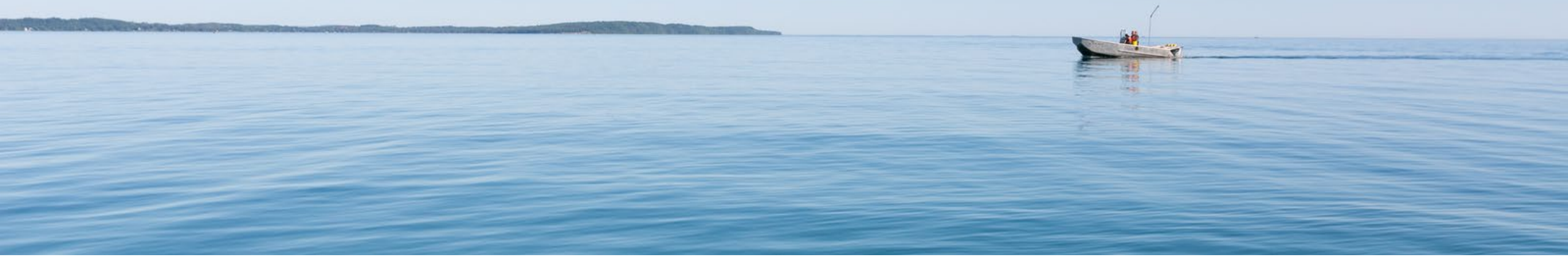


# A Human Wellbeing Evaluation Framework for Ecosystem Restoration



The Nature  
Conservancy 

Cooperative Institute for  
Great Lakes Research  
**CIGLR**   
*Great Lakes Science for Society*

Matthew Jurjonas, Ph.D.  
*Environmental Social Scientist*

# RESEARCH GOALS

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Design a Framework to Address the UN “Decade of Ecosystem Restoration’s” Call for Socio-Ecological Systems Science.

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Understand the Current Extent of Human Wellbeing Considerations in Ecosystem Restoration.

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Create an Independent 3<sup>rd</sup> Party Evaluation of an Existing Restoration Program



# The Great Lakes Restoration Initiative: *A Unique Opportunity*

## Led by the EPA out of the Great Lakes National Program Office

- 2010 Under the Obama Administration
- Restore and Protect the Great Lakes Ecosystem
- \$3.5 Billion as of 2020

## Focus Areas

- Toxic Substances and Areas of Concern
- Preventing and Controlling Invasive Species
- Nonpoint Source Pollution Impacts on Nearshore Health
- Habitat and Species
- Foundations for Future Restoration Actions

# The Great Lakes Restoration Initiative: *What is it?*

## Action Plans

- I FY 2010-2014
- II FY 2015-2019
- III FY 2024

## Annual Reports to Congress

- Progress According to Focus Areas
- Traditional Ecological Metrics

## Public Database

- 5335 records as of 7/2020
- Qualitative Textual Project Descriptions
- Project Status (New Project, Revision, Continuation, Increase)

## And Academic Literature...

<https://glri.us/>



Credit: Buffalo Niagara Waterkeeper

# But what is GLRI *really*?

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Funder	Year	GLRI Amount	Project Type	Project Title	Recipient	Project Description	Focus Area	Start Date	End Date	Affected States	Locations	
65	APHIS	2020	\$ 514,000	New Project	Swine/Swan -Removal of Inv	Dept. of Agricult	Conduct early detection and removal	2 Invasive Species	12/31/2019	12/30/2020	IL, IN, MI, NY, OH	41.828642, -83.375244	
66	APHIS	2020	\$ 50,000	New Project	Terns - Multiple Projects Aim	Dept. of Agricult	Conduct mesopredator control to ass	4 Habitat and Wildlife Protection and	12/31/2019	12/30/2020	OH, WI	41.686239, -83.330465	
67	APHIS	2020	\$ 143,000	New Project	Turtle - Multiple Projects Aim	Dept. of Agricult	Conduct mesopredator control to ass	4 Habitat and Wildlife Protection and	12/31/2019	12/30/2020	IL, OH	41.492121, -82.150269	
68	ATSDR	2010	\$ 5,000,000	New Project	Biomonitoring of Great Lake	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	9/10/2010	9/30/2016	Multi-state	46.785090, -92.103324	
69	ATSDR	2010	\$ 500,000	New Project	Public health support for Bro	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	9/10/2010	9/30/2016	Multi-state	43.241451, -86.249199	
70	ATSDR	2011	\$ 2,195,661	Continuation	Biomonitoring of Great Lake	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	9/10/2010	9/30/2016	Multi-state	42.885377, -78.871990	
71	ATSDR	2011	\$ 195,600	Increase	Public health support for Bro	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	9/10/2011	9/30/2016	NY	43.123531, -79.043103	
72	ATSDR	2012	\$ 2,200,000	Continuation	Biomonitoring of Great Lake	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	9/10/2010	9/30/2016	Multi-state	42.885377, -78.871990	
73	ATSDR	2013	\$ 525,000	New Project	Biomonitoring of Great Lake	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	3/3/2014	9/30/2018	NY	43.261206, -77.080078	
74	ATSDR	2013	\$ 250,000	New Project	Healthcare Provider Outreac	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	9/29/2014	9/30/2018	MN	44.000000, -85.000000	
75	ATSDR	2014	\$ 800,000	Continuation	Biomonitoring of Great Lake	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	3/3/2015	9/30/2019	NY	43.261206, -77.080078	
76	ATSDR	2014	\$ 249,000	Continuation	Healthcare Provider Outreac	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	9/29/2014	9/30/2019	MN	44.000000, -85.000000	
77	ATSDR	2015	\$ 1,047,739	New Project	Biomonitoring Legacy and E	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	7/1/2016	6/30/2020	WI	43.000000, -88.000000	
78	ATSDR	2016	\$ 850,000	Continuation	Biomonitoring Legacy and E	Dept. of HHS-Ag	The Agency for Toxic Substances and	1 Toxic Substances and Areas of Co	7/1/2016	6/30/2020	WI	43.000000, -88.000000	
79	BIA	2010	\$ 122,623	New Project	1855 Reservation Islands- bl	Little Traverse B	Garden and High Island habitat asse	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	MI	45.796494, -85.497665	
80	BIA	2010	\$ 303,852	New Project	Boardman River restoration	Grand Traverse	Restoring the Boardman River waters	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	MI	44.696969, -85.629501	
81	BIA	2010	\$ 33,181	New Project	Clam Lake collaborative asse	St. Croix Chippew	Wild rice restoration	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	WI	45.788534, -92.322664	
82	BIA	2010	\$ 190,000	New Project	Cranberry marsh/wild rice c	Lac Courte Orei	Convert cranberry marsh to wild rice	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	WI	46.043000, -91.406000	
83	BIA	2010	\$ 18,000	New Project	Duck Creek Dam removal	Oneida Nation o	Restore fish passage on Duck Creek	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	WI	44.544851, -88.103249	
84	BIA	2010	\$ 234,070	New Project	Habitat and wildlife protection	Lac du Flambea	Re-establish sub-impoundment in Mis	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	WI	45.903200, -89.759600	
85	BIA	2010	\$ 66,650	New Project	Invasive species project	Bay Mills Indian	Invasive species survey at sensitive	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	MI	46.413900, -84.594700	
86	BIA	2010	\$ 21,276	New Project	Invasive species projects	Oneida Nation o	Invasive species management/contro	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	WI	44.505749, -88.201246	
87	BIA	2010	\$ 49,926	New Project	Invasive species/ native plan	Keweenaw Bay	Invasive plant species control and na	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	MI	46.778903, -88.495560	
88	BIA	2010	\$ 39,000	New Project	Lancaster Brook fish passag	Oneida Nation o	Replacement of three culverts	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	WI	44.552161, -88.128269	
89	BIA	2010	\$ 150,000	New Project	Native species enhancement	Bad River Band	Protect, restore and enhance native	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	WI	46.593200, -90.651100	
90	BIA	2010	\$ 157,000	New Project	Native species restoration	Grand Portage I	Native fish, wild rice, moose habitat	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	MN	47.968548, -89.689293	
91	BIA	2010	\$ 289,000	New Project	Nett Lake ecosystem restora	Bois Forte Band	Restore the Nett lake wetland ecosys	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	MN	47.811000, -92.339600	
92	BIA	2010	\$ 47,279	New Project	Non-point abatement prograr	Oneida Nation o	Installation of best management prac	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	WI	44.552100, -88.128270	
93	BIA	2010	\$ 59,000	New Project	Pine Creek-Wild River rice r	Nottawaseppi Hi	Wild rice/ wetland restoration	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2012	MI	42.105864, -85.261459	
94	BIA	2010	\$ 193,585	New Project	Red Cliff Lake Superior shor	Red Cliff Band c	Identify shoreline and nearshore hab	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	WI	46.853020, -90.791190	
95	BIA	2010	\$ 38,000	New Project	Rehabilitation of wild rice be	Sokaogon Chipp	Rehabilitate 40-50 acres of wild rice	4 Habitat and Wildlife Protection and	3/3/2010	9/30/2011	WI	45.557100, -88.915200	



# RESEARCH DESIGN

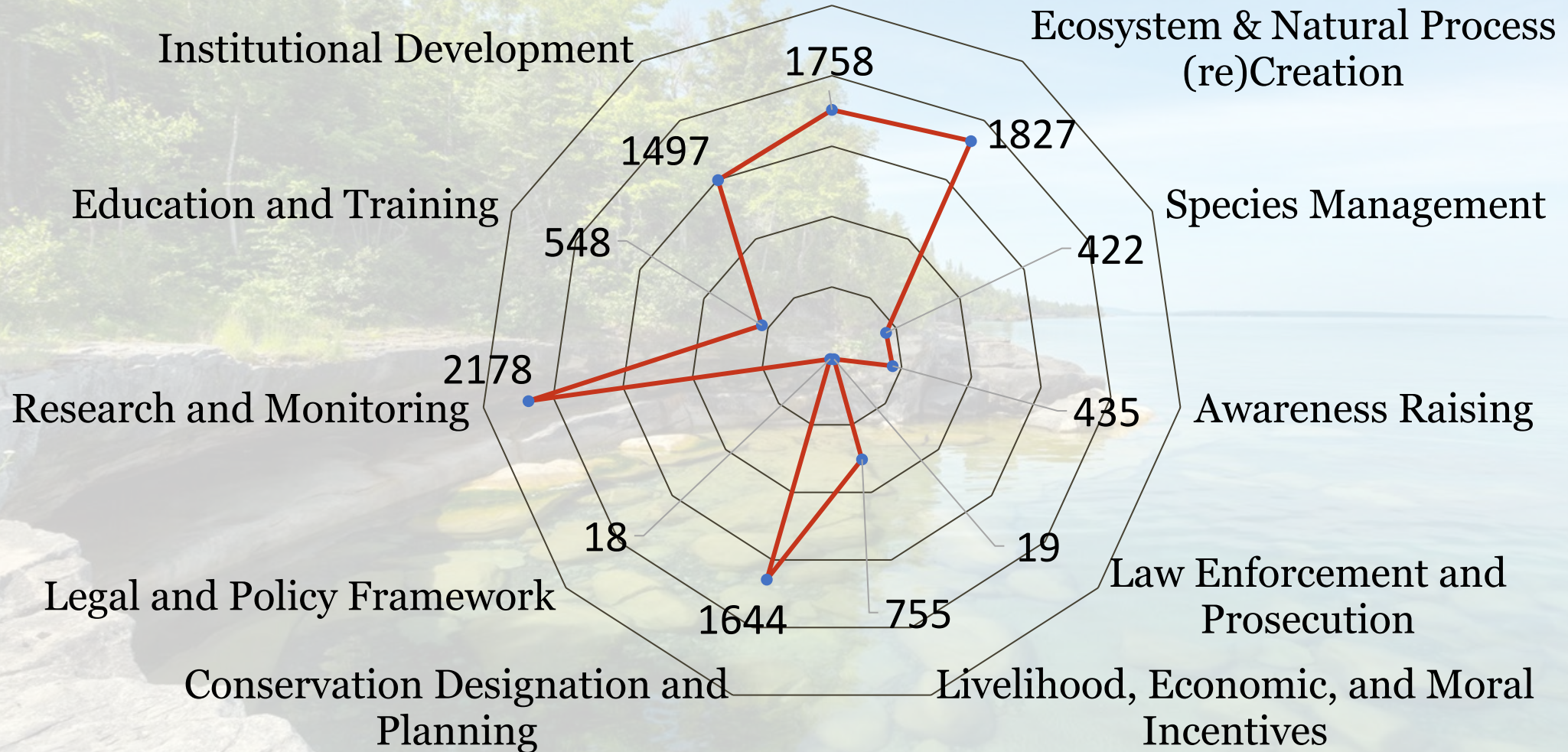
## Methods

- Classify Projects (Qualitative Content Analysis)
  - Conservation Standards Action Classification Key (CAC 2.0)
- SES Framework Development
- Survey Research
  - Planning Score
  - Ecological Score
  - Human Wellbeing Score



# GLRI ACCORDING TO THE CAC 2.0 FRAMEWORK

Site/Area Stewardship



# NON-MONETARY VALUE ACTIONS

## *Public Health, Equity, & Wellbeing*

Tribal Engagement (n=30 applicants)

- 676 (~13%) Projects
  - Cultural Preservation (n=6)
  - Tribal Youth (n=14)
  - Traditional Ecological Knowledge (n=13)

DEIJ (n=86)

- Improving Democratic Process (Public Input) (n=32)
- At-risk Youth (n=17)
- Environmental Justice (n=2)

Public Health (n=175)

- Fish Consumption Advisories (n=83)
- E. Coli Advisories and Beach Status (n=73)
- Recreation Development (n=44)

Education and Training (n=549)

- B-Wet (n=10)
- Pharmaceuticals (n=9)
- E-Waste (n=7)

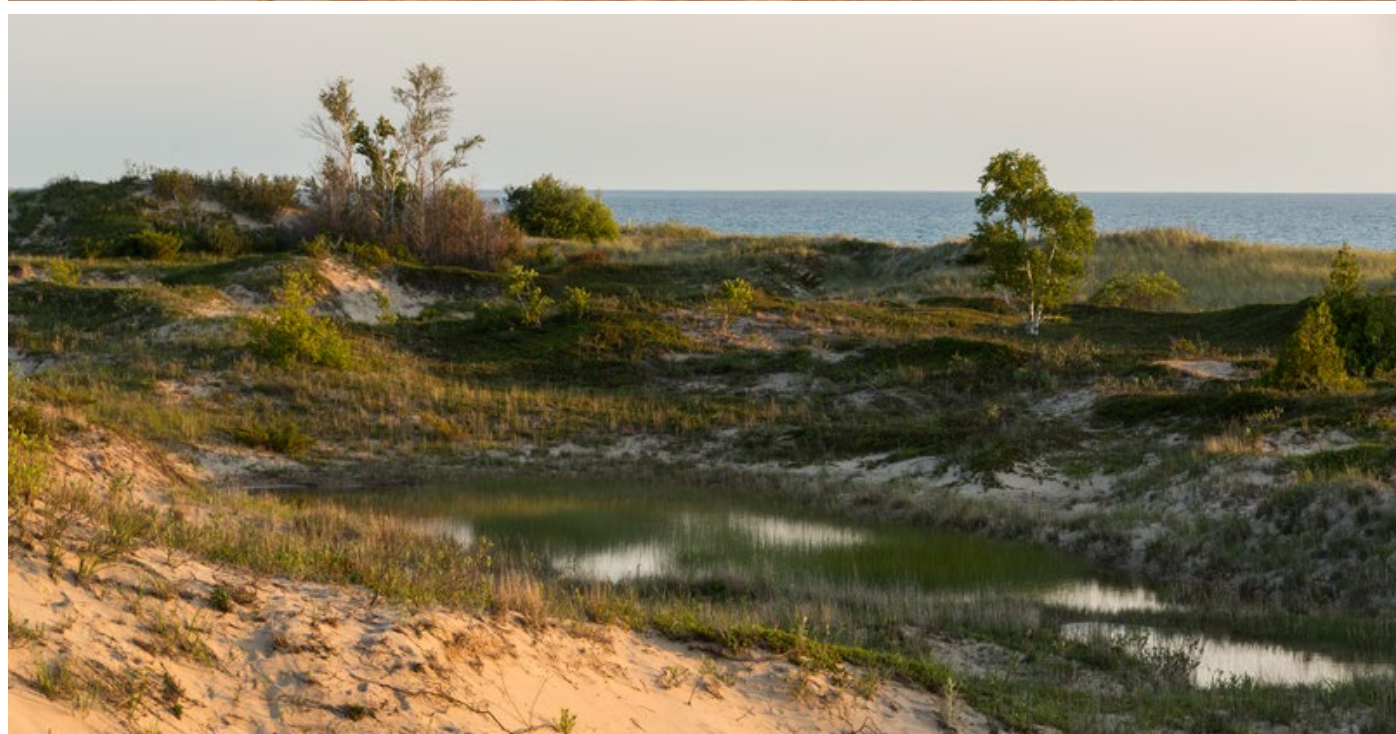


# GLRI SURVEY SAMPLE FRAME

Project Population:  
5,335 Total project  
records as of July 2020.

First Filter: 2,470 Project  
records that conducted a  
restoration, remediation,  
or protection action.

Project Sample: 1,574  
Unique project records  
after screening for  
revisions, continuations,  
increases, and identical  
project titles.

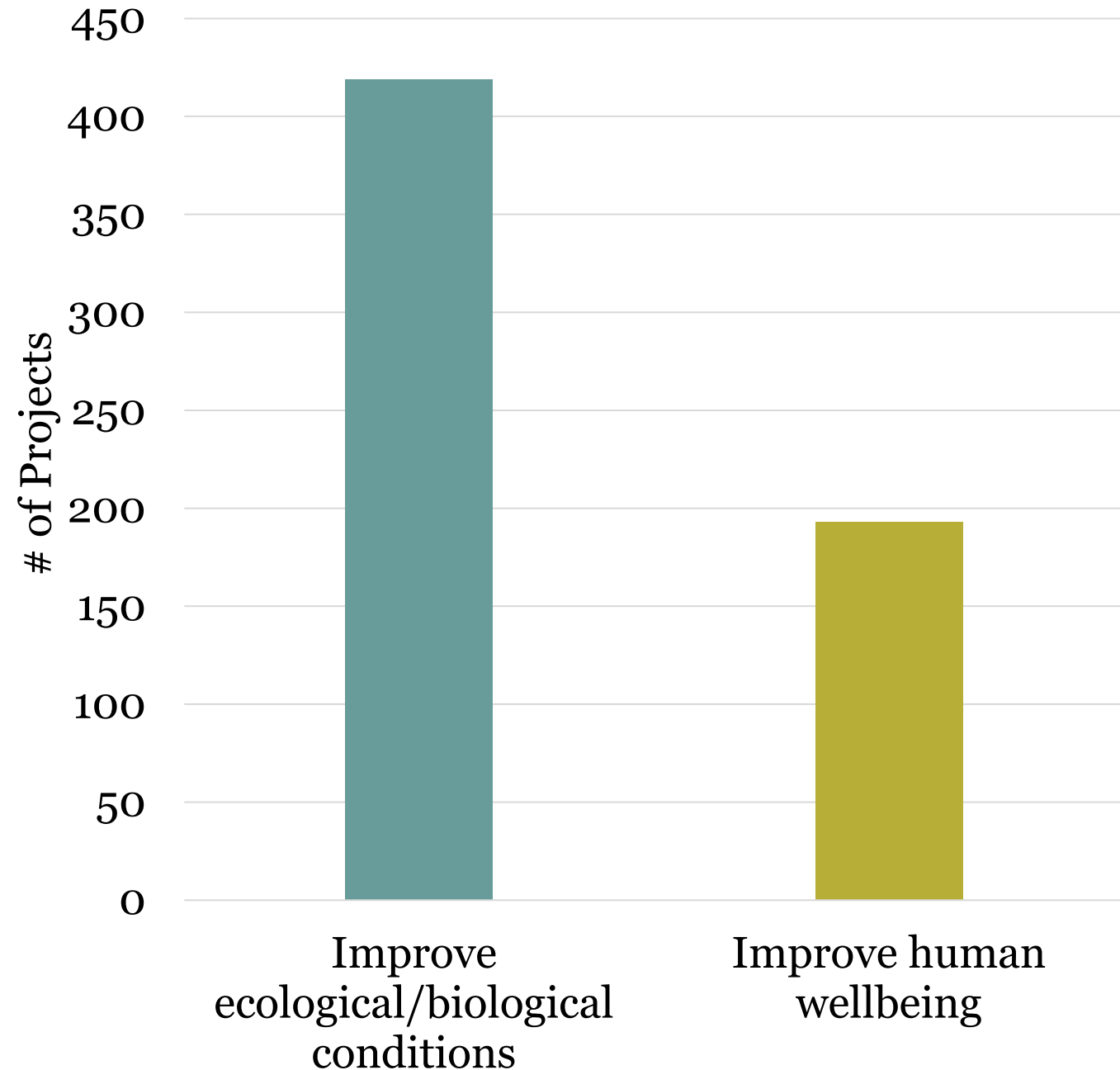


# PROJECT MANAGER SURVEY

- Open Oct. 2020 through April 2021
- 3 Contact Attempts
  - (email recruitment)
- <10 Minutes/Response
- N=457 ~28% Response Rate by Project Records
- 50.5% Response Rate by Local Recipients (205 of 406)!

Jurjonas, May, Kyriakakis, Cardinale, Pearsall, & Doran (2023)

GLRI Project Goal (N=448)

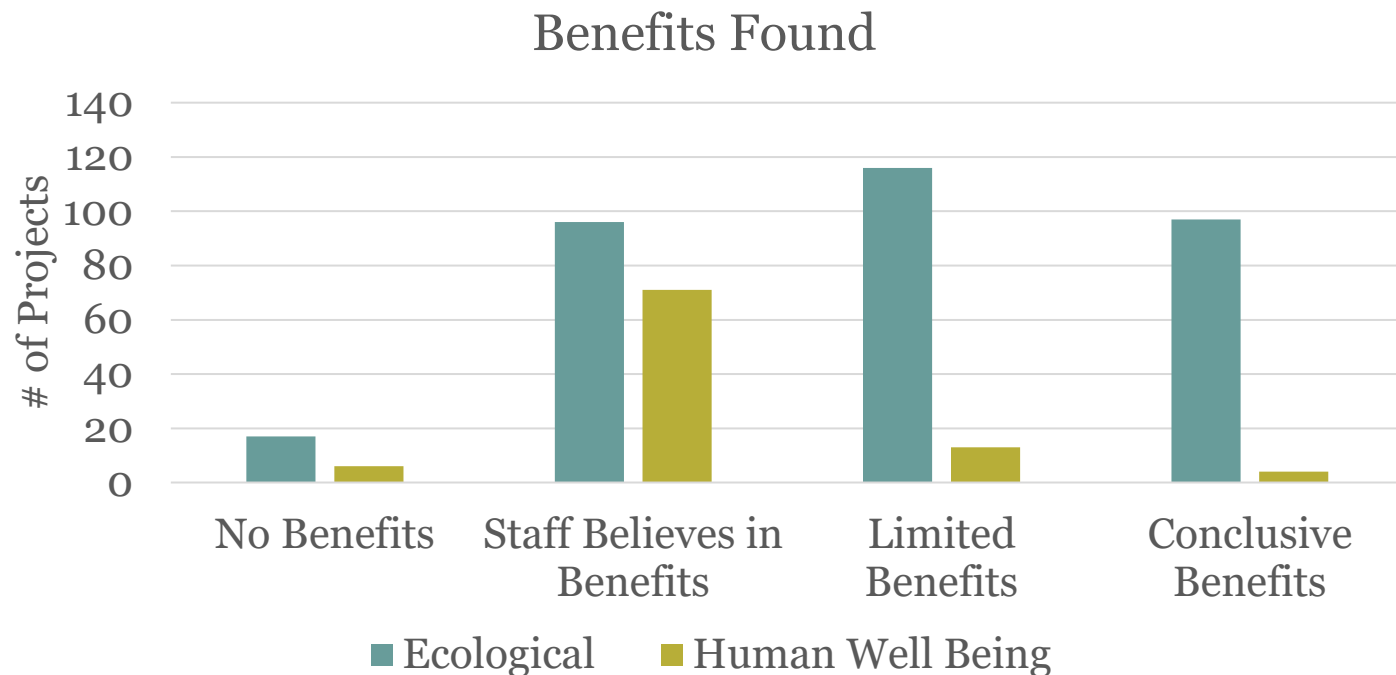
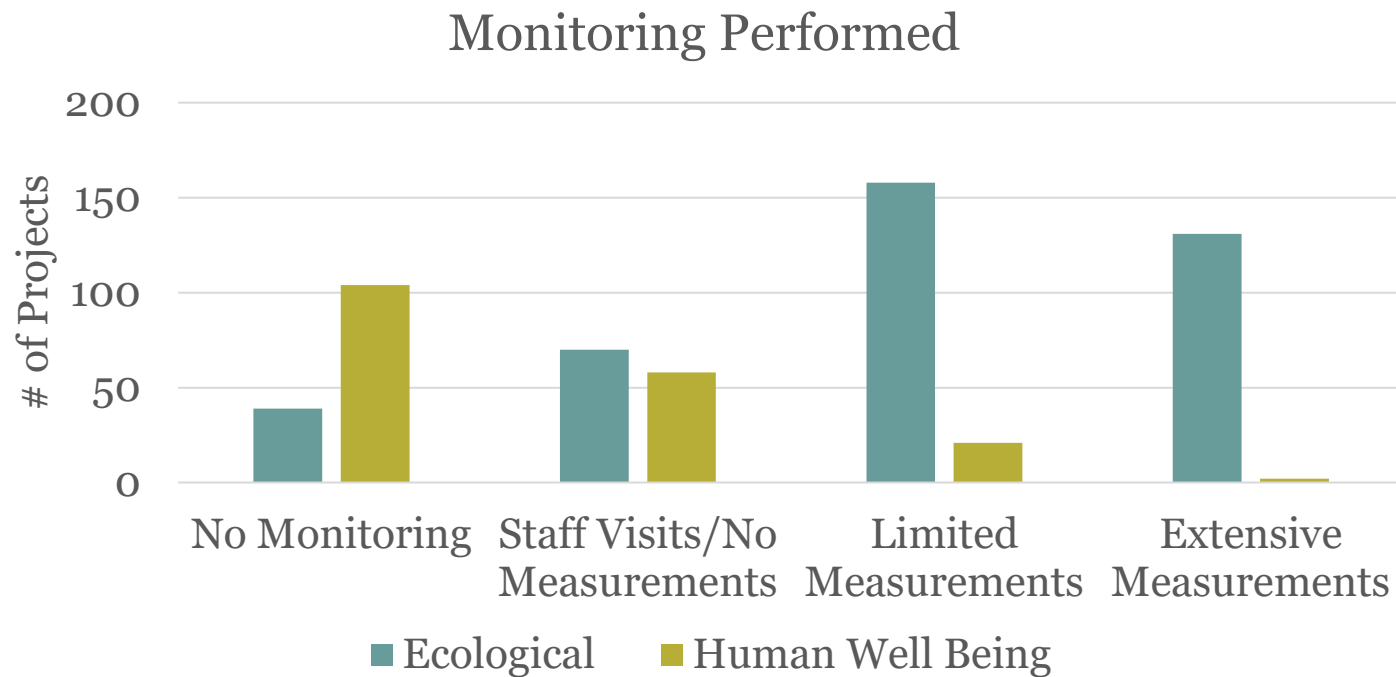


# PLANNING SCORE RUBRIC

	Ecological Projects (Out of 412)	Human Wellbeing Projects (Out of 191)	Total Projects (Out of 448)
<b>Received Public Input</b>	366(88.8%)	170(89.0%)	392(87.5%)
<b>Included Equity Considerations</b>	160(38.8%)	96(50.3%)	170(37.9%)
<b>Performed an Economic Analysis</b>	66(16.0%)	24(12.6%)	73(16.3%)
<b>Linked to a Vision Statement</b>	380(92.2%)	170(89.0%)	413(92.2%)
<b>Linked to Planning Document</b>	312(75.7%)	150(78.5%)	337(75.2%)
<b>Pre-determined Indicators</b>	286(69.4%)	31(16.2%)	290(64.7%)
<b>Established a Baseline</b>	312(75.7%)	21(11.0%)	316(70.5%)
<b>Accountability</b>	237 (57.5%)	111(58.1%)	250(55.8%)

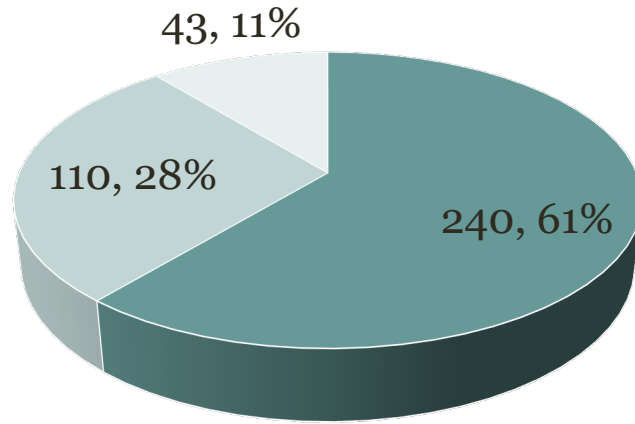
Jurjonas, May, Kyriakakis,  
Cardinale, Pearsall, & Doran  
(2023)

# HUMAN WELLBEING FRAMEWORK



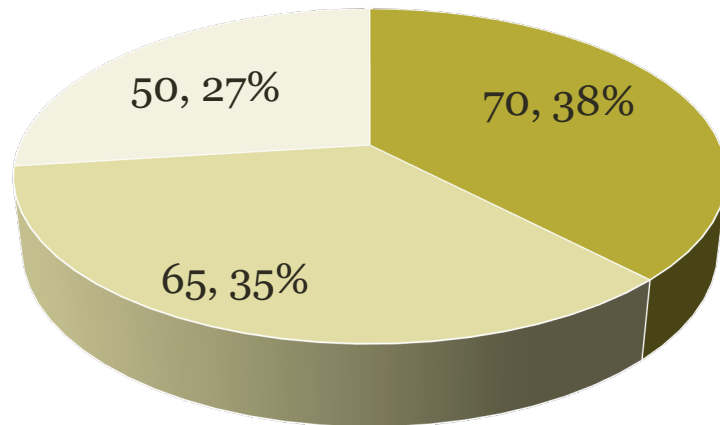
- Living Standards and Work
  - Public Health
  - Social Cohesion
  - Education
  - Safety and Security
  - Leisure and Connection to Nature
  - Governance
  - Life Satisfaction or Happiness
- (Smith et al., 2013; Annis et al., 2017)

## Successful at Meeting Ecological/ Biological Goals?



■ Strongly Agree ■ Somewhat Agree ■ Neither Agree no Disagree

## Successful at Meeting Human Wellbeing Goals?



■ Strongly Agree ■ Somewhat Agree ■ Neither Agree no Disagree

# BEYOND MONITORING

## Local Project Manager Perceptions

- ~90% Success on Ecological/Biological Goals!
- ~73% Success on Human Wellbeing Goals!

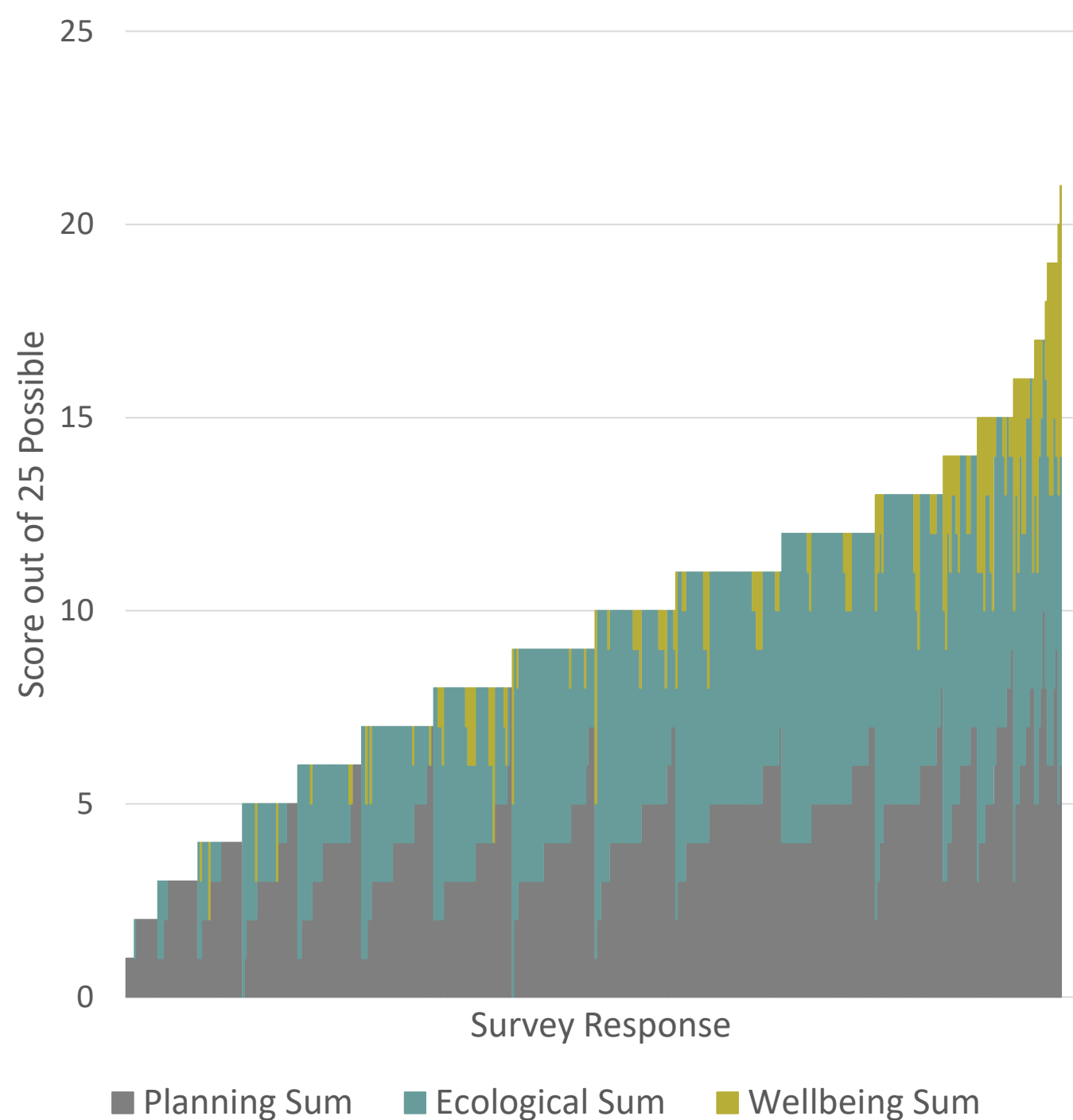
# GLRI TAKEAWAYS

## New Directions

- Climate Change (n=89)
- Environmental Social Science (n=11)
- Environmental Justice (n=2)

## Program Improvements

- Transparency
  - Nesting
  - Project Site Locations
- Environmental Accomplishments in the Great Lakes (EAGL)
  - New Criteria “Unseen Benefits”





# CLOSING THOUGHTS

- To what extent can we rely on self-reported success perceptions?
- Is there need for more monitoring / external evaluations?
- Will reporting HWB benefits boost public support for restoration? Or Congressional support?



**Thank You!**

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**PETRICOR**  
Sistemas Resilientes A.C.



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