



RESEARCH MODEL



ANDREW MUIR

Science Director, Great Lakes Fishery Commission

DANIEL ZIELINSKI

Principal Engineer/Scientist, Great Lakes Fishery Commission

MARC GADEN

Deputy Executive Secretary, Great Lakes Fishery Commission

**This is a living document and subject to change according to the FishPass Advisory Board*

CONTENTS

1. INTRODUCTION.....	3
2. RESEARCH TYPE	3
2.1. Core Research.....	4
2.2. Supplementary Research	5
2.3. External Research.....	5
3. FUNDING	6
4. ANIMAL CARE AND FISH HEALTH	6
5. RESEARCH PRIORITIES AND SCHEDULING.....	6

1. INTRODUCTION

The FishPass Advisory Board (Board) is composed of project managers, scientists, and engineers with representatives from, but not limited to, the Michigan Department of Natural Resources (MIDNR), U.S. Army Corps of Engineers (USACE), City of Traverse City (TC), Grand Traverse Band of Chippewa and Ottawa Indians (GTB), U.S. Fish and Wildlife Service (USFWS), U.S. Geological Survey (USGS), Fisheries and Oceans Canada (DFO), and collaborating academic institutions and will generate a program of research in accordance with the FishPass mission. Great Lakes Fishery Commission (GLFC) staff will serve as ex-officio members to the Board to help develop, conduct, and monitor research activities at FishPass. Publication and dissemination of research results will be a requirement for all research activities and will be coordinated by the GLFC in collaboration with relevant participating agencies (see publication guidelines below). Board membership will include a Core Group of voting members (one representative from USACE, USGS, USFWS, GTB, TC, MIDNR, and DFO) and non-voting Science Team (10-15 members representing each participating organization and highly qualified, invited external researchers). Per the Charter, the Core Group will be responsible for managing FishPass business, operations and maintenance, and funding, while the Science Team establishes and proposes to the Core Group the scientific direction and an annual plan of research. The Science Team also implements the annual plan of research through the onsite assistance of GLFC staff. The FishPass Operation and Maintenance Plan outlines the specific roles and responsibilities of all personnel. GLFC staff also serve as ex-officio members of the Science Team. Specific roles of each Board group and guidelines of participation are detailed in the Advisory Board Charter.

2. RESEARCH TYPE

The research model is comprised of three types (Table 2-1). **Core research** is an internal research program directed and implemented by the Science Team and aligned with the FishPass mission to address project objectives. Due to the fixed timeframe for results and collaborative nature of the Science Team, Core research will not follow a request for proposal (RFP) process or competition—rather, the core program of science will be a consensus-based collaboration. **Supplementary research** supports the information needs essential to Core research. The Science Team will determine when and if a request for proposal (RFP) for Supplementary research is required. The intent of Supplementary research is to capture innovative solutions not identified by the Science Team, complementary to Core research, and addressing key uncertainties or novel methods. Finally, **External research** provides FishPass usage coordination to externally generated and externally funded research where investigators request use of the facility.

Table 2-1. Summary of FishPass supported research types. Entities eligible for each type are identified along with source of funding, purpose, and decision-making process.

	Core research	Supplementary research	External research
Entity:	Science Team*	Internal and external researchers**	Internal and external researchers**
Funding:	FishPass internal funding	FishPass internal funding	External funding
Purpose:	<ul style="list-style-type: none"> Directed research aligned with FishPass mission and objectives. Continuous optimization of a sorting system to remove sea lamprey and pass desirable fishes. Research themes and specific questions to be generated by the Science Team. 	<ul style="list-style-type: none"> Request for proposal issued as needed. Generate innovative research that supports Core research. Research may be conducted either in or outside of the FishPass facility 	<ul style="list-style-type: none"> Research requesting use of the FishPass facility. Does not interfere with Core or Supplementary research. Approved by the Science Team and Core Group. Provides compensation for facility use.
Decision making process:	<ul style="list-style-type: none"> Science team reviews prior year results and develops updated plan by consensus. Plan reviewed by external panel of experts. Reviewed plan recommended to Core Group for implementation and funding allocation. 	<ul style="list-style-type: none"> Science team develops an RFP to address a specific problem or solicit unique ideas. Science team reviews proposals and makes recommendations to the Core Group for funding. 	<ul style="list-style-type: none"> Proposals for external research are sent to GLFC staff and reviewed by the Science Team. Decisions on facility use, scheduling, and required compensation are made by the Core Group.

*All Science Team members will be partners on development and implementation of the annual science plan; roles and responsibilities will be determined annually through the Science Team coordination meetings and according to the publication guidelines herein.

**Science Team and Core Group Advisory Board members can submit for Supplementary and External research, but will be excused from the Board review process.

2.1. CORE RESEARCH

The Science Team will collaboratively develop a preliminary experimental design for selective fish passage focusing on key species as determined by the Science Team and approved by the Core Group. The preliminary experimental design is to be implemented after FishPass construction is completed. The preliminary experimental design will be based on hypotheses regarding: (1) what are the sortable attributes of fish at FishPass and how can they be used to promote passage of desirable fish and block and/or remove undesirable fish in the Boardman River and (2) how can technologies and techniques that exploit or overcome sortable attributes be improved or used synergistically to direct, sort, assess, and manage (pass or remove) fish moving in a river. This preliminary design will be modified annually on the basis of the previous season results and incrementally improved to achieve the desired selective capacity over a 10-yr optimization period. This research will provide information needed to fully achieve bi-directional, selective fish passage in the Boardman River consistent with the FishPass Research

Plan. This research shall be developed by the Science Team and implemented by Science Team members with assistance of GLFC staff. If expertise outside of the Science Team is needed to formulate or conduct the program of science, the Science Team may invite external researchers to participate. Core research shall be assessed annually and experimental approaches and/or specific technologies will be modified based on previous year results.

The development and implementation of core research activities will follow an annual review process outlined in Section 5. The Science Team will meet annually in a two-day retreat format to formulate specific research questions and themes to modify the experimental design in each subsequent year. This plan will be reviewed by the Core Group for formal acceptance. Research activities shall primarily be conducted during peak sea lamprey migration (March-July). The Science Team will reconvene (remotely or in person as needed) to review preliminary results, provide an update to the Core Group, identify potential adjustments/modifications for the following year research cycle, and identify any needs for external research to be conducted through a request for proposals (RFP).

2.2. SUPPLEMENTARY RESEARCH

Supplementary research supports a request for proposal (RFP) process that identifies novel and innovative research projects that support informational needs essential to Core research, but not explicitly an objective of the annual science plan. Supplementary research projects are nested within the overall experimental design and are hypothesis-driven experiments designed to address specific basic research needs to further improve the theory and development of selective passage. Areas of research to be targeted in the RFP will be identified by the Science Team. This research can be basic or applied in nature and conducted at an external site or within the FishPass facility. RFPs for external research will be issued as needed.

The Science Team will review research proposals for consistency with FishPass needs, feasibility, and scientific merit, and where necessary seek external peer-review. The Science Team will then provide recommendations to the Core Group for funding. Members of the Science Team may submit Supplementary research proposals, but will be excluded from the review process. Unlike Core research, projects funded through Supplementary research may run for 1-3 years.

2.3. EXTERNAL RESEARCH

External research accommodates FishPass facility use by externally funded research projects. Facility use requests will be directed to the Science Team and Core Group for review, fee schedule (TBD), and coordination into the annual plan of research. Requests that do not interfere with Core and Supplementary research and represent novel and innovative science that FishPass facilities are uniquely suited to accommodate will be considered. Proposals submitted to GLFT or GLFC research boards that request use of the FishPass facility will be directed to the Board to coordinate facility use or possible Supplementary funding. Researchers are strongly encouraged to seek approval from the Advisory Board prior to submission of grant proposals requiring use of the facility. Fees for the use of the facility must be negotiated and/or received at least one month prior to commencement of approved projects.

3. FUNDING

A plan for funding Core research has yet to be developed and is considered work of the Core Group. The distribution of Core research funding will be driven by the annual experimental design and roles agreed upon by consensus of the Science Team and approved by the Core Group. Core and Supplementary research funding will be administered by the GLFC. Science Team members are encouraged, and will be supported by GLFC staff, to seek external grants to support Core and Supplementary research.

4. ANIMAL CARE AND FISH HEALTH

All research proposals must satisfy the appropriate review panel(s) for care, holding, transportation, and treatment of animals and follow appropriate standard operating procedures. All state and federal rules and regulations must be followed while using chemicals and drugs for disinfection and/or disease treatment. All research must adhere to the care protocols of their respective institutions.

5. RESEARCH PRIORITIES AND SCHEDULING

The GLFC with advisement from the Board will be responsible for coordinating, scheduling, and overseeing an annual program of research at FishPass. Figure 5-1 details the anticipated schedule of events surrounding decisions on core research activities, RFP process, and critical community events that may impact site access and fidelity of research.

While Core and Supplementary research will be given priority, the timing and length of research activities will be coordinated to best utilize the facilities and accommodate External research. Requests for FishPass facility use by Advisory Board members will be given priority over external requests. During December Board meetings, space and facility use estimates for the upcoming year will be posted to an online Google Calendar and linked to the FishPass web page (<http://www.glfc.org/fishpass.php>). The Board will be responsible for submitting Part 301: Inland Lakes and Streams permits to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) covering planned research activities and water diversions to the fish sorting channel.

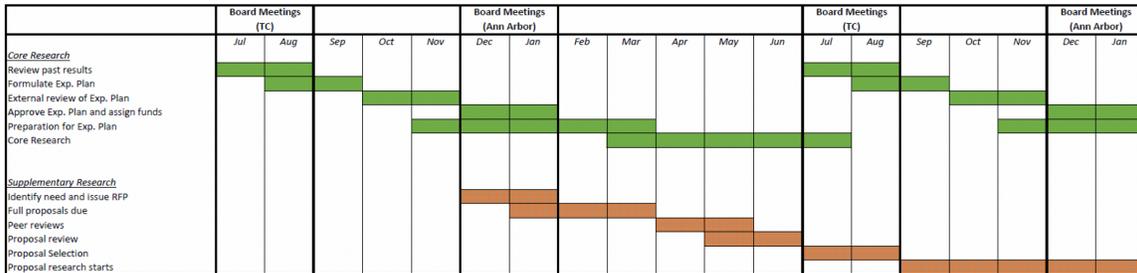


Figure 5-1. Timeline for research activities supporting Core and Supplementary research.

ABOUT FISHPASS

FishPass is the capstone of a ~20y restoration project on the Boardman (Ottaway) River, Traverse City, Michigan, re-connecting the river with Lake Michigan. FishPass will replace the deteriorating Union Street Dam with a new, complete barrier to all fish that will have the ability to sort and selectively pass desirable fishes while blocking harmful invaders like sea lamprey. While fully automated selective passage is the long-term goal of the project, passage of any fish during the initial 10-yrs will be coordinated with fishery management agencies, limited in number, and restricted to fishes native to the upper Great Lakes.