# Woodland Fish Passage Project

# Project Overview and Roles and Responsibilities

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**Verdantas Project No:16667**
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# 1. Introduction

This document provides an overview of the Woodland Fish Passage Project (Project), describes the fishway designs and ancillary components and presents the roles of the Project Team entities in implementing construction. Each Team member has defined responsibilities and reporting requirements to advance the goal of constructing the project in accordance with the Contract Documents. The State of Maine's Department of Marine Resources (Maine DMR) contracted Verdantas (formerly Alden) as the design engineer for the Project.

## 1.1 Description of Project Site and Existing Structures

The Woodland Dam is located within the Woodland Pulp papermill in Baileyville, Maine, and spans the St. Croix River, which serves as a 68-mile international boundary between the United States and Canada in eastern Maine. This river has a drainage area of 1,631 square miles at its mouth, where it flows into Passamaquoddy Bay. Constructed in 1906, predating the Federal Power Act, the Woodland Dam is a concrete gravity structure founded on bedrock and authorized through Congressional Authorization rather than Federal Energy Regulatory Commission (FERC) licensing. The dam facility comprises a powerhouse, headworks, principal and emergency spillways, process water intake, and a fishway. Its total length, including spillways, is approximately 1,910 feet, with the dam structure itself measuring 730 feet long and 48 feet high. The main spillway is equipped with five manually operated Tainter gates, each measuring 6 feet by 12.5 feet. The emergency spillway, divided into Canadian and American sections, includes flashboards supported by steel frames, which are manually installed and removed. A 250-foot low concrete training wall below the dam separates flow to either side of an island in the downstream channel.

The right abutment of the dam's American side includes a non-overflow section known as the hydraulic wall, measuring 795 feet in length, with a maximum height of 37 feet and a crest width of 5 feet at an elevation of approximately 145.6 feet (North American Vertical Datum of 1988, NAVD 88). Adjacent to this section are the headworks and powerhouse, which house seven turbine-generator units essential for plant operations. The dam infrastructure directly supports significant operational facilities for Woodland Pulp. The Project site also includes a 730-foot-long Denil fishway, which was installed in 1966. This fishway primarily serves to facilitate the upstream of migratory fish. An aerial view of the project is shown on Figure 1.

Figure 1. Aerial Photograph of Woodland Dam

## 1.2 Description of Proposed Project

The purpose of the proposed project is to provide improved upstream and downstream passage for migratory fish, primarily Alewives, Blueback Herring, American Shad, and American Eel. A new fish lift will be constructed on the island with an entrance near the existing Denil fish ladder entrance. The existing Denil ladder will be demolished and replaced with new fishways. The fish lift will transport fish from the tailrace to an elevated exit flume connected to the head pond.

A new fish ladder with an entrance at the downstream end of the island was included in the design but has been recently removed from the construction scope. The fish ladder was intended to extend upstream adjacent to the spillway channel and connect to the fish lift exit channel. Downstream bypasses within the intake were also designed to connect to a new steel flume attached to the downstream side of the intake above the powerhouse and transport fish via an elevated pipe to the tailrace, discharging adjacent to the fish ladder entrance. The portions of this bypass system that connected to and ran in parallel with the fish ladder have also been removed from the construction scope and will be redesigned.

A second bypass will be located at the downstream end of the fish lift exit flume and discharge adjacent to the fish lift entrance. A new bridge has been designed to cross the tailrace to accommodate access to the island for construction, if elected, and for future operations and maintenance. An overview of the proposed facilities is provided on Figure 2; refer to the Design Plans for detailed delineation of components that are no longer in the construction scope or are considered at Maine DMR's option. Descriptions of major project components follow.

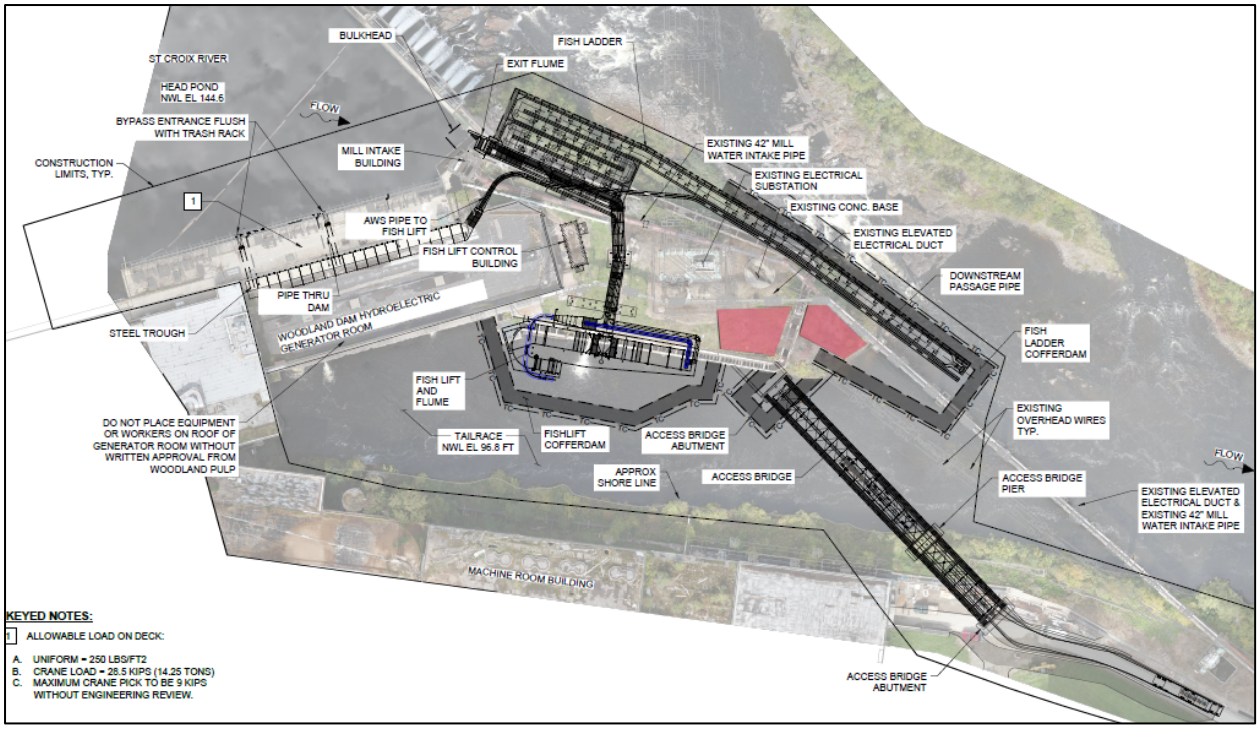



Figure 2. Woodland Fish Passage Project, Overall Site Plan (showing proposed cofferdams)

### 1.2.1 Fish Lift

The fish lift consists of an 8-foot-wide, 20-foot-long concrete entrance channel that turns 180 degrees and increases in width to 14 feet. The entrance channel includes an isolation gate and a hinged flap gate that adjusts with tailwater level to maintain a constant entrance velocity. The 14-foot-wide concrete channel is 114 feet long with a top wall elevation of 110 feet and a bottom elevation of 88.5 feet. The channel includes a V-gate, a hopper recessed below the channel, isolation gates, and flow conditioning baffles, sills and weirs upstream of the hopper. Flow enters the channel from three supply pipes at the upstream end of the channel. The hopper is 490 cubic feet in volume and is lifted via a hoist to a discharge elevation of 146 feet. A steel superstructure with a top elevation of 178 feet supports the hopper hoist and lift and includes access stairs and walkways. A three-dimensional view of the fish lift is shown on Figure 3.

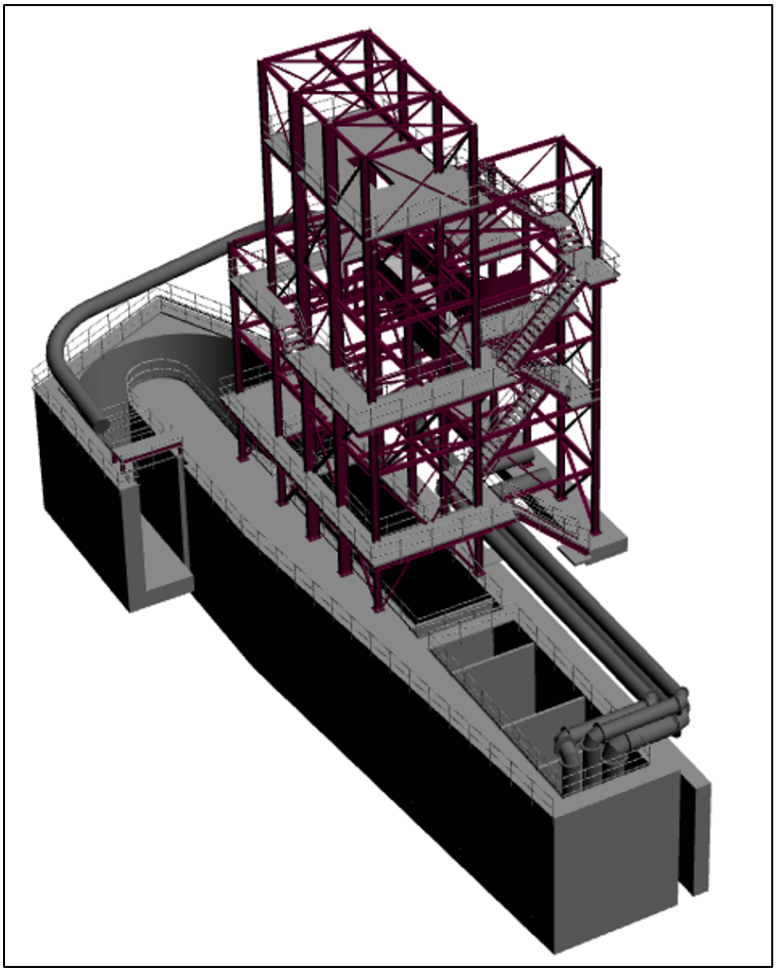


Figure 3. Fish Lift Isometric View

### 1.2.2 Fish Lift Exit Flume

An exit flume provides egress above the dam for fish lifted from the tailrace by the hopper. The exit flume is 8 feet wide and 10 feet high with a bottom elevation that varies from 137.4 feet at the tower to 135.2 feet at the head pond. The steel portion of the flume extends from the tower approximately 90 feet where it was designed to meet the fish ladder and transitions to an elevated concrete flume for approximately 110 feet to the head pond. The concrete portion of the exit flume includes a crowder to guide fish to a viewing window in the concrete wall of the flume. A wedgewire screen auxiliary water intake, 8 feet wide by 20 feet long, is located within the floor at the upstream end of the flume.

### 1.2.3 Downstream Fish Bypass Systems

Two downstream bypass entrances are included at the hydropower intake within a new 0.750-inch clear spaced trash rack (by others). Each entrance opening is 3 feet wide and 6 feet high, flush within the new rack, and transitions to a 36-inch diameter pipe that is routed through the headwall and dam into a steel trough attached to the dam above the powerhouse. These components are referred to as Fish Bypass 3 in the construction drawings. Additionally, three

circular eel bypasses, each 6 inches in diameter, are routed from the intake rack through the headwall and dam into the same steel bypass trough. The three eel bypasses are plumbed so that each can be isolated and backflushed with a submersible backwash pump located within the bypass trough. The steel bypass trough runs along the dam for 160 feet to a flow control weir and then transitions to a pipe routed 380 feet to a discharge point adjacent to the fish ladder entrance. This bypass pipe is referred to as Fish Bypass 1 in the construction drawings. A portion of the bypass trough and Fish Bypass 1 have been removed from the construction scope and will require redesign due to the removal of the fish ladder.

A second downstream fish bypass system is located at the end of the fish lift exit flume on the fish lift tower. The exit flume terminates at a flow control weir and transitions to a 36-inch diameter steel pipe. The bypass pipe is routed around the tower with a discharge near the fish lift entrance and is referred to as Fish Bypass 2 on the construction drawings.

### 1.2.4 Auxiliary Water System

Water is supplied to the fish lift entrance channel for attraction flow via the auxiliary water system (AWS). The system is comprised of three separate supply pipes and intakes. The systems are referred to as AWS Pipes 1, 2, and 3 on the construction drawings.

AWS Pipe 1 includes an 8-foot-wide by 20-foot-long intake screen on the floor of the fish lift exit flume at the upstream end near the head pond. The intake transitions to a 30-inch steel pipe and runs below the fish lift exit flume for approximately 260 feet to the upstream end of the fish lift entrance channel.

AWS Pipe 2 intake is 5.5 feet wide by 14.5 feet long, starts at an intake screen on the floor of the steel bypass trough and runs under the fish lift exit flume for approximately 267 feet to the upstream end of the fish lift entrance channel. This pipe is a 24-inch diameter steel pipe, has been removed from the construction scope, and will require redesign due to the removal of the fish ladder.

AWS Pipe 3 intake is 8 feet wide by 10 feet long, starts at an intake screen near the Fish Bypass 2 flow control weir at the end of the fish lift exit flume. This 24-inch diameter pipe runs along the fish lift tower for 95 feet to the upstream end of the fish lift entrance channel. All three AWS pipes include butterfly valves to modulate flow.

### 1.2.5 Fish Ladder

A pool and chute fish ladder located on the north side of the island with an entrance just downstream of where the existing mill water piping crosses the tailrace was included in the design but has been removed from the construction scope. The fish ladder is comprised of pools that are 8 ft wide by 8 ft long with a normal water depth of 4.75 ft and a drop of 9 inches from pool to pool. A sloping weir, 2 ft wide by 2.5 ft long, separates each pool with a normal depth through the weir of 21 inches. The fish ladder includes an entrance gate overflow weir that adjusts with the tailwater level to maintain a constant velocity. The fish ladder extends upstream along the north side of the island for approximately 650 ft at a 9.375% slope and connects with the fish lift exit flume, with a total of 65 pools. An adjustable overflow weir gate is located at the top of the ladder where it

connects to the fish lift exit flume to control flow. The fish ladder is reinforced concrete construction, and the top half of its length is elevated and supported by concrete columns.

### 1.2.6 Bridge

The Project includes a new access road and a 13.5-foot-wide prefabricated bridge, both of which are considered work at Maine DMR's option to provide access to the island if the Contractor does not elect to use them during construction. The bridge crosses the tailrace with two spans: 160 feet and 67 ft, with a pier at the edge of water on the shoreside bank.

### 1.2.7 Equipment and Control Building

The Project includes a 12 feet by 30 feet prefabricated equipment building to house electrical and control systems and the air backwash cleaning system for the wedgewire intake screens. The building will also include a workspace for fishway monitoring and controls.

## 1.3 Construction Schedule

Construction of the proposed facilities is expected to begin in 2025 and was estimated to be substantially complete within approximately 24 to 30 months including the fish ladder. The schedule and sequence of tasks will be impacted by the removal of the fish ladder from the scope and will ultimately depend on the means and methods proposed by the selected Contractor and accepted by Maine DMR, the Engineer, and Woodland Pulp LLC. The Woodland Mill has an annual maintenance outage (AMO) for the paper mill each year, typically occurring in May. During the AMO, construction may need to be reduced and/or suspended and will be coordinated with Woodland Pulp to minimize impacts to Woodland's AMO activities. The AMO for 2025 was scheduled for May 10 through May 25.

## 1.4 Permitting

The permits for the Project are summarized in the table below. Several other international, federal, state, and local environmental regulations have reviewed, and those requirements either do not apply or are being fulfilled by the permits listed below.

| Permit | Description | Current Status | Anticipated Timeline |
|---|---|---|---|
| USACE<br>Pre-construction Notification | Federal requirement for work in navigable waterways over certain thresholds. | Submitted 10/4/24, under USACE review, awaiting verification | 1/31/25 |
| Maine Historic Preservation Commission Notice | Notification as part of USACE PCN. | Complete – No effect correspondence received 11/4/24 | NA |
| Maine Tribal Historic Preservation Office Notice | Notification as part of USACE PCN. | Complete | NA |
| IJC St. Croix R Bd of Control review | Not required. | NA | NA |
| National Environmental Policy Act (NEPA) | NOAA will prepare. Sturgeon BA prepared & submitted to NOAA. | In preparation | Jan. 2025 |
| Maine Waterways Development & Conservation Act permit | State requirement for and Water Quality Certification for construction, reconstruction or structural alteration of a hydropower generating project. | Submitted 10/28/24, under MEDEP review, awaiting permit | Feb. 2025 |
| Baileyville Building Permit | Town building permit | Application submitted, awaiting scheduling for town bd mtg. | Feb. 2025 |

# 2. Definition of Staffing Responsibilities

The Project Team and Stakeholders includes the following list of entities and their corresponding roles and responsibilities. The Maine DMR is implementing the project and will execute the contract for construction services. Woodland Pulp owns the property, will provide site access and ultimately will retain ownership of the project once it is constructed. Section 2.10 provides an organizational chart for the Project Team.

- Project Lead and Implementation Lead
  - Maine Department of Marine Resources (Maine DMR)
- Property Owner
  - Woodland Pulp, LLC
- Design Engineer
  - Verdantas LLC (formerly Alden)
  - Design subconsultants
- Construction Oversight Administration Support
  - On Point Construction Services LLC
- Contract Support for Construction Oversight
  - The Nature Conservancy
- Technical Support
  - Maine DMR
  - National Oceanic and Atmospheric Administration Fisheries (NOAA)
  - U.S. Fish and Wildlife Services (USFWS)
  - USGS, S.O. Conte Research Laboratory
- Stakeholders
  - State of Maine
  - NOAA
  - USFWS
  - Passamaquoddy and Peskotomuhkati Tribes
  - Department of Fisheries and Oceans, Canada
  - International Joint Commission of the St. Croix River

## 2.1 Project Lead: Maine DMR

The Maine DMR will assume the following responsibilities:

- Contract administration with General Contractor
- Review weekly and monthly progress reports
- Process any change order requests from the Contractor
- Process payment requests from the Contractor
- Issue stop work orders based on adverse quality conditions or safety concerns
- Manage communication with Stakeholders
- Mediate Owner, General Contractor or Stakeholder issues that may arise as needed

## 2.2 Property Owner: Woodland Pulp LLC

Woodland Pulp is the property owner and assumes the following responsibilities:

- Provide site access to General Contractor, Project Team, and Stakeholders
- Attend weekly progress meetings with Contractor as needed
- Provide mill schedules and identify potential impacts on Project work
- Coordinate mill activities with Project activities
- Recommend stop work orders due to adverse impacts to business operations or safety concerns

## 2.3 Construction Oversight Administration Support: On Point Construction Services (On Point)

On Point will assume the following responsibilities:

- Support Maine DMR with the administration of the General Contractor contract
- Manage submittals and requests for information (RFIs) from the General Contractor
- Hold weekly progress review meetings with the Contractor, Owner and Design Engineer
- Provide weekly progress reports from the Contractor
- Review any change order requests from the Contractor
- Review payment requests from the Contractor

## 2.4 Design Engineer: Verdantas LLC (formerly Alden)

As the project's design engineer, Alden's primary role is to oversee construction to ensure it aligns with the approved design and to address any technical questions from the parties involved. The design engineer's responsibilities include any duties and responsibilities assigned by On Point and the following:

- Conduct periodic observation of construction at critical milestones to confirm construction is in general conformance with the approved construction plans and specifications.
- Report any observations of nonconformance with contract drawings and specifications to On Point and Maine DMR.
- Prepare weekly and monthly inspection and progress reports.
- Conduct observations of forms, reinforcing, and concrete placement to evaluate conformance with the approved design plans
- Intermittently observe the collection of concrete samples.
- Review shop drawings and submittals from the Contractor for conformance with the approved construction drawings and specifications.
- Respond to Contractor/vendor questions, clarifications, and requests for information as supplied by On Point.
- Provide Maine DMR, Woodland Pulp, and On Point with copies of all field observation reports prepared after each site visit for the purposes of observing construction.
- Manage weekly construction oversight, providing weekly monitoring, observation and recording of all project activity.

- Make recommendations to On Point to stop work due to adverse quality conditions or safety concerns.
- Review all Quality Control and Inspection Plan (QCIP) reports and test results.

The electrical and controls design was prepared by Electrical Consultants Inc. (ECI). ECI will review all submittals and RFIs related to the electrical and controls design.

Kleinschmidt Associates (KA) prepared the design of intake modifications that include a new narrow spaced bar rack and stop logs to dewater the hydropower intakes. This project may be contracted separately. Verdantas will coordinate with KA as needed where the two projects interface.

## 2.5 The Nature Conservancy

The Nature Conservancy (TNC) is providing contracting and project management support to Maine DMR for the construction oversight of the project. TNC will execute a contract with Verdantas to provide engineering support and weekly onsite oversight of construction. Verdantas will execute a contract with On Point to provide Construction Management for the project.

## 2.6 National Oceanic and Atmospheric Administration (NOAA) Fisheries

NOAA is a major funder for the project with grants issued to Maine DMR and the Passamaquoddy Tribe. NOAA will track progress, provide technical support and will conduct periodic site inspections.

## 2.7 Passamaquoddy Tribe

The Passamaquoddy Tribe is a project partner and a recipient of grant funding from NOAA to contribute to the design and construction of the Project. The Passamaquoddy Tribe will also provide technical support.

## 2.8 United States Department of Interior

USFWS is a major funder and USGS Conte Lab is providing engineering support. USFWS will track progress and USFWS and USGS will conduct periodic site inspections.

## 2.9 Stakeholders

The stakeholders for the Woodland Fish Lift Project are responsible for funding and overseeing the project. While these organizations will not participate in daily construction activities, they retain the right to monitor progress. To facilitate this, each stakeholder will receive monthly progress reports with opportunities to review and provide feedback.

Should any stakeholder have questions or concerns regarding the construction process, they should contact the Maine DMR. The Maine DMR will then communicate these inquiries to either

the Design Engineer or the Construction Management team, ensuring that appropriate actions are taken to address their input.

## 2.10 Project Team and Contact Information

**Woodland Pulp LLC (Property Owner)**

| | | |
|---|---|---|
| John McAuliffe<br>*Engineering Manager and Reliability Excellence Facilitator* | john.mcauliffe@igic.com | Cell: (207) 512-6088<br>Office: (207) 427-4051 |

**Verdantas LLC (Design Engineer)**

| | | |
|---|---|---|
| Gregory Allen, PE<br>*Project Engineer* | gallen@verdantas.com | Cell: (508) 344-3530<br>Office: (508) 500-6202 |
| Mark Graeser, PE<br>*Project Engineer* | mgraeser@verdantas.com | Cell: (303) 548-3648<br>Office: (509) 956-4965 |

**On Point Construction Services (Construction Oversight Administration Support)**

| | | |
|---|---|---|
| Kieth Locke<br>*Co-Owner of On Point* | klocker@onpoint.com | Cell: (413) 355-3105 |

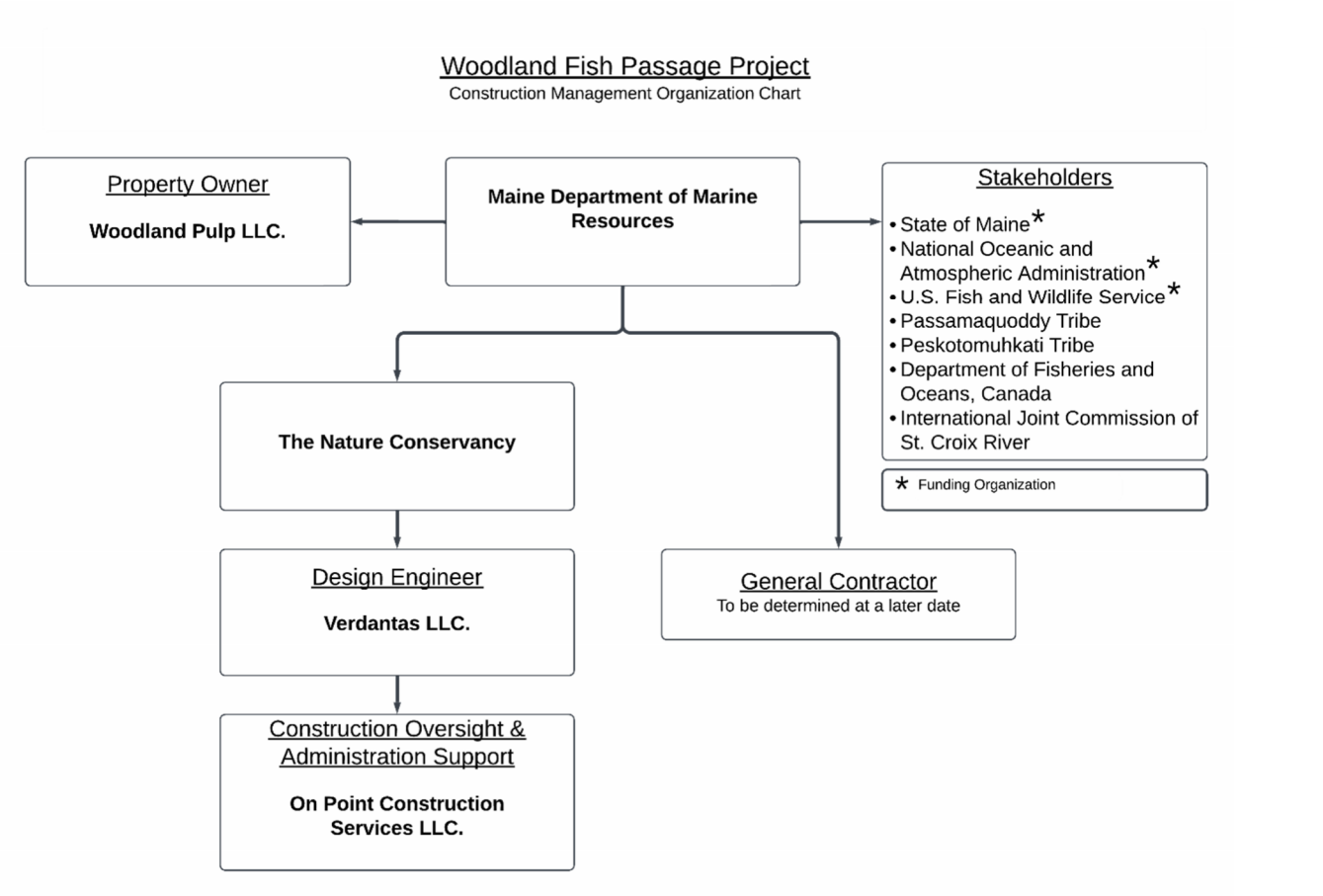
**Maine Department of Marine Resources (Project Manager and Stakeholder)**

| | | |
|---|---|---|
| Sean Ledwin<br>*Director, Bureau of Sea-Run Fisheries and Habitat* | sean.m.ledwin@maine.gov | Cell: (207) 530-6000<br>Office: 207-530-6000 |

**National Oceanic and Atmospheric Administration (Stakeholder)**

| | | |
|---|---|---|
| Donald Dow III, PE<br>*Hydrology and Fish Passage Engineer* | donald.dow@noaa.gov | Cell: (207) 416-7510<br>Office: (207) 866-8563 |

**Passamaquoddy Tribe (Stakeholder)**

| | | |
|---|---|---|
| Ralph Dana<br>*Multi Media Specialist, Sipayik Environmental Department* | ralphdana@wabanaki.com | Cell: (207) 214-9244<br>Office: (207) 853-5155 |

# 2.11 Organization Chart