Question & Answer Session Oct. 30th 2019

#	Question	Resp.
Construction		
5	What is the exact date or month the project will start?	2
6	Can we still paddle the river during construction?	1
29	Will the river be closed or will people still be able to paddle?	1
30	How long with this take?	2
38	What is the timeline for this project?	2
39	What is the starting date?	2
112	Can I kayak down the river during the construction of FishPass? If I'm not able to kayak down the river during construction, where can I get out? If I start at Hull Park and come down the river, where can I get out?	1
141	Who will be liable to damage to buildings that are on the river during construction?	3
192	What is the timeline for construction? Start and expected completion? Will there be a shutdown of Union Street and shutdown of adjacent parking lot during construction?	2
194	With adjacent residences plus the historic CUMC what is being done during construction to ensure adjacent buildings are not damaged? Pile driving can cause damage and what will be the hours of work - need to follow city rules.	3
203	There are many residences and historic Central Methodist Church in the area where Fish Pass/Damn Walkway is being built. When Hagerty built their most recent building, pile driving was not done to protect the buildings from damage. What precautions are being taken to protect the existing buildings?	3
Design and Permitting		
7	Should the project present a "rebuilding" opportunity, please consider the portage at the Union Dam for Kayakers (Est. @ annual > 10,000?). The current method may be considered as both poor & a very possible liability risk. Due to the slippery 45 degree exit from the river & then the slippery rocks re-entry procedure. Ask any kayaker.	13
21	Why an amphitheater? How well-utilized will it really be (can't be used in winter months) and is it really a necessary component?	12
22	Will there be restrooms?	1
23	Has there been an environmental impact study done, including sampling of sediments for heavy metals, solvents, PCBs, PFAs and other hazardous substances? Removal of Union St dam will release sediments and could be construed as a "discharge" within the meaning of the Clean Water Act, or a "release" of pollutants or hazardous/toxic substance within the meaning of CERCLA, Part 201, Mich. NREPA and RCRA.	3
27	How much more park area will the city gain?	2
43	The trees on the north side of the Boardman are a sound and visual screen from the city as well as being valuable in their size and co2 cleansing. Will they be kept in place?	17
47	Are any of the federal dollars available for this project without the fish sorting?	8
73	Is any of it parkland?	2
77	What about overall assessments of toxic sediments behind the dam and how will that be cleaned up? Who pays for that?	3
78	If the Fish Passage is supposed to be for research who is pushing to have a playground there?	12
79	What about control of lighting and noise?	7
102	What is the height of the arc labyrinth weir and the permanent barrier on the upstream end of the Fish Pass?	5
103	Have you done an environmental impact statement/assessment or when are you going to do it? Specifically, to the Union Street dam removal.	4
108	If we remove the dam at Union Street, will there be a large collection of sediment downstream and where do they think that might occur? At the mouth of the River? Where it comes out at the Bay?	3
117	Regarding "environmental improvements" proposed, why do they think the trees and everything need to come out?	17
118	Do the trees need to be removed from the project?	17

119	What are you going to do to protect the birds? What are you going to replace it with when you take down all the trees?	17
120	Why is removing the habitat environmentally-friendly or necessary?	17
121	How can you remove mature trees and replace with new trees that doesn't disrupt the existing habitat?	17
128	What is the size of the barrier between FishPass and the main river channel?	5
129	Is the 30% increase in accessible access based on a specific river level or is it for a range of river levels?	2
134	Is there a default setting for FishPass? How hard is it to impose the default? What is the default setting if it is abandoned?	5
142	What is the expected life span of the new constructed dam?	6
152	Are large number of sediment contamination studies and environmental and other impact studies going to be required prior to the corps of engineers being issued a permit to tear down the dam?	3
153	Has there been a design that does not include the elaborate FishPass system that includes all the other features including park, dam getting redone, minus FishPass? If so, what is the difference between what needs to be done and FishPass at that 18-22 million dollars? What's the baseline cost if totally redone without FishPass?	8
157	What is the functional projected life span of the FishPass?	6
159	Can you elaborate more on how the public will be exposed to the river through the research facility, as opposed to just seeing it from up on one of the bridges or the streets (how it is now)?	12
161	Have the riparian rights been secured from the church or rivers edge condos?	14
165	What in detail is being done to contain the stormwater off the additional parking lots?	9
171	Why wouldn't they locate this next to the sewage treatment plant and avoid the riparian rights issue and parkland issue?	10
172	What's the net gain in parkland due to the implementation of this project?	2
173	Is there a net gain in tree canopy and what is that gain?	17
176	How can they justify cutting down 63 mature shade trees in a city park (Union Street Dam) when the FishPass will be constructed in the water and the research station will be on land that is already cleared?	17
181	How can the Parks Commission and Planning Commission justify their decision to approve it with almost no comment?	15
188	The Boardman River is a designated as a Michigan Natural River. The dam removal that as taken place over the past couple years is helping it return to a more natural state. Its lower end flows through the central area of Traverse City and is a precious resource that serves all the citizen of Grand Traverse County. I have seen a short video that features the plan for the Fish Pass and the planned development for the surrounding area. It looks very industrial, with many less trees than currently line the banks. It is important that trees that beautify our city and keep the river shaded should not be removed. Already many trees were cut to create a boardwalk to nowhere in river and an access ramp for the disabled that does not meet ADA standards. The surrounding trees need to be maintained and native trees should be planted to fill in where trees have been cut. Who will make the critical decisions about the Fish Pass design and landscaping? Shouldn't it be up to the community and our elected officials? Do we need a public vote whether to proceed?	17
191	Possibility of a fire pit - I do not think this is necessary or prudent. Who will monitor, build fire and ensure its extinguished? I'm afraid of inappropriate use at night.	11

201	From what I have read, it has been noted that to protect the waters in the Grand Traverse Area, Traverse City specifically, can help to keep the waters safe having more permeable surfaces. The proposed Fish Pass is constructing a building and an amphitheater. As I understand it - the building will house restrooms and I thought, an information center. The amphitheater, from the drawing I saw, is concrete/block - not a natural material. With the building being an information center, and 3 parks, Lay Park, Hannah Park, VFW Park - being about a 1/2 block to a block of the Fish Pass area - why is an amphitheater being built? It is adding a non-permeable surface right at the river's edge. Couldn't the new building or the parks be used for groups who are gathered to learn about Fish Pass Project? If not, why not?	16
202	The amphitheater, specifically, is a concern to residents who live in the area. It seems that it could become a natural gathering place for non-Fish- Pass related activity. Not a community group gathered to share stores and sign songs, but unfortunate more likely for those leaving bars late at night. The downtown police officer has been a great addition but he does not work evenings/nights. Nor is he or other officers able to be everywhere. How will the amphitheater be monitored? If there is a fire pit, which had been discussed, who will monitor who builds a fore and it is property extinguished? What will prevent fires that are not authorized?	16
206	Anglers pay for licenses each year which support the DNR. What accommodations will there be for anglers (access, courtesy hours without watercraft, etc.)?	18

Fish Community Objectives

28	How does FishPass deal with the thousands of salmon and steelhead that will be prevented from passing upstream? Will extreme numbers swamp the technology (e.g., channels and holding tanks)? Are these fish to be harvested?	1
40	Will steelhead be passed upriver by FishPass, past the Union St. Dam?	4
54	With the Grand Traverse Band, NMEAC and the Brook Trout Alliance all on record against steelhead passage, why are steelhead still being considered for passage?	5
98	Will the public be allowed to comment once the type of fish species that are going to be passed are disclosed?	6
100	What date will the fish species be disclosed? What date will the screening be disclosed?	7
136	Is there the possibility of a local oversight committee that would have control of the DNR's actions once FishPass has been constructed?	8
167	Is it not true that the DNR, and only the DNR, will have final say in what fish are passed, regardless of what organizations they may discuss it with, making it susceptible to politics and lobbying efforts?	9
168	How can we avoid the above question from being the case? Will the DNR share their public input plan before reaching a decision on which fish to pass? Will the DNR define what input, specifically that from the tribe, looks like and how it is actually considered and weighted?	10
177	Isn't it true that sea lamprey can get into the Boardman river watershed from places other than the union street dam and still be found upstream from the union street dam location?	2
182	Why is the Great Lakes Fishery Commission not the entity that will decide which fish pass upstream of FishPass?	3
210	When will a decision be made regarding the "desirability" of passing any non-native salmonids?	11

Funding

16	Where is funding at? What are the sources of funding?	1
26	What is the cost and who pays?	1
33	What is the projected total cost of the FishPass project and how much has been spent so far?	1
42	What are the funding sources for the FishPass project -- both the amounts and percentages of the total cost?	1
46	How much will FishPass cost the average city resident in taxes?	2
74	How much is Traverse City contributing to FishPass?	1
89	The August-Sept. 2019 FishPass update indicates that a 90% engineering design has been submitted by AECOM. Does that include an updated cost estimate for construction and evaluation?	1

99	What is the date that the budget that TC will have to commit to operate and maintain this be disclosed?	3
107	What is each participant's funding exact share? (if not dollars, percentage). What are we looking at in terms of funding from Traverse City?	1
155	If FishPass wasn't in the picture, who would pick up the tab to rebuild Union Street dam and all the betterments that are proposed?	4
186	What happens if government funding is suddenly cut off?	5

Miscellaneous

25	What if the experiment fails? Have ALL of the worst-case scenarios been played out to everyone's satisfaction and is so, where is all of this documented?	1
35	All alcohol and smoking and motorized water vessel should bd eliminated from the Boardman. No more "Paddle for Pints.	2
44	Will Hannah Park improvement be part of the Lower Boardman project?	11
50	References to any environmentally studies all seem to lean toward positive impacts. What about some of the negative impacts, like destruction of bird habitat, etc? What if this giant experiment goes awry? What could happen to wildlife, both in the water and elsewhere? (this includes humans)	16
51	The ECT Report in 2008/09 said the Union Street Dam was o.k. Has that changed? If not, why not just do nothing - leave the existing dam there?	6
52	How is $20mill worth of re-configuration & concrete poured & pushed into a mostly natural setting needing preservation, not a worse outcome than some lamprey invading?	3
72	Did the DDA have permission from anyone?	12
83	If it fails outright, who pays for cleanup and reconstruction?	1
101	What is the basis for the statements that the dam is obsolete and deteriorating?	6
115	After FishPass is completed, will you be looking at the recreational and commercial usage of this segment of the river, particularly fishing, canoeing, and kayaking?	7
125	What is the Watershed Center's position on this?	9
143	Why is there no listing of organizations that have expressed concerns? (referencing project overview document)	8
154	Have they articulated a sales pitch for FishPass in terms of what the benefit is for species in the upper Boardman and economic benefits of tourism fishing? What's the economic benefit of having a system like FishPass? What's the species benefit?	10
160	Is there data to show what these improvements result in economically, related to quality of life, and tourism?	4
166	What are the benefits to near shore habitats in the bay as well as farther up in the watershed to restoring connectivity, especially for native fish?	17
204	Is a permit system for watercraft on the lower Boardman under consideration? If so, consider the system in place on the Pine River as an instructive model. Contact Leslie Auriemo with the USFS. If not, how will the number of watercraft be controlled and balanced with other users?	5
205	What specific limits will be placed on business development on the lower Boardman? How many liveries, restaurants, condos?	13
208	Have all members of the LBLT read Dr. Ray J. White's Comments on the Michigan DNR Fisheries Division's 2014 Draft Boardman River Assessment, particularly as it discusses the passage of steelhead and salmon into the river?	14
209	Have all members of the LBLT familiarized themselves with the ecological problems and changes that will occur if non-native species of fish, i.e. steelhead and salmon, are allowed to ascend and spawn in the Boardman watershed	15

Operation & Maintenance

4	Who is going to oversee the management of FishPass? Having the DNR in sole charge is the veritable fox guarding the chickens as they are unwavering in their plans to introduce steelhead to bolster their revenues.	13
9	How much will it cost annually to control, manage, and maintain FishPass?	1

18	Who will operate Fish Pass? We have heard it mentioned that more than likely the city will take ownership of operations. Will the city have to hire specialized staff to do this?	1
31	On what date will the city assume control, management, and maintenance of FishPass?	1
34	Once the FishPass project is completed, who will be in charge of it?	2
36	Who will be responsible for the cost of the continued operation?	2
53	Will the future operational maintenance cost/budget require city funds?	8
76	Who pays for maintenance, and who manages and oversees it?	1
90	Have or will cost estimates be developed for the operation and maintenance of the FishPass facility? Who will be the source of funding for O & M activities?	1
104	What entity will own the structure and where will liability lie for adverse results that might occur?	8
114	Will kayaks be able to paddle up into the FishPass channel? To what extent will fish be able to go downstream, either through the weir or FishPass?	3
130	What happens to FishPass after the end of the 10-year period? Does it go away? Does it stay in place? Does it become something else? What kind of analysis has been done on that?	5
131	On which budget will the operation of FishPass fall?	1
132	How are we going to be assured that the city is going to maintain it after 10 years? Is there a contingency fund or will it be cut from the budget?	9
140	How will trash, leaves, and floating debris be managed?	10
156	Has the cost of long-term operations and maintenance at the facility been looked at? Who will be the source of funding and for how long?	2
170	Is the city going to be designated as the owner of this project, and if that is the case, can they dictate to the DNR parameters within which they can operate?	11
183	What is the state of the deliberation in the city for taking managerial control of this thing once it's built? Is the current staffing in any of those offices (planning, parks & rec) adequate to the operation and maintenance of this machine once it's built? What is the city's current thinking about the plan to operate and maintain the facility once it's transferred? Who's going to manage it? Using what tools? How? And Where's the funding going to come from?	12
184	Once the agreement ends, what is the yearly cost to maintain and run the facility?	2
185	What happens to all fish caught in the pass? How are they killed? Where are they stored? How are the "disposed of"?	4
187	When project comes to an end, can the facility be converted to another use?	6
193	Once maintenance of FishPass is turned over from DNR/Great Lakes Fisheries, what is the anticipated cost to the city for ongoing maintenance? And any anticipated major overhaul of design based on initial use either before or after this 10-year period?	2
198	I understand that after 10 years the management of the Fish Pass will be turned over to the city. Is the city knowledgeable enough and have the resources to maintain it?	7
200	I had heard that the Fish Pass and all that it includes: grounds, amphitheater, area where the kayaks leave and return to the river, etc. - will initially be managed by the DNR of Great Lakes Fisheries (I'm not exactly certain which organization) - and after, I believe 10 years, they will no longer manage the project. Who will be managing/maintaining the area after the developing organizations are no longer doing so? Will the organization who eventually manages the area also manage the experimental fish pass projects?	7

Public Engagement & Decisions

1	Who made the first decision that TC needed a fish Pass at Union St?	10
2	Why is it planned to be located at Union Street dam?	10
8	On what date did the city Commission approve FishPass?	1
10	Given that mismanagement by the city and DNR has permitted the spillway gate to be breached multiple times by salmon this year, why should the public have confidence in their operation of FishPass once the project is completed?	6
37	Is this the best thing we can do for the river?	11
61	Who was the original individual that started the search for a place for an experimental fish passage?	3

62	How does that individual benefit from this?	3
64	Who benefits financially?	3
65	Shareholder values were a large consideration, why not city residents and taxpayer values?	9
66	Who were these shareholders and whom did they represent?	9
67	Who in the city made the decision to buy into the project and bring it to the city commission?	7
80	After the public forums, will the stakeholders be able to make changes?	5
105	Where are the additional meetings after the 30th? What goes on from there in terms of discussion, debate, and any of those things. From the answers to the questions we receive.	9
110	What has been done to get public input into the Union dam removal, Fish Pass design, and amenities proposed for the FishPass park?	9
113	Where did the "team" get the idea of adding on all these amenities? Including kayak passage, amphitheater, research building. What is the cost of each of those? Where is the money coming from?	2
122	How did the philosophy of the natural rivers shift with this fourth dam removal or result in FishPass?	12
137	How much room is there to negotiate this humongous project? Is there room anywhere to downscale, step back, take a breath? Is there room to slow it down?	4
146	Why the elaborate design of the surrounding area beyond just the passage of Fish? Was there adequate community input and will there be opportunities for additional community input before executing?	9
189	Why have an experimental Fish Pass at all? Shouldn't we be doing whatever possible to preserve and enhance the natural character of the river? Should environmental protection (especially in this time of climate change) outweigh any commercial interests?	12
195	The amphitheater is a concern to residents of the area. It could become a gathering place at night for non-fishing activity, barn patrons of from Union Street, the homeless etc. The downtown police officer is a great addition but he does not work nights and can't be everywhere. How will this be	8
196	I understand the area where kayaks leave and return to the river will be moved east of current spot, directly below residents and Hagerty offices at the River Edge. Why? The numbers and noise from this is a concern and is something the city should be addressing - large numbers of people drinking in boats is not a good idea.	8

Research

32	Tell me the screening method that will be used to "sort" different fish species.	1
41	What remedy is planned if lampreys get past Fish Pass?	10
49	How will the passage of fish with potentially toxic levels of chemicals affect other critters upstream/downstream?	2
56	Lamprey can climb barriers and attach fish that are being passed around a barrier. Hence, how will the FishPass experiments determine the effectiveness of methods preventing lamprey passage?	4
57	Who will be managing and designing research activities at the FishPass site?	11
58	Whose personnel will be performing experiments at the FishPass site (federal, state, university)?	3
59	Will results of experiments be written for publication in peer reviewed outlets?	9
60	Will raw (unanalyzed) experimental results be made available to the public? Before or after proper analysis? Before a critical evaluation of the experiment and statistical analysis of data could produce confusion and erroneous conclusions that will prove difficult to remediate.	12
63	Will the engineering design be "patented" or copyrighted" and available for purchase?	16
87	Is the term "FishPass" a copyrighted name and will design and/or engineering and knowledge gained be proprietary information?	16
88	Will this be a legal enterprise that stands to profit from this experiment if it succeeds as planned?	16

91	What technologies are currently being considered for selecting fish species to pass or nor pass? Have the technologies mentioned in the GLMIS Report for the Brandon Road Lock and Dam been evaluated?	1
92	How is the sorting canal supposed to operate? Will operation require staff at least during periods of fish abundance?	3
93	Will laboratory studies be conducted as part of the evaluation study or will studies be limited to those conducted in the sorting canal?	5
94	Will a yearend report be prepared describing activities and the results or studies conducted this year?	13
97	The screening method hasn't been decided on. Will the public be allowed to comment once you disclose the screening method that you will use?	14
109	What specific screening method will be used to ensure that attached Lampreys don't get passed?	1
124	Given that FishPass is a novel design and given that we know the names of the organizations involved, who are the scientists by name and CV/qualifications who are going to actually develop the screening system?	15
135	Is there a caveat for when the Asian carp get here?	6
150	What are the alternatives to getting Lake Sturgeon, species of suckers, species of other native fish, back into the upper river if there is no FishPass?	7
151	What are lowermost barriers impact on local extinction of fish like Lake Sturgeon? Compared to overfishing, overharvest, what effect did lowermost barriers (i.e. dams) have?	8
164	Is the term "FishPass" a copyrighted name and will design and/or engineering and knowledge gained be proprietary information? Will this be a legal enterprise that stands to profit from this experiment if it succeeds as planned?	16
197	I have seen concerns on if the Fish Pass will be effective in stopping invasive species - it is "experimental" How will this be monitored and what will be done if it is not effective.	10

Construction

Construction Response #1

Question #: 6, 29, 112
Response: For the safety of the public and the project contractors **during construction**, the Boardman River will be closed to paddling between Cass Street and Union Street Bridge. The river will be open to paddlers up- and down-stream of the project site. Construction on FishPass will also overlap with construction on the Cass Street and Union Street Bridges which will also require temporary closure of the river in this area. Currently Hull Park is the last access point above the project area. A request for access just above the project site at Legion Park is working through the decision-making process. Once FishPass is constructed, the river will be re-opened to paddling within the nature-like bypass channel. Paddling will not be allowed in the fish-sorting channel.

Construction Response #2

Question #: 5, 30, 38, 39, 192
Response: We anticipate the project will go out for bid during January and February 2020, with the contractor selected by March or April 2020. The exact construction start date will be dependent on the contractor's schedule and the contracting period, but we anticipate construction to begin Summer 2020. Construction is expected to last two construction seasons. During construction, the parking lot on the south side of the river will be closed, as it will be used for construction staging. We anticipate the facility will be ready for research activities in spring of 2022 and the initial research and optimization phase is planned to last for 10 years post-construction.

Construction Response #3

Question #: 141, 194, 203
Response: FishPass construction will include a number of tasks and equipment that will generate vibrations – including impact pile driving for the bridge foundations and vibratory pile driving to install temporary and permanent sheet pile structures. Construction vibrations will be highest immediately adjacent to equipment work areas (which will be primarily at in-river locations). The peak particle velocity from construction vibrations at these structures has been estimated to range between 0.5 and 1.0 in/s. While damage to structures is unlikely under estimated vibrations, before/after condition surveys and documentation and vibration monitoring will be implemented at existing buildings and any other key structures located along the river banks within the project area. The contractor will be liable for any damage during construction. The contractor will also be required to list Central Methodist Church, River's Edge Condominiums, DDA and City as additionally insured on their insurance policies. Construction work will only be allowed on Monday-Saturday between 7am and 7pm.

Design and Permitting

Design & Permitting Response #1

Question #: 22
Response: Yes. At the open-houses in 2017, the inclusion of restrooms was the top request for incorporation into the FishPass site design. Two, public restrooms are included in the Research and Education Building. For more information, see documentation at http://www.glfc.org/fishpass.php: October 10, 2017 - The FishPass team assisted the City of Traverse City in hosting an open house to seek public input on the design of FishPass; GLFC's Science Director Andrew Muir's op-ed in Traverse City Record Eagle about recent FishPass open house; View results from recent FishPass open house.

Design & Permitting Response #2

Question #: 27, 73, 129, 172
Response: Excluding the Research and Education Building and immediately surrounding paved area, the Union Street Dam park area will increase by approximately 30% (1.12 acres to 1.44 acres). This estimate considers normal water levels in the Boardman River.

Design & Permitting Response #3

Question #: 23, 77, 108, 152
Response: Unlike the dams in the upper Boardman River, Union Street Dam will not just be removed, it will be replaced with a vastly improved barrier. Construction sequencing has also been designed so that any soil removal will be accomplished behind a sheet pile cofferdam, protecting work and soils from water flow. Appropriate measures, such as silt curtains, will be used during dredging activities to further minimize downstream sediment transport. In addition to construction sequencing to minimize sediment release, substantial contaminant testing has been conducted within the project footprint per requirements of the DEQ/USACE Joint Permit Application. A combination of 29 sediment samples have been taken during remedial investigations in 1997 and 2007 as well as soil characterizations for FishPass in 2017 and 2019. The majority of samples were screened for inorganic chemicals, polynuclear aromatic hydrocarbons (PNAs), and polychlorinated biphenols (PCBs). Samples were taken at depths between 0-78 inches. No PCBs were detected within these sediments or in additional samples taken upstream of Cass Street Bridge. None of the samples had toxicity characteristic leachate procedure (TCLP) concentrations that exceeded criteria for characteristically hazardous waste. A total of 3100 cubic yards of organic silt (i.e. top layer of sediment) with the highest concentrations of metals and PNAs will be removed and disposed of at a type II landfill. No underlying sand and gravel is contaminated and none are expected to be harmful to aquatic life. All sediment remediation within the project site will be covered by the construction contract. The U.S. Army Corps of engineers (USACE), on behalf of the Great Lakes Fishery Commission, is working with the local company AECOM to complete the required National Environmental Policy Act (NEPA) and other appropriate statute reviews for FishPass. Based on the DEQ's (now Environment, Great Lakes and Energy [EGLE]) review of the project, a permit is required under the authority of Part 301 of NEPA, Part 315 of NEPA, Floodplain Regulatory Authority in Part 31 of NEPA, and Part 91, Soil Erosion and Sedimentation Control of NEPA. Additionally, USACE staff determined the project would also require an individual Federal Section 10/404 permit for work in waters of the U.S., which would involve an entire NEPA review, and the need for a separate Environmental Assessment was not warranted. MI EGLE held a public hearing (February 12, 2019) in Traverse city on their permit issuance and had essentially no comments. Based on the EGLE public hearing, the USACE will not hold a public hearing for the federal permit.

Design & Permitting Response #4

Question #: 103

Response: The USACE, on behalf of the Great Lakes Fish Commission, is working with AECOM to complete the required National Environmental Policy Act (NEPA) and other appropriate statute reviews for FishPass. Prior to USACE's coordination actions, the FishPass team presented at 48 local governmental meetings since 2016 with diverse audiences including the City and County Commissioners, Planning Commission, Parks and Rec Commission, Arts Commission, and the Boardman Implementation Team to obtain citizen input into the project design, alternatives and concerns and comments.

The USACE conducted early coordination with appropriate state and Federal agencies including Michigan Department of Environmental Quality (now EGLE), Michigan Department of Natural Resources (MDNR), State Historic Preservation Office (SHPO), US Environmental Protection Agency (USEPA), and US Fish and Wildlife Service (USFWS). During early project coordination, the SHPO indicated the project will have "no adverse effect." The MDEQ indicated that since the project is not primarily for navigational purposes coordination will occur through the state's permitting process, and that Coastal Zone Management consistency would be conducted during the state permit review process and that a Section 401, water quality certification would occur at that time. The USFWS concurred the project would have "no effect" on the northern long-eared bat. It was also determined by the USFWS that no Coordination Act Report (CAR) would be required since the USFWS is involved with the project and consultation does not always mean a full report. The MDNR indicated that Fisheries Division is supportive of the FishPass project and is working collaboratively with other partners on the FishPass Advisory Board and Science Panel. The USEPA had many comments regarding the project regarding the specific scope of the project, the alternative technologies to be used, sediment testing, and interagency coordination. The Little Traverse Bay Band of Odawa Indians indicated that they wished to be notified if any Native American cultural resources or human remains were discovered. Once the early coordination was completed for the FishPass project as part of the preparation of an EA and a review of the comments and concerns presented, it appeared that there were no issues raised that would lead one to believe that the project would significantly affect the quality of the human environment. Therefore, based on the available information, the decision was made not to prepare an Environmental Impact Statement (EIS) as the project did not warrant that level of review.

After the determination was made by the USACE Regulatory staff that an individual Federal Section 10/404 permit would be required for the FishPass project for work in waters of the U.S., which would involve an entire NEPA review, the need for a separate EA for the FishPass project was not warranted. AECOM, on behalf of the city filed the joint permit application for FishPass. The submittal included 200+ pages of attachments including the application and drawings.

Design & Permitting Response #5

Question #: 102, 128, 134

Response: The default operation of the entire facility is to be a barrier to all fish passage. No operation is required to achieve this function as there are no operable features on the labyrinth weir and the gates in the fish sorting channel can be left in the up, or closed, position. The top elevation of the arc-labyrinth weir is 589.3 ft above sea level. The low-flow weir (located between the arc-labyrinth weir and fish-sorting channel) is 588 ft above sea level. When fully closed the upstream gate in the fish-sorting channel is at 591.5 ft above sea level. The normal water surface elevation of the upstream pool is 589.3 ft above sea level and the downstream water elevation is between 580-583 ft above sea level. Thus, the proposed structure imposes a 5-9-foot-high barrier to fish passage. It should be noted that the low-flow weir features a 10-ft long sloped ramp downstream of the crest that prevents fish from swimming close to the crest. Riprap will be placed downstream of the labyrinth weir to prevent the formation of a jumping pool immediately below the dam. The wall separating the fish-sorting channel and nature-like fishway has a top elevation of 590 ft above sea level at the upstream end and 589 ft above sea level at the downstream end.

Design & Permitting Response #6

Question #: 142, 157

Response: Depending on levels of maintenance, the new facility has a projected life span between 75-100 years.

Design & Permitting Response #7

Question #: 79

Response: All proposed project lighting and operational noise will comply with appropriate city ordinances.

Design & Permitting Response #8

Question #: 47, 153

Response: The project is all about fish sorting - selective fish passage to try and solve a Great Lakes and a global problem. FishPass is the capstone to the Boardman River restoration effort and a major element of the Lower Boardman Unified Plan. Lost connectivity through river segmentation by dams is one of the greatest threats limiting the restoration, health, and sustainability of our treasured Great Lakes and riparian ecosystems. The Boardman River Dams Ecosystem Restoration Project is a 15-year local effort to restore - through dam removal - natural flow regimes and river function reconnecting the Boardman-Ottaway River, Grand Traverse Bay, and Lake Michigan. From inception, the Boardman River restoration project has had the goals of removing the three upper dams and modifying the lowermost dam to allow for native fish passage. FishPass allows us to achieve hydrological connectivity while still reaching ecological connectivity objectives of keeping harmful invasive species out of the river. Imagine the first sturgeon in more than a century to make it home.

There have been no formal designs that incorporate all the site features associated with FishPass but without the fish sorting channel. The majority of funds for FishPass are from the Great Lakes Restoration Initiative (86%), and these funds are directly tied to ecological restoration not dam repairs. These funds are specifically used to support the FishPass mission of providing selective fish passage in the Boardman River. As a result, the city will receive a new dam, improved and increased usable park space, and fish sorting research facility at minimal cost. The city will need to provide funds for relocation of the existing watermain ($250K). If the fish-sorting channel is omitted from the design, funds from the Great Lakes Restoration Initiative could no longer be applied. **To achieve the same design without a fish-sorting channel, the city would be responsible for the entire estimated cost of $10M.**

Design & Permitting Response #9

Question #: 165

Response: Stormwater runoff from the parking lots will be captured using several green infrastructure components. First, the parking lots will contain permeable pavers which will help decrease the total runoff. Second, any runoff not directly absorbed will be collected by curb and gutter and directed into one of three rain gardens. The new design presents a significant improvement over current conditions where all runoff from the parking lots is collected and discharged directly into the river.

Design & Permitting Response #10

Question #: 171

Response: The overall mission of FishPass and desired outcome of the entire Boardman River Restoration Project is to restore connectivity between the Boardman (Ottaway) River and Lake Michigan. The last barrier in the system is the Union Street Dam. The FishPass project and overall Boardman Restoration goals could not be met with a project site located near the sewage treatment plant.

Design & Permitting Response #11

Question #: 191

Response: A fire pit has never been included in the FishPass design.

Design & Permitting Response #12

Question #: 21, 78, 159

Response: FishPass is designed to be a "living laboratory" and, as such, many public access and educational features have been incorporated into the design and largely based on community input into the design process. The site is close to downtown and is part of both paddling and walking routes. The site provides unique opportunities for first-hand outreach and education features. It is anticipated that FishPass will appeal to all ages of residents, visitors, students, and teachers. Moreover, FishPass has been designed to improve the existing setting.

The public access and educational features are as follows:

- A new pedestrian connection from Cass Street, along the north bank.
- An interpretive overlook along the entire north and south banks.
- A rehabilitated boardwalk on the north bank downstream of the Union Street bridge and a new boardwalk along the south bank.
- An enlarged fishing pier near the location of the existing, deteriorating pier.
- A pedestrian bridge that provides a ""bird's eye view"" of the FishPass site, including the fish sorting channel.
- ADA compliant access throughout the park and at all connections on north, south, east, and west.
- A state-of-the-art portage rail for kayaks and canoes.
- An outdoor classroom to accommodate small groups.
- A research building (including public restrooms and instream video viewing) on the north bank.

Together, these features allow for researchers to do their work in the presence of visitors, for visitors to interact with researchers and/or to meander throughout the site on their own, for pedestrians to have easier access to the site and for that access to be connected to other improvements (e.g., boardwalks), and for educators to expose students and visitors of all ages to science in action.

Design & Permitting Response #13

Question #: 7

Response: The 90% plans include a state-of-the-art paddling portage ingress and egress with a kayak/canoe rail to make the portage as easy and efficient as possible. Also included in plans is an ADA handicapped ingress egress ramp.

Design & Permitting Response #14

Question #: 161

Response: The city has met several times and is working out agreements with both of these entities.

Design & Permitting Response #15

Question #: 181

Response: This is a question for the Parks and Planning Commissions -

Design & Permitting Response #16

Question #: 201, 202

Response: The new research and education building is to house the scientific operations and provide work space for the various components of the fish sorting channel. The incorporation of public restrooms into the research and education building was the result and desire gained through the public outreach process. The amphitheater is planned in a location that provides a view of the project. The city, as with any structure or park, is aware of public access issues after hours. The sight will be lit in accordance with city practices.

Design & Permitting Response #17

Question #: 43, 117, 118, 119, 120, 121, 173, 176, 188

Response: Consistent with community input, the FishPass team and designated contractor will make every effort to retain as many trees as possible while completing the construction of FishPass. We acknowledge that there may have been some confusion from the presented renderings pertaining to the extent of the trees that will need to be removed for the construction of this project. All visual and video renderings presented are artistic conceptions and are not intended to be an exact depiction of the project and its surroundings. The actual position of trees to be removed and retained during construction are outlined in the design plan set. The removal of trees has been limited to the fewest possible to allow for equipment access and new infrastructure on the site. The FishPass design was deemed consistent with the Traverse City Master Plan by the Traverse City Planning Commission. We estimate that approximately 60 adult trees, Diameter at Breast Height (DBH) > 3.5", will be removed. Of the trees slated for removal, sixteen (~22%) are located on the dam and constitute a dam safety hazard. According to Michigan Department of Environment, Great Lakes, and Energy and the 2008 Dam Safety Report, trees and woody vegetation should not be permitted to grow on embankment dams because they pose a threat to long-term integrity of the structure. Roots leave passages for seeping and piping and under windstorms uprooted trees can scar the embankment creating a shortcut for slope failure. Discounting the sixteen trees that are in violation of safety recommendations and should have been removed per safety recommendations, the total loss of trees due to construction and new design is approximately 45.

The current design plan accounts for planting native trees consisting of the following species: sugar maple, river birch, American beech, tulip tree, black gum, American sycamore, swamp white oak, basswood, white spruce, white pine, downy serviceberry, Allegany serviceberry, American hornbeam, and Eastern redbud. Tree species were selected based on recommendations from the City Parks Division and Tree Assessment. The single act of removing mature trees is not environmentally friendly. However, the project will provide numerous benefits to the ecosystem and project site as a whole. FishPass will replace the disturbed arboreal habitat, stabilize water levels in Boardman Lake, improve instream habitat, improve natural stream function, and improve resilience and storm-water management utilizing permeable pavers, a green-roof education building, and three new raingardens. In addition to perhaps the greatest ecological enhancement associated with FishPass is the possibility that for the first time in over a century, native fishes will be able to move under their own volition to access 168 miles of our restored watershed and complete their life cycles. Overall, the ecological benefits from the reconstruction of the Union Street dam for FishPass vastly outweigh the minor and temporary effects on fish and wildlife.

Design & Permitting Response #18

Question #: 206

Response: FishPass was designed with equal access for the public and researchers in mind. We anticipate the majority of research efforts will occur within the fish sorting channels on the north side of the river, while the nature-like channel on the south side will be accessible by the public. Fishing will not be allowed in the fish sorting channels, but will be permissible in the nature-like channel. FishPass features many elements that should improve the fishing experience at the site, including improved instream fish habitat, erosion resistant bank treatments with natural vegetation, and improved access to the shore via stepped stones. Under rare occurrences when critical research would be negatively impacted by fishing, temporary restrictions may be necessary. Such restrictions would be infrequent and coordinated with the MI DNR and widely communicated with the public in advance.

Fish Community Objective

FCO Response #1

Question #: 28

Response: Most salmon migrating into the Boardman River from Lake Michigan are currently blocked and removed from the river by the Michigan Department of Natural Resources at the James P. Price Trap and Transfer facility < 0.5 miles downstream of the project. In this process the salmon are harvested and the low number of non-salmon species (e.g. rainbow trout, brown trout) encountered are released up stream, but below Union Street Dam. The Michigan Department of Natural resources does not expect the trap and transfer facility to operate any differently in the future. The FishPass sorting system is not meant to replace the trap and transfer operation for salmon, which will continue to run concurrently with FishPass. In this way, the FishPass system will act as an additional barrier to prevent the passage of salmon up into the Boardman River Watershed. Furthermore, the existing structure (i.e., Union Street Dam and its fishway) was not designed to have the ability to block salmon or steelhead and current measures to do so are temporary at best.

The exact process of fish sorting will be determined by ongoing research at FishPass over the 10-year optimization phase, in which fish will be sorted below a complete barrier. Despite the sorting process being in an optimization stage, the design of the FishPass fish sorting system has been envisioned to account for the full migration size of all species. The primary way in which this will be accomplished is through reiterative sorting. Fish that fail to reach the passage stage in the process will be allowed to exit through an auxiliary gate into the nature like channel, upon which they would still be able to volitionally reenter the sorting channel. In a similar manor, if a fish reaches the passage stage that is at capacity (which is still below a full barrier), it would also be provided with the exit pathway and allowed to reenter the sorting process, again indefinitely until the final fate of passage or blockage is obtained.

FCO Response #2

Question #: 177

Response: No. The Boardman River Estuary is the only connection between the Boardman River Watershed and Lake Michigan. Currently, Lamprey are not blocked from entering Kid's Creek and the small connecting streams to it (a.k.a. Boardman River/Hospital Creek) as they are below Union Street Dam. This habitat is already accounted for in the Great Lakes Fishery Commission Sea Lamprey Control Program. It is treated on a regular basis. The most recent treatment occurred on 12 July 2018.

FCO Response #3

Question #: 182

Response: The Great Lakes Fishery Commission only has management authority in regard to sea lamprey. The commission has no management authority over the other natural resources (including fisheries) in the State of Michigan or elsewhere. The 1954 Convention on Great Lakes Fisheries, which created the Great Lakes Fishery Commission, was born from a strong need to work together across borders not only to combat sea lampreys but also to promote science and establish working relationships among management jurisdictions. The commission consists of four Canadian commissioners appointed by the Privy Council and four U.S. commissioners (plus one alternate) appointed by the President. The commissioners are supported by a secretariat, located in Ann Arbor, Michigan. The convention charges the commission with five major duties: (1) to develop a binational research program aimed at sustaining Great Lakes fish stocks; (2)to coordinate or conduct research consistent with that program; (3) to recommend measures to governments that protect and improve the fishery; (4) to formulate and implement a comprehensive sea lamprey control program; and (5) to publish or authorize publication of scientific and other information critical to sustaining the fishery. The convention also includes a clause mandating the commission to establish "working arrangements" among governments to ensure multi-jurisdictional fishery management. The commission, thus, became a focal point for cooperative Great Lakes fishery management, though was designed specifically to not supersede existing state or provincial management authority.

FCO Response #4

Question #: 40
Response: The DNR established in 2018 that no salmon or steelhead would be passed upstream of Union Street Dam for 10 years following construction and initial operation of FishPass. Studies of various fish passage technologies and techniques using native fish species may occur if deemed necessary by the FishPass Advisory Board. A decision on salmon and steelhead passage will occur after the test period and after statewide public input.

FCO Response #5

Question #: 54
Response: The Boardman River is a statewide resource with many users and a broad range of interest groups involved in its management. Other angler groups and individuals have requested steelhead and salmon be passed upstream of Union Street. Fish passage discussions will be an open and inclusive process for the next several years.

FCO Response #6

Question #: 98
Response: Members of the public will be welcome to comment and participate in discussions to determine what species of fish will be passed. Our goal would be that all interested groups and individuals will be part of the decision-making process and these discussions will invite statewide input as the Boardman River is a state public trust resource.

FCO Response #7

Question #: 100
Response: Approximately 10 years following the construction and initial operation of FishPass and after substantial statewide public outreach and input.

FCO Response #8

Question #: 136
Response: During the testing phase of FishPass, a FishPass Advisory Board will review and approve actions for FishPass activities. Public comment and consultation with tribal partners will inform future actions at the Union Street Dam Facility after the FishPass Project is completed. Since the Boardman River is a public trust resource, all citizens of the state have the right and responsibility to provide input on its management by the DNR who holds it in trust for all of the state's citizens.

FCO Response #9

Question #: 167
Response: Under Public Act 451 of 1994 under 324.48301 - The DNR has authority regarding fish passage at dams. The DNR will consult with tribal partners and the public to inform future decision on fish passage. The DNR holds the Boardman River in trust for all of the state's citizens and is responsible for the decisions on fisheries management for all of its citizens.

FCO Response #10

Question #: 168
Response: Fish passage discussions will be an open and inclusive process done in consultation with tribal partners. Statewide public input will be used to inform future decisions regarding fish passage and there will be opportunities for all interested parties to provide input.

FCO Response #11

Question #: 210
Response: Within the next 10 years through an inclusive and collaborative statewide input process as the Boardman River is a state public trust resources that is managed by the DNR for the benefit of all citizens.

Funding

Funding Response #1

Question #: 16, 26, 33, 42, 74, 89, 107
Response: Approximately $4 M has been spent on design, preliminary assessment and research studies, and review. An updated construction estimate was completed as part of AECOM's 90% design package. The estimated cost for construction, research equipment, and contingencies is between $18-22 M. To date, the project has received $12.8 M from the Great Lakes Restoration Initiative, $1.65 M from the State of Michigan. Prior to construction, the FishPass team anticipates an additional $6 M from the Great Lakes Restoration Initiative, $1 M of internal funding from the Great Lakes Fishery Commission, and $250,000 from the city for the relocation of a watermain that crosses Union Street Dam. The City Department of Municipal Utilities supports and recommends the relocation of the existing watermain. In the end, the approximate percentage of funding is 86% from GLRI, 7.6% from MI, 1.8% from the City of Traverse City, and 4.6% from the GLFC.

Funding Response #2

Question #: 46
Response: The majority of FishPass (98.2%) will be constructed with funds from federal and state sources. These are funds that will be spent for projects regionally and nationally whether or not they are spent on this project. No tax increase is anticipated due to FishPass. The cost to city taxpayers for the replacement of the existing dam would be significantly greater should the FishPass funding not be applied.

Funding Response #3

Question #: 99
Response: The city already operates and maintains the existing park and Union Street Dam with costs built into the general fund budget each year.

Funding Response #4

Question #: 155
Response: The cost for the replacement of the dam and all the betterments would be the responsibility of the City of Traverse City and its citizens.

Funding Response #5

Question #: 186
Response: The funding for FishPass construction has been secured pending acceptance of the FY2020 GLRI budget and we are currently establishing Operations and Maintenance plans for FishPass.

Miscellaneous

Misc. Response #1

Question #: 25, 83

Response: The project team maintains a risk register, which details all the project risks and identifies options for eliminating or minimizing those risks. The worst-case scenario for the project is that sea lamprey cannot be sorted from other fishes and selective passage is not achieved. If this outcome arises after the 10-year optimization (experimental) period, the Advisory Board has several options depending on the experimental outcomes: (1) extend the optimization phase; (2) default to the original USACE solution - a trap-and-transfer facility; (3) maintain the site as a barrier to all fishes, including sea lamprey; and (4) modify the structure.

Misc. Response #2

Question #: 35

Response: This issue is not within the purview of FishPass.

Misc. Response #3

Question #: 52

Response: The Lower Boardman River has been heavily altered and bears little resemblance to a "natural setting." Consistent with the Traverse City Master Plan and the Lower Boardman Unified Plan, the greenspace adjacent to FishPass will be improved by better access, greater corridor connectivity, increased recreational opportunities, and better ecological function. Key features of FishPass green space include removal of overgrown and invasive vegetation, planting native trees, renewed native riparian vegetation, erosion-resistant shorelines, boat launches and pull outs, stabilized water levels in Boardman Lake, improved instream habitat, improved natural stream function, improved resilience and storm-water management utilizing permeable pavers, a green-roof education building, and three new raingardens. Perhaps the greatest ecological enhancement associated with FishPass is the possibility that for the first time in nearly a century, native fishes will be able to move under their own volition to access 168 miles of our restored watershed and complete their life cycles! FishPass offers the possibility of a true rebirth of the Boardman River.

To address the second part of the question, it is necessary to understand the pervasiveness of the sea lamprey and its unique life history (http://www.glfc.org/sea-lamprey.php). Fish species of the Great Lakes have not co-evolved with sea lamprey and therefore are not able to tolerate a parasite of this size. Consequently, most fish attacked by a sea lamprey die and remarkably, a single sea lamprey can kill up to 40 pounds (21 kg) of fish during its parasitic stage. Before sea lamprey control, sea lamprey predation on valuable fish stocks was so high it became a key factor in the collapse of the Great Lakes ecosystem and economy that it supported; tens of thousands of jobs were lost, property values were diminished, and a way of life was forever changed for millions of people. Sea lampreys killed more than 100 million pounds of Great Lakes fish annually, which was five times the commercial harvest in the upper Great Lakes. If Union Street Dam were removed allowing full connectivity to the Great Lakes, the implications could be lake wide owing to the volume of high-quality sea lamprey spawning habitat in the Boardman, the lack of homing in sea lampreys, and their high fecundity (each female can produce more than 100,000 eggs). If sea lamprey were allowed to infest the Boardman River, the U.S. Fish and Wildlife Service estimated that the cost of sea lamprey treatment with chemical lampricide TFM would be $600,000 every 2-4 years. Finally, it is highly unlikely that the bordering jurisdictions and fishery management agencies would tolerate access to the Boardman River by sea lampreys.

Misc. Response #4

Question #: 160

Response: A truly connected riverine system has direct benefits to our bays and the Great Lakes. This project provides ecological benefits which result in direct benefits to quality of life and to tourism. It is anticipated that regional, national and international attention will contribute to the local economy.

Misc. Response #5

Question #: 204

Response: Currently, there are no plans for a permit system to regulate use.

Misc. Response #6

Question #: 51, 101

Response: Safety inspections of the dam in 2008 and 2013 both reported that primary components of the dam (culverts) have reached the end of their design life and need to be repaired or replaced. While the design life of the culverts can be extended by re-lining them, the reports also recommended that complete replacement of the dam be considered. Furthermore, a new dam that passes flow passively without the need for gates would be preferred. Many recent repairs to the dam are only temporary and complete replacement remains the best option. The reports also recommended that the watermain located on top of the dam be relocated and all trees and shrubs currently growing on the dam and near concrete structures be removed. As time passes, the risk of dam failure, which would have catastrophic consequences for downtown Traverse City, increases.

Misc. Response #7

Question #: 115

Response: An intended benefit of the project is enhanced fishing and paddling opportunities.

Misc. Response #8

Question #: 143

Response: A listing of organizations that have expressed concerns is not included in the project overview because such a list is not pertinent. In fact, very few concerns have been raised over the course of the three-year public consultation and all of those have been successfully addressed by incorporating solutions to those concerns into the design, providing an explanation or rationale for decision making, or meeting face-to-face with those who raised the concerns. For example, early on in the project NMEAC raised a concern about contaminant movement into the system and the team responded by funding a contaminant movement study. Angler groups expressed concerns over potential effects on brook trout populations so the team responded by funding fish assessment and movement studies as well as a population genetic study to collect baseline data prior to the passage of any fishes above Union Street Dam. These studies have been designed to allow precise detection of change once fish are passed above Union Street and one major advantage of FishPass over other fish passage options is this it is completely adaptive enabling mangers to respond to such changes. Additionally, on the basis of 992 design suggestions solicited via two public open houses, the FishPass team incorporated public desires into the FishPass design and eliminated other options that were not desired. (See documentation at http://www.glfc.org/fishpass.php: October 10, 2017 - The FishPass team assisted the City of Traverse City in hosting an open house to seek public input on the design of FishPass; Read GLFC's Science Director Andrew Muir's op-ed in Traverse City Record Eagle about recent FishPass open house; View results from recent FishPass open house).

Misc. Response #9

Question #: 125

Response: While The Watershed Center does not have a position on FishPass, but provided the following comments: The Watershed Center has been involved in discussions over the years and has reviewed the latest plans. The center is encouraged by the use of live plantings in the riprap along the shore, the addition of in-stream habitat and large woody debris, pervious pavers in the parking lots, rain gardens or bioretention basins to capture and filter stormwater from the walkways and Union Street, the green roof on the research and education building, and the opportunities for learning about and connecting with the river and its history. The center's concerns about the project include the loss of mature trees along the shoreline, the need for more density and diversity of riparian vegetation, the current lack of a maintenance plan for the enhanced park, and the replacement of numerous mature trees with a reduced canopy. The center will continue to ensure the project complies with zoning regulations such as water setback requirements. The center will continue to engage with and provide feedback to decision-makers as the project progresses.

Misc. Response #10

Question #: 154

Response: Economic analysis on the benefits of FishPass to Traverse City has not been done. Economic studies tend to be expensive and we do not currently have funding, nor would it be a high priority for the project team. Data from the James P. Price weir on the lower Boardman show that as many as 10,000 people visit the site each year. The team anticipates that at a minimum 10,000 people would visit FishPass, but on the high end, it could be as many as 40,000, which is why the team will develop the site as a living laboratory featuring education and outreach.

Regarding the benefits to the Boardman River ecosystem, it is extremely difficult to estimate production potential of rivers associated with reestablishing connectivity, but we currently have several studies ongoing to collect baseline data to monitor and measure ecosystem change. Additionally, via the Great Lakes Restoration Initiative, the team has funded a project led by Michigan State University entitled "The Consequences of Connectivity." A major outstanding question regarding barriers and selective fishways is the extent to which connectivity needs to be restored to positively affect fishery production and ecosystem function. For example, is it favorable to allow unfettered access via barrier removal or selective passage that allows managers to precisely control the species and number of animals allowed access? Knowledge of how different species and numbers of those species affect population dynamics, population genetics, and fishery production in both rivers and their connecting lakes is critical to the operation of selective fish passageways. Further, fishery managers need to understand the circumstances (e.g., stakeholder desires, physical location of system, geography, hydrology, invasive species threats) under which selective passage provides an economically viable management alternative to barrier removal.

We have hired a PhD student from Michigan State University to achieve the following objectives. (1) modify and expand an existing operating model (Jones et al. 2009) to evaluate the economic and ecological tradeoffs of various connectivity scenarios including maintaining an existing barrier, removing a barrier, and providing selective passage and determining the optimal level of passage. These decisions balance the need to establish connectivity while minimizing access by invasive species, such as parasitic sea lamprey, to spawning habitat. We will model the effects of passage decisions on fishery production potential starting with a simple model including walleye and sea lamprey and then expand this exercise to include a greater range of the fish communities in both lakes and connecting rivers. This effort will be informed by field data that are currently and will continue being collected on fish movement and migration phenology. (2) Use structured decision making (SDM) to evaluate strategies and tactics for addressing questions about connectivity in the Great Lakes basin, using the Boardman River, Traverse City as a case study. While satisfying the two objectives will inform fish passage and connectivity evaluations throughout the Great Lakes basin, they will be directly applicable to developing an adaptive operational procedure for FishPass on the Boardman River, MI. Both project objectives are critical to the adaptive management framework established for FishPass. Results will provide fishery managers a robust framework to make tough decisions about barrier/connectivity options based on multiple competing viewpoints. A value-added result is that the modeling efforts will be directly applied in guiding FishPass operation in terms of the optimal level of connectivity to establish (i.e., numbers and species to pass). This project will be completed on December 31, 2023.

Misc. Response #11

Question #: 44

Response: The Lower Boardman River initiative will begin a process to discuss concepts for the Lower River soon. Those discussions and development of design concepts will be part of the overall conversation toward a unifying plan for the River. The plans include a boardwalk under the south side of the Union Street Bridge with a connection to the Union Street Bridge southwest staircase. Although Lay Park was not part of this question, it is worth noting that FishPass does not in any way touch or alter Lay Park.

Misc. Response #12

Question #: 72
Response: The TCDDA Board of Directors established in their strategic plan a priority to develop a unifying plan for the lower Boardman River. The city then requested that the plan encompass portions of the river that were not in the DDA's boundary but are within the Traverse City limits.

Misc. Response #13

Question #: 205
Response: The Lower Boardman River Initiative is a collaboration of interests aimed at developing a unifying plan for the lower 1.6 miles of River. The Leadership Team, which includes city representation, is discussing policies that reflect the input that has been received from over 1,000 individuals and organizations that have participated in the process to date. The unifying plan will include policy recommendations, but the nature and specificity of those recommendations have yet to be formulated.

Misc. Response #14

Question #: 208
Response: Dr. Ray J. White's comments on the Michigan DNR Fisheries Division's 2014 Draft Boardman River Assessment has not been formally presented to the Leadership Team; however, the FishPass team is aware of and has read Dr. Ray's comments.

Misc. Response #15

Question #: 209
Response: No.

Misc. Response #16

Question #: 50
Response: There is no evidence at this time concerning the destruction of bird and wildlife habitat and we welcome the provision of any Boardman River specific studies that show this as an issue for our consideration. Since this is a system that provides the option of no fish being passed, evidence of such issues can be effectively dealt with by stopping passage.

Misc. Response #17

Question #: 166
Response: Restoring connectivity would most importantly bring nutrients and energy to the river system that has been blocked for decades. This occurs by providing more miles of spawning habitat for migratory native species to use and by the river serving as an estuary area for young fish to live. These Boardman River fish produced fish will boost the local bay fish populations.

Operation and Maintenance

O&M Response #1

Question #: 9, 18, 31, 76, 90, 131

Response: An agreement on the operation and maintenance of FishPass is in preparation between the primary project partners: Michigan Department of Natural Resources, Grand Traverse Band of Ottawa and Chippewa Indians, City of Traverse City, and the Great Lakes Fishery Commission. The city is already responsible for the operation and maintenance of the existing dam. The new dam will require less onerous maintenance because there are no gates to exercise and trash racks to clear. The additional park amenities and increased green space will be the responsibility of the city. The operation and maintenance of the fish sorting channel and coordination of research activities will be overseen by the FishPass Advisory Board and implemented, on a day-to-day basis, by two permanent staff. Research will be collaboratively conducted by the FishPass Science Team made up of federal (e.g., USGS, USACE), state (i.e., DNR), and academic researchers.

Costs for FishPass operation and maintenance are not currently available, as the engineering design needed to be fully developed before the maintenance activities could be defined and costs quantified. An operation and maintenance (O&M) plan is currently under development. The O&M plan will be reviewed by the FishPass Advisory Board and a separate Memorandum of Agreement will be developed to establish each parties' responsibilities. Operational permits for water releases within the fish sorting channel will be subject to review by MI EGLE.

O&M Response #2

Question #: 34, 36, 156, 184, 193

Response: Once FishPass is fully optimized and functioning as a selective fishway (10-years), Operations and Maintenance plans will have been established, staff hired and trained, and agreements in place to operate the fishway. FishPass will likely be operated under a joint agreement between the City of Traverse City, the Michigan DNR, and the Grand Traverse Band of Ottawa and Chippewa Indians, and the Great Lakes Fishery Commission. Operation and maintenance of the dam and park elements are not expected to change after the 10-year optimization period. Because the final solution for selective fish passage is the end goal of the optimization period and how optimization is achieved is currently unknown, costs associated with long-term operation cannot be estimated at this time.

O&M Response #3

Question #: 114

Response: The sorting channel will have gates at its downstream entrance and paddlers will not be allowed to enter. Active work and experiments will be ongoing in the sorting channel paddling could interrupt this work and be a safety concern. Paddlers will have full access to the adjacent nature-like channel and a state-of-the-art kayak/canoe rail will be installed to facilitate portaging around the dam.

While initial research will emphasize selective upstream passage of fish, downstream passage is planned to be addressed at a later time. Regardless, fish will be able to move downstream safely through the fish-sorting channel, low-flow weir, or labyrinth weir.

O&M Response #4

Question #: 185

Response: The only fish that will be removed from the facility are sea lamprey, which will be euthanized with eugenol or shipped to The USGS Hammond Bay Biological Station for research use. This is the current fate of sea lamprey collected at all lamprey traps throughout the Great Lakes. Sea lampreys will not be stored on site. All other species will be released back downstream of the barrier, or desirable fish will be released upstream of the barrier to complete their lifecycle.

O&M Response #5

Question #: 130

Response: Once optimized for passage of desirable fishes and removal of non-desirable fishes, FishPass will become a functional fishway. Operations and Maintenance plans and agreements among the partners are currently being drafted by the FishPass Advisory Board and will serve to ensure the functionality of the site over time.

O&M Response #6

Question #: 187

Response: Yes. Reconfiguration of the facility is an option post-project as the city or project team desire.

O&M Response #7

Question #: 198, 200

Response: Once FishPass is fully optimized and functioning as a selective fishway (10-years),, Operations and Maintenance plans will have been established, staff hired and trained, and agreements in place to operate the fishway. FishPass will likely be operated under a joint agreement between the City of Traverse City, the Michigan DNR, and the Grand Traverse Band of Ottawa and Chippewa Indians, and the Great Lakes Fishery Commission.

O&M Response #8

Question #: 53, 104

Response: The city currently maintains the existing park and dam at Union Street. FishPass' planned labyrinth weir will require less maintenance than the existing dam structure. Additional maintenance for new larger footprint park and public restroom will be the responsibility of the city. Maintenance of the fish sorting channel and scientific building will be accomplished through an agreement (which is in process) between the City of Traverse City, the Michigan DNR, and the Grand Traverse Band of Ottawa and Chippewa Indians, and the Great Lakes Fishery Commission.

O&M Response #9

Question #: 132

Response: The city currently maintains the existing park and dam at Union Street. The labyrinth weir requires less maintenance than the existing dam structure. Additional maintenance for new larger footprint park and public restroom will be the responsibility of the city. Maintenance of the fish sorting channel and scientific building will be accomplished through an agreement (which is in process) between the City of Traverse City, the Michigan DNR, and the Grand Traverse Band of Ottawa and Chippewa Indians, and the Great Lakes Fishery Commission. The fish sorting channel does not have to operate to ensure that hydraulic needs of the river are satisfied, meaning that the nature-like bypass channel is designed to handle all of the hydraulic needs of the system.

O&M Response #10

Question #: 140

Response: The city currently maintains the Union Street dam and removal of floating debris is part of an ongoing effort by the city. A debris boom is included in the design to keep debris from fouling the FishPass structure, and some level of maintenance not exceeding the current efforts will likely be required.

O&M Response #11

Question #: 170

Response: The city is the owner of the park and will own the project when complete. The city cannot dictate navigable waters, that authority is held by the State and Federal governments.

O&M Response #12

Question #: 183
Response: Maintenance will be accomplished through an agreement (which is in process) between the City of Traverse City, the Michigan DNR, and the Grand Traverse Band of Ottawa and Chippewa Indians, and the Great Lakes Fishery Commission. Competent staff will be tasked with operations and maintenance. The City Parks Division currently maintains the existing park and dam at Union Street. The labyrinth weir requires less maintenance than the existing dam structure. Additional maintenance for new larger footprint park and public restroom will be the responsibility of the city.

O&M Response #13

Question #: 4
Response: Michigan Department of Natural Resources (DNR), the city, and the Grand Traverse Band of Chippewa and Ottawa Indians via a Memorandum of Understanding or Memorandum of Agreement. Decisions on fish species to be passed will be responsibility of DNR with input from our tribal partners and from all citizens of the state.

Public Engagement and Decisions

P.E. and Decisions Response #1

Question #: 8

Response: On September 6, 2016 the Commissioners adopted the Resolution of Intent to Serve as a partner in the Bi-directional Fish Passage Project at Union Street Dam. On January 3, 2017 the Planning Commission unanimously voted that FishPass is consistent with the City Master Plan.

P.E. and Decisions Response #2

Question #: 113

Response: On October 10, 2017, two open-houses were held at the Traverse City Governmental Center to obtain input about the design of FishPass, focusing on green space, infrastructure, and educational spaces. At the open-houses the FishPass team received 992 design suggestions and the team incorporated the public desires into the FishPass design (see documentation at http://www.glfc.org/fishpass.php: October 10, 2017 - The FishPass team assisted the City of Traverse City in hosting an open house to seek public input on the design of FishPass; Read GLFC's Science Director Andrew Muir's op-ed in Traverse City Record Eagle about recent FishPass open house; View results from recent FishPass open house). The design feature that garnered the most support through this process was inclusion of public restrooms, which are included in the research and education building. The FishPass team also engaged the Boardman River angling community through a two-night workshop on May 30-31, 2018. The first night, which was open to the public, generated an exhaustive list of angler concerns and issues regarding Boardman River fisheries. The items were synthesized and organized into ten categories by the FishPass team and discussed with angler organizations' leadership (i.e., Focus Group) on the second night of the workshop. The FishPass team also hosted an informational session prior to the MI DEQ Joint Permit Application public comment session on February 12, 2019. In addition to these large meetings, the FishPass team has participated in and has provided routine updates on the project at 48 local governmental meetings since 2016 with diverse audiences including: City and County Commissioners, Planning Commission, Parks and Rec Commission, Arts Commission, and the Boardman Implementation Team meetings. These meetings were all subject to the open meetings act and had public notices in advance. The team also has held more than 50 additional meetings or presentations with adjacent property owners (Central Methodist Church and River's Edge Condos), local organizations, local stakeholders, and students. The FishPass team actively sought public comment throughout each meeting and addressed as many comments as possible through the design and assessment plans.

The approximate cost for the kayak passage, educational plaza, and research and education building is $2M. Funding for these features is shared by the Great Lakes Fishery Commission, State of Michigan, and Great Lakes Restoration Initiative.

P.E. and Decisions Response #3

Question #: 61, 62, 64

Response: Dr. Andrew Muir, Great Lakes Fishery Commission Science Director, was the individual who initiated the FishPass project. The Great Lakes Fishery Commission is a not-for-profit Binational Treaty Organization serving the public and protecting the fishery as mandated by the 1955 Convention on Great Lakes Fisheries (http://www.glfc.org/pubs/conv.htm); therefore, neither the Commission nor Dr. Muir will profit from FishPass, nor will any of the FishPass project partners. The businesses of Traverse City stand to benefit if FishPass and the new greenspace attract people and provide better access and mobility through the downtown core than is currently available. The real winner would be the ecosystem through restored connectivity between the river, bay, and Lake Michigan and restoration of the historical energy and nutrient cycles while maintaining the ability to exclude non-desirable fishes, such as the invasive sea lamprey.

P.E. and Decisions Response #4

Question #: 137

Response: FishPass is fully funded and the 100% design is nearly complete. This process has unfolded over the course of three years and the funding has been timed to coincide with the completion of the 100% design. The project is scheduled to go out for bid in January 2020 and construction begin by mid-2020.

P.E. and Decisions Response #5

Question #: 80

Response: The public has had numerous opportunities to provide input into the design of FishPass and the resultant designs are not only better but also are reflective the citizens' values and desires. On October 10, 2017 two open-houses were held at the Traverse City Governmental Center to obtain input about the design of FishPass, focusing on green space, infrastructure, and educational spaces. The FishPass team also engaged the Boardman River angling community through a two-night workshop on May 30-31, 2018. The first night, which was open to the public, generated an exhaustive list of angler concerns and issues regarding Boardman River fisheries. The items were synthesized and organized into ten categories by the FishPass team and discussed with angler organizations' leadership (i.e., Focus Group) on the second night of the workshop. The FishPass team also hosted an informational session prior to the MI DEQ Joint Permit Application public comment session on February 12, 2019. In addition to these large meetings, the FishPass team participated in and provided routine updates on the project at 48 local governmental meetings since 2016 with diverse audiences including City and County Commissioners, Planning Commission, Parks and Rec Commission, Arts Commission, and the Boardman Implementation Team meetings. These meetings were all subject to the open meetings act and had public notices in advance. We also held over 50 additional meetings or presentations with adjacent property owners (Central Methodist Church and River's Edge Condos), local organizations, local stakeholders, and students. The FishPass team actively sought public comment throughout each meeting and addressed as many comments as possible through the design or assessment plans.

P.E. and Decisions Response #6

Question #: 10

Response: Currently the Union Street dam structure has only temporary means of blocking undesirable fish and no means of passing other fish species except for the currently blocked fish ladder. The FishPass project includes a new improved selective barrier for fish and will serve as a permanent barrier to sea lamprey, thus remedying some of the current observations and concerns about salmon passage through temporary structures.

P.E. and Decisions Response #7

Question #: 67

Response: The city has been a voting member of the Implementation Team since its creation. This is part of the overall Boardman River Restoration Project and the City Commission has been periodically updated throughout the planning process.

P.E. and Decisions Response #8

Question #: 195, 196

Response: In the process of negotiating easements for the project, all parties agreed to not permit storage of kayaks on the kayak landings. While the kayak launch is shifted upstream from its current location, the only space for onsite kayak parking is downstream of the amphitheater.

If there is activity that is outside the law or ordinances, the police or code enforcement should be notified and process followed.

P.E. and Decisions Response #9

Question #: 65, 66, 105, 110, 146

Response: As FishPass architects and engineers have pondered the design for FishPass and the immediate surrounding area, a wide range of river users, residents, and tourists will have a stake in the site and, therefore, have been consulted. The site has to offer opportunities and access a wide range of people while still serving as a fishery management facility.

The site itself will be vastly improved, aesthetically, from the status quo. The south bank will consist of a nature-like river channel while the north branch will feature an adaptive, selective fish sorting channel. Both the south and north river banks will be populated with native vegetation (including a net increase of trees); the north bank also will be vastly improved with the removal of scrub brush and the addition of some reclaimed land in the impoundment.

The Traverse City Planning Commission and City Commission have both found FishPass to be consistent with the city's master plan for parks and is designed to complement other initiatives such as plans for connecting walks to adjacent parks and properties, better kayak and canoe portage around the dam, more efficient parking, and the integration of the Boardman River and Grand Traverse Bay into the fabric of the TC-5 neighborhood.

To gauge the sentiments of the citizens of Traverse City, the City of Traverse City and the FishPass team (consisting of many local organizations) has participated in more than 130 meetings and events over the past three years to discuss FishPass with Traverse City's civic organizations, non-governmental organizations, condominium owners, businesses, clubs, and many other entities. The FishPass team has presented its goals and vision to elected officials at the county and city levels, and to the Downtown Development Authority.

In October, 2017, the team held an open house to obtain public input on FishPass design features. At that open house, which was attended by hundreds of Traverse City citizens, participants identified desirable features (e.g., a public restroom, observation areas, signage for self-guided tours, a fishing pier, native plants, places for education) and undesirable features (e.g., interactive screens, new parking, canoe storage, barbecue grills). The FishPass design considers the public's interest in the site and incorporates features that are most desired. The result will be a park-like setting where form meets function; where scientists can do their work and visitors can observe and interact with the scientists.

In May, 2018, many organizations gathered together to hold a two-day workshop to discuss issues regarding Boardman River fisheries. Approximately 80 members of local organizations attended to consider specifics concerning the passage of fish species, nutrient transfer in the Boardman River, and the capacity of boat passage at FishPass, among many other issues.

In February 2019, a public open house was held to consider comments about the joint permit application for FishPass and FishPass has been the topic of discussion at many other community events.

In addition to these large meetings, the FishPass team participated in and provided routine updates on the project at 48 local governmental meetings since 2016 including Commissioners, Planning Commission, Parks and Rec Commission, Arts Commission, and the Boardman Implementation Team meetings. These meetings were all subject to the open meetings act and had public notices in advance. We also held over 50 additional meetings or presentations with adjacent property owners (Central Methodist Church and River's Edge Condos), local organizations, local stakeholders, and students. The FishPass team actively sought public comment throughout each meeting and addressed as many comments as possible through the design or assessment plans.

On an ongoing basis, members of the FishPass team expect to engage with interested citizens and organizations as the project moves toward construction. Additional public engagement sessions will be held as opportunities arise.

P.E. and Decisions Response #10

Question #: 1, 2

Response: A team, not an individual, made the decision on FishPass / Union Street Dam modifications. Since inception, the Boardman River Implementation Team (IT) has considered solutions for Union Street Dam that account for invasive sea lampreys and enhanced fish passage. A local Sea Lamprey and Fish Passage Working Group was convened between 2012 and 2016 with the objective of identifying potential solutions for Union Street Dam that allowed passage of native fishes and exclusion of invasive sea lamprey. The plan was always to modify the lowermost dam (Union Street Dam) to provide functional connectivity to Great Lakes. Union Street Dam is a deteriorated structure that needs significant repair or replacement; it does not provide passage for any native fishes and is known to pass sea lampreys. The U.S. Army Corps of Engineers' final Detailed Project Report and Environmental Assessment for the removal of Boardman and Sabin Dams and the modification of Union Street Dam focused on the upstream passage of lake sturgeon via trap and transfer with passage downstream accommodated by a modified fishway at Union Street Dam. Since 2016, the vision for FishPass has been heartily embraced by the Sea Lamprey and Fish Passage Working Group and the IT as a solution for Union Street Dam, preferable to a single species trap and transfer. Below details the process and timeline for the decision by the IT, Michigan Department of Natural Resources (MIDNR), and the City of Traverse City to develop FishPass.

Site selection for the FishPass project was accomplished through a structured decision analysis. In April 2016, a project planning team was formed consisting of Great Lakes Fishery Commission (GLFC) staff, 8 fish passage and behavior experts, and 2 U.S. Fish and Wildlife Service (USFWS) sea lamprey biologists. The team generated a list of 17 site selection criteria (for simplicity combined into 13 criteria in Table 1 below). A total of twelve sites were considered during the decision analysis, including the Cheboygan River (MI), Manistique River (MI), Boardman River (MI), Bad River (MI), Whitefish River (MI), Little Manistee River (MI), Ocqueoc River (MI), Conneaut Creek (OH), Grand River (OH), Thunder Bay River (MI), Tittabawassee River (MI), and Saginaw River (MI). Each site was scored for each of the 17 criteria – those that met a criterion scored 3pts, somewhat met a criterion 2pts, and failed to meet a criterion 1 pt. Scores for each site were tallied, sites were then rank ordered, and the top six sites (i.e., Cheboygan, Ocqueoc, Thunder Bay, Boardman, Little Manistee, and Grand Rivers) were visited by members of the planning team during July 2016. During site visits, local DNR and USFWS biologists, and Dam operators were consulted. At the conclusion of this process, the Boardman River Union Street Dam site ranked highest based on the selection criteria and site visit because it was the right size for FishPass, provided appropriate hydraulic head, had a sea lamprey run that required frequent treatment, was a failing infrastructure, and the Boardman River Dams Project Implementation Team (IT) was seeking a solution for Union Street that allowed them to achieve the goal of restoring connectivity for native fishes. The other sites failed to meet many criteria and most of them had significant issues with respect to project timing, needs, and site specifications that made them illogical and infeasible options for FishPass. The Boardman River Union Street site received strong support as the FishPass project site from the Boardman River IT in July 2016, Michigan Department of Natural Resources in August 2016, and the City of Traverse City in September 2016.

P.E. and Decisions Response #11

Question #: 37

Response: Yes, FishPass, in conjunction with the entire Boardman River Restoration Project, is the best thing to do for the river ecosystem. To have the capacity to selectively allow native fish access to the Boardman River watershed, while preventing access to invasive or non-desired species, will provide an invaluable opportunity to restore (to the greatest extent possible) resilient, self-sustaining and ecologically appropriate aquatic communities for future generations to appreciate.

P.E. and Decisions Response #12

Question #: 122, 189
Response: The philosophy of seeking natural river function has never shifted and, in fact, was the very reason why the idea and impending reality of FishPass was pursued. Specifically, as intended in its conception and subsequent design, FishPass seeks to provide the capacity to selectively allow for native fish species access to the Boardman River watershed while preventing invasive or non-desired species access. FishPass will provide an invaluable opportunity to restore (to the greatest extent possible) resilient, self-sustaining and ecologically appropriate aquatic communities for future generations to appreciate. With the wholesale removal of Union Street Dam, which would allow for the "unnatural" invasion of sea lamprey and other noxious species, eliminated as an alternative, the development of FishPass as a solution to restoring "natural" aquatic connectivity for species native to the Great Lakes is a superior way to achieving a "naturally" functioning river and watershed.

Research

Research Response #1

Question #: 32, 91, 109

Response: The default operation of the FishPass facility is to function as a barrier to all fish, through a combination of vertical barrier, velocity, and lack of a downstream leaping pool. The primary mission of FishPass is aimed at sorting and selectively passing a mixed fish assemblage by predetermined categories of desirable and undesirable species by exploiting or overcoming differences in timing of movements into the river, behavioral, physiological (i.e., swimming ability), social, and morphological attributes/traits (e.g., size) of each fish at the individual and species-level. The exact method for achieving selective passage is not yet known and will be the focus of research at FishPass for at least the next 10 yrs. Research will be conducted in three phases: 1). Basic research, 2). applied research, and 3). extension.

The basic research phase will identify differences between desirable and undesirable fishes to prioritize/identify research (e.g., techniques or technologies) that is best suited to sort fish at FishPass. The applied research phase will attempt to determine how best to arrange and integrate different fish guidance, sorting, and passage technologies and techniques in FishPass, to determine the logical order of operations in terms of attributes fish are sorted on, and to understand sorting efficiencies, efficacies, and needed redundancies in operations to achieve acceptable levels of sorting. Water velocity barriers, light guidance, video shape recognition, naturally occurring chemosensory and alarm cues, and eel ladder style traps are just some technologies that could be integrated at the facility to sort fish. These technologies are derived from a plethora of research on fish passage and invasive species control, including technologies identified in the Great Lakes Mississippi River Interbasin Study Report for Brandon Road Lock and Dam (aimed at Asian carp and other invasive species prevention), and 50 years' worth of research on sea lamprey biology, ecology, and control funded by the Great Lakes Fishery Commission. Finally, the extension research phase will attempt to determine what metrics should be used to assess passage success, how might the efficacy of management actions be measured, how might long-term goals be managed during the research/optimization and long-term operational phase, what is the relationship between metrics of passage success and management outcomes, and how can resource user and local values be reflected in the management of FishPass.

Research Response #2

Question #: 49

Response: Contaminant movement is being studied as part of the current assessment plan. Due to similar concerns raised by the public early on in the project development, the Great Lakes Fishery Commission is funding a contaminant transfer study lead by Dr. Brandon Gerig at the University of Northern Michigan. Dr. Gerig will build upon his previous work on contaminants in Pacific salmonids in Michigan tributaries to study contaminants in a suite of Lake Michigan migratory fishes and assess the risk of contaminant transfer to resident fishes in the Boardman River prior to and following implementation of selective fish passage. Results from this study will help the Advisory Board determine appropriate target numbers of fish for upstream passage and informing the adaptive operation of FishPass.

Research Response #3

Question #: 58, 92

Response: The entire facility was designed to accommodate fish passage research below a barrier. The gates at the upstream end of the fish-sorting channel will be operated to maintain a barrier while passing water into the fish-sorting channel. The FishPass Science Team will formulate a directed plan of research to investigate different types and configurations of fish passage technologies to determine the most efficient means to sort fish. FishPass is an example of real-scale adaptive management in that scientists will conduct pre-construction surveys of fish numbers and habitat use above and below the facility to better understand the ecosystem, engineers will design and construct sorting channels to restore controlled connectivity where the barrier formerly existed, and researchers will apply treatments within the channel to optimize fish sorting and passage efficacy. Research activities will be greatest during the migratory period of fish (spring and fall), but other research and preparation for future studies will likely occur all year long. FishPass will have two dedicated science personnel to support research. Additional federal (e.g. USGS, USACE), state (i.e., DNR), and academic researchers will also be temporarily onsite to conduct research,.

Research Response #4

Question #: 56

Response: While sea lamprey can use their mouth to attach to surfaces, they are unable to climb out of the water on vertical surfaces. The risk of sea lamprey breaching a barrier by attaching to fish that can jump over barriers, and then successfully reproducing, is extremely low. Parasitic lamprey are not sexually mature and cannot reproduce. Sea lamprey that are undergoing maturation to spawn and migrate upstream under their own power will have stopped feeding and, therefore, are not likely to be attached to fish. The risk of reproduction due to this type of passage is also low because migratory fish that move during the fall, as most pacific salmonids do, does not match the migratory and spawning period of sea lamprey, which is typically between April and May in the Boardman River.

While the occurrence of sea lamprey attaching to migratory fish that are moving into a tributary is likely very low, we have considered this risk in the design and future operation of FishPass. The overall mission of FishPass is to develop and test new technologies and techniques that effectively sort fish, including the situation of sea lamprey attached to migratory fish. Computer visual recognition is just one approach we are developing now that could be able to identify parasitic sea lamprey. It is important to note that these techniques still need to be tested, and FishPass will provide the necessary infrastructure to do so safely and thoroughly. FishPass was designed so that all research will occur below a barrier to all fish passage. The new structure features a dam that will block all fish passage (much improved over the existing dam) and the fish sorting channels, where research will primarily occur, has a double head gate system such that we can adjust the upstream barrier to allow flow for testing, but prevent all fish passage. Only when all technologies have been fully vetted, risks identified, and all stakeholders consulted (in approximately 10 yrs after construction) might the gates be lowered and selective fish passage be initiated in the Boardman River; however controlled passage of some native fishes during the experimental phase may be warranted to address questions about movement, energy and nutrient dynamics, etc..

Research Response #5

Question #: 93

Response: The current Research Model for FishPass envisions three different types of research. First, an internal, core research program focused on selective fish passage will be directed and implemented by the FishPass Science Team. This research will primarily take place within the facility, but complementary laboratory research may be conducted as needed. Second, an external research program will support informational needs essential to the internal research program. The second research type is anticipated to be a mix of instream and laboratory research. The third type of research supported by FishPass will be for externally derived and funded research that simply seeks the use of the FishPass facility.

Research Response #6

Question #: 135

Response: The intent of the project is to develop an approach to exclude sea lamprey and selectively pass desirable fishes. Silver and Bighead (a.k.a Asian) carp are not a primary target for sorting as they do not reside in the Great Lakes. Should other invasive fishes pose a risk to the river, FishPass operations can be modified to selectively sort them out as well, but this will require additional study.

Research Response #7

Question #: 150

Response: The original option for fish passage at the Union Street Dam in the Army Corps of Engineers' Feasibility Study was to modify the dam to pass lake sturgeon in a downstream direction and block aquatic nuisance species from the Great Lakes from moving up the Boardman River. Upstream passage of lake sturgeon would then be achieved by trapping and transferring via truck to a location upstream of Union Street Dam. The only alternative to pass other species upstream, while continuing to block invasive species, would be a trap and transfer system where fisheries technicians physically sort through all fish and select those for passage or removal. Regardless of passage solution, the Union Street Dam would still require significant repair or replacement.

Research Response #8

Question #: 151

Response: In the Laurentian Great Lakes, there are 1007 lowermost barriers (i.e., the first structure that blocks fish passage within a tributary) that impact the movement of approximately 121 fish species known to exhibit some form of migration. The number of species impacted could be even higher as these barriers also block non-migratory movements as well. When fish passage is blocked by barriers, populations up- and down-stream can become genetically fragmented, fish are unable to access habitat necessary to complete critical stages of their life cycle, and areas upstream of the barrier can be starved of nutrients derived from migratory species (e.g., excretion, eggs, carcasses).

In the case of lake sturgeon, overexploitation and habitat degradation (including sediment pollution, barriers, destruction of spawning habitat, deteriorated water quality, and siltation) combine to be the primary drivers in their decline (see GLFC Miscellaneous Publication 2003-02). To precisely define the impact of barriers, alone, on lake sturgeon in the Great Lakes, a thorough scientific inquiry would be required. Regardless, overexploitation, habitat alteration and degradation (which includes barriers), and sea lamprey predation are considered the greatest remaining threats to lake sturgeon populations.

Addressing the impact of barriers on all fish communities, not just lake sturgeon, and aquatic ecosystems is a major concern for fisheries managers and driving force behind FishPass.

Research Response #9

Question #: 59

Response: Yes. Currently, the FishPass team provides monthly updates on data collection for ongoing monitoring and assessment activities. If anyone wishes to be included on our monthly e-update they can send a note to fishpass@glfc.org. Upon completion, results of all studies will be published either on the FishPass website (http://www.glfc.org/fishpass.php), in peer-reviewed journals, or as project completion reports to the Great Lakes Fishery Commission (http://www.glfc.org/glfc-publications-reports.php). As most of the projects are multi-year, and require analysis to achieve specific project objectives, annual reports are not generated. The FishPass Advisory Board will consider how best to provide an annual report on activities and progress.

Research Response #10

Question #: 41, 197

Response: FishPass does not "experiment" with the river, it experiments with technology. FishPass technologies will be tested and evaluated in contained channels below a complete barrier during the approximately 10-year optimization phase. The labyrinth weir (south bank) will operate as a permanent barrier to all fish while the fish-sorting channel headworks (north bank) will have redundant hydraulic gates that can be adjusted to block all or some fish passage depending on what species are deemed desirable for passage. The new structure will greatly reduce the risk of sea lamprey passage compared to the existing structure. The objective of FishPass is to block all sea lamprey and eliminate the need for lampricide treatments. If sea lamprey do infest the upper Boardman watershed, it will be treated by the Great Lakes Fishery Commission as is currently done when necessary. The Boardman River has been treated with lampricide seventeen times since 1963. Of those treatments, six have been above the Union Street Dam, with the most recent treatment in 2015.

Research Response #11

Question #: 57

Response: A Science Team that includes representatives from each project partner and external behavioral ecologists and engineers was assembled to generate an annual plan of research consistent with the FishPass Research Plan (See FishPass Documentation: http://www.glfc.org/fishpass.php). The Science Team will be actively engaged in science and will annually review assessment data and make recommendations on research activities, in accordance with the Research Plan, to the FishPass Advisory Board for final approval and implementation.

Research Response #12

Question #: 60

Response: Raw data can certainly be requested; however, requests will be considered on a case by case basis. Raw data are typically not provided by any science organization because they can easily be misused or misinterpreted by those not privy to the experimental design. Data processing, including organization, translation, standardization, validation (i.e., removal of outliers or obvious instrument reading errors), are first required before data can be used. Per institutional standards, certain conditions may also be placed on data to protect principle investigators and their students affording appropriate timeframes for analysis and publication as some data will be supporting MSc. or PhD projects.

Research Response #13

Question #: 94

Response: The FishPass team provides monthly updates on data collection for ongoing monitoring and assessment activities. If anyone wishes to be included on our monthly e-update they can send a note to fishpass@glfc.org. Upon completion, results of all studies will be published either on the FishPass website (http://www.glfc.org/fishpass.php), in peer-reviewed journals, or as project completion reports to the Great Lakes Fishery Commission (http://www.glfc.org/glfc-publications-reports.php). As most of the projects are multi-year, and require analysis to achieve specific project objectives, annual reports are not generated. That being said, the FishPass Advisory Board will consider how best to provide an annual report on activities and progress. We thank the person who raised this question for the excellent suggestion.

Research Response #14

Question #: 97

Response: The specific methods for fish sorting are currently being evaluated and designed by the FishPass Science Team. The Science Team comprises experts from North America and Europe in fish ecology, behavior, movement, fish passage, hydrology, and engineering. The Science Team will present annually a plan of research to be approved by the FishPass Advisory Board. The FishPass Research Plan (See FishPass documentation http://www.glfc.org/fishpass.php) outlines a three-phase approach that affords the opportunity for individuals to submit proposals to conduct research at FishPass. The request for proposal process also allows the Advisory Board to announce special research topics that they feel deserve external attention to solve particular problems. Comments and suggestion from the public are always welcome and continuously sought by the FishPass team. Please send any research or sorting recommendations to fishpass@glfc.org.

Research Response #15

Question #: 124

Response: A Science Team, which includes representatives from each project parities and external behavioral ecologists and engineers, was assembled to generate an annual plan of research consistent with the FishPass Research Plan (See FishPass Documentation: http://www.glfc.org/fishpass.php). The Science Team will be actively engaged in science and will annually review assessment data and make recommendations on research activities, in accordance with the Research Plan, to the FishPass Advisory Board for final approval and implementation. Science Team members include Frank Dituri (City of Traverse City), Paul Jacobson (Electric Power Research Institute), Thomas Pratt (Fisheries and Oceans Canada), Brett Fessell (Grand Traverse Band of Ottawa and Chippewa Indians), Heather Hettinger and Jay Wesley (Michigan Department of Natural Resources), Brandon Gerig (Norther Michigan University), Hans VanSumeren (Northwestern Michigan College), David Gondor (Ontario Ministry of Natural Resources), Paul Kemp (Southampton University), Andy Goodwin (U.S. Army Corps of Engineers), Jessica Barber (U.S. Fish and Wildlife Service), Theodore Castro-Santos and Nicholas Johnson (U.S. Geological Survey), Robert McLaughlin (University of Guelph), Wes Larson (University of Wisconsin Stevens Point), and Aline Cotel (University of Michigan). Additionally, Andrew Muir, Reid Swanson, and Daniel Zielinski (Great Lakes Fishery Commission) are ex-officio members of the Science Team. We do not have CVs for all members of the science team, but all of them are discoverable online.

Research Response #16

Question #: 63, 87, 88, 164

Response: The Great Lakes Fishery Commission is a public entity and strives to make fishery management methods and technologies freely available to management agencies who will put them to use. The commission does not use its research program (or any of its programs) to profit monetarily. The commission enters into contracts with researchers (a.k.a. "contractor") that clarify ownership and application of intellectual property. All data generated by the FishPass Science Team shall be published and shared among the Parties in a manner consistent with the duties of the GLFC under the 1954 Convention on Great Lakes Fisheries. All copyright interests in work products generated from research at FishPass are owned by the investigator but may be published, copied, used to create derivative works or compilations, or otherwise used in whole or in part by the Parties, or its agencies, units of the United States or Canadian governments, institutions, businesses or other entities cooperating with or supplying goods or services in furtherance of the goals and missions of FishPass provided that the investigator is acknowledged in any publication.

The engineering design for FishPass was produced by AECOM on behalf of the commission and is owned by the commission. It is specific to the Union Street Dam site.

The term "FishPass" is a title created by the commission and is in the public domain; it is used only to describe the project at the Union Street Dam site.

If the commission funds a project at FishPass, the following language would be standard in its contract:

A. In addition to the provisions of Paragraph 2, ownership of all intellectual property (as defined herein) including those protected under the laws of patents, copyrights, and trade secrets in any technical report, work product, photograph, drawing, plan, specification, model, prototype, pattern, sample, or other product, design, technical information, invention, ideas, results, method, or process ("Intellectual Property"), which is produced, conceived, developed or first actually reduced to practice solely by the Contractor in performing this Contract, shall vest in the Contractor. The Contractor will fully and promptly disclose in writing to the Commission any Intellectual Property mentioned in this Contract and disclose to the Commission full details of any patent application relating to such Intellectual Property 30 days prior to submitting said application to any governmental patent office. A record of all Intellectual Property mentioned in this Contract, whether created solely by the Contractor or in collaboration with the Contractor will be reported in the Contractor's completion report or, if produced after the Contract end date, will be reported by letter to the Commission. Any Intellectual Property developed jointly by employees or agents of the Contractor and by employees, agents or anyone having a duty to convey rights to such Intellectual Property to the Commission or its Cooperators, will be jointly owned by the Contractor and the Commission.

B. The Commission and its Cooperators shall have a royalty-free, perpetual, non-exclusive, worldwide license to make, have made, use, reproduce, disclose, modify, prepare derivatives, distribute, display, and publish any Intellectual Property for non-commercial purposes as defined in this Contract in furtherance of the goals and missions of the Commission and its Cooperators. The Commission and its Cooperators may secure the services of an independent vendor or third party worldwide in exercising the rights granted above for such non-commercial purposes of the Commission and its Cooperators.