services	Strongly Unrelated Strongly Related	I don't know (IDK)
Pollination	0 ----------------------------- 2 -------------------------------- 4	IDK
Regulation of Human Diseases	0 ----------------------------- 2 -------------------------------- 4	IDK
Biological Control (pest control, invasives)	0 ----------------------------- 2 -------------------------------- 4	IDK
Air Quality Maintenance (air purification, visibility)	0 ----------------------------- 2 -------------------------------- 4	IDK
Storm Protection	0 ----------------------------- 2 -------------------------------- 4	IDK
Erosion Control	0 ----------------------------- 2 -------------------------------- 4	IDK
Water Regulation (flood mitigation)	0 ----------------------------- 2 -------------------------------- 4	IDK
Climate Regulation (carbon storage, moderation of weather extremes)	0 ----------------------------- 2 -------------------------------- 4	IDK
Water Purification and Waste Water Treatment (water quality, waste assimilation, groundwater quality)	0 ----------------------------- 2 -------------------------------- 4	IDK

9. On a scale from Strongly Unrelated to Strongly Related, how would you rate the following <u>Cultural Services</u> in their relation to your research? (Slide the bar to select the appropriate rating)
   Cultural Services - non-material benefits obtained from ecosystems

Ecosystem Services	Strongly Unrelated Strongly Related	I don't know (IDK)
Recreation and Tourism (lake recreation, wild game, song birds, other wildlife)	0 ----------------------------- 2 -------------------------------- 4	IDK
Aesthetic Values (aesthetics)	0 ----------------------------- 2 -------------------------------- 4	IDK
Sense of Place	0 ----------------------------- 2 -------------------------------- 4	IDK
Educational Values	0 ----------------------------- 2 -------------------------------- 4	IDK
Inspiration	0 ----------------------------- 2 -------------------------------- 4	IDK
Cultural Heritage Values	0 ----------------------------- 2 -------------------------------- 4	IDK
Social Relations	0 ----------------------------- 2 -------------------------------- 4	IDK
Cultural Diversity	0 ----------------------------- 2 -------------------------------- 4	IDK
Knowledge systems (cultural, economic, scientific knowledge)	0 ----------------------------- 2 -------------------------------- 4	IDK
Spiritual and Religious Values	0 ----------------------------- 2 -------------------------------- 4	IDK

10. Relative to the information needs of resource managers, how adequate is the ecosystem services-related information provided by **you and your research**?

	Greatly Inadequate More Than Adequate	I don't know (IDK)
Adequacy of ecosystem services-related Information provided by you	0 ----------------------------- 2 -------------------------------- 4	IDK

11. Relative to the information needs of resource managers, how adequate is the ecosystem services-related information provided by the **GLSC**?

	Greatly Inadequate More Than Adequate	I don't know (IDK)
Adequacy of ecosystem services-related Information provided by the GLSC	0 ----------------------------- 2 -------------------------------- 4	IDK

Part 3: Demographic Information
The last few questions ask about some demographic characteristics. Category-specific responses will not be reported unless there are more than 10 responses in the given category in order to avoid reporting information that can identify individuals.

1. What is your gender?
   a. ____ Male
   b. ____ Female
2. What is the highest level of education that you have attained?
   a. ____ Undergraduate degree
   b. ____ Master's degree
   c. ____ Doctorate degree
   d. ____ Other _____
3. How long have you been working with the GLSC?
   a. 0-4 years
   b. 5-9 years
   c. 10-14 years
   d. 15-20 years
   e. 20+ years
4. Do you have any additional comments that you would like to share?
   a. (Open ended)