

Elizabeth A. Boepple, Esq.
eboepple@mpmlaw.com
(207) 523-8215

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Sean R. Turley, Esq.
sturley@mpmlaw.com
(207) 523-8202

Sent by email to: selectmen@townofjonesport.com

Jonesport Board of Appeals
70 Snare Creek Lane
Jonesport, ME 04649

Re: *Appeal of Kingfish Maine's Application (#800) to the Town of Jonesport Planning Board to Construct and Operate an Industrial Facility in the Rural Residential District and Shoreland Zone*

Dear Jonesport Board of Appeals:

This firm serves as counsel to Protect Downeast, a membership-based organization that represents a diverse coalition of Jonesport residents and business owners and their allies in nearby communities who oppose the industrial aquaculture farm (hereinafter the “**Industrial Aquafarm**”) Kingfish Maine (“**Kingfish**”) proposes to build and operate on property it acquired in the Town of Jonesport (“**Town**”) on Natt Point, which is addressed as 9 Dun Garvin Road and identified by the Town on Tax Map 8 as Lot 23 (the “**Property**”). We also represent the following members of Protect Downeast, who join Protect Downeast as parties to this appeal: Cynthia Beauvais and Karl Ebert, Owen Moody, and Carrie Peabody. (The parties to this appeal will be referred to collectively as Protect Downeast in this letter.)

On November 29, 2022, the Town’s Planning Board approved with conditions the application dated June 30, 2022 submitted by Kingfish (the “**Application**”) seeking authorization under the Town’s Land Use and Development Ordinance (“**LUDO**”) and Shoreland Zoning Ordinance (“**SZO**”) to construct and operate the Industrial Aquafarm (the “**Decision**”).¹ Protect Downeast appeals the Decision on the grounds set forth below and requests that the Board of Appeals (“**BOA**”) vacate the Decision and remand this matter to the Planning Board with instructions to deny the Application.²

¹ The purported grounds for the Decision are contained in two separate documents: the “Land Use and Development Ordinance Findings & Conclusions” (the “**LUDO Findings**”) and the “Shoreland Zoning Ordinance Findings & Conclusions” (the “**SZO Findings**”). Protect Downeast objected—and continues to object—to the Planning Board reviewing the Application in two parts as if it were issuing two separate permits to Kingfish—one under the LUDO and the other under the SZO. Kingfish filed a single application for the Industrial Aquafarm, which the Planning Board approved. Kingfish did not apply for multiple permits through multiple applications.

² This letter is Protect Downeast’s answer to the fifth prompt on the “Application for Administrative Appeal to the Board of Appeals,” which asks a party filing an appeal to describe the facts relevant to the appeal; identify and explain the grounds for the appeal; and notify the BOA of the action the party requests that the BOA take to remedy the error committed by the Planning Board. Protect Downeast acknowledges the instruction in the SZO for the party filing an appeal to file a written statement that is “concise.” SZO ¶ 16.G.3.2. Protect Downeast represents that in light of the complexity of this matter; the months of proceedings dedicated to discussing the Application; the hundreds of pages of evidence in the record,

I. Standing and Jurisdiction

A. Standing

Protect Downeast has standing to file this appeal on behalf of its members, who have been aggrieved by the Decision.³ The term “aggrieved party” is defined in the SZO to include, among other classes of parties, “any other person or group of persons who have suffered a particularized injury as result of the granting or denial of such permit [under the SZO].” The Supreme Court of Maine, sitting as the Law Court, has interpreted nearly identical language to mean that a party has standing to file an appeal if that party (a) participated in the underlying proceeding⁴ and (b) has suffered a particularized injury as a result of the municipal action taken during that proceeding.⁵ A “particularized injury” occurs when the administrative action “adversely and directly affect[s] [the] party’s property, pecuniary or person rights” and that harm is “in fact distinct from the harm experienced by the public at large.”⁶ However, a “high degree of proof of a particularized injury” is not required for a party to possess standing to appeal.⁷ When the appellant is an organization, that organization has standing if (a) it participated in the underlying proceedings and (b) at least a single member of the organization alleges that he or she will suffer a particularized injury that would confer standing on that individual.⁸

Protect Downeast was an active participant in the Planning Board’s review of the Application through the testimony and written submission of its members and through the extensive commentary and analysis provided by its counsel. Protect Downeast’s concerns for its members and the fishing community of Chandler Bay and Englishman’s Bay that will be especially and particularly harmed by the Industrial Aquafarm is well documented in the record.

The individuals joining Protect Downeast in this appeal, like many other members of Protect Downeast, have standing on the following grounds:

- Carrie Peabody is a member of Protect Downeast who will be directly and negatively impacted by the Industrial Aquafarm. Carrie Peabody’s family would be damaged on many fronts if the Kingfish facility moves forward. Her husband provides significant income to her family through his lobstering and clamming business. The potential for pollution and increased nitrogen

including a 432-page application submitted by Kingfish; and the number of written submissions filed with the Planning Board, this letter is as concise as possible to alert the BOA to the key issues it must resolve on this appeal.

³ LUDO § 9.E (“The [BOA] may, upon written application of an aggrieved party and after public notice, hear appeals from determinations of the Planning Board . . . in the administrative of the [LUDO].”); SZO § 16.G.3.1 (“An administrative . . . appeal may be taken to the [BOA] by an aggrieved party from any decision of . . . the Planning Board.”).

⁴ “Participation may be formal or informal, in person or through an attorney, and it does not demand that the party have initiated the municipal proceeding for which appellate review is sought.” *Norris Family Assocs., LLC v. Town of Phippsburg*, 2005 ME 102, ¶ 16, 879 A.2d 1007 (quotation marks and citations omitted).

⁵ *Friends of Lincoln Lakes v. Town of Lincoln*, 2010 ME 78, ¶ 11, 2 A.3d 284.

⁶ *Nergaard v. Town of Westport Island*, 2009 ME 56, ¶ 18, 973 A.2d 735.

⁷ *Anderson v. Swanson*, 534 A.2d 1286, 1288 (Me. 1987)

⁸ *Friends of Lincoln Lakes*, 2010 ME 78, ¶¶ 13–15, 2 A.3d 284; *New England Herald Dev. Group v. Town of Falmouth*, 521 A.2d 693, 696 (Me. 1987).

levels would harm his business, including through the Industrial Aquafarm's impact on the clam flats that are directly outside the Peabody's home. Additionally, the significantly increased truck traffic from the Industrial Aquafarm that will pass directly in front of the Peabody home will decrease the value of their property.

- Owen Moody is member of Protect Downeast who will be directly and negatively impacted by the Industrial Aquafarm. Owen Moody's business is as a clam digger and lifelong lobsterman in Chandler Bay and Englishman's Bay. The potential pollution from the Industrial Aquafarm will have direct and negative impacts to both clam seed and lobsters and will lead to destroying the environment and the lobstering and clamming economy. Mr. Moody's individual business will suffer and cause economic harm to his family.
- Cynthia Beauvais and Karl Ebert are members of Protect Downeast who will be directly and negatively impacted by the Industrial Aquafarm. Ms. Beauvais' and Mr. Ebert's home, located at 533 Mason Bay Road, will have a direct and unobstructed view of the Industrial Aquafarm as well as the intake and discharge pipes reaching into Chandler Bay. Ms. Beauvais and Mr. Ebert are in the business of owning and renting properties, including properties on Chandler Bay overlooking Natt Point. The significant increase in truck and other related traffic; industrial noise and the discharge of pollution directly into Chandler Bay will result in a direct and negative financial impact on their business and devalue their property. Additionally, the economic harm the Industrial Aquafarm will inflict on Ms. Beauvais' and Mr. Ebert's tenants, most of whom are engaged in the local fishing and marine harvesting industry, will in turn have a direct, negative impact on Ms. Beauvais and Mr. Ebert finances. Thus, Ms. Beauvais' and M. Ebert's quiet enjoyment of their home as well as their financial well-being will be directly and negatively impacted by the Industrial Aquafarm.

Because Protect Downeast, Carrie Peabody, Owen Moody, and Cynthia Beauvais and Karl Ebert qualify as "aggrieved parties" of the Decision, they individually and collectively have standing to pursue this appeal before the BOA.

B. Jurisdiction

The BOA has jurisdiction over this appeal by virtue of section LUDO § 9.E and SZO § 16.G.1.a. Section 9.E of the LUDO provides as follows:

The Board of Appeals may, upon written application of an aggrieved party and after public notice, hear appeals from determinations of the Planning Board . . . in the administration of [the LUDO]. Such hearings shall be held in accordance with State laws.⁹

⁹ LUDO § 9.E.

This letter, with the accompanying application form, constitutes a “written application of an aggrieved party” for the BOA to hear an appeal of a “determination[] of the Planning Board,” thereby invoking the BOA’s jurisdiction over this appeal.¹⁰

Similarly, SZO § 16.G.1.a provides the BOA the authority to hear appeals of decisions reached by the Planning Board involving the provisions of the SZO:

The Board of Appeals shall have the following powers: . . . To hear and decide appeals where it is alleged that there is an error in any order, requirement, decision, or determination made by, or failure to act by, the . . . Planning Board in the enforcement or administration of [the SZO].¹¹

Because Protect Downeast challenges the Planning Board’s determination that Kingfish satisfied the applicable provisions of the SZO, the BOA has jurisdiction over this appeal.

II. Procedural History

A. *The Application and State Permits*

Kingfish first filed a skeletal application for the Industrial Aquafarm with the Planning Board on October 1, 2021. In an October 19, 2021 meeting, the Planning Board tabled Kingfish’s application until such time as Kingfish obtained the state permits it needs to proceed with the Industrial Aquafarm from the Maine Department of Environmental Protection (“**DEP**”), including:

1. A Maine Pollution Discharge Elimination System (“**MEPDES**”) permit,
2. A Natural Resources Protection Act (“**NRPA**”) permit, and
3. A Site Location and Development Act (“**SLODA**”) permit.

As of October 2021, Kingfish had received its MEPDES permit, which was issued on June 25, 2021 (the “**Discharge Permit**”). On November 12, 2021, the DEP issued Kingfish permits under NRPA (the “**NRPA Permit**”) and SLODA (the “**SLODA Permit**”), both of which are currently subject to an appeal before the Superior Court.¹²

¹⁰ LUDO § 9.E.

¹¹ SZO § 16.G.1.a.

¹² The fact that the NRPA Permit and SLODA Permit are subject to appeals means that Kingfish’s rights in those permits have not vested. *NECEC Transmission LLC v. Bureau of Parks & Lands*, 2022 ME 48, ¶ 42, -- A.3d --, as revised (Sept. 8, 2022) (clarifying that an applicant’s rights in a permit do not vest until it is “final and not subject to direct or further appeal”). Even if these permits were final, the Town has an independent duty to determine whether or not the Application satisfies the standards in the LUDO and SZO. In fact, the validity of the permits issued to Kingfish by the DEP depend on Kingfish complying with all other laws, including local ordinances:

Compliance With All Applicable Laws. The application shall secure and comply with all applicable federal, state and local licenses, permits, authorizations, conditions, agreements and orders prior to or during construction and operation, as appropriate.

Despite receiving the NRPA Permit and SLODA Permit in November 2021, Kingfish did not submit a complete application to the Planning Board until June 30, 2022.

The Planning Board voted to find the Application complete on July 19, 2022 and held its first of several public hearings on the substance of the Application on August 2, 2022.¹³

B. The Planning Board's Review of the Application

The Planning Board held only two hearings on Kingfish's compliance with the LUDO, the first on August 2, 2022 and the second on August 25, 2022. The Planning Board then voted on August 25, 2022 to find that the Application had satisfied the standards in the LUDO. Protect Downeast, along with several members of the public, participated in those public hearings and provided testimony and legal argument in opposition to the Industrial Aquafarm, including the arguments raised in this appeal. On November 29, 2022, the Planning Board adopted the "Land Use and Development Ordinance Findings & Conclusions" (the "**LUDO Findings**") as the grounds for its conclusion that the Industrial Aquafarm satisfies the LUDO.

The Planning Board held four public hearings on whether the Industrial Aquafarm complied with the standards set forth in the SZO between September 1, 2022 and October 20, 2022. Protect Downeast actively participated in those hearings, pointing out to the Planning Board the evidence in the record that the Industrial Aquafarm violates several provisions in the SZO and that Kingfish's failure to satisfy those standards compelled the Planning Board to deny the Application. The Planning Board did not vote on October 20th to find that the Application complied with the SZO; instead, the Planning Board closed the public hearing on that day and then convened on November 29, 2022 to vote to adopt the "Shoreland Zoning Ordinance Findings & Conclusions" (the "**SZO Findings**").

III. Facts

A. The Facilities on Natt Point

Kingfish proposes to construct and operate a recirculating aquaculture system ("**RAS**") on the Property, which is 93 acres,¹⁴ in order to grow **6000–8000 tons** of yellowtail kingfish on an annual basis.¹⁵ Kingfish intends to use the portion of the Industrial Aquafarm located upland not only as a "broodstock" and "hatchery" for yellowtail kingfish for but also for "processing and shipping" of the fish to market:

NRPA Permit at 15. Kingfish has argued throughout these proceeding that the Town should simply defer to the DEP and abdicate its responsibility to decide for itself whether Kingfish satisfies its ordinances. This argument has no merit and must be rejected by the BOA.

¹³ The LUDO Findings and SZO Findings suggest that a public hearing was held on July 19, 2022 on the Application. That is false. The Planning Board only considered whether the Application was complete at that meeting and did not take public comment.

¹⁴ NRPA Permit at 1.

¹⁵ Application at 24.

The facility would hatch, grow, and process fish in newly constructed buildings. Operations will be conducted indoors, in staged growth tanks that develop the fish from egg to market size. It will support growth of the fish through its life cycle, from egg to production size. Broodstock and juvenile fish operations, as well as specific feed growing operations will be focused in one building, Building 1. The rest of the growth period and processing and shipping will be in the primary building (Building 2). The onsite operation would also perform associated work, including maintenance of broodstock, growing of specialized feed sources for the fry developmental stage, and water quality and biological health monitoring. Ancillary buildings and structures and tankage is planned for food, chemicals, water supply and wastewater treatment from the operation.¹⁶

The Property is located in the Rural Residential District (“**RRD**”) and subject, in part, to the Shoreland Overlay Zone (“**SZ**”).¹⁷

The scale of the Industrial Aquafarm is staggering. The buildings, roads and other structures Kingfish proposes to construct on the Property would have an impervious surface area of approximately 21.9 acres.¹⁸ The construction of the Industrial Aquafarm will impact 261,196 square feet of freshwater wetlands, including 64,004 square feet of wetland of special significance.¹⁹ The largest building on the Property—the “grow-out facility”—is 422,465 square feet, or approximately 9.7 acres, by itself. The adjacent “hatchery & broodstock facility,” which is dwarfed by the “grow-out facility,” is 64,380 square feet, or approximately 1.5 acres.

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¹⁶ Application at 24.

¹⁷ The SZ applies to the portion of the Property within 250’ of the normal high-water line of Chandler Bay. SZO § 3.

¹⁸ NRPA Order at 1.

¹⁹ NRPA Permit at 1.



Figure 1: A portion of the “Site Plan” included in the Application, which has been desaturated. A color overlay and text has been superimposed thereon to highlight the locations of the “hatchery & broodstock facility” (in red) and the “grow-out facility” (in orange).



Figure 2: Schematic of the “hatchery & broodstock facility” and “grow-out facility” in the Application. The buildings collectively occupy approximately 11 acres of the Property. Lines and text have been superimposed thereon to show the measurements in feet for the sides of the “grow-out facility.”



Figure 3: Schematic depicting the Industrial Aquafarm from the perspective of Chandler Bay.

Kingfish did not include any schematics or building plans depicting the interiors of the buildings it proposes to construct on the Property in the Application. But it did include the following depiction

of the first floor of the “grow-out facility” in its application for a MEPDES permit to the DEP, which hints at the massive, industrial scale of the Industrial Aquafarm.²⁰

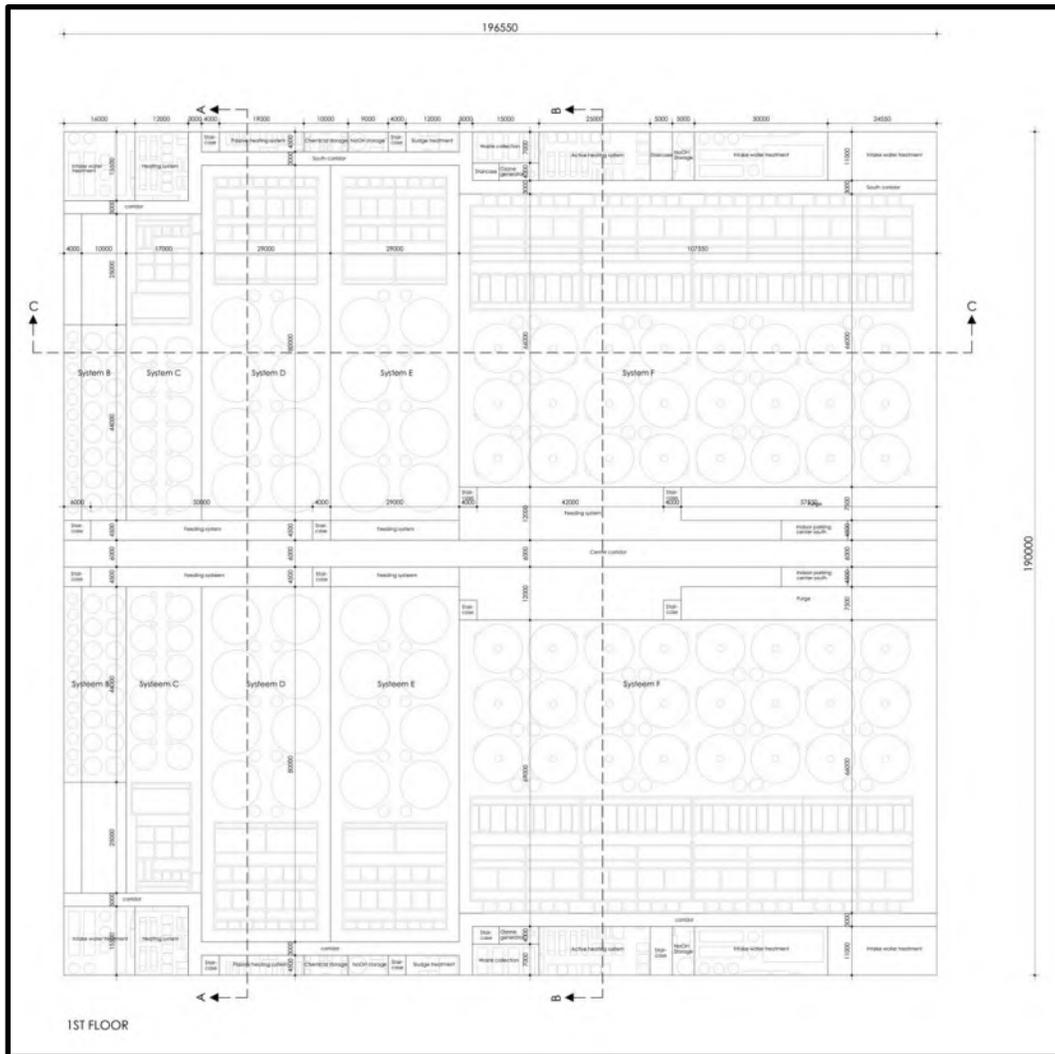


Figure 4: Schematic for the “First Floor” of the “grow-out facility.” The brightness and contrast has been adjusted from the original schematic to enhance visibility.

During the course of the proceedings before the Planning Board, Kingfish submitted a video recording of a tour of Kingfish’s facility in the Netherlands. Although that facility is much smaller than the proposed Industrial Aquafarm, the industrial nature and scale of Kingfish’s operations is still apparent.

²⁰ Kingfish provided this diagram to the DEP in its application for a MEPDES permit dated July 8, 2020 (the “**Discharge Application**”) on page 97. The Discharge Application is attached as Exhibit A.



Figure 5: Screenshot from “Tour of Zeeland Facility” video provided by Kingfish to the Planning Board.²¹



Figure 6: Screenshot from “Tour of Zeeland Facility” video provided by Kingfish to the Planning Board.

²¹ The video is available at <https://vimeo.com/753925571/adad1e70dc>.



Figure 7: Screenshot from “Tour of Zeeland Facility” video provided by Kingfish to the Planning Board.

As Dr. Dave Santillo informed the Planning Board in his letter²² dated 6 July, 2022 recounting his visit to Kingfish’s Zeeland facility:

The “take-home” key observation for me is that it has the feel of a state-of-the-art wastewater treatment facility that happens to produce fish. The area of the facility dedicated to waste treatment far exceeds that dedicated to fish production.

What Kingfish proposes to build, then, on the Property are massive industrial structures primarily for the processing and treatment of wastewater associated with the raising and selling of yellowtail kingfish.

B. The Intake and Outtake Pipes

Extending from the Property into Chandler Bay would be two intake pipes measuring approximately 1,400’ in length and two outtake pipes, which are 2,800’ long and 4’ in diameter.²³ The construction of these pipes will have a direct impact on 7,136 square feet of coastal wetlands.²⁴

²² Protect Downeast provided Dr. Santillo’s letter to the Planning Board as an attachment to its letter dated October 17, 2022.

²³ NRPA Permit at 1.

²⁴ NRPA Permit at 1.

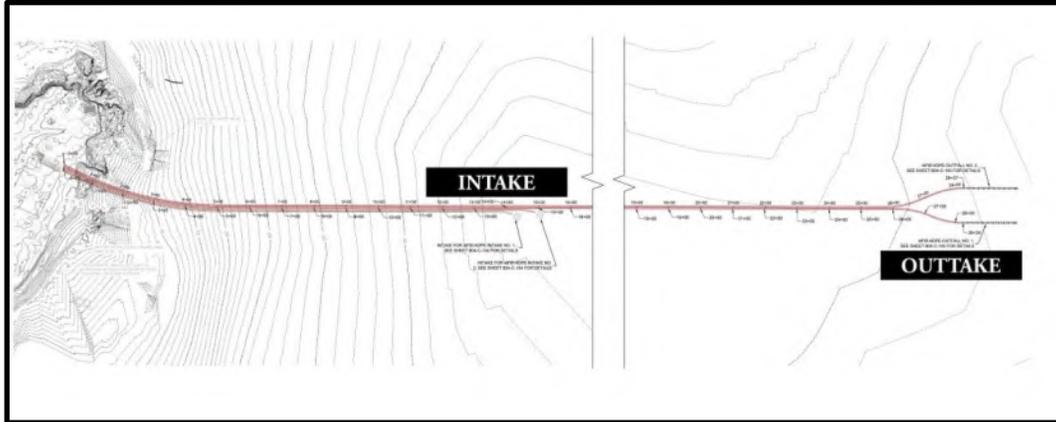


Figure 8: Portion of “Intake Piping Plan” depicting the intake and outfall pipes extending from the Industrial Aquafarm. A color overlay has been superimposed thereon to show the outfall pipes in red and the intake pipes in orange.

The openings to the two intake pipes are located ~1400’ and ~1500’ into Chandler Bay. At those spots, there are two massive, 14’-tall intake structures that extend upward from the sea floor. Kingfish proposes to take in **19,812 gallons** of seawater from Chandler Bay **per minute** through those pipes.²⁵

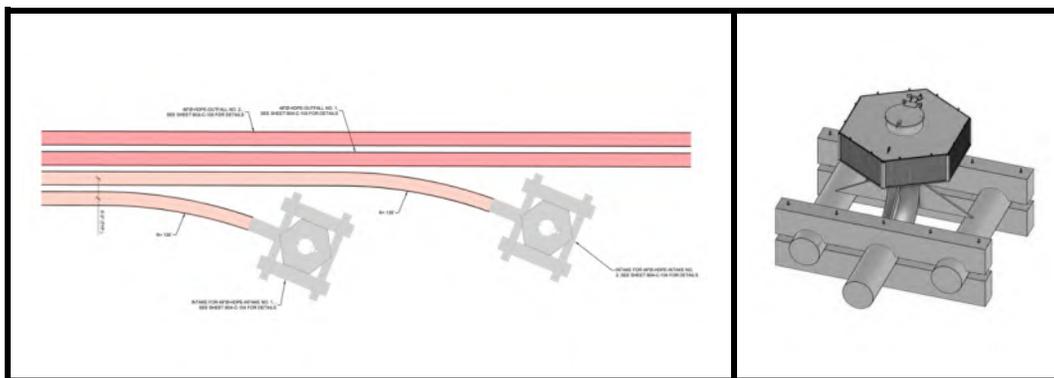


Figure 9: Portion of “Intake Plan” (left) and schematic showing “Intake Structure” (right). A color overlay has been superimposed on the “Intake Pipe” to show the outfall pipes in red, the intake pipes in orange, and the intake structures in gray.

More than three-quarters of this seawater will pass through “heat exchangers” while the remainder will “be filtered for medium and fine solids” and used as part of the hatchery operation.²⁶

²⁵ The “Final FACT SHEET” attached to the Discharge Permit (“the “**Fact Sheet**”) at 3.

²⁶ Fact Sheet at 3.

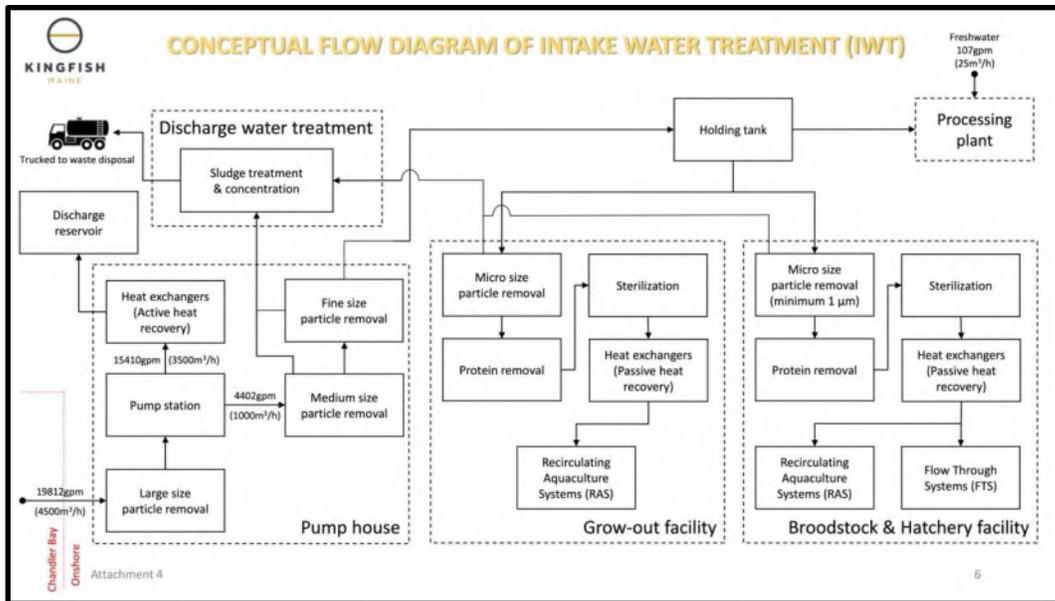


Figure 10: “Conceptual Flow Diagram of Intake Water Treatment (IWT).”²⁷ The diagram depicts, starting in the lower-right corner, the intake of 19,812 gallons per minute (19,812gpm) into the facility from Chandler Bay, which then flows into either (a) heat exchangers (15,410gpm) or through a series of filters (4,402gpm) before entering the “Grow-out facility” or the “Broodstock & Hatchery facility.”

The water used as part of the fish-growing operation will then be discharged back through the outtake pipes into Chandler Bay after passing through a mechanical filtration system and “Outfall Diffuser[s].”²⁸

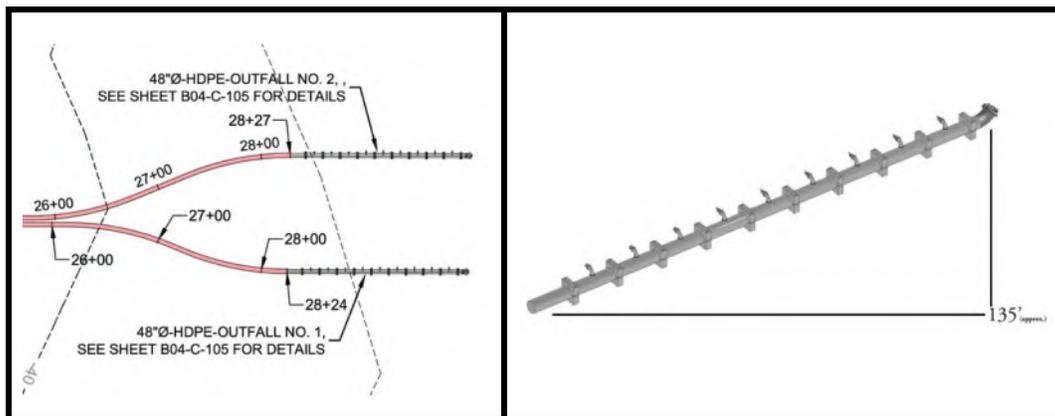


Figure 11: Portion of “Intake Piping Plan” (left) and schematic showing one of the two “Outfall Diffuser[s]” (right). A color overlay has been superimposed on the “Intake Piping Plan” to show the outfall pipes in red.

²⁷ Discharge Application at 34.

²⁸ Fact Sheet at 5.

C. *The Discharge of Pollutants into Chandler Bay*

Kingfish proposes to discharge up to 28.7 million gallons of “pollutant”²⁹ per day into Chandler Bay,³⁰ up to 6.5 million gallons of which will be “fish culture or process water.”³¹ That “culture and processing water”³² will include suspended solids like phosphorous and nitrogen “that may be present at levels above ambient conditions in Chandler Bay.”³³

In total, Kingfish intends to dump **1639lbs** of nitrogen into Chandler Bay on a daily basis.³⁴

In its review of the Industrial Aquafarm, the DEP determined the effect these discharges will have on Chandler Bay by considering, among other facts, the impact of the nitrogen released on eelgrass.³⁵

The “background concentration” of nitrogen present in Chandler Bay is 0.26mg/L.³⁶ The maximum of what is called “remaining assimilative capacity” Kingfish can legally discharge without degrading the water of Chandler Bay is 20%, or 2.1mg/L. Kingfish wants to discharge 6.6mg/L, resulting in the degradation of the water quality of Chandler Bay:

The threshold for performing [anti-degradation] analysis for this discharge is 2.1mg/L. Kingfish is proposing to discharge 6.6 mg/L, **therefore, Kingfish has triggered the anti-degradation provision threshold of 20%** of the [remaining assimilative capacity] for their discharge.³⁷

As a result, the operation of the Industrial Aquafarm “**will result in a lowering of existing water quality as it related to eelgrass as an indicator for nitrogen.**”³⁸

²⁹ The Discharge Permit provides the following definition of “pollutant”:

Pollutant means dredged spoil, solid waste, junk, incinerator residue, sewage, refuse, effluent, garbage, sewage sludge, munitions, chemicals, biological or radiological materials, oil, petroleum products or byproducts, heat, wrecked or discarded equipment, rock, sand, dirt and industrial, municipal, domestic, commercial or agricultural wastes of any kind.

Discharge Permit at 32. The term used on the Fact Sheet is “treated wastewater.” Fact Sheet at 1.

³⁰ Discharge Permit at 1.

³¹ The DEP defines “process wastewater” as:

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

Discharge Permit at 32.

³² “Culture and process water” is defined as “water that interacts with RAS processes involved in growing fish” that “will be discharged into Chandler Bay.” Fact Sheet at 5.

³³ Fact Sheet at 5.

³⁴ Discharge Application at 37.

³⁵ Fact Sheet at 19.

³⁶ Fact Sheet at 18.

³⁷ Fact Sheet at 19 (emphasis added).

³⁸ Fact Sheet at 25 (emphasis added).

Despite this express finding, the DEP still issued Kingfish the Discharge Permit because the DEP was **required by statute** to consider whether it believed that the Industrial Aquafarm would “achieve important economic or social benefits to the State.”³⁹

[T]he Department may still issue a discharge license if it finds, “following an opportunity for public participation, that the action is necessary to achieve important economic or social benefits to the State” and that the standards for classification of the water body are met and that discharge does not cause or contribute to the failure of the water body to meet the standards of classification.⁴⁰

There is no equivalent statute or provision in the LUDO or SZO that provided the Planning Board the authority to approve the Application despite the fact that the Industrial Aquafarm will “result in a lowering of existing water quality as it related to eelgrass as an indicator for nitrogen.”⁴¹

IV. Standard of Review

The BOA has the authority to reverse a decision of the Planning Board when it applies the standards in the LUDO when the BOA finds that “the decision [by the Planning Board] is clearly contrary to the specific provisions of the [LUDO].”⁴² The equivalent provision in the SZO broadly provides the BOA the power to “decide appeals where it is alleged that there is an error in any . . . decision . . . made by . . . the . . . Planning Board in the . . . administration of the [SZO].”⁴³ That provision does not require that the BOA find that the Planning Board’s decision was “clearly contrary” to the SZO in order to reverse a decision by the Planning Board.

Under state law, the BOA’s review of an appeal is *de novo* unless an ordinance or statute expressly provides that its review is appellate.⁴⁴ The statute that governs boards of appeals, 30-A M.R.S.A. § 2691, states that “[u]nless otherwise established by charter or ordinance, the [BOA] **shall** conduct de novo review of any matter before the board subject to paragraph D.”⁴⁵

³⁹ Fact Sheet at 25 (quoting 38 M.R.S.A. § 464(F)(5)). As will be discussed, the water quality standard in the SZO expressly prohibits any activity that “by itself or in combination with other activities or substances will impair the designated uses of the water classification of the waterbody,” no matter the economic benefit an applicant claims will occur if the activity is permitted. SZO § 16.R.

⁴⁰ Fact Sheet at 25 (quoting 38 M.R.S.A. § 464(F)(5)).

⁴¹ Throughout the proceedings before the Planning Board, Kingfish repeatedly attempted to hide or minimize this fact through a clever sleight of hand by focusing the Planning Board’s attention on the DEP’s finding that the discharge from the Industrial Aquafarm will not change the “classification” of Chandler Bay, which is true. Discharge Permit at 3. But that fact does not negate the fact that the DEP expressly found that the release of nitrogen from the Industrial Aquafarm will degrade Chandler Bay, as measured by the impact of nitrogen on eelgrass.

⁴² LUDO § 9.E.

⁴³ SZO § 16.G.1.

⁴⁴ *Yates v. Town of Southwest Harbor*, 2001 ME 2, ¶¶ 10–11, 763 A.2d 1168; *Stewart v. Town of Sedgwick*, 2000 ME 157, ¶ 7, 757 A.2d 773; *Mills v. Town of Eliot*, 2008 ME 134, ¶ 14, 955 A.2d 258.

⁴⁵ 30-A M.R.S.A. § 2691(C). “Paragraph D” of the statute provides that the BOA may exclude “irrelevant, immaterial or unduly repetitious evidence.” 30-A M.R.S.A. § 2691(D).

No provision of either the LUDO or SZO instructs the BOA to conduct an “appellate” hearing on this matter. Therefore, the procedure the BOA must follow is that for a *de novo* hearing. The Law Court has defined a *de novo* hearing as follows:

When a Board holds a hearing *de novo*, it does not examine evidence presented to the decision maker or tribunal below, nor does it review the procedure below except to assure that the matter is properly before it. Instead, **it looks at the substantive issues afresh, undertakes its own credibility determinations, evaluates the evidence presented, and draws its own conclusions** [T]he function of the Board is to take evidence, make factual findings, and apply the laws and ordinances to the petition or application at issue, **and to do so independently of the decision, if any, of a lower tribunal.**⁴⁶

Therefore, the BOA is required to (a) review the entire administrative record; (b) permit the introduction of new, relevant evidence into that record; (c) consider all of the evidence for itself as if it were the body tasked with approving or denying the Application; and (c) not show **any deference** to the decisions and findings of the Planning Board.

V. Argument

A. *The Industrial Aquafarm is comprised of industrial and commercial structures, which are prohibited in the RRD.*

The Planning Board made a finding that is clearly contrary to a specific provision of the LUDO when it determined that the mainland structures Kingfish intends to construct on the Property are permitted in the RRD. The uses of land and structures permitted in each of the Town’s zoning districts are provided on the “Table of Land Uses” in section 15 of the LUDO.

Because the Property is located within the RRD, the activity it intends to engage in on that land must not be prohibited by LUDO § 15. If it is, then the Planning Board did not have the authority to approve the Application.

In the RRD, “[m]arine related activities are permitted that qualify as “[f]unctionally water-dependent uses” are allowed.⁴⁷ But principal “[c]ommercial structures” and “[i]ndustrial structures” are prohibited.

When discussing the classification of the Industrial Fishfarm, the Board treated “marine-related activities,” “commercial structures” and “industrial structures” as mutually exclusive. In doing so, the Planning Board misinterpreted the LUDO.

Even if the Board was correct in classifying the Industrial Aquafarm as a marine-related **activity**, there is a clear prohibition in the LUDO on constructing industrial and commercial **structures** in the RRD. As a result, the Application triggered a classic conflict in a municipal ordinance in which one portion of an ordinance states that something is allowed while another portion of the ordinance prohibits it.

⁴⁶ *Stewart v. Town of Sedgwick*, 2000 ME 157, ¶ 7, 757 A.2d 773.

⁴⁷ LUDO § 15.19.

The LUDO contains a provision that directly instructed the Planning Board what is must do when such a conflict exists. It is set forth in section 11:

Section 11. CONFLICTS WITH OTHER ORDINANCES

Where provision of this Ordinance conflict with the provisions of other regulations or ordinances, **whichever imposes the more stringent restrictions shall prevail.**⁴⁸

According to section 11, then, the Board was **required to impose the stricter standard**—i.e., the prohibition on industrial and commercial structures in the RRD. Therefore, the Board had no choice but to deny the Application if Kingfish proposes to construct industrial or commercial structures on the Property.

It is indisputable that Kingfish proposes to construct structures on the Property that are industrial and commercial.

The term “industrial” is not defined in the LUDO. The SZO provides a definition of “industrial” that is not binding on the BOA in interpreting the LUDO, but it is instructive. It states that something is “industrial” if related to the “assembling, fabrication, finish, manufacturing **packaging or processing of goods**, or the extraction of minerals.”⁴⁹

Kingfish has admitted that it intends to package and process the fish it grows on site:

The facility would hatch, grow, and **process fish** in newly constructed buildings. . . .
The rest of the growth period and **processing and shipping** will be in the primary building (Building 2).⁵⁰

The processing and packaging of fish is clearly depicted in the video Kingfish shared with the Planning Board of its operations in the Netherlands:

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⁴⁸ LUDO § 11 (emphasis added). As Kingfish recognized in its letter to the Planning Board dated August 17, 2022, the use of the word “shall” renders the provision mandatory. Kingfish Letter at 12 n.6; see *Portland Sand & Gravel, Inc. v. Town of Gray*, 663 A.2d 41, 43 (Me. 1995).

⁴⁹ SZO § 17.26 (emphasis added).

⁵⁰ Application at 24.

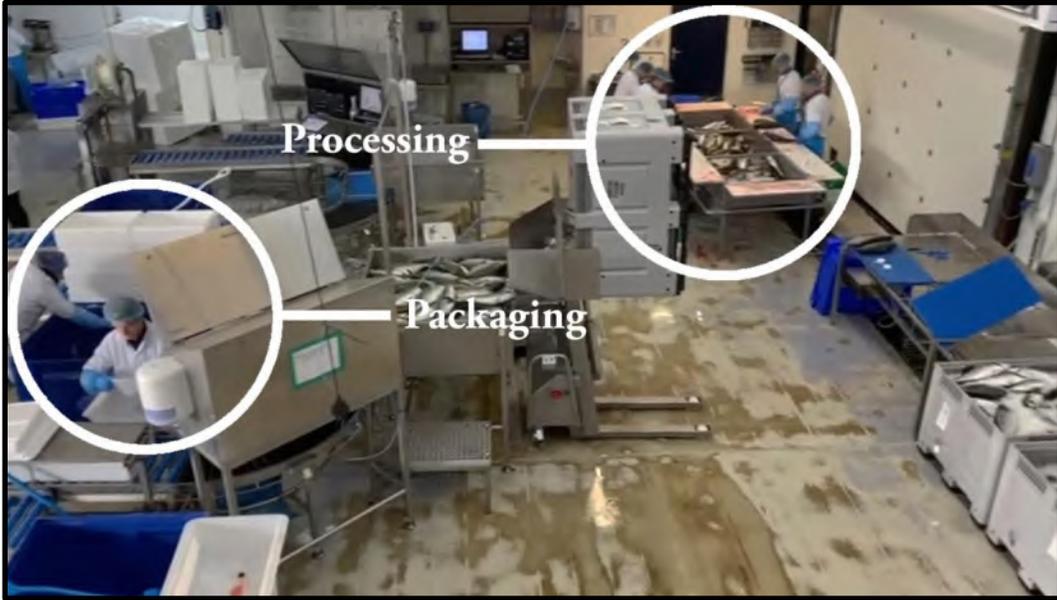


Figure 12: Screenshot from “Tour of Zeeland Facility” video provided by Kingfish to the Planning Board. Text and graphic overlays have been superimposed thereon to highlight the apparent processing and packaging of fish depicted in the video.



Figure 13: Screenshot from “Tour of Zeeland Facility” video provided by Kingfish to the Planning Board. Text and graphic overlays have been superimposed thereon to highlight the apparent processing and packaging of fish depicted in the video.



Figure 14: Screenshot from “Tour of Zeeland Facility” video provided by Kingfish to the Planning Board. Text and graphic overlays have been superimposed thereon to highlight the apparent processing and packaging of fish depicted in the video.

Because Kingfish will be packaging and processing the fish it grows at the Industrial Aquafarm on-site, the question becomes whether packages of processed fish qualify as “goods.” When, as here, an ordinance does not define a term, the BOA may rely on a dictionary definition to interpret the meaning of that term.⁵¹ The dictionary defines “goods” as “something manufactured or **produced for sale.**”⁵² Kingfish is growing yellowtail kingfish in order to sell it for a profit. Therefore, the yellowtail kingfish Kingfish proposes to produce at the Industrial Aquafarm are goods; the operation of the Industrial Aquafarm is an industrial activity, which is prohibited in the RRD; and the Planning Board made a finding that is clearly contrary to a specific provision of the LUDO (section 15) when it determined that the Industrial Aquafarm is a permitted use within the RRD.

The Planning Board compounded this error by not recognizing that the structures Kingfish intends to construct on the Property are “commercial” in nature. The term “commercial” is not defined in either the LUDO or SZO. The dictionary defines “commercial” as “occupied with or engaged in commerce or **work intended for commerce.**”⁵³ As mentioned above, Kingfish wants to **produce, package and sell** yellowtail kingfish for a profit to consumers. That is a commercial enterprise, and the buildings on its site are going to be used for a commercial purpose.

Because the conflict provision in the LUDO required the Board to apply the stricter standard—the prohibition on both “industrial structures” and “commercial structures” in the RRD—the Planning Board erred in finding that Kingfish satisfied the LUDO and that the Industrial Aquafarm is a permitted use in the RRD. The only way the BOA can correct this error, which is clearly contrary to

⁵¹ State Tax Assessor v. MCI Comm'ns Servs., Inc., 2017 ME 119, ¶ 14, 164 A.3d 952.

⁵² “Good” Merriam-Webster.com Dictionary, Merriam-Webster, <https://www.merriamwebster.com/dictionary/good>, accessed December 20, 2022 (emphasis added).

⁵³ “Commercial” Merriam-Webster.com Dictionary, Merriam-Webster, <https://www.merriamwebster.com/dictionary/commercial>, accessed December 20, 2022 (emphasis added).

the provisions of the LUDO, is to reverse the Decision and instruct the Planning Board to deny the Application.

B. The Planning Board misinterpreted the water quality standard to allow it to approve the Application even though the Industrial Aquafarm will discharge pollutants into Chandler Bay that will impair the designated uses of that waterbody.

Kingfish's discharge of 1639lbs of nitrogen a day into Chandler Bay "will result in a lowering of existing water quality as it related to eelgrass as an indicator for nitrogen,"⁵⁴ which will, in turn, "impair the designated uses" of Chandler Bay as a class "SB" waterbody.⁵⁵ Therefore, the Planning Board erred in finding that Kingfish satisfied the water quality standard in section 15.R of the SZO (the "**SZO Standard**").

Section 15.R of the SZO provides as follows:

No activity shall deposit on or into the ground or discharge to the waters of the State any pollutant that, by itself or in combination with other activities or substances will **impair designated uses of the water classification of the water body.**⁵⁶

The SZO Standard is absolute. If any activity proposed by Kingfish will impair a designated use of a waterbody, then the Planning Board was obligated to deny the Application.

"Impair" is not defined in the SZO or LUDO. The dictionary defines "impair" to mean "weaken or damage something."⁵⁷ Therefore, if the discharge from the Industrial Aquafarm weakens or damages the "designated uses" of Chandler Bay as a class SB marine waterbody, which include "fishing, aquaculture, [and the] propagation and harvesting of shellfish,"⁵⁸ the Planning Board erred in approving the Application.

Notably, the SZO Standard prevents activities that will impair Chandler Bay even if the severity of that impairment to the uses of Chandler Bay is not so extreme as to change the **classification** of Chandler Bay as an SB waterbody.

The statutory provisions the DEP interpreted when it issued Kingfish the Discharge Permit is qualitatively different than those contained in the SZO. Unlike the Town, the DEP can issue a

⁵⁴ Fact Sheet at 25 (emphasis added).

⁵⁵ Chandler Bay is a Class SB waterbody:

Class SB waters must be of such quality that they are suitable for the designated uses of recreation in and on the water, fishing, aquaculture, propagation and harvesting of shellfish, industrial process and cooling water supply, hydroelectric power generation, navigation and as habitat for fish and other estuarine and marine life.

³⁸ M.R.S.A. § 465-B(2).

⁵⁶ SZO § 15.R.

³⁸ M.R.S.A. § 465-B(2).

⁵⁷ "Impair" Merriam-Webster.com Dictionary, Merriam-Webster, <https://www.merriamwebster.com/dictionary/good>, accessed December 20, 2022.

⁵⁸ 38 M.R.S.A. § 465-B(2).

discharge permit **even when** the proposed land use will weaken or damage the uses of a waterbody so long as the harm caused by those activities is not so severe as *to change the classification* of the waterbody pursuant to the State’s “anti-degradation” policy, which is explained on the “Fact Sheet” accompanying the Discharge Permit:

6. ANTI-DEGRADATION - IMPACT ON RECEIVING WATER QUALITY

The State of Maine’s antidegradation policy states that water quality that exceeds the minimum applicable standards will be managed by the Department for the environmental, economic, and social benefit of the State. See 38 M.R.S. §§414-A(1)(C), 464(4)(F)(5) and the Conclusions section of this Permit. Where a new or increased discharge is proposed, the Department determines whether the discharge will result in a lowering of existing water quality. Pursuant to the policy, the Department must:

- A. Determine whether the discharge will use greater than 20% of the remaining assimilative capacity for a water quality parameter. If the Department finds that the discharge does use greater than 20% of the remaining assimilative capacity for that water quality parameter, then,
- B. The Department must determine whether the discharge will result in a lowering of existing water quality.

As discussed above in section 5.d. of this Fact Sheet, the Department has identified that Kingfish proposes to discharge nitrogen in an amount that will use greater than 20% of the remaining assimilative capacity for nitrogen as it relates to eelgrass as the indicator thresholds. Pursuant to the State’s antidegradation policy, the Department considers this to be a lowering of water quality.

Therefore, the Department has determined that the proposed nitrogen discharge from the Kingfish facility will result in a lowering of water quality as it relates to eelgrass habitat.

When, as here, the Department determines that a new or increased discharge will result in a lowering of existing water quality, the Department may still issue a discharge license if it finds, “following opportunity for public participation, that the action is necessary to achieve important economic or social benefits to the State” and that the standards of classification of the water body are met and that the discharge does not cause or contribute to the failure of the water body to meet the standards of classification. 38 M.R.S. §§ 414-A(1)(C), 464(4)(F)(5).⁵⁹

The DEP later summarized its ultimate conclusion that the potential economic benefits of the Industrial Aquafarm offset the environmental harm caused by the Industrial Aquafarm as follows:

⁵⁹ Fact Sheet at 25 (emphasis in original).

Therefore, considering the information in A, B, and C above and pursuant to 38 M.R.S. §§414- A(1)(c), 464(4)(F)(5), **the Department finds that the new proposed discharge from Kingfish will result in a lowering of existing water quality as it related to eelgrass as an indicator for nitrogen, and that this lowering of water quality is necessary to achieve important economic or social benefits to the State.**⁶⁰

The DEP's authority to issue a discharge permit even when there is impairment/harm to a marine waterbody is set forth in 38 M.R.S.A. § 484(F), particularly subsections (1) and (5) (the "**DEP Standard**"). Here is section 484(F)(1):

Existing in-stream water uses and the level of water quality necessary to protect those existing uses must be maintained and protected. Existing in-stream water uses are those uses which have actually occurred on or after November 28, 1975, in or on a water body whether or not the uses are included in the standard for classification of the particular water body.⁶¹

Reading this section in isolation, it may appear to the BOA that the DEP could not have issued Kingfish a discharge permit if the Industrial Aquafarm in any way harmed Chandler Bay.

But such an interpretation would be in error because this provision must be read in conjunction with sections 484(F)(5), which expressly provide the DEP with the latitude to still issue a discharge permit when the activity "**would result in lowering the existing quality of any water body**" if (a) "the project does not cause or contribute to the failure of the water body to meet the standards of classification"⁶² and (b) "the action is necessary to achieve important economic or social benefits to the State."

The department may only issue a discharge license pursuant to section 414-A which would result in lowering the existing quality of any water body after making a finding, following opportunity for public participation, that the action is **necessary to achieve important economic or social benefits to the State** and when the action is in conformance with [the requirement in section 484(F)(3) that the activity not change the classification]. That finding must be made following procedures established by rule of the board.⁶³

⁶⁰ Fact Sheet at 28 (emphasis added).

⁶¹ 38 M.R.S.A. § 484(F)(1).

⁶² 38 M.R.S.A. § 484(F)(5) incorporates by reference section 484(F)(3), which states, in part:

The department may issue a discharge license or approve water quality certification for a project affecting a water body **in which the standards of classification are not met** if the project does not cause or contribute to the failure of the water body to meet the standards of classification.

38 M.R.S.A. § 484(F)(3) (emphasis added).

⁶³ 38 M.R.S.A. § 484(F)(5).

In other words, unlike the SZO Standard, **the DEP Standard is relative.** The DEP has the authority to approve an application for an activity that will impair or harm the designated uses of a waterbody if (a) that harm does not *change* the classification of that waterbody and (b) the applicant can present evidence of a potential economic benefit to the State.⁶⁴

In contrast, **the SZO Standard is absolute.** If there is impairment, then the Planning Board was required to deny the Application.⁶⁵

Importantly, there is ample evidence in the record that the Industrial Aquafarm will impair the designated uses of Chandler Bay. As discussed in Discharge Permit, the DEP uses the impact of nitrogen on eelgrass as an indicator for the potential harm that nitrogen will cause to a waterbody. In this case, the DEP *expressly found* that the discharge of nitrogen *will be* so high as to trigger the antidegradation policy discussed above.

The threshold for performing [anti-degradation] analysis for this discharge is 2.1mg/L. Kingfish is proposing to discharge 6.6 mg/L, therefore, **Kingfish has triggered the anti-degradation provision threshold** of 20% of the [remaining assimilative capacity] for their discharge.⁶⁶

Further evidence of impairment is found in the letter from Dr. Richard Aishton to the Board dated August 17, 2022:

Nitrogen is, among other things, a fertilizer that will help grow algae in Chandler Bay. When algae growth is widespread, as it will be in Chandler Bay, the amount of Nitrogen (and phosphorous – 393 lbs/day), the algae blocks the penetration of the sun to lower depths where other marine plants grow. The result is that the plant matter dies and its decomposition uses oxygen in the decomposition process, reducing the amount of free oxygen in the water. Of course, this oxygen is needed by aquatic life to survive. The chain of events in any ecosystem is difficult to predict, but the loss of plant matter, increase in algae blooms and the loss of free oxygen will combine to have significant detrimental effects on the marine ecosystem.

The “chain of events” that Dr. Aishton, in his expert opinion, believes is likely to occur as a consequence of Kingfish discharging 1639lbs of nitrogen into Chandler Bay on a daily basis is summarized in the diagram below:

⁶⁴ There is no requirement under the statute that Kingfish provide any economic benefit to the Town itself. The only metric that matters to the DEP is the potential economic benefit to the State as a whole, not to Jonesport.

⁶⁵ In the proceedings before the Planning Board and its written submissions, Kingfish persistently conflated the SZO Standard and the DEP Standard, arguing that because the DEP found that Kingfish satisfied the DEP Standard, the Planning Board had to find that Kingfish satisfied the SZO Standard. That characterization of the relationship between the two standards is misleading. Kingfish spoke the truth when it state to the Planning Board that the DEP did not find that the discharge Industrial Aquafarm will **change** the classification of Chandler Bay. But that is not relevant to deciding whether Kingfish complied with the SZO Standard.

⁶⁶ Fact Sheet at 19 (emphasis added).

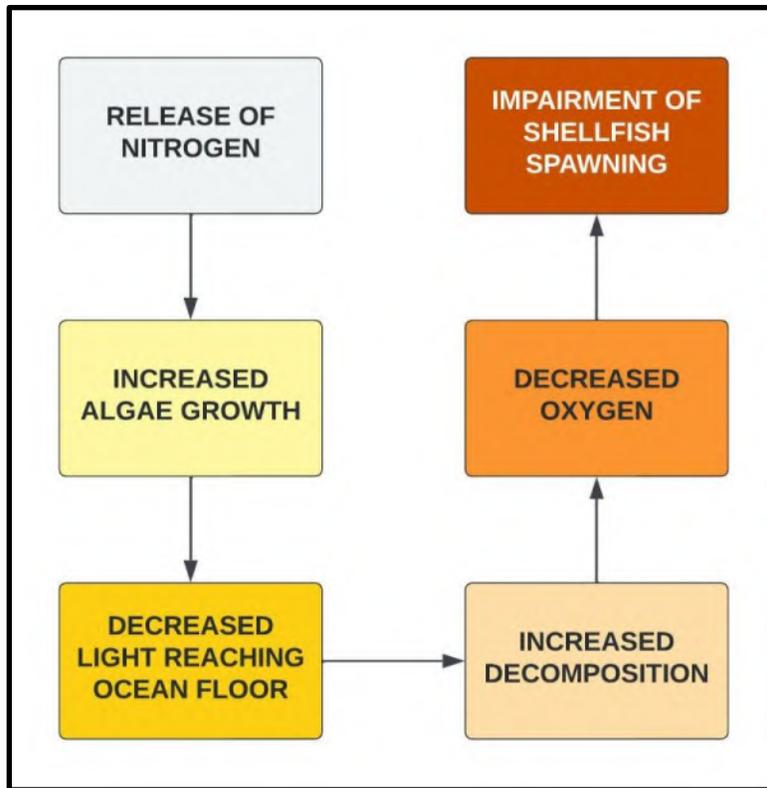


Figure 15: Diagram summarizing Dr. Aishton’s expert opinion on the expected impact of nitrogen on the designated uses of Chandler Bay.

Because of the State’s antidegradation policy, the DEP had the authority to issue Kingfish the Discharge Permit even though the discharge of nitrogen will likely harm Chandler Bay.

But the Planning Board could do no such thing. The SZO Standard did not allow the Planning Board to weigh the potential economic benefits (to the State, not Jonesport) against the harm caused by a discharge of nitrogen from the Industrial Aquafarm on the designated uses of Chandler Bay. Nor did the SZO Standard permit the Planning Board to approve the Application despite the clear evidence of impairment.

Because there is evidence in the record that the designated uses of Chandler Bay will be impaired by discharges from the Industrial Aquafarm, the Board was required to find that Kingfish has not satisfied the water quality standards set forth in the SZO and deny the Application on those grounds. Its failure to do so requires the BOA to vacate the Decision.

C. The Planning Board misinterpreted the SZO § 16.D.7, which prohibits activities that will adversely affect existing commercial and maritime activities in the Commercial Fisheries/Maritime Activities District.

The BOA must reverse the Decision because the Planning Board misinterpreted section 16.D.7 of the SZO, which prohibits activities that will “adversely affect” the existing commercial fishing and maritime activities in the Town’s Commercial Fisheries/Maritime Activities District.

SZO § 16.D.7 states:

After the submission of a complete application to the Planning Board, the Board shall approve an application or approve it with conditions if [the Planning Board] makes a positive finding based on the information presented that the proposed land use . . . **will not adversely affect existing commercial fishing or maritime activities in a Commercial Fisheries/Maritime Activities District.**⁶⁷

The Planning Board found this standard not to apply because the Industrial Aquafarm is not located in the Commercial Fisheries/Maritime Activities District.⁶⁸ That interpretation of this standard does not withstand scrutiny.

Section 16.D.7 does not require that the land use “adversely affect[ing] existing commercial fishing or maritime activities” be itself located in the Commercial Fisheries/Maritime Activities District. The location of the source of the adverse effect is not mentioned at all. Instead, this provision obligated the Planning Board to determine whether a land use **located anywhere** that is subject to the standards in the SZO would adversely affect existing commercial fishing activities located in those districts. This interpretation of where the activity is located is further supported by simple logic: commercial fishing and maritime activities, by their very nature, do not that take place in only one designated district. Instead, the activities in the district support the commercial fishing that happens in Chandler Bay and beyond. It therefore stands to reason that it is those activities, regardless of where they are occurring, that are intended to be protected. Therefore, if there was evidence in the record that such an adverse effect would result from the Industrial Aquafarm, then the Planning Board was required to deny the Application.

Such evidence exists in the NRPA Permit.

The DEP expressly found that the “[t]he diffusers, intakes and concrete anchoring collar structures” located where the intake and outtake pipes terminate in Chandler Bay “**could cause entanglement of traps and possible loss of gear**” and pose “potential concerns with setting of fishing gear directly on or beside” the intake structures and diffusers.⁶⁹ The DEP further found that “[t]raditional fishing access **could be a concern for lobster, crab and scallop fishing** due to intake and discharge structures” because these structures will be located 2’–10’ off the sea floor and “could entangle fishing gear.”⁷⁰

Beyond these adverse effects on commercial fisheries, the 1639lbs of nitrogen released by the Industrial Aquafarm every day will have a direct, negative impact on eelgrass, an essential part of a healthy commercial fishery.

Because of the high probability that the Industrial Aquafarm will make it more difficult to fish and trap in Chandler Bay, the commercial activities located in Commercial Fisheries/Maritime Activities

⁶⁷ SZO § 16.D.7 (emphasis added).

⁶⁸ SZO Findings at 14 (“The Board found by unanimous vote that this criterion is not applicable to the current application as the [Property] is not situated in the Commercial Fisheries/Maritime Activities District”).

⁶⁹ NRPA Permit at 1.

⁷⁰ NRPA Permit at 4.

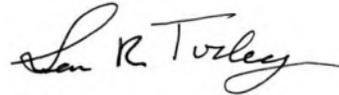
District are likely to be harmed by the Industrial Aquafarm. Therefore, the Board erred in finding that Kingfish satisfied SZO § 16.D.7, specifically, and in reaching the Decision, generally.

VI. Conclusion

For the reasons set forth above, the BOA must reverse the Decision and should remand this matter to the Planning Board with instructions to deny the Application.



Elizabeth A. Boepple, Bar No. 4422
eboepple@mpmlaw.com
Licensed in Maine, New Hampshire & Vermont



Sean R. Turley, Bar No. 6351
sturley@mpmlaw.com

Counsel to Protect Downeast
MURRAY PLUMB & MURRAY
75 Pearl Street, P.O. Box 9785
Portland, Maine 04104-5085

Cc: office@townofjonesport.com
Stephen Wagner, Esq. swagner@rudmanwinchell.com
Clients



Maine Department of Environmental Protection

**General Application for
Waste Discharge License (WDL) /
Maine Pollutant Discharge Elimination System (MEPDES) Permit**

Regulatory requirements for the preparation and filing of applications may be found in Chapters 2, 521 and 522 of the Department's rules.

GENERAL INSTRUCTIONS

1. This general form is to be used to make application for the discharge of pollutants to the surface waters of the State, from all source except from privately owned discharges subject to the Over Board Discharge Program requirements.
2. Applicants are responsible for publishing public notice of their application at the time it is filed with the Department. See pages 7 and 8.
3. For a proposed new discharge of wastewater of more than 25,000 gallons per day or a project involving licenses from more than two bureaus in DEP, an applicant must conduct a public informational meeting before submitting an application to the Department. See page 7.
4. In some circumstances an applicant must have a pre-application or pre-submission meeting with the Department prior to filing of an application. See page 9.
5. At the time an application is filed with the Department, a copy must be provided to the municipal office and notice provided to all abutters by certified mail. See page 7.
6. Application fees must be paid at the time an application for a **new** discharge or permit is filed. Contact the Department for additional information and calculation of the fee amount. For existing discharges, fees are charged on an annual basis and application fees are not required with an application for permit renewal.
7. Attach additional sheets as necessary in answering specific questions. Be sure to number each sheet to identify the question to which it pertains.
8. Failure to fully complete all required forms or to pay necessary application fees will result in the application being returned.
9. After completing the application, submit 2 copies to:

Maine Department of Environmental Protection
Bureau of Water Quality
Division of Water Quality Management
State House Station 17
Augusta, Maine 04333-0017

10. Please read the entire application form before furnishing any information. If you need any assistance in filling out the form or required attachments, please contact the Department at the above address or by calling (207) 287-7688.
-

ELECTRONICALLY SIGNED DECISIONS

8. Electronically signed decision options. To expedite processing of applications and reduce paper usage, **all final decisions on an application will be electronically signed by the Commissioner (or his/her designee) and will be sent to the respective e-mail addresses provided for the Applicant and the Cognizant Official** listed on this application, unless the “opt out” signature block is signed below.

*I hereby **decline** to receive an electronically signed decision on the WDL/MEPDES permit via e-mail and choose to receive manually signed (hand written) decision via regular (U.S. Postal) mail.*

Sign to DECLINE only N/A

(Applicant): N/A

Date:

SUPPORTING MATERIALS AND REQUIRED ATTACHMENTS

9. For **new and transfer applications only** from privately-owned facilities, include:

A Certificate of Good Standing issued by the Maine Secretary of State.

Attachment 1

Proof of Title, Right or Interest (TRI) in the property on which the treatment system and outfall pipes and structures are or will be located. See Chapter 2 of the Department’s rules for TRI criteria. *Attachment 2*

10. For **transfer applications only**, answer the following then skip to the Certification on page 6.

N/A

A. Name of current/former owner:

B. Describe any planned changes in the current discharge:

C. Provide a statement describing the technical and financial capacity to comply with the current permit conditions and applicable laws and rules. (use a separate sheet)

11. Unless submitted previously and there have been no changes, provide a topographic map (or other map if a topographic map is unavailable) extending one mile beyond the property boundaries of the source, depicting the facility and each of its intake and discharge structures

Attachment 3

12. If modification of an existing permit is being requested, attach a statement describing the nature of the modification and the reasons or circumstances necessitating the change. Include any relevant modified process flow schematics available.

Not Applicable

13. Attachments for specific activities and circumstances. For each specific question, check ‘Yes’ or ‘No’ to indicate if the statement is applicable to a discharge or activity described in this application. Where ‘Yes’ is checked, attach the applicable form.

Specific Question	Yes	No	Applicable Form
A. Is this facility a publicly owned treatment works treating sanitary wastewaters?			DEP Form: Publicly Owned Treatment Facilities (DEPLW0106)
B. Does this application seek authorization to introduce septage into treatment works?			DEP Form: Disposal of Septage and Holding Tank Wastes in Wastewater Treatment Facility (DEPLW0507-A2004)
C. Is this application for a subsurface wastewater disposal system?			DEP Form: Application for Subsurface Wastewater Disposal System (DEPLW0313-B2005)
D. Is this application for a land surface (including spray irrigation) wastewater disposal system?			DEP Form: Application for Surface Wastewater Disposal System (DEPLW0450-B2005)
E. Is this a food processing facility or POTW that treats food processing wastewaters?	✓		DEP Form: Food Processing Facilities (DEPLW1999-19)
F. Is this an existing discharge of industrial process wastewater?			EPA Form: 2C
G. Is this to be a new discharge of industrial process wastewater?	✓		EPA Form: 2D
H. Is this a discharge of non-contact cooling water?			EPA Form: 2E
I. Is this discharge of storm water associated with an industrial activity?			EPA Form: 2F
J. Is this a discharge of non-process wastewater?			EPA Form 2E
K. Is this application for an Atlantic salmon net pen facility?			DEP Form: Supplemental Information for Atlantic Salmon Aquaculture Net Pen (for Individual Permit) (DEPLW0956)
L. Is this a fish hatchery or rearing facility?	✓		DEP Form: Fish Rearing Facilities (DEPLW1999-18)
M. Does this application involve a new or modified outfall structure?	✓		DEP Form: Outfall Information (DEPLW1999-17)
N. Is this application for a waste snow dump?			DEP Form: Supplemental Information for Snow Dumps (DEPLW0249)

OUTFALL AND TREATMENT INFORMATION

Use attachments as necessary to provide details for each discharge point and treatment system.

14. Describe each discharge location. Include all combined sewer overflow (CSO) points, bypasses, emergency discharge points, at pump stations, etc.

<u>Outfall Number/Name</u>	Description, Volume Discharged and Receiving Water
<i>Outfall A</i>	<i>One 47.24 inch (1200mm) pipe running 2624ft (800m) out from mean low water into Chandler Bay. Daily discharge volume maximum: 28.7 million gallons per day (mgd) (4525m³/hr); diffuser is (6) 8.3in (211mm) ports with duckbill-style valves, with additional three capped ports for redundancy/cleaning</i>
<i>Outfall B</i>	<i>One 47.24 inch (1200mm) pipe running perpendicular to Outfall A to the same endpoint in Chandler Bay. Provides redundant pipe and will be switched with Outfall A on a regular basis. Daily discharge volume maximum would be the same as listed for Outfall A, i.e. only one outfall is running at a time and total daily discharge maximum is 28.7 mgd. Diffuser set up is the same</i>

If any of the above-listed discharges (other than CSOs) are intermittent or seasonal, please describe the nature, circumstances and duration of each.

See description above for Outfall B.

15. Briefly describe current treatment facilities or methods for each discharge.

Effluent water treatment including sources and uses is detailed in Attachment 4.

16. If this is a renewal application, please describe all significant modifications to the treatment facilities (and collection system if applicable) since the last permit application was filed.

Not Applicable.

17. Are new or expanded treatment facilities or outfall structures being proposed? **Yes** If so, please include a construction schedule. Plans and specifications must be submitted to the Department for review and approval prior to construction of the facilities. **Please see Attachment 5.**

18. If this application is for a new or increased discharge, include a statement that:

Please see Attachment 6.

- A. describes in detail the nature of and reason for the requested increase in pollutant loading to the receiving water;
 - B. if the Department determines that the discharge will diminish the remaining assimilative capacity of the receiving water, demonstrates that alternative methods to reduce or eliminate the increased discharge are not feasible. Include engineering and economic analyses that consider alternative methods of production, process controls, wastewater minimization methods, improved wastewater treatment methods and alternate disposal sites; and
 - C. if the Department determines that the discharge will diminish the remaining assimilative capacity of the receiving water, demonstrates that the increased pollutant load will result in important social and economic benefits to the State.
-

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Additionally, by signing below, I certify that

(1) notice of this application has been made by publication in newspaper circulated in the area where the project site is located on or about (a copy of the advertising form is included in this application); (2) notice has been sent by certified mail or Certificate of Mailing to owners of land abutting the discharge site (a copy of the list of abutters is included in this application); and (3) notice and a copy of this application have been provided to the clerk of the municipality(ies) where the discharge is located. (4) Further, if this is a new discharge over 25, 000 gallons per day, a public meeting attended by approximately members of the public was held on .

The forgoing steps have been taken in accordance with the instructions attached to this application and the provisions of Chapters 2 and 522 of the Department's rules.

Attachment 7 provides documentation of the items certified above.

By: Signature: 

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Date: 8-6-2020

Printed Name: (Ohad Maiman /Kees Kloet)

Title: CEO/COO

Assisting Parties. If the applicant has been assisted in preparing this application, the person assisting must sign below.

Signature: 
Printed Name: Megan Sorby

Date: 8/5/2020

Telephone: 502-387-8673

Affiliation: Kingfish Maine

Address: 33 Salmon Farm Road

Town: Franklin

State: Maine

Zip: 04634

Professional Registration or Certification:

See following pages for requirements on public notice, public meetings, pre-applications meetings and pre-submission meetings.

Instructions for providing notices of the application. For all applications, the first 3 items must be completed. If the application is for a new discharge, you must also complete item 4.

1. *Publication of Public Notice.* Applicants for waste discharge permits are required to publish a public notice that the application is being file with the Department of Environmental Protection. The notice must be published within 30 days prior to the application being sent to the Department. The notice should be published in the legal advertisement section of a daily or weekly newspaper having general circulation in the area where the discharge will occur. If the public notice is not published at the proper time or if the application is returned because it is incomplete, you may be asked to have the notice published a second time.

Using the form on the next page, fill in the blanks with the appropriate information. Strike out all of the items (CSO, multiple discharge sources, etc.) in the second paragraph that do not apply to your discharge. The form may then be sent to the newspaper that is to publish the notice. Additionally, include a copy of the form with the application filed with the Department.

2. *Notice to Abutters.* Applicants are also required to send a copy of the public notice by certified mail or Certificate of Mailing to all abutting property owners within 30 days prior to the application being filed with the Department. For the purposes of public notice of this application, an “abutter” is any person who owns property that is both (1) adjoining and (2) within 1 mile of the delineated project boundary, including owners of property directly across a public or private right of way. Additionally, include a copy of the form with the application filed with the Department.

3. *Notice to Municipal Office.* Applicants are required to send a copy of the public notice by certified mail to the town or city clerk of each municipality where the discharge is located within 30 days prior to the application being filed with the Department. Applicants must also file a duplicate copy of the application with each municipality.

4. *Public Meeting.* Where the application is for a new discharge of greater than 25,000 gallons per day, you must hold a public meeting in accordance with Chapter 2, Section 8, of the Department’s rules. Notice of the meeting must be sent to abutters and the clerk of the municipality(ies) where the discharge is located at least 10 days prior to the meeting. Notice of the meeting must be published in the same newspaper used to publish the notice of filing.

After all required notices have been made, sign the statement on the Certification page of the application.

NOTICE OF INTENT TO FILE
MAINE WASTE DISCHARGE LICENSE / MAINE POLLUTANT DISCHARGE ELIMINATION
SYSTEM PERMIT APPLICATION

Please take note that, pursuant to 38 MRSA, Sections 413 and 414-A, _____ of _____ intends to file a wastewater discharge permit application with the Department of Environmental Protection (DEP). The application is for the discharge of _____ of _____ to the _____ in _____, Maine.

Include as applicable:

CSO: Included in this application is the discharge from _____ Combined Sewer Overflows to _____.

Multiple industrial point sources: The application includes _____ associated with the primary activity described above.

Antidegradation: The application proposes a new or increased discharge that may lower existing receiving water quality within its legal classification, and the application contains a statement regarding important social and economic benefits resulting from the activity causing the discharge, pursuant to 38 MRSA, Section 464.

Mixing Zone: The application includes a request for establishment of a mixing zone in the _____, inside of which classifications standards and uses not need to be met, pursuant to 38 MRSA, Section 451.

The application will filed on or about _____ and will be available for public inspection at DEP's Augusta office during normal business hours. A copy may also be seen at the municipal offices in _____.

A request for a public hearing or request that the Board of Environmental Protection assume jurisdiction over this application must be received by the DEP, in writing, no later than 20 days after the application is found acceptable for processing, or 30 days from the date of this notice, whichever is longer. Requests shall state the nature of the issue(s) to be raised. Unless otherwise provided by law, a hearing is discretionary and may be held if the Commissioner or the Board finds significant public interest or there is conflicting technical information.

During the time specified above, persons wishing to receive copies of draft permits and supporting documents, when available, may request them from DEP. Persons receiving a draft permit shall have 30 days in which to submit comments or to request a public hearing on the draft.

Public comment will be accepted until a final administrative action is taken to approve, approve with conditions or deny this application. Written public comments or requests for information may be made to

Maine Department of Environmental Protection
Division of Water Quality Management
Department of Environmental Protection
State House Station #17
Augusta, Maine 04333-0017
Telephone (207) 287-7688

Pre-application and pre-submission meetings

Pre-application meetings. Pre-application meetings between the applicant and the Department are an opportunity for the applicant to determine the statutory and regulatory requirements that apply to a specific project and to identify a Project Manager for the application. The purpose of these meetings is to identify issues, processing times, fees and the types of information and documentation necessary for the Department to properly assess the project. The applicant shall consult the appropriate bureau Permit Assistance Coordinator to determine what information the applicant must provide before or during a pre-application meeting. Any applicant may request a pre-application meeting. The Department shall make a date available for the meeting as expeditiously as possible, but no later than 30 days from receipt of a written request and receipt of all information required for a pre-application meeting by the bureau. The Department shall prepare a written summary of all pre-application meetings.

For waste discharge permits, pre-application meetings are required prior to submission to or acceptance by the Department of an application for the following:

New wastewater discharge license for a discharge greater than 25,000 gallons per day (38 M.R.S.A. Sections 413, et seq.);

Projects requiring new or amended licenses involving more than two bureaus.

Pre-submission meetings. Pre-submission meetings between the applicant and the Department occur after the applicant has finished preparing the application for submission. These meetings are an opportunity to review the assembled application to ensure that the necessary information has been included prior to filing the application with the Department. An applicant may request a pre-submission meeting by contacting the Project Manager, or the Permit Assistance Coordinator for the bureau if no Project Manager has been identified. The Department shall make a date available for the meeting as expeditiously as possible, but no later than 20 days from receipt of a written request.

For waste discharge permits, a pre-submission meeting is required prior to submission to or acceptance by the Department of an application for the following:

Any application for which a pre-application meeting was held; or

Any application that has been previously rejected by the Department (see Chapter 2, Section 7-B of the Department's rules).

Waivers. The requirement of a pre-application or pre-submission meeting may be waived by written notice from the Department and agreement by the applicant. The Department will agree to waive a pre-application or pre-submission meeting if the Department is satisfied that such a meeting would be of no value in achieving the purposes noted above.

Note: The waiver of a pre-application or pre-submission meeting does not waive the public informational meeting required for new discharges of more than 25,000 gallons per day.



Maine Department of Environmental Protection
Waste Discharge Permit Application

Food Processing Facilities

This form must be attached to the General Application for a Waste Discharge License/MEPDES Permit (Form DEPLW0105-B2003)

Please answer all questions completely, using additional pages as necessary with responses clearly identified by item number on this form.

1. Facility Name: Kingfish Maine, Inc. NPDES # ME _____

2. Attach a drawing showing the water flow through the facility. Please include the sources and volumes of intake water, operations contributing to wastewater discharges, treatment units and outfalls with numbers corresponding to those in the general application.

See Attachment 8. Highlighted area shows flow of water from use in processing to specified processing water treatment system, followed by combination with effluent from the culture facility in the main discharge water treatment system. Outfall will be the same as all facility water, Outfall A or B.

3. Is chlorine used in the process or is the intake water chlorinated? for cleaning only If so, what is the concentration of chlorine in the final effluent(s)? less than 0.1mg/L

4. List chemicals used for sanitation or disinfection during production or clean-up operations, and maximum discharge concentrations. *See Attachment 9. Items are distinguished by area and purpose of use.*

5. List chemicals used in products or processing, and maximum discharge concentrations. *See Attachment 9. Items are distinguished by area and purpose of use.*

6. If boiler blowdown or non-contact cooling water is discharged, please complete EPA form 2E. *Not Applicable.*

7. How are sanitary wastes disposed of? *Septic system to be established on site after obtaining all relevant building permits*

8. Please complete the attached table of products and productions rates.
 Complete a separate block for each product or type of production.

Product Name: Yellowtail Kingfish, Seriola lalandi

Pounds per day processed		Total pounds per year processed	Processing period(s) each year		Daily effluent flows	
Average	Maximum		Total weeks per year	During the months of	Average	Maximum
50,706	126,765	13,200,000	52	Jan-Dec	53,000gal	80,000gal
Describe processing operation <i>Fish will be harvested from the culture tank and humanely slaughtered in accordance with state and federal guidelines. Fish will be processed in an area separate from the culture systems, where they will be bled, eviscerated, and placed in temperature controlled containers. The company offers a variety of product cuts, so fish will be sent down designated process lines to be cut accordingly. All handling will be in accordance with state and federal regulation of seafood processing.</i>						
Type of wastewater treatment <i>All water used in processing will go through treatment in the processing plant, consisting of primary flocculation to bind particulates as well as fats and oils, mechanical filtration to remove all solids, and a secondary flocculation and water clarification. At this point, water will be piped and combine with all water flowing into the discharge water treatment system, where it will go through additional treatment steps for removing solids, biological filtration for removing nutrients, and sterilization prior to discharge.</i>						

Product Name: _____

Pounds per day processed		Total pounds per year processed	Processing period(s) each year		Daily effluent flows	
Average	Maximum		Total weeks per year	During the months of	Average	Maximum
Describe processing operation						
Type of wastewater treatment						

Product Name: _____

Pounds per day processed		Total pounds per year processed	Processing period(s) each year		Daily effluent flows	
Average	Maximum		Total weeks per year	During the months of	Average	Maximum
Describe processing operation						
Type of wastewater treatment						

B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in Items III-A be intermittent or seasonal?

YES (complete the following table)

NO (go to Section IV)

Outfall Number	1. Frequency		2. Flow		
	a. Days Per Week (specify average)	b. Months Per Year (specify average)	a. Maximum Daily Flow Rate (in mgd)	b. Maximum Total Volume (specify with units)	c. Duration (in days)

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet).

Year	A. Quantity Per Day	B. Units Of Measure	c. Operation, Product, Material, etc. (specify)
			NOT APPLICABLE

CONTINUED FROM THE FRONT	EPA I.D. NUMBER (copy from Item 1 of Form 1)	
C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.		
1. Pollutant	2. Reason for Discharge	
Formalin	Common Trade name: Parasite-S; Active ingredient: 37% Formaldehyde Use: Bath treatment for external issues Treatment level: 200ppm	
VI. Engineering Report on Wastewater Treatment		
A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below. <input type="checkbox"/> Report Available <input checked="" type="checkbox"/> No Report		
B. Provide the name and location of any existing plant(s) which, to the best of your knowledge resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.		
Name Kingfish Zeeland	Location Oost Zeedijk 13, 4485 PM Kats, Netherlands Receiving Waters: Oosterschelde	

VII. Other Information (Optional)

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

Please see Attachment 4 and Attachment 6 for further clarification on proposed limitations for Kingfish Maine's proposed RAS facility.

In addition to constant monitoring of intake and effluent water in the facility, Kingfish Maine has been working to develop an appropriate monitoring program together with University of Maine labs. Working with local facility, Downeast Institute (DEI), we are evaluating the possibility of biological monitoring using species cultured at DEI. These potential monitoring opportunities can aid our facility but also aid in providing framework for future development of other RAS facilities in Maine.

VIII. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name and Official Title (type or print) Ohad Maiman, CEO; Kees Kloet, COO	B. Phone No. (502) 387-8673
C. Signature  	D. Date Signed 7-8-2020



Maine Department of Environmental Protection
Waste Discharge Permit Application

Fish Rearing Facilities

This form must be attached to the General Application for a Waste Discharge License.
(Form DEPLW0105-B2003)

Please answer all questions completely, using additional pages as necessary with responses clearly identified by item number on this form.

1. Facility Name: *Kingfish Maine, Inc* NPDES #ME
2. Source(s) of water supply and average monthly flow of each:
Chandler Bay & private well(s): 861 million gallons;
3. Is any of the hatching or rearing water heated or cooled by mixing with water from another source, use heat exchangers, etc? If yes, explain listing the volumes and maximum temperatures of each source.
We do not utilize water from any other sources than Chandler Bay (99.4%) or private on-site wells (0.6%). We utilize 77.3% of water brought in from Chandler Bay for use in (1) heating the culture water (22.1% of total flow from Chandler Bay), and (2) recovery of thermal energy from the water before it is discharged from the facility (referred to as heat recovery water). Please see Attachment 4 for an explanation of volumes and temperatures.
4. Type(s) of feed used:
commercially produced diet in multiple sizes to support various growth stages
5. Amount of feed used. Average: 22,000 lbs/day Maximum: 26,000 lbs./day
6. Month(s) of maximum feeding: Because standing stock is stable, feed remains consistent throughout the year.
7. Species of fish raised: *Yellowtail kingfish (Seriola lalandi)* _____
8. Maximum quantity of fish at any time. _____
Broodstock: Pounds *12,000* Number of fish: *300*
First Year Fish: Pounds *approx. 4,400,000* Number of fish: *approx. 1,520,000*
(average: pounds: approx. 3,300,000; Number: approx. 1,140,000)
9. Attach a drawing showing the number, size and arrangement of all rearing tanks.
See Attachment 10.
10. Attach a list of all disinfectants used, giving for each the name, ingredients, frequency of use, concentration of use, and total quantity used per year.
See Attachment 9
11. Attach a list of drugs and/or therapeutic agents used, giving for each a name, ingredients, frequency of use, concentration of use, and total quantity used per year.
See Attachment 9



**Maine Department of Environmental Protection
Waste Discharge Permit Application**

Outfall Information

DEPLW0102

Revised: 02/22/2018

This form must be attached to the General Application for a Waste Discharge License / MEPDES Permit
(Form DEPLW0105-B2003)

Please answer all questions completely, using additional pages as necessary with responses clearly identified by item number on this form.

1. Facility Name: Kingfish Maine, Inc. MEPDES # ME _____

2. Attach a plan of the treatment facility or discharge sources showing the location of each outfall and the receiving water. Please number each outfall with the corresponding number from the permit application. **See Attachment 3.**

3. For each outfall, provide the following information. Please use additional forms as necessary to describe all outfall locations.

A. Outfall name: A Outfall number: N/A

B. Flow discharged. Average: 28.7 MGD Maximum: 28.7 MGD

C. Diameter of outfall pipe: 47.24 inches

D. Depth below mean low water at outlet: approx. 30 ft

E. Describe any diffusers, mixers or similar structures used to disperse the effluent. Please include drawings or diagrams as appropriate. (use a separate sheet)

The point of discharge will be equipped with a multiport diffuser, equipped with duckbill style valves to maintain consistency effluent flow rate. Ports will be oriented upward from the seafloor. See conceptual drawings, Attachment 11.

F. Outfall name: B Outfall number: N/A

B. Flow discharged. Average: 28.7 MGD (only operates when A is not) MGD
Maximum: 28.7 MGD

C. Diameter of outfall pipe: 47.24 inches

D. Depth below mean low water at outlet: approx. 30 ft

- E. Describe any diffusers, mixers or similar structures used to disperse the effluent. Please include drawings or diagrams as appropriate.

This outfall is redundant for Outfall A, i.e. it only operates when A is not (i.e., for cleaning and maintenance); flow is the same as A and NOT in addition to A. The point of discharge will be equipped with a multiport diffuser, equipped with duckbill style valves to maintain consistency effluent flow rate. Ports will be oriented upward from the seafloor. See conceptual drawings, Attachment 11.

State of Maine



Department of the Secretary of State

I, the Secretary of State of Maine, certify that according to the provisions of the Constitution and Laws of the State of Maine, the Department of the Secretary of State is the legal custodian of the Great Seal of the State of Maine which is hereunto affixed and of the reports of qualification of foreign business corporations in this State and annual reports filed by the same.

I further certify that KINGFISH MAINE INC., a DELAWARE corporation, is a duly qualified foreign business corporation under the laws of the State of Maine and that the application for authority to transact business in this State was filed on December 13, 2019.

I further certify that said foreign business corporation has filed annual reports due to this Department, and that no action is now pending by or on behalf of the State of Maine to forfeit the authority to transact business in this State and that according to the records in the Department of the Secretary of State, said foreign business corporation is a legally existing business corporation in good standing under the laws of the State of Maine at the present time.

In testimony whereof, I have caused the Great Seal of the State of Maine to be hereunto affixed. Given under my hand at Augusta, Maine, this fifteenth day of June 2020.



A handwritten signature in black ink, appearing to read 'Matthew Dunlap', written over a horizontal line.

Matthew Dunlap
Secretary of State

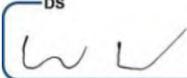
OPTION TO PURCHASE REAL ESTATE

THIS AGREEMENT is made as of May 2nd 2019, by and between **W.W. Wood Properties, LLC**, a Maine limited liability company, with a mailing address of **P.O. Box 358, Holden, ME 04429** (“Owner”) and **Kingfish Maine, Inc.** (“Optionee”), WHO AGREE AS FOLLOWS:

- Option Property:** Owner is the owner of certain premises situated at **9 Dun Garvin Road**, consisting of approximately **94 acres** of land, together with all buildings and improvements thereon and all rights and easements appurtenant thereto, which parcel is further identified in the Jonesport, ME assessor’s records as **9 Dun Garvin Road, Map/Lot reference of 008-023** and is outlined in heavy line on the attached **Exhibit A** (the “Property”) and being the premises described in a deed to Grantor recorded in the Washington County Registry of Deeds in Book 4301, Page 266.
- Option:** In consideration of the “Option Consideration” herewith paid to Owner by Optionee as identified below, Owner hereby grants to Optionee the exclusive, irrevocable right to purchase the Property on the terms set forth in this Agreement (the “Option”). If Optionee elects to purchase the Property, such election shall be made by written notice given to Owner at any time on or before the end of the “Option Period” identified below. Optionee shall have the right, on each occasion by written notice, to extend the Option Period for up to three (3) consecutive “Extension Periods” as described below, in exchange for the corresponding “Extension Consideration” payments set forth below. Each such extension notice and payment shall be made on or before the end of the Option Period (as then extended). The Option and Extension Periods (hereinafter collectively the “Option Period”) and their corresponding Option and Extension Consideration payments (hereinafter collectively the “Option Consideration”) are as follows:

Option Period	Option Consideration
[REDACTED] from execution of this Agreement	[REDACTED]
Extension Periods	Extension Consideration
[REDACTED] from expiration of Option Period	[REDACTED]
[REDACTED] from expiration of First Extension Period	
[REDACTED] from expiration of Second Extension Period	

- Purchase Price:** If Optionee elects to exercise this Option, the purchase price for the Property shall be [REDACTED] (“Purchase Price”). The Option Consideration and first Extension Consideration of [REDACTED] shall be credited against the Purchase Price payable at the closing. All other Extension Considerations shall not be credited against the Purchase Price. If Optionee does not exercise this Option, or if Optionee fails to close, Owner shall retain all Option and Extension Considerations then paid as full consideration and as its sole remedy. Optionee shall be entitled to a refund of the Option Consideration and Extension Considerations only if Owner’s title to the Property proves defective, as provided below.
- Inspections and Approvals:** During the Option Period, Optionee and its employees, contractors and agents shall have the right and easement, at Optionee’s expense and after reasonable notice to Owner, to enter upon the Property for the purposes of conducting inspections, surveys, soils tests, and other testing. Optionee shall reasonably restore the Property to its prior condition in the event that Optionee’s activities disturb or damage the Property. During the Option Period, Optionee may seek at its expense such rezoning, permits and approvals for permits and programs necessary to make the project feasible (for example, the State of Maine’s Pine Tree Zone Program and/or permits that will allow the company to build and sustain its desired business) and the like as Optionee requires (“Approvals”), and Owner agrees to cooperate and join with Optionee in obtaining such Approvals. If, at the end of the Extension Periods, Optionee shall be diligently pursuing any such Approvals, Optionee shall have the right, upon written notice to Owner, to further extend the Option Period for a reasonable period of time (not to exceed [REDACTED]) in order that Optionee may receive a final decision thereon. If Optionee elects to exercise this Option period extension, Optionee shall pay to Owner an Option Consideration of [REDACTED] or a prorated portion thereof if

DS


said Option Period extension is less than 6 months.

Promptly following execution of this Agreement, Owner shall provide the following ("Due Diligence Materials") to Optionee, to the extent the same are in Owner's possession or control:

- a) Title documents pertaining to the Property
- b) Copies of all applicable licenses, permits, zoning, development and governmental approvals received by the Owner (or, if requested but not yet received by Owner, copies of all applicable requests/applications and related documents);
- c) Copies of all environmental, soils, traffic and other pre-development reports or studies in Owner's possession;
- d) Any other relevant material documentation such as tax abatement agreements, easement agreements, ground leases and the like, if applicable;
- e) Property tax bills for the prior two years;

Any and all material written correspondence with governmental bodies in Owner's possession relating to the Property

5. Closing: If Optionee elects to purchase the Property, Owner shall convey the Property to Optionee (or its designee) by good and sufficient general Warranty Deed conveying marketable title, free and clear of all encumbrances, defects, liens, tenants and occupants ("Title Defects"), and utilizing the description obtained by Optionee's survey if requested. The closing shall take place within 90 days after written notice from Optionee that it has exercised the Option at the date, time and place specified in the notice. Optionee shall have the right to apply the Purchase Price at the Closing to the removal of any mortgages encumbering the Property. The parties agree to execute and deliver such documents as are reasonably necessary and customary to complete the closing. Real estate taxes and utilities shall be prorated as of the closing date. Real estate transfer taxes, income taxes and gains taxes shall be paid by Owner.
6. Broker: The parties agree that no broker has been involved in this transaction, other than The Boulos Company and Bold Coast Properties. Optionee shall be responsible for any fees to The Boulos Company. Owner shall be directly responsible for any fees to be paid to Bold Coast Properties or any other broker engaged by Owner. Each party agrees to indemnify the other from and against any damages, costs or expenses (including reasonable attorneys' fees) that the other party may suffer as a result of claims made or suits brought by any broker, finder or agent in connection with this transaction, the obligated party hereunder to be the party whose conduct gives rise to such claims. This indemnity shall survive the closing and any termination of this Option.
7. Ownership/Risk of Loss: Owner hereby warrants that Owner is the owner of the Property in fee simple, that Owner has the full right and authority to grant the Option described in this Agreement, and that there is no other option, contract or other right to purchase the Property in existence. Prior to the Closing, the risk of loss to the Property or taking by eminent domain shall be on Owner. Possession of the Property will be delivered to Buyer upon Closing.
8. Owner's Warranties: To the best of Owner's knowledge and belief there are no and have never been any Hazardous Materials on, under, in or about, or migrating to or from the Property. The presence of such materials at or any time prior to the Closing shall constitute a Title Defect, rendering the title unmarketable as aforesaid. As used herein, "Hazardous Materials" means any hazardous or toxic materials, waste, substances or matter, oil or other petroleum products, underground tanks, asbestos, or similar materials, including as defined in any federal, state or local law or regulation, or any other substances constituting a hazard or threat to the health of persons, animals or plants. This warranty shall survive the Closing and any expiration or other termination of this Option.
9. Memorandum of Option; No Further Encumbrances: Owner agrees to execute a document for recording purposes which will include the primary terms of this Option, other than the Purchase Price. During the term of this Option Agreement, Owner agrees not to further encumber the Property in any manner without Optionee's consent.
10. Notice: Any notice required to be given by Optionee to extend or exercise this Option shall be in writing, shall be addressed to Owner as set forth above, and shall be sent by registered or certified mail, return

receipt requested, or by a reputable overnight carrier that provides a receipt, such as FedEx or Airborne, and shall be deemed delivered on the date postmarked or the date deposited with the overnight carrier.

- 11. **Confidentiality:** Owner agrees not to disclose any Confidential Information to any person or other entity without Optionee's prior written consent, except to Owner's professional consultants who agree to be bound by this paragraph. For purposes of this Agreement, "Confidential Information" includes Optionee's interest in the Property, the prospective use of the Property (if disclosed); and the terms of this Agreement and any other agreements between the parties with respect to the Property, except to the extent Optionee may have publicly disclosed any such information.
- 12. **Binding Effect:** This Option Agreement shall be binding upon the parties and their heirs, administrators, successors and assigns upon full execution by Owner and Optionee in the spaces provided below. Optionee may freely assign its rights hereunder.

IN WITNESS WHEREOF, Owner and Optionee have executed this Agreement as of the date first set forth above.

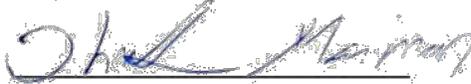
OWNER:
W.W. Wood Properties, LLC.

DocuSigned by:

222CE162A0EFADD

By: Wayne Wright
Its: Authorized Signatory

OPTIONEE:
Kingfish Maine, Inc.



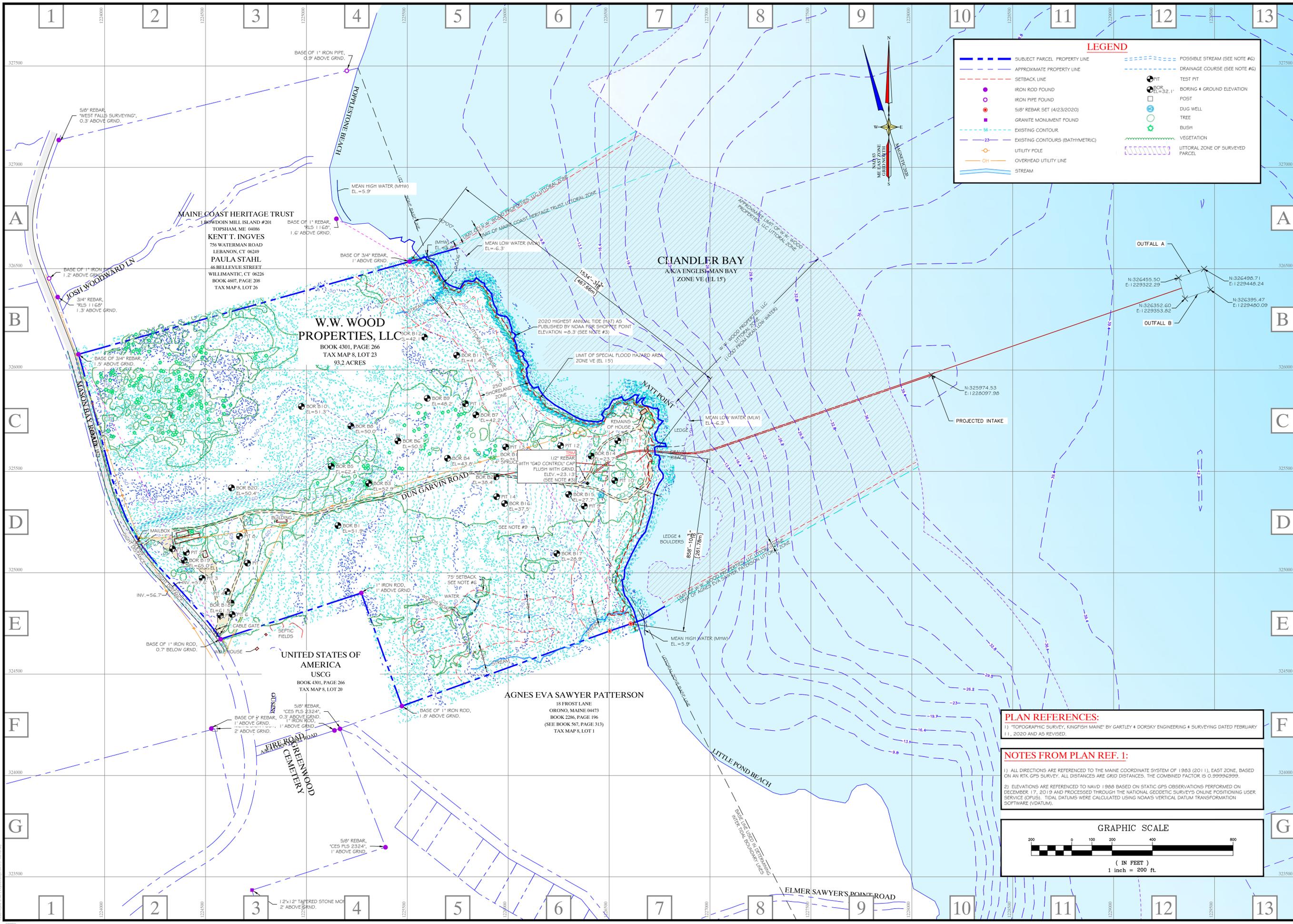
By: Ohad Maiman
Its: CEO

Exhibit A



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MEPDES Application – Attachment 3 – Map Depicting Facility Intake and Discharge Structures

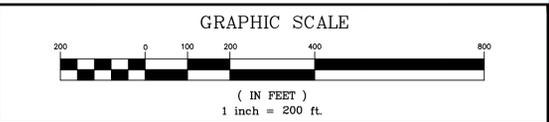


LEGEND

SUBJECT PARCEL PROPERTY LINE	POSSIBLE STREAM (SEE NOTE #6)
APPROXIMATE PROPERTY LINE	DRAINAGE COURSE (SEE NOTE #6)
SETBACK LINE	TEST PIT
IRON ROD FOUND	BORING + GROUND ELEVATION
IRON PIPE FOUND	POST
5/8" REBAR SET (4/23/2020)	DUG WELL
GRANITE MONUMENT FOUND	TREE
EXISTING CONTOUR	BUSH
EXISTING CONTOURS (BATHYMETRIC)	VEGETATION
UTILITY POLE	LITTORAL ZONE OF SURVEYED PARCEL
OVERHEAD UTILITY LINE	
STREAM	

PLAN REFERENCES:
 1) "TOPOGRAPHIC SURVEY, KINGFISH MAINE" BY GARTLEY & DORSKY ENGINEERING & SURVEYING DATED FEBRUARY 11, 2020 AND AS REVISED.

NOTES FROM PLAN REF. 1:
 1) ALL DIRECTIONS ARE REFERENCED TO THE MAINE COORDINATE SYSTEM OF 1983 (2011), EAST ZONE, BASED ON AN RTK GPS SURVEY. ALL DISTANCES ARE GRID DISTANCES. THE COMBINED FACTOR IS 0.99996999.
 2) ELEVATIONS ARE REFERENCED TO NAVD 1988 BASED ON STATIC GPS OBSERVATIONS PERFORMED ON DECEMBER 17, 2019 AND PROCESSED THROUGH THE NATIONAL GEODETIC SURVEY'S ONLINE POSITIONING USER SERVICE (OPUS). TIDAL DATUMS WERE CALCULATED USING NOAA'S VERTICAL DATUM TRANSFORMATION SOFTWARE (VDATUM).



DATE	
REVISIONS	
NO.	
DRAWN BY: JAM	
CHECKED BY:	
DATE: JULY 27, 2020	
SCALE: 1" = 200'	
LOCATION: ROUTE 187	
TOWN: JONESPORT COUNTY: WASHINGTON STATE: MAINE	
CLIENT/PROJECT: KINGFISH MAINE	
SHEET TITLE: EXHIBIT 2	
PROJECT NO. 2019-412	
EX2	

Gartley & Dorsky
 ENGINEERING SURVEYING

59 Union Street, Unit 1, P.O. Box 1031 Camden, ME 04843-1031
 Ph (207) 236-4365 Fax (207) 236-9055 Toll Free 1-888-282-4365
 165 Main Street Suite 212 P.O. Box 1072 Dunsmuir, Maine 04543
 Ph (207) 790-5005





KINGFISH
MAINE

INTAKE & DISCHARGE WATER TREATMENT



KINGFISH
MAINE

SUMMARY OF KINGFISH MAINE MEPDES PERMIT

- Land based recirculating aquaculture facility, annually growing 6000-8000 ton of yellowtail kingfish, *Seriola lalandi*
- Employing approximately 70 people, potentially more if processing
- Site location: 9 Dun Garvin Road, Jonesport, Maine
- Receiving water: Chandler Bay
- **Key Features:**
 - Kingfish Maine will complete the whole culture cycle here in Jonesport – hatchery, growout, and harvest
 - Kingfish Maine application includes processing of fish on site, though we are still deciding to what level.
 - Kingfish Maine will draw water from Chandler Bay; when referring to water use throughout the application, it is in one of three distinctions:

HEAT RECOVERY WATER

No contact with fish

Heat exchangers or Heat pumps

Discharge Tank

77.3% of total water

CULTURE WATER

Contacts fish

Wastewater Treatment

Discharge Tank

22.1% of total water

PROCESSING WATER

Contacts fish

Processing Area Treatment

Wastewater Treatment

Discharge Tank

0.6% of total water

SUMMARY OF KINGFISH MAINE WATER USE & FILTRATION

The facility will take in 19,812 gallons per minute (gpm) of seawater from Chandler Bay through two seawater intake pipes. It will go through large particle filtration and then be piped to the pump station to be split in two ways.

Heat Recovery Water

15,410gpm (3500m³/hr) of seawater will go through heat exchangers where Kingfish Maine will extract the thermal energy in the water in a countercurrent flow system. This energy will be utilized in heating the temperature of the water in the culture systems to our target range. This heat recovery water does not come in contact with culture water or fish. It has reduced suspended solids and colder temperature than when it was taken into the pump station but is otherwise unaltered from its natural state. Therefore, it will not go through any further treatment but will go directly to the discharge reservoir prior to being discharged in Outfall A or B.

Culture System & Processing Water

4,402 gpm (1000m³/hr) of seawater will be filtered for medium and fine solids and sent to a holding tank, which will feed hatchery, growout, and processing operation.

Culture System Water

Water leaving the culture tanks will go through mechanical filtration, which removes large and fine solids, within the recirculating system (40-60um). After mechanical filtration, new (“make up”) water will be added and an equal amount of water will leave the culture system and go through heat exchangers, where we will recover all possible thermal energy from the discharged culture water by utilizing a countercurrent flow system and heat pumps with the *Heat Recovery Water*. The energy will be redirected back to maintain target water temperature in the culture systems. After this step, the culture system water will then be piped to the discharge water filtration system. In this system, water will go through large and fine solids filtration (mechanical, 100um), followed by biofilters for the reduction of nutrient load, and finally, sterilization. The water will then combine with other effluent sources in the discharge reservoir prior to being discharged in Outfall A or B.

Processing Water

The processing plant will use a small amount of the total seawater listed above in addition to a maximum of 107 gpm (25m³/hr) of freshwater as well. All water utilized in processing plant will be collected and go through its own dedicated filtration system first, consisting of a primary flocculation to bind fats, oils, and other byproducts of processing; mechanical filtration to remove solids and bound materials; then a secondary flocculation and water clarification. It will then progress to the main discharge water filtration system, where it will combine with the outflow from the culture systems, go through the same filtration steps, meaning this water, just as the culture water, has redundant filtration systems prior to discharge. It will finally go to the discharge reservoir with all filtered water prior to being discharged in Outfall A or B.

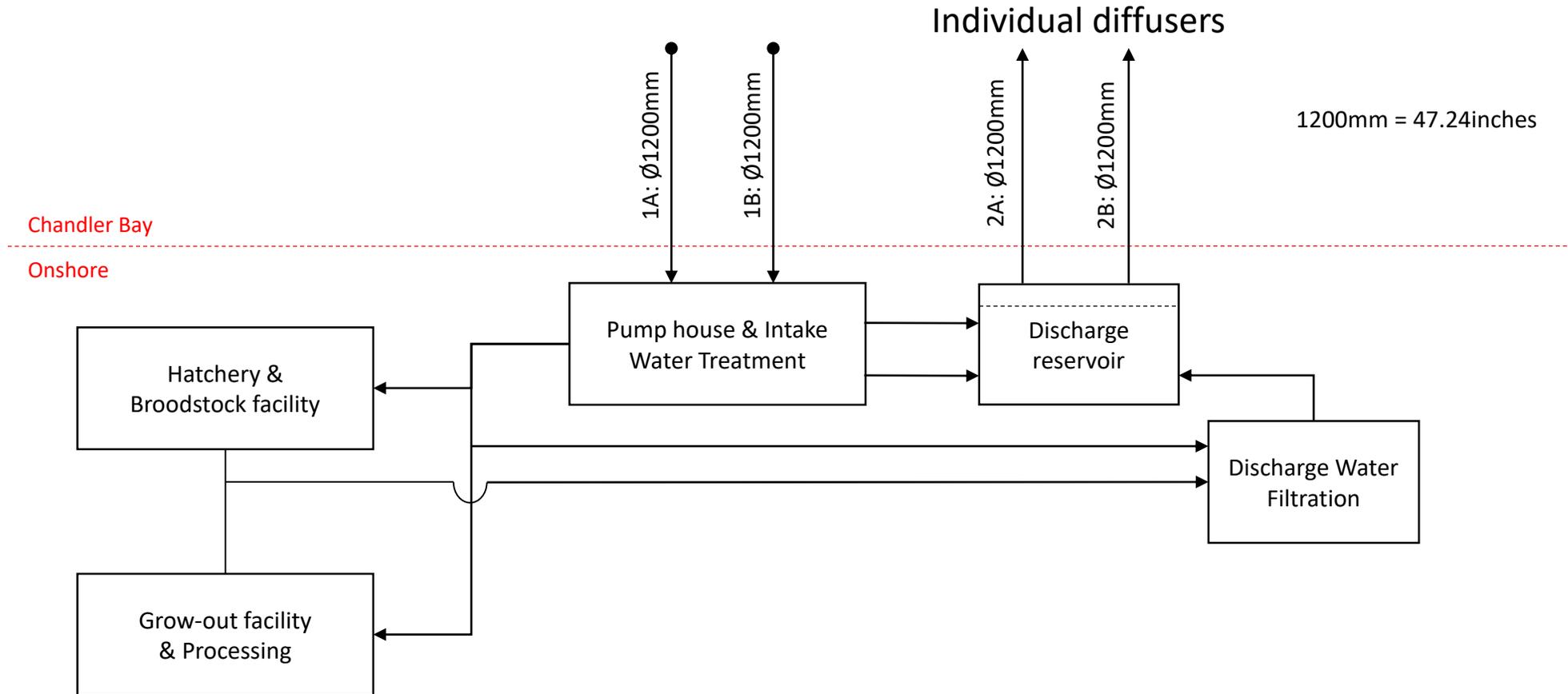


SUMMARY OF KINGFISH MAINE SOLID WASTE REMOVAL

As mentioned in “Summary of Kingfish Maine Water Use & Filtration”, solids filtration for the culture water, both large and fine particles, will occur using fish exclusion barriers and drum or disc filters to remove solids down to 40-60um in the culture systems, and 100um in the additional wastewater treatment system. The solids collected in the processing area will be filtered utilizing similar mechanical filtration and, if required, include chemical flocculants for improved clarification and removal.

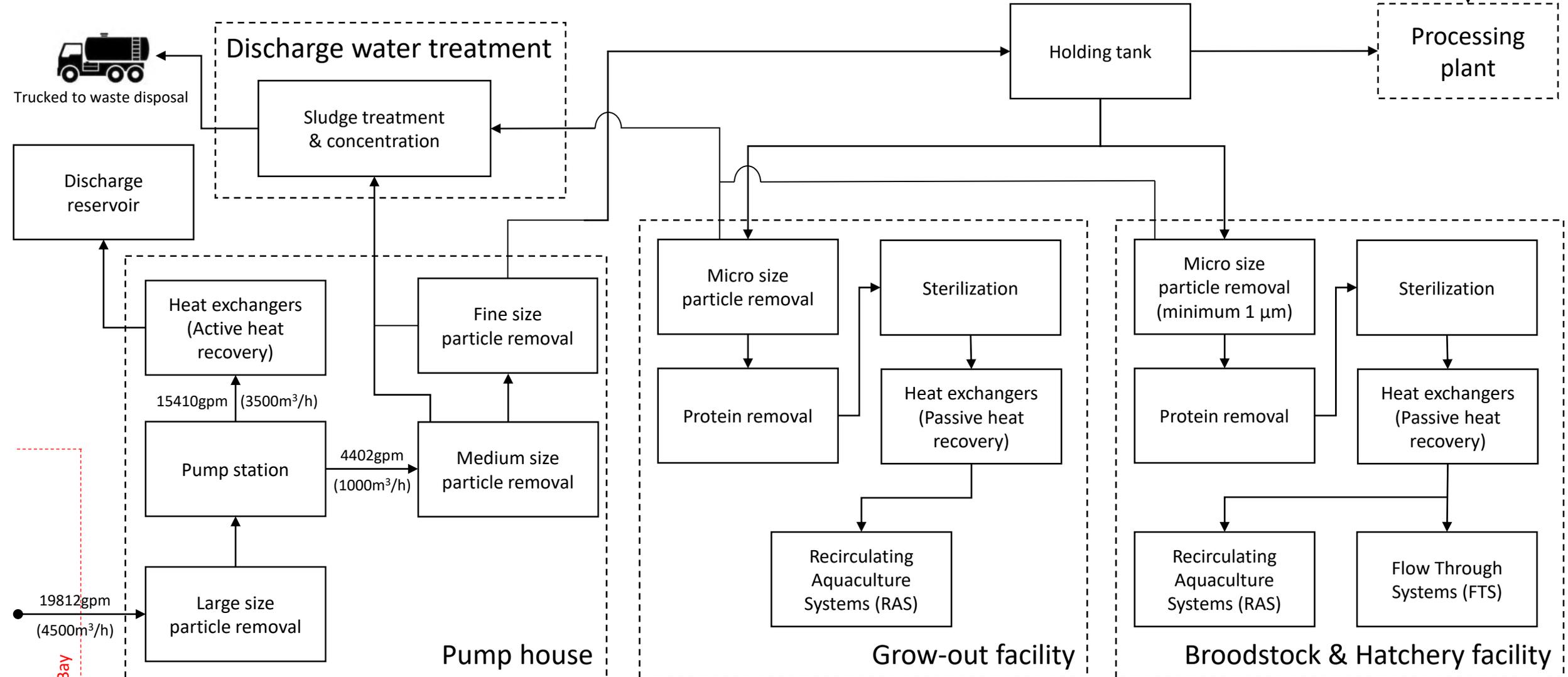
All solid waste will be combined and trucked offsite for disposal. Kingfish Maine is exploring secondary uses for any waste from processing activities on site, such as composting with Coast of Maine Organic Products Inc., an organic compost producer located in East Machias, ME. Due to the high or concentrated salt level in our sludge, options for additional uses are limited, but we continue to explore all new technology for making use of this nutrient rich material.

CONCEPTUAL FLOW DIAGRAM – INTAKE & EFFLUENT



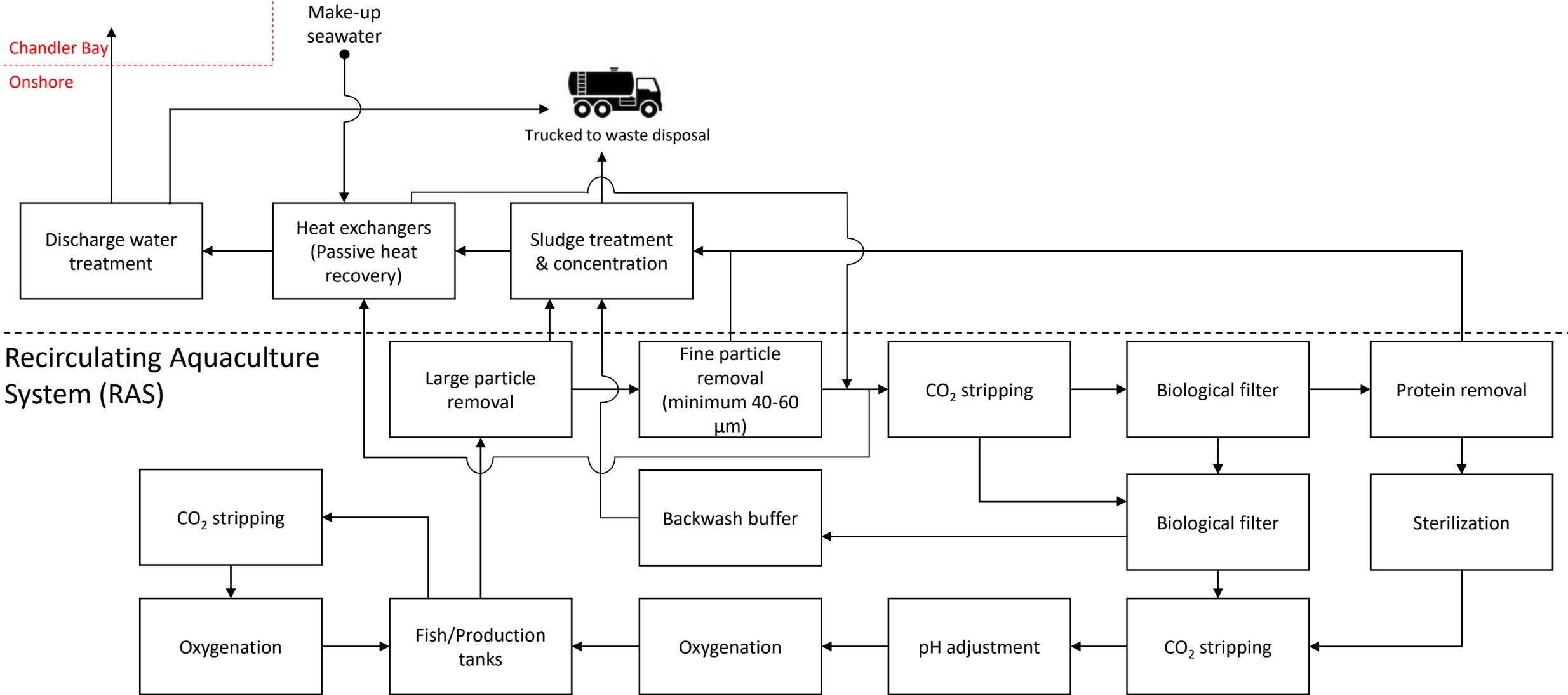
CONCEPTUAL FLOW DIAGRAM OF INTAKE WATER TREATMENT (IWT)

Freshwater
107gpm
(25m³/h)



Chandler Bay
Onshore

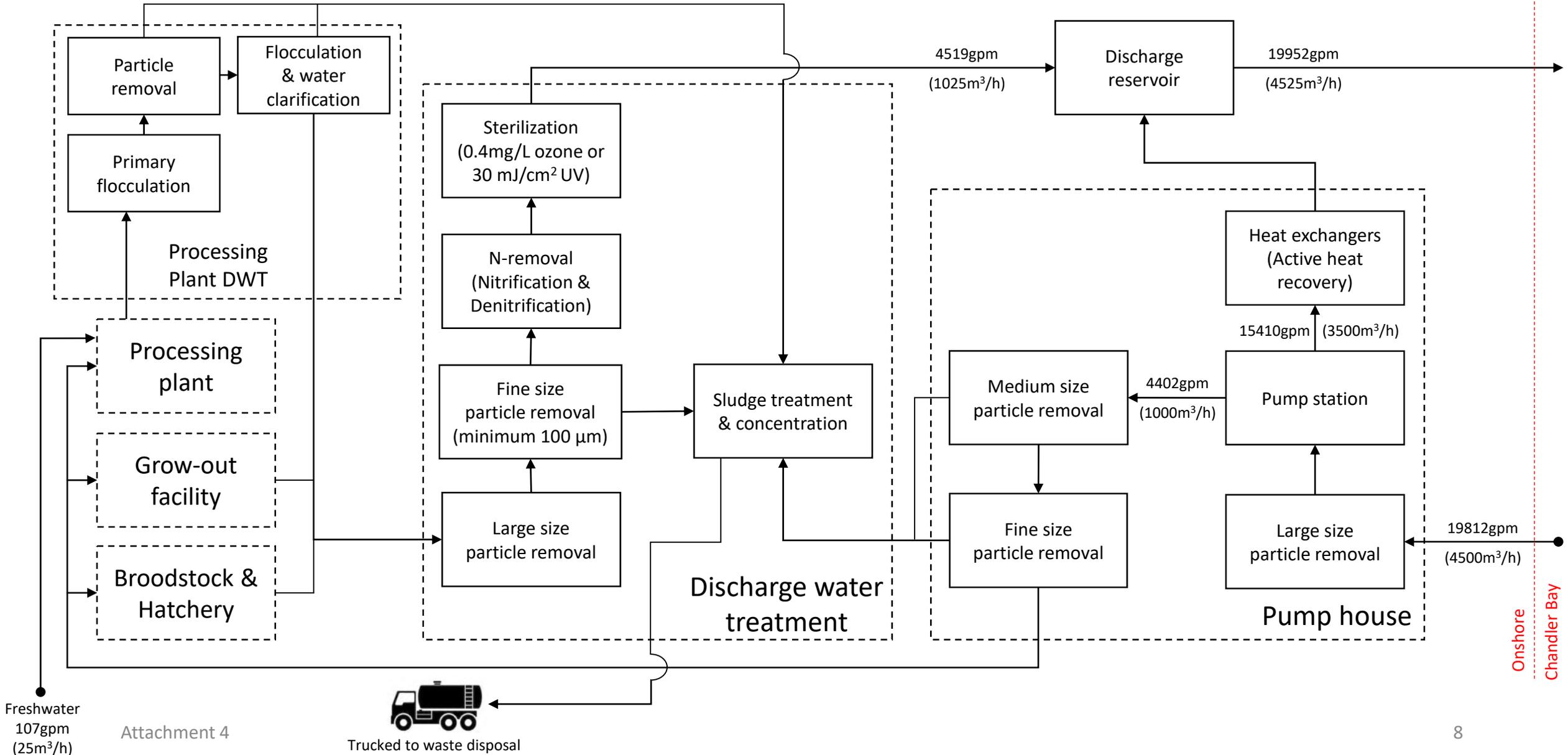
CONCEPTUAL FLOW DIAGRAM OF RAS SYSTEM





CONCEPTUAL FLOW DIAGRAM OF DISCHARGE WATER FILTRATION (DWF)

KINGFISH
MAINE



SUMMARY OF KEY PARAMETERS OF EFFLUENT

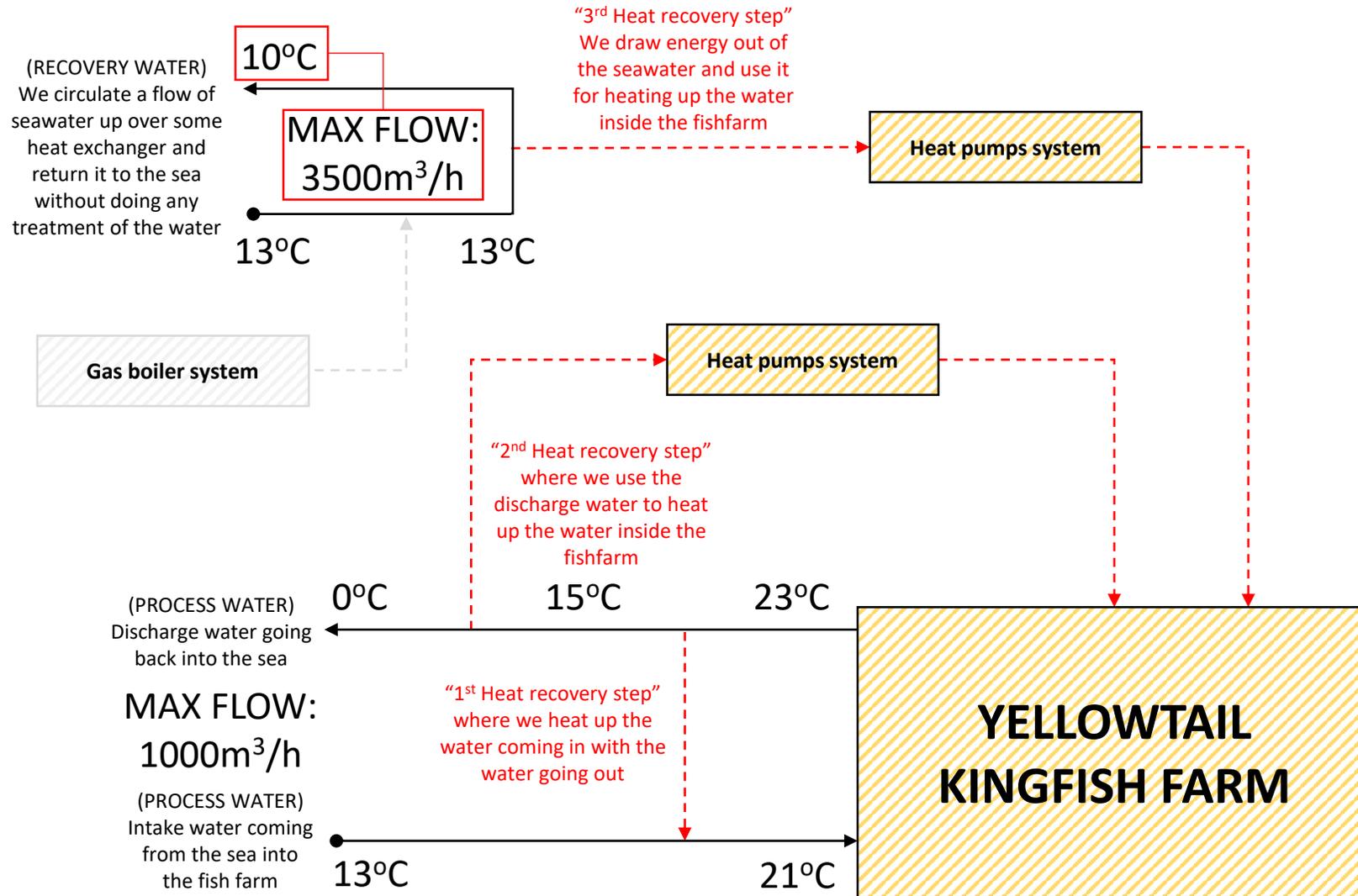
Parameter	Total Discharge (kg)	Total discharge (lbs)
Flow	108600m3/day	28.7MGD
BOD	740.5	1628.99
TSS	740.5	1628.99
Total N	745.0	1639
Total P	178.7	393
	Range	
pH	6.0-9.0	-
Salinity	Ambient	-
Temperature - Summer	7.8-15C	46-59F
Temperature - Winter	0-7.8C	32-46F
Near Field Dilution	60x	
Far Field Dilution	173x	

Amounts calculated from standing biomass and feed rates for yellowtail kingfish, *Seriola lalandi*, as well as wastewater treatment efficacy. Further explanation of these parameters is included as Attachment 6 to main application.

FISHFARM THERMODYNAMICS – EXAMPLE, SUMMER

This one-pager shows the general principle and example temperature behind Kingfish Maine’s heat recovery methods.

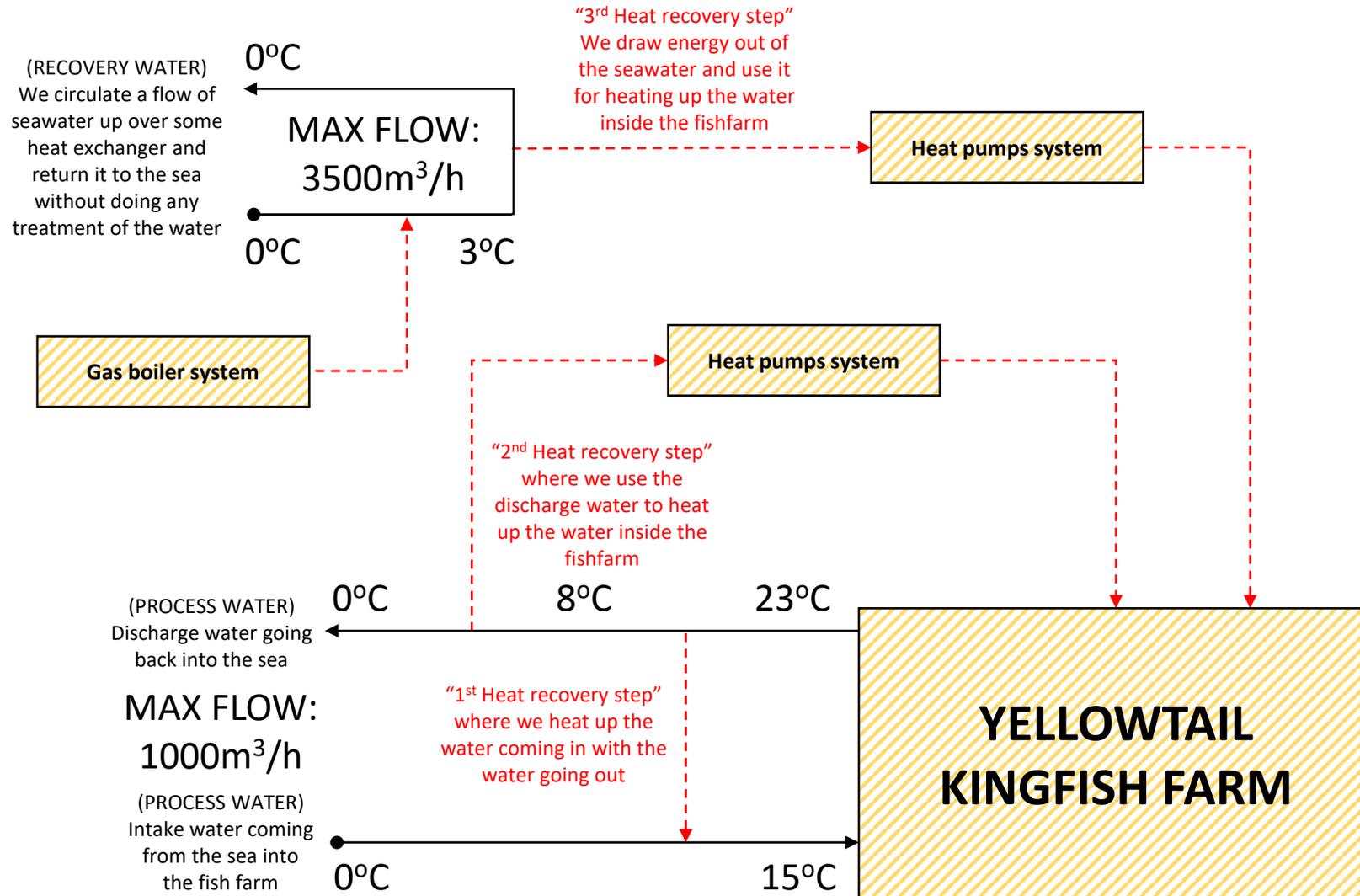
BLENDING FLOW
TEMP: 7.8°C



FISHFARM THERMODYNAMICS – EXAMPLE, WINTER

This one-pager shows the general principle and example temperature behind Kingfish Maine’s heat recovery methods.

BLENDING FLOW
TEMP: 0°C



MEPDES Application – Attachment 5 – Construction Schedule of Treatment Facility and Outfall Structure

Kingfish Maine is currently in the permitting process for a land-based recirculating aquaculture facility with a goal of beginning construction in H2 of 2021. Construction of the facility will begin once necessary permits have been obtained, and construction documents have been issued. We estimate this to be within 1-3 months after all permits are acquired.

Specifically related to intake and outfall construction, any in-water construction will be completed within the recommended construction window for protection of marine resources, which is determined to be November to April in this area. The points of connection in the upland area for the intake and outfall pipes will be the pumphouse and wastewater treatment buildings, respectively. Construction of these building structures will be part of the larger construction schedule, which will be determined once Kingfish Maine has received necessary permits. Accordingly, connection of the intake and outfall pipes to their respective points on the upland will occur once the pipes have been completely configured in the aquatic environment and transitioned to the upland area.

MEPDES Application – Attachment 6 – Question 18, Main Form:

Kingfish Maine proposes to construct and operate a recirculating aquaculture facility to grow 6000-8000 ton of yellowtail kingfish, *Seriola lalandi*, in Jonesport, Maine. This facility would be completely vertically integrated, beginning with broodstock and egg production through to harvest and initial processing.

Company Background

The Kingfish Company began with the development of a site in the province of Zeeland in the Netherlands, located along the Oosterschelde, a Natura 2000 nature reserve. The company's focus in sustainability and responsible production practices is evidenced by the accolades of becoming the first land based Best Aquaculture Practices certified facility as well as the first Aquaculture Stewardship Council certified source of yellowtail kingfish. Beginning in 2019, The Kingfish Company began an expansion of its initial site to double production capacity and began looking for a location in the US to establish a new development.

In both Europe and the United States, the Kingfish Company continues to implement the best available technologies together with well established systems and operational protocols to maintain this focus on environmental sustainability.

Kingfish Maine Development

A key part of the Kingfish Company's growth is expansion to a facility in the US. Kingfish Maine was established in 2019 with the aim of creating a new farm site in Jonesport, Maine. The location identified brought one of the most critical elements needed for a marine fish land-based fish farm: direct access to good quality seawater. This water, coupled with recirculating aquaculture technology, allows us to not only maintain ideal conditions for the fish but also minimize environmental impact.

Intake and Outfall Siting

Kingfish Maine engaged with the local community early to get a first-hand understanding of priorities in Jonesport for an aquaculture facility. Discussions with residents of the Jonesport area indicated it was critical to them that the development of any pipes for this facility take up as short a footprint as possible into Chandler Bay because of fishing activity. Kingfish Maine approached siting the location of the intake and outfall pipes and modelling of effluent flow with this concern in mind, looking for an area that would achieve both regulatory compliance and the concerns of residents; we are fortunate that the local fishing community has such accurate knowledge of Chandler Bay, providing us great detail regarding seafloor characterization, depths, and areas of least impact on their activities.

To add to the local knowledge provided, Kingfish Maine engaged in data collection on the background water quality, flow, and current conditions in Chandler Bay; this, along with Maine DEP data were used to inform modelling of our effluent to ensure the application of Kingfish Company's system technology would be suitable for this specific site in Jonesport (see **Table 1** for summary ranges of these values).

Parameter	Background Level Chandler Bay
BOD5	<80mg/L
TSS	2.5-22mg/L
Total N	0.17-0.4mg/L
Total P	0.031-0.051mg/L
Temperature	2C - 16C (35-60.8F)
pH	8.0
Salinity	32-33ppt
Dissolved Oxygen	78%-115%

Table 1. Summary of background water quality parameters in Chandler Bay, Jonesport, Maine. Source of information is from Maine DEP data collection sites in the surrounding area, which include stations R1-3, ME02-0229, ME01-0064, and ME05-0016, as well as Kingfish Maine data collection, performed by internal staff as well as Normandeau and Associates.

We performed both near-field modelling using CORMIX and far-field modeling using TUFLOW, a 3-dimensional far-field model, of the facility’s effluent in order to locate the outfall in a position that would maximize mixing and dispersion. Kingfish Maine assessed modelling results for effluent points progressively farther from shore in order to achieve the point of maximum mixing and dispersion with minimal disturbance to local activity.

Kingfish Maine Effluent Filtration and Pipe Design

In any aquaculture facility, there is an effluent consisting water that has been used to rear the fish and the byproducts of feeding and growing those fish: fish waste, which mainly consists of solids and naturally occurring nutrients, such as nitrogen and phosphorus. Because RAS facilities minimize demand or consumption of water by reusing it in the systems, effluent can be higher in these constituents, which is why wastewater filtration and treatment is specifically designed and sized to extract as much of that waste as possible. Kingfish Maine has employed best practicable treatment strategies in the design of our effluent filtration system (*detailed in Attachment 4 of the main application*), demonstrated in the following ways:

- Our system is designed to the specifications required of The Kingfish Company’s certifications with Best Aquaculture Practices (BAP) and Aquaculture Stewardship Council, two globally recognized certification standards within the aquaculture industry.
- We incorporate redundancy in our treatment by water first being filtered within the recirculating culture systems themselves; water only leaves the system once it has been filtered and then goes to the wastewater filtration system, where it goes through a second round of multistep filtration and sterilization.
- We utilize proven technology in design our effluent treatment to ensure we maximize efficiency (see **Appendix B** for Wastewater Treatment diagram), which includes:
 - Large and fine particle filtration to remove solids (TSS), which is the major contributor to BOD
 - Moving and fixed bed bioreactors for nitrification and denitrification, or removal of nutrient load
 - Sterilization utilizing ozone or UV at recommended levels
- Locally, we have consulted with Maine Department of Marine Resources regarding solids filtration levels and water sterilization treatment application.

When incorporating our data and calculations into the modelling, we used conservative removal rate assumptions for each parameter in the effluent characterization to ensure the results provided a prudent depiction of how the effluent flow would behave in Chandler Bay (see **Appendix A**, Kingfish Maine

Near- and Far- Field Modelling Report – Chandler Bay, Maine for complete description of models and assumptions used to construct).

Kingfish Maine also incorporated a diffuser design on the end of each effluent pipe in order to aid in improved dispersion and mixing of the flow; this includes a six-port diffuser, each measuring 8.3 inches (211mm) with duckbill-style valves as well as an additional three, capped ports for redundancy and cleaning.

Kingfish Maine Effluent Characterization and Modelling Results

Sustainability and responsible environmental practices are at the core of The Kingfish Company’s company values. Methods by which Kingfish Maine minimizes impacts in development of this project:

- By growing a marine species, Kingfish Maine uses minimal amounts of a limited resource, freshwater, and relies mainly on the use of seawater from Chandler Bay for operations.
- By utilizing recirculating aquaculture systems, Kingfish Maine is reducing as much as possible the demand for that seawater, focusing on continued efficiency improvements to reduce that necessary supply.
- By implementing multiple types and redundant filtration systems, Kingfish Maine is maximizing effluent treatment capability, improving the water quality of our effluent.
- By implementing the same multistep redundancy in our heat recovery systems, Kingfish Maine will be discharging cooler water than the facility takes in.

The results of modelling show that Kingfish Maine can achieve maximum mixing and dispersion without significant impacts to surrounding habitat and fishing activity by placing our effluent approximately 2,624 ft (800m) off the shore of the proposed site with the diffuser configuration described above. Dilution factors obtained were 60x at the edge of the near-field mixing zone (CORMIX), which is limited to 230ft from effluent point, and 173x in the far-field (TUFLOW) (see **Appendix A**, Kingfish Maine Near- and Far- Field Modelling Report – Chandler Bay, Maine for complete description of model results).

Key parameters in review show:

- *Total Flow*: 28.7 million gallons per day, of which
 - 6.4 million gallons is for the culture and processing of fish (“culture water”, “processing water”), and
 - 22.3 is used in reclaiming thermal energy from the water prior to discharge (“heat recovery water”)
- *pH and Salinity*: Kingfish Maine will not be altering pH or salinity outside of the normal range found in Chandler Bay as yellowtail kingfish require these parameters to remain with the ambient range naturally occurring.
- *Temperature*: Because of Kingfish Maine’s heat recovery process, we will be sending out effluent that is colder than ambient temperatures in Chandler Bay, and we have no significant effect on the overall temperature of Chandler Bay. The maximum temperature difference shown in the far-field modelling results is 0.09°F cooler than ambient (see **Appendix A**, Kingfish Maine Near- and Far- Field Modelling Report – Chandler Bay, Maine for complete description of model results).
- *Total Nitrogen*: The dilution factor of 173x in the far-field model results in a total nitrogen (TN) level of 0.038mg/L contributed by Kingfish Maine effluent. With a median and mean background TN of 0.25mg/L and 0.27mg/L, respectively, total nitrogen in Chandler Bay would be 0.29mg/L-0.31mg/L, which is within the protective limits set by DEP for preservation of dissolved oxygen and eelgrass.

- *BOD₅ and TSS*: Presuming the standard permissible limits for BOD and TSS of 30mg/L average daily concentration and 50mg/L maximum daily concentration to be included in a discharge permit from DEP, at a dilution factor of 173x, Kingfish Maine effluent would result in less than 0.035mg/L change on dissolved oxygen in Chandler Bay. This would meet standard DEP assessment criteria.

Kingfish Maine will also be drawing water from Chandler Bay, allowing for ongoing monitoring of the water quality. Our intake pipes will be located at approximately half the distance, or 1,312 ft (400m) from shore along the same trajectory as the effluent pipes. This demonstrates our commitment to maintaining the environment in which we are located as any negative impact would be detrimental to our own operation.

Alternatives

As discussed above, Kingfish Maine is implementing best practicable treatment that has been demonstrably achieved in our industry in our wastewater treatment system and meeting standards of two globally recognized best aquaculture practices certifying agencies. In our modelling, we also completed model runs at a location further from shore that demonstrated greater dilution of a critical parameter, nitrogen. However, in order to achieve this, the discharge point was approximately 2 miles from shore in order to avoid depth limitations to tidal mixing caused by the presence of two islands, Ballast and Mark Islands. Locating the discharge at this point not only presents an economic limitation for Kingfish Maine but also requires far greater impact to the seafloor and to local fishing activity, in direct contrast to the main concerns voiced by the community. Assessing these factors, the placement of our discharge point at 2,624 ft (800m) and intake at 1,312 ft (400m) from shore of the site is the most favorable option.

From the design of our treatment system to the location of both our intake and effluent locations, Kingfish Maine continues to maintain our focus on sustainability, not just from an environmental perspective of our choices but also with respect to how we operate as a part of the local community.

Kingfish Maine Social and Economic Benefits

The Kingfish Company works to bring positive benefit to the communities where we develop. In establishing a vertically integrated business of this scale, encompassing all aspects of the aquaculture process of taking yellowtail kingfish from egg to market, provides significant opportunity for growth in Jonesport, Washington County, and Maine across a multitude of sectors in both direct and indirect engagement. Kingfish Maine can demonstrate and quantify this growth through our current activities.

- Kingfish Maine is already developing hatchery production in the University of Maine's Center for Cooperative Aquaculture Research. The company will be able to utilize this not just for immediate hatchery production but also to begin training a small group of individuals in a company standard, which can then be translated to new staff that is assembled for the larger facility. Through this measured approach to development, the workforce can be brought on systematically, allowing for Kingfish Maine to source employees locally as much as possible and collaborate with local entities to build education and training programs to fill the workforce.
- Kingfish Maine is already beginning to build this training program. In collaboration with teachers and administrators at Jonesport-Beals High School, Kingfish Maine is working to build an aquaculture focused education program with hands on work, such as constructing a small RAS system in the classroom with Kingfish Maine staff. We have spoken with

University of Maine, Washington County Community College, and Downeast Institute to explore how this program can tie into those at their institutions to provide greater opportunity for higher level education. Our goal is to create a lasting effect, providing not only attractive employment opportunities today but attract future generations to stay in the area.

- The company is dedicated to providing quality employment opportunities to build a stronger, more resilient community. Kingfish Maine has consulted with Sunrise County Economic Council, Downeast Institute, as well as local individuals to better understand those aspects of a career package development that are most important as well as initiatives in which the company can participate to improve the community.

In order to attempt to quantify these benefits, Kingfish Maine engaged the University of Maine to perform an economic impact assessment. An IMPLAN model was used to evaluate the impact of the planning, construction, and ongoing operation of \$108 million-dollar RAS facility in Jonesport. Kingfish Maine is shown to provide significant numbers of both direct and indirect employment opportunities to Washington County. Between 2008 and 2018, Washington County saw private employment decline by 6.8% across all industries while the state, as a whole, saw a 3.2% increase. Ongoing operations of Kingfish Maine stands to provide 126 direct and indirect jobs to Washington County, accounting for an increase of 2% in private employment - 1/3 of the private employment jobs that were lost in 2008 to 2018. While the construction phase has wider implications at the state level, Kingfish Maine's ongoing operations provide significant benefits to both Jonesport and Washington county in terms of economic output, employment, and income level. The full report is still in draft as more information is added as details become available through the design process; however, a summary of the findings of this study is attached as **Appendix C**.



KINGFISH
MAINE

APPENDIX A *Kingfish Maine Near- and Far- Field Modelling Report – Chandler Bay, Maine, Ramboll Environmental*

Intended for
Kingfish Maine

Date
August 2020

Project Number
1690016697

KINGFISH MAINE NEAR- AND FAR- FIELD DISCHARGE MODELING REPORT – CHANDLER BAY, MAINE

**KINGFISH MAINE
NEAR- AND FAR- FIELD DISCHARGE MODELING
REPORT – CHANDLER BAY, MAINE**

Project No. **1690016697**
Issue No. **Final**
Date **04 August 2020**
Made by **Holly Leslie**
Checked by **Richard Wenning**
Approved by **Richard Wenning**

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APPENDICES

Appendix 1

Outfall Location Analysis

Appendix 2

Calibration

EXECUTIVE SUMMARY

The Kingfish Company and its subsidiary, Kingfish Maine (Kingfish), are proposing to construct and operate a 6,000 – 8,000 metric ton (MT) Yellowtail kingfish Recirculating Aquaculture System (RAS) facility in Jonesport, Maine. Included among the local, state, and federal permits that must be obtained before construction can begin is the requirement to apply for a Maine Pollutant Discharge Elimination System (MEPDES) permit, which governs the discharge of wastewater from the RAS facility.

This report describes the results of environmental modeling work performed by Ramboll to support the MEPDES permit application. This report aims to:

1. Describe the modeling approach and work conducted to predict likely discharges from the proposed facility;
2. Describe the spatial footprint of the near-field and dilution factors achieved in the NMZ;
3. Describe the movement of the discharge plume in the far-field zone; and,
4. Describe the spatial extent of possible contact of the discharge plume with the shoreline.

Ramboll used two US Federal Agency-approved surface water dispersion models in this work to predict the mixing behavior and dispersion of combined culture water and heat recovery water discharged to Chandler Bay from a proposed submerged ocean outfall. The Cornell Mixing Zone Model (CORMIX) 3D dilution model was used to predict the near-field mixing zone (NMZ) of wastewater discharges. The TUFLOW Finite Volume (FV) model was used to predict the spatial extent of dispersion of the wastewater discharge in Chandler Bay.

Engineering specifications for the location of the pipeline and configuration of diffusers at the proposed ocean outfall, as well as characteristics of the wastewater discharge, were provided to Ramboll by Kingfish. The ambient conditions in Chandler Bay and characteristics of the receiving seawater were obtained from coastal monitoring records available on the Internet from the State of Maine and from other available public sources. Hydrodynamic conditions were simulated in the models to be representative of conditions typical for winter and summer seasons along downeast coastal Maine.

Results from the CORMIX model used to predict seawater conditions at the ocean outfall indicate the NMZ is likely to extend approximately 230 ft from the location of the pipeline outfall during either summer or winter conditions. At the edge of the NMZ, the wastewater discharge will have been subjected to a dilution factor of 60x; i.e., the levels of residual nutrients in the wastewater at 230 ft from the outfall will be 60-times lower than levels at the point of discharge.

Once beyond the NMZ, the wastewater discharge in the far-field zone, which is expected to continue to mix and dilute with seawater, is predicted to move with offshore flow currents and tidal forces in the bay. During tidal cycles, the diluted wastewater discharge is expected to move with offshore flow currents up to 3 miles to the north with incoming tides and up to 1 mile south with outgoing tides. The TUFLOW FV model predicts that the diluted wastewater discharge plume may reach its north and south limits approximately 7 days after commencement of discharges; i.e., the model predicts the diluted wastewater discharge is highly unlikely to move beyond 3 miles north of the discharge location or 1 mile south of the discharge location during any given tidal cycle.

The modeling results predict that wastewater from the outfall may reach the western shore of Chandler Bay along Route 187. Using total nitrogen concentrations in the wastewater discharge as an indicator, the modeling results predict the wastewater discharge will have been subjected to a dilution factor of 173x; i.e., total nitrogen levels will be 173-times lower than at the point of discharge. Any total nitrogen associated with the wastewater discharge that reaches the shoreline is predicted to fall within the threshold range that Maine DEP cites as protective of eelgrass and dissolved oxygen conditions.

1. INTRODUCTION

1.1 Background

On behalf of Kingfish Maine (Kingfish), Ramboll developed near-field and far-field surface water dispersion models to support Kingfish's application for a Maine Pollutant Discharge Elimination System (MEPDES) permit for their proposed Recirculating Aquaculture System (RAS) facility in Jonesport, Maine. Development of the RAS facility requires the construction of an ocean outfall in Chandler Bay for discharging culture water and heat recovery water (hereafter referred to collectively as wastewater discharge). Kingfish is required by the Maine Department of Environmental Protection (DEP) to obtain a wastewater discharge license under the MEDPES program. This report describes the modeling work performed to delineate the near-field mixing of the wastewater at the initial point of discharge and predict the likely far-field dilution behavior of the wastewater discharge plume as it disperses further away from the location of the proposed ocean outfall in Chandler Bay.

Maine DEP has established the following procedures for understanding near-field mixing and far-field dilution characteristics associated with obtaining a license for wastewater discharges to the ocean in the State of Maine:

- Near-field (initial) dilution: Near-field Mixing Zone (NMZ) is defined as the distance from the point of discharge where mixing patterns are driven by the exit velocities of the discharge. Maine DEP specifies the conditions under which near-field dilution should be estimated – *"dilution available as the effluent plume rises from the point of discharge to its trapping level, at mean low water level and slack tide for acute exposure analysis and at mean tide for the chronic exposure analysis."*¹ Near-field dilution is estimated based on the dilution factor derived from established and accepted near-field mixing models.
- Far-field dilution: Far-field dilution is the mixing and dispersion that occurs within the plume that is outside of the zone of influence of the exit velocities from the point of discharge. Maine DEP has not established specific licensing criteria for determining appropriate far-field dilution conditions. For Kingfish's proposed discharge, Ramboll has developed a three-dimensional (3D) hydrodynamic model to estimate the dispersion and mixing characteristics in the far-field zone and calculated far-field dilution factors based on the model results.

1.2 Modeling Approach

The specific objectives of the hydrodynamic modeling are as follows:

1. Describe the modeling approach and work conducted to predict likely discharges from the proposed facility specifically with respect to total nitrogen and temperature;
2. Describe the spatial footprint of the near-field results and dilution factors achieved in the NMZ;
3. Describe the movement of the discharge plume in the far-field; and,
4. Describe the spatial extent of possible contact of the discharge plume with the shoreline.

Both the near-field and far-field models are US Federal Agency-approved surface water dispersion models. Both models are used consistent with their intended purpose to predict the likely route and trajectory of wastewater discharges from a point source location (in this case, a submerged ocean outfall). In the NMZ, the characteristics of the discharge govern how the discharge plume is likely to mix with the receiving water. The primary forces that typically influence hydrodynamics and the movement of the wastewater in the receiving environment beyond the NMZ are ocean currents, and winds. Thermal/density stratification commonly

¹ 06-096 CMR Chapter 530 – Surface Water Toxics Control Program, §4(A) (calculation of dilution factors) states in part as §4(A)(2)(a)

influences mixing patterns but water profile data from Chandler Bay collected by Maine DEP in 2001-2010 and by Kingfish in 2019 suggests that water temperatures are not strongly stratified. Wind-generated waves may also occasionally also modify movement and influence the behavior of the plume.

The wastewater discharge from the proposed Kingfish facility will include a combination of heat recovery water and culture water from the RAS. For the modeling work, the discharge water is described by Kingfish to consist of a mixture of nearly three-quarters heat recovery water and one-quarter RAS culture water.

The heat recovery water includes only water that is taken from Chandler Bay and cycled through heat exchangers to remove heat energy. Heat recovery water does not interact with any RAS processes involved in growing fish and, thus, is identical to ambient seawater conditions in Chandler Bay in all aspects (e.g., salinity, nutrient characteristics) except for water temperature. During most times of the year, the temperature of water returned to Chandler Bay is anticipated to be approximately 5 degrees (F) *below* (i.e., colder than) ambient conditions due to the heat recovery process that will be used by Kingfish to maintain growing conditions in the culture tanks.²

The culture water from the RAS facility includes water that interacts with RAS processes involved in growing fish. Culture water from the hatchery and grow-out tanks in which yellowtail kingfish will be raised at the facility will be discharged to Chandler Bay. The suspended solids and nutrient (primarily phosphorus and nitrogen) content of the culture water, as well as the biological oxygen demand (BOD) condition of the culture water, may be present at levels above ambient conditions in Chandler Bay.

The near-field modeling work described in this report was conducted to simulate the mixing of the wastewater discharge with the ambient receiving seawater in the bay, and predict the near-field dilution factor based on two relevant water quality characteristics of the discharge water, total nitrogen and temperature. Total nitrogen is the primary wastewater constituent of concern with respect to water quality in Chandler Bay. Although the nature of nitrogen in the discharge and the form it takes in the environment are variable, the modeling considers total nitrogen as a non-transformative conservative constituent that does not change its form in the receiving environment. Water temperature is a common parameter when assessing wastewater mixing. In this case, the wastewater temperature will typically be colder than surface water temperature in Chandler Bay.

There is currently little understanding of the variation in the magnitude and direction or velocity with depth of the counter currents and helicoidal flows in the bay. This understanding is important when considering potential plume movements, which may vary with water depth. Therefore, both the CORMIX and TUFLOW FV models were performed using a 3D modeling approach to simulate the behavior of mixing, dilution and dispersion conditions of the wastewater discharge in this particular setting.

Lastly, the modeling approach included a variable water level boundary to reflect the tidal cycle in Chandler Bay. Tide curves of variable lengths were utilized, generally based on tidal peaks set at the Mean High Water (MHW) level. MHW is the average of all the observed high-water heights. In accordance with Maine DEP requirements, influences from the wind at the water surface were omitted from the model.

1.3 Dispersion Models

Two types of modeling have been completed, both in 3D:

² This is expected to be true throughout the year with the only exception of when surface water temperatures in Chandler Bay reach freezing. Wastewater discharges during these times will be the same temperature as ambient surface water.

- CORMIX near-field plume modeling; and
- TUFLOW FV far-field advection-dispersion modeling.

CORMIX is an industry-standard mixing zone model which is primarily used to determine detailed wastewater plume characteristics close to the outfall (<300 ft). Whilst CORMIX does not include a sophisticated hydrodynamic model to simulate the unsteady (i.e. time-varying) movement of the receiving environment, it has the functionality to model the discrete hydraulic effects associated with pipe outfalls and diffusers, typically used to aid wastewater dispersion in situations such as this. Beyond the near-field zone of the receiving water, the accuracy of CORMIX to predict mixing characteristics is reduced. Likewise, in coastal environments, flow conditions normally vary over time in response to the rise and fall of tides.

The 3D TUFLOW FV³ far-field model used in this work encompasses the area of Maine coastline extending from the headland at Jonesport in the south west to the headland at Point of Man in the north east. The bay between the two headlands is split by a central island; Roque Island. The bay to the south west of Roque Island, adjacent to Jonesport is Chandler Bay. The bay to the north and east of Roque Island is Englishman Bay. Within the model area, there are several smaller islands and rocky outcrops, smaller inlets and bays and a complicated bathymetric environment. The full area has been modeled to understand the complicated flow regime operating within the bay as tides rise and fall. Figure 1-1 shows boundary conditions and the key locations within the Jonesport, Maine, TUFLOW-FV model.



Figure 1-1: Boundary conditions and locations within the Jonesport, Maine, TUFLOW-FV model

2. CORMIX MODEL APPROACH

2.1 CORMIX Model

Wastewater discharge modeling was undertaken using the Cornell Mixing Zone Model (CORMIX) Version 11, a 3D dilution model for the definition of discharge plumes. Consistent with its intended use, the CORMIX model was used to model continuous point source discharges using the role of boundary interaction to predict steady-state mixing behavior and plume geometry at the outfall location specified by Kingfish.

Separate calibration of the results of the model has not been possible because there is insufficient data on water quality in the near vicinity of the proposed outfall (and as the outfall is not yet operational). It has not, therefore, been possible to directly verify the model outputs against available water quality information. However, conservative input data were used to ensure a conservative approach was taken with respect to the model's predictions.

Data on the proposed outfall and receiving environment were obtained from several sources (indicated below by brackets []). The discharge is based on the initial proposed outfall design provided to Ramboll by Kingfish. Hydrodynamics, concentrations of selected constituent parameters, recirculation, and dispersion were evaluated using the following conditions (representative conditions for winter and summer seasons have been modeled):

- Pipe outfall = 6No. 211 mm wide fanned-out ports with 5 m spacing [Kingfish];
- Outfall location = central port 800 m offshore [Kingfish];
- Effluent flow rate = 1,250 L/s (44.14 cfs) [Kingfish];
- Effluent nitrogen concentration = 6.9 mg/L [Kingfish];
- Summer effluent density = 1,024.75 kg/m³ (calculated from average temperature of 9.3°C [Kingfish] and salinity equivalent to Chandler Bay of 3.2% [Kingfish]);
- Winter effluent density = 1,025.71 kg/m³ (calculated from average temperature of 0°C [Kingfish] and salinity equivalent to Chandler Bay of 3.2% [Kingfish]);
- Average background nitrogen concentration in receiving environment = 0.27 mg/L [Kingfish];
- Average depth of Chandler Bay in vicinity of outfall = 13 m [C-MAP (see Section 3.6)];
- Depth at discharge = 13 m [as above];
- Average width of Chandler Bay = unbounded [calculated using GIS];
- Flow Currents = 0.1 m/s [TUFLOW model (see Section 3)]; and
- Manning's roughness (n) = 0.03 [NLCD (see Section 3.5)].

The orientation of the diffuser at the outfall was assumed to be perpendicular to the shoreline and to the ambient current axis. The nozzles on the diffuser were assumed to be oriented downstream in the direction of the ambient current. For the purposes of near-field modeling, ambient flow currents were modeled as uni-directional. Design details may be subject to change as the design progresses. The configuration and orientation of the diffuser is applicable for determining the mixing and dilution potential of the wastewater discharge in the near-field.

For the sake of brevity in reporting, a full description of design iterations is not provided herein. Appendix 1 presents a comparison of different modeling results in the far-field showing how changes in the location of the outfall in Chandler Bay influences the mixing and dilution conditions of the wastewater discharge.

3. TUFLOW FV MODEL APPROACH

3.1 Software

The hydrodynamic model of the Jonesport, Maine, coastline was developed using industry-standard TUFLOW Finite Volume (FV) software. The most recent release was used, build 2019.01.008. TUFLOW FV is a flexible mesh, finite volume numerical model that simulates hydrodynamic, sediment transport, and water quality processes in oceans, coastal waters, estuaries, rivers, and floodplains. The model was used because the flexible mesh structure allows users to modify the resolution of different spatial boundaries, which can improve model resolution in specific areas of interest.

TUFLOW has been benchmarked for use in many coastal environments in the United States. TUFLOW is certified by the US Federal Emergency Management Agency for use under the National Flood Insurance Program. TUFLOW also has approved status for use within the United States Army Corps of Engineers National Hydrology, Hydraulics and Coastal Software list.

TUFLOW FV includes a module for Advection Dispersion (AD). AD refers to the transport of dissolved constituents within hydrodynamic flows. An AD module within a numerical modeling suite is used to simulate a range of environmental processes including salinity dynamics, constituent fate and transport and heat, amongst others. TUFLOW FV applies the AD module to simulate the time evolution of salinity, temperature, suspended sediment, passive tracers and water quality constituents.

3.2 Model Area and Mesh Design

TUFLOW FV is designed for solving Non-Linear Shallow Water Equations (NLSWE) on unstructured meshes, comprising triangular and quadrilateral elements. The flexible mesh approach allows for a seamless boundary fitting along complex coastlines or open channels as well as accurately and efficiently representing complex bathymetries with the minimum number of computational elements. The flexible mesh capability is particularly efficient at resolving a range of resolutions within a single model without requiring multiple domain nesting, allowing for a fine resolution within the area of interest and coarser resolution in the regional extents.

Figure 3-1 shows the TUFLOW FV mesh for the Jonesport coastline and the tidal water level boundary. The mesh was primarily developed to assess the movement of discharge wastewater released offshore within Chandler Bay. Consequently, the mesh was constructed with smaller mesh elements (higher mesh resolution) close to Jonesport to resolve the complex hydrodynamic environment at this location. Larger mesh elements (lower mesh resolution) were progressively applied with increasing distance away from Chandler Bay, and for the out of bank, dry land areas. The unstructured flexible mesh was created using the mesh generation tool Rising Water Software GIS Mesher⁴.

⁴ <https://www.risingwatersoftware.com/>

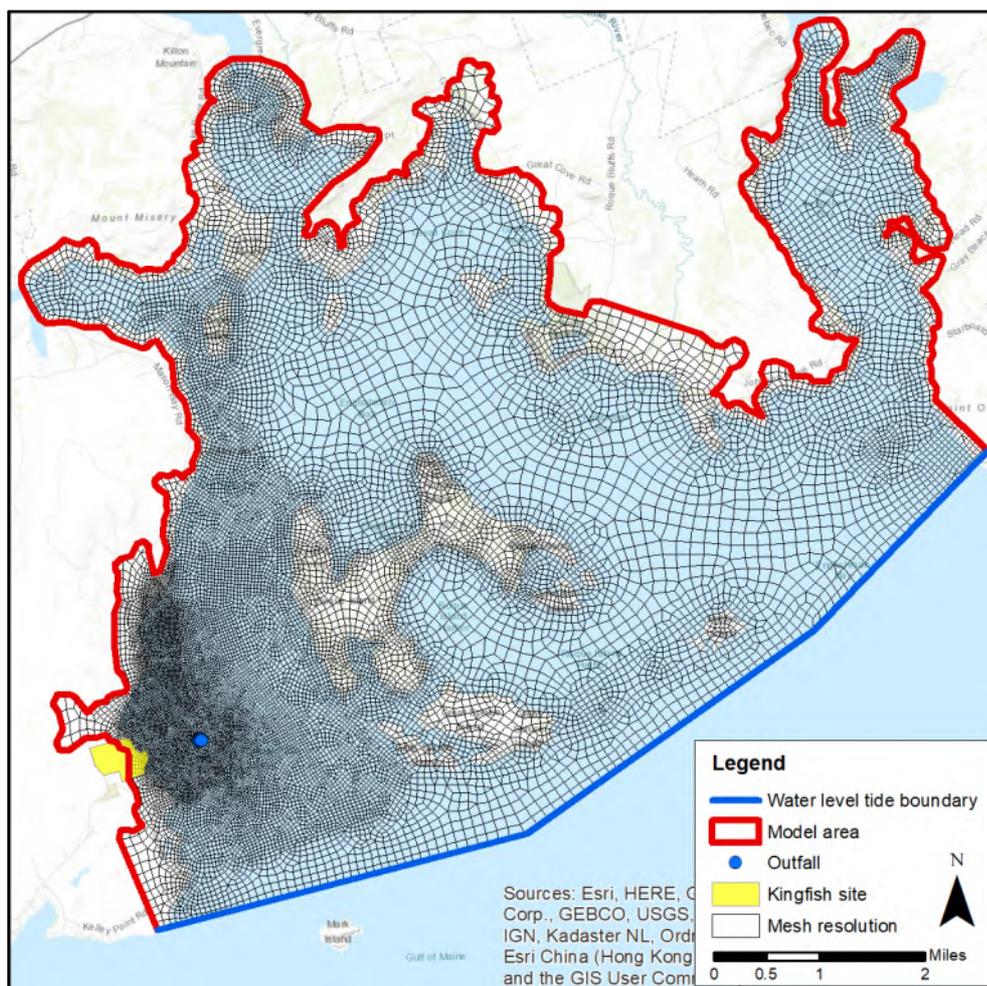


Figure 3-1: TUFLOW FV mesh for Jonesport, Maine

3.3 3D Layer Z Coordinate Approach

TUFLOW FV includes three-dimensional (3D) capability. Two-Dimensional (2D) depth averaged simulations can be an excellent approximation for many applications however, there are cases where 3D modeling is required to sufficiently describe the observed flow characteristics. For example, 3D modeling is useful in areas where there is a significant variation in magnitude and direction of velocity with depth, such as counter currents and helicoidal flows, or where the effects of density become important such as in stratified environments or dense plume outfalls. A 3D modeling approach has been applied for the Jonesport model to be able to understand the vertical movement of wastewater released from the outfall within Chandler Bay.

Modeling with 3D layers involves setting vertical cells similar to the way that horizontal cells are defined in the mesh (Figure 3-2). These can be set with a fixed elevation depth (z) for each cell (e.g. each layer is 2 ft thick); by dividing the depth of the river into an equal number of evenly distributed sigma layers (e.g. 4 sigma layers throughout the model would mean a 16 ft depth has 4 x 4 ft layers, an 8 ft depth has 4 x 2 ft layers); or a combination (hybrid) of the two schemes.

The Jonesport model has applied a hybrid z-sigma layering method for vertical layers with the hybrid z-sigma layer method defined by a series of surface sigma layers overlaid on a z scheme at depth. The hybrid z-sigma layering method provides flexibility and stability in areas of wetting and drying not available via a z only coordinate system while providing the potential for high resolution near-surface exchange and gradient capturing.

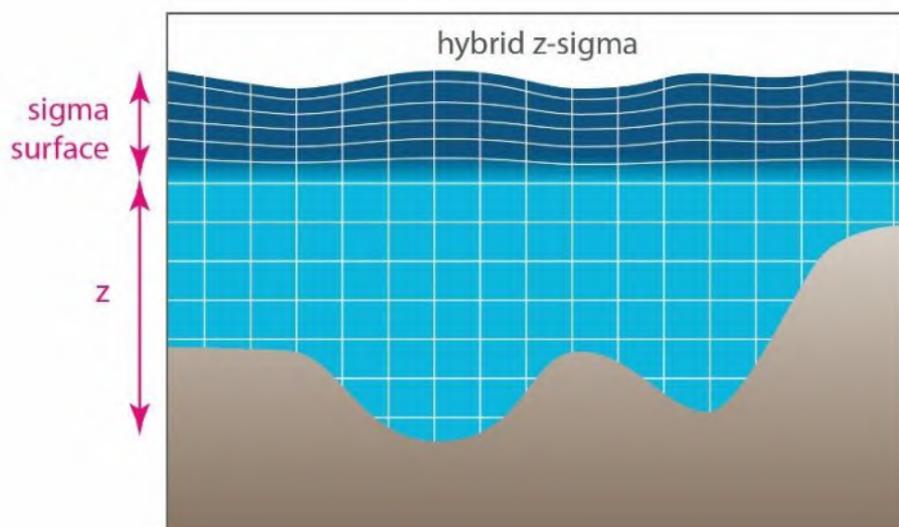


Figure 3-2: 3D Model z-sigma Vertical Discretization Approach

The vertical datum applied in this study is the North American Vertical Datum of 1988 (NAVD88). The hybrid z-sigma approach applied for the Jonesport model is as follows:

- 11 z layers
 - 6.56 ft (2 m) intervals from -13.12 ft (-4 m) NAVD88 to -65.62 ft (-20 m) NAVD88,
 - 13.12 ft (4 m) intervals from -65.62 ft (-20 m) NAVD88 to -104.99 ft (-32 m) NAVD88.
- 4 surface sigma layers.
- 1.64 ft (0.5 m) minimum bottom layer thickness to ensure the bottom layer of the 3D solution at the bed is not less than 1.64 ft (0.5 m), avoiding 'skinny' vertical layers where the bed elevation is between two z coordinate layers.
- 6.56 ft (2 m) water depth required before 3D calculations are applied.

3.4 Tidal Boundary

3.4.1 Data Availability

Exceedance probability, the likelihood that water levels will exceed a given elevation, is based on a statistical analysis of historic values. Extreme Water Level data is available from the National Oceanic and Atmospheric Administration (NOAA). NOAA provides exceedance probability levels for select CO-OPS water level stations with at least 30-years of data. A NOAA Technical Report, "Extreme Water Levels of the United States 1893-2010"⁵ describes the methods and data used in the calculation of the exceedance probability levels.

Annual Exceedance Probability (AEP) levels were derived relative to the National Tidal Datum Epoch (1983-2001) Mean Sea Level datum at gauge stations. Two AEP levels are provided; AEP levels for the mid-year of the National Tidal Datum Epoch and the projected AEP levels and tidal datums assuming continuation of the linear historic trend.

This study is concerned with everyday tide data and, as such, has utilized the 99% projected AEP level. The 99% AEP level is the tide level that will be exceeded in all but one year per century, although it could be exceeded more than once in other years.

Extreme levels measured by the CO-OPS tide gauges during storms are called storm tides, which are a combination of the astronomical tide, the storm surge, and limited wave setup caused by

⁵ NOAA, NOAA Technical Report NOS CO-OPS 067, "Extreme Water Levels of the United States 1893-2010", September 2013

breaking waves. They do not include wave runup; the movement of water up a slope. The 99% AEP level was used as it was considered to be a peak tide level frequently experienced and as such, represents an everyday tide level.

The closest two CO-OPS water level stations with extreme water level data predictions are Eastport and Bar Harbor (Table 3.1).

Table 3.1: NOAA station information for water level CO-OPS sites used to estimate projected 99% AEP tide levels

Station Name	Station ID	NOAA Chart number	Sensor Information	Latitude, Longitude	Projected 99% AEP Tide Level for 2018 (NAVD88)
Bar Harbor, ME	8413320	13318	Acoustic water level (A1)	44° 23.5' N, 68° 12.2' W	7.579 ft (2.310 m)
Eastport, ME	8410140	13328	Acoustic water level (A1)	44° 54.2' N, 66° 59.1' W	12.467 ft (3.800 m)

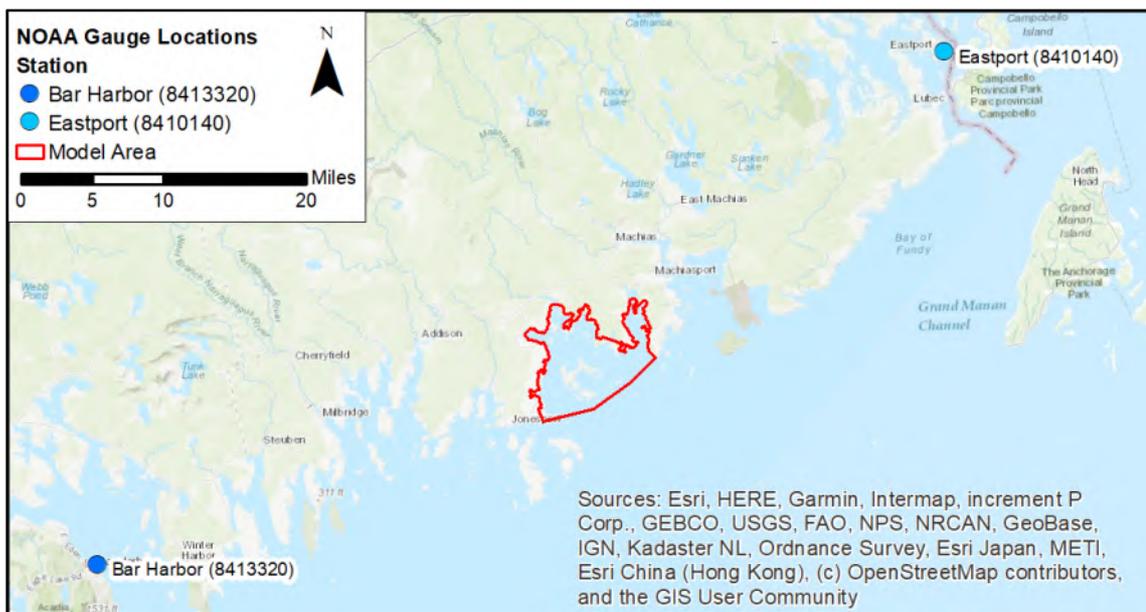


Figure 3-3: NOAA station water level CO-OPS sites in relation to the TUFLOW-FV model location

The AEP tide levels are station specific so their use for evaluating surrounding areas may be limited. Considering the significant distance between the two stations, a simple linear interpolation to derive the 99% AEP tide level for Chandler Bay using only Eastport and Bar Harbor data would not be appropriate.

Tidal datum information was available for NOAA stations in between Eastport and Bar Harbor. This data was utilized to characterize the tide level variation along the Maine coastline. This information was fed into the interpolation calculation to provide greater confidence to the 99% AEP water levels derived for Chandler Bay (Table 3.2).

Table 3.2: NOAA station information for used to calculated projected 99% AEP tide levels for TUFLOW-FV hydraulic model.

Station Name	Station ID	Sensor Information	MHW (NAVD88)	Cumulative Distance	Projected 99% AEP Tide Level for 2018 (NAVD88)	
					NOAA	Interpolated using MHW
Bar Harbor	8413320	Acoustic water level	4.99 ft (1.52 m)	0 miles (0 km)	7.58 ft (2.31 m)	7.58 ft (2.31 m)
Milbridge	8412581	Tidal Datum	5.45 ft (1.66 m)	19.2 miles (30.876 km)	-	8.14 ft (2.48 m)
Model - West	-	-	-	33.3 miles (53.564 km)	-	8.73 ft (2.66 m)
Model - East	-	-	-	40 miles (64.312 km)	-	8.99 ft (2.74 m)
Cutler Naval Base	8411250	Tidal Datum	6.4 ft (1.95 m)	48.6 miles (78.152 km)	-	9.35 ft (2.85 m)
Cutler Farris Wharf	8411060	Tidal Datum	6.59 ft (2.01 m)	53.2 miles (85.674 km)	-	9.58 ft (2.92 m)
Eastport	8410140	Acoustic water level	8.86 ft (2.7 m)	73.4 miles (118.082 km)	12.47 ft (3.8 m)	12.47 ft (3.8 m)

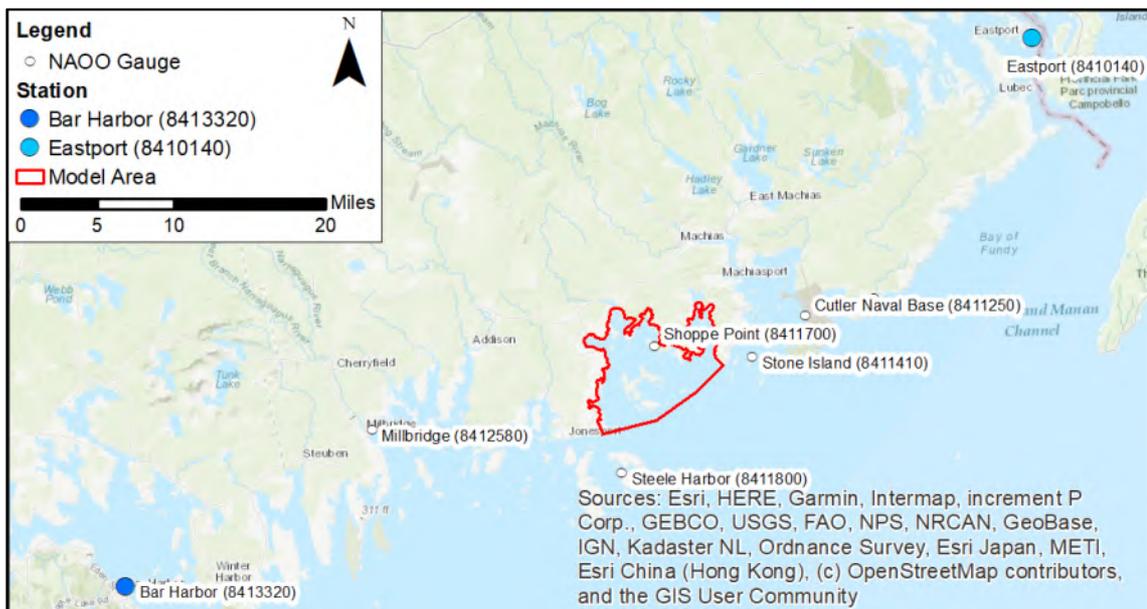


Figure 3-4: NOAA station sites in relation to the TUFLOW-FV model location

Tides can be influenced by a range of different conditions that are unrelated to the movement of the sun and moon. Weather conditions can lead to low- or high-pressure systems which impact the timing and height of tides as do winds and offshore currents which can contribute to storm surges. In order to avoid distorting model results, astronomical tides were used which ignore those extraneous influences.

The closest available NOAA tide gauge station providing a continuous astronomical tide timeseries dataset was Cutler Farris Wharf (8411060). A timeseries of astronomical tide data was extracted from the NOAA database. The tide levels were then scaled to the 99% AEP tide levels derived in Table 3.2. Figure 3-5 shows the scaled tide curves applied in the TUFLOW FV model.

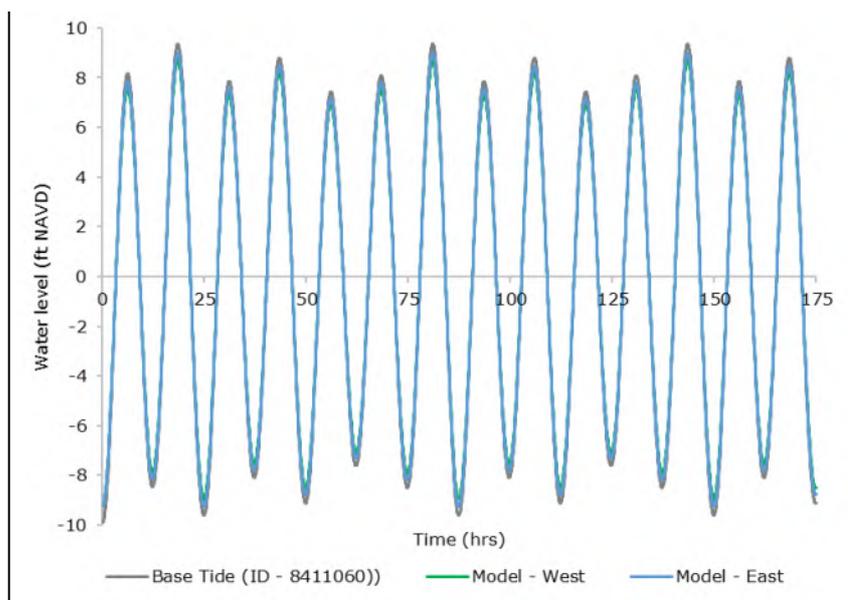


Figure 3-5: Scaled tide curve applied in the TUFLOW-FV model

The tidal boundary of the model was set to span the mouth of Chandler and Englishman’s Bay, stretching from the headland at Jonesport in the south-west to the headland at Point of Man in the north-east (Figure 3-1).

3.5 Model Roughness

Model roughness values within the TUFLOW FV model have been defined using data sourced from the National Land Cover Database⁶ (NLCD) Roughness Layer 2011 Edition, sourced from the US Geological Survey (USGS). Modeling judgement is required when assigning model roughness values as there are no specific guidelines. The Conveyance Estimation System⁷ (CES) cross-referenced against values presented in Chow⁸ (1959) were used to derive suitable Manning’s ‘n’ values.

Roughness values are used to define the land use variation in the model active area, examples include: Pasture, Roads, Buildings, Forest, Mangroves etc. Each material is assigned a constant Manning’s n value. Table 3.3 details the roughness values assigned to each land type identified in the model active area. Figure 3-6 shows the roughness mapping applied in the TUFLOW-FV model.

Table 3.3: Model roughness values

ID	Manning’s ‘n’	Land Type - Roughness
11	0.03	Open Water
21	0.025	Developed Land
24	0.032	Developed, High Intensity
31	0.035	Barren Land
44	0.2808	All Forest Types
52	0.0539	Shrub/Scrub
71	0.0456	Herbaceous
81	0.0922	Hay/Pasture
82	0.0539	Cultivated Crops
90	0.2008	Woody Wetlands
95	0.1511	Emergent Herbaceous Wetlands
100	0.0508	Roughness Stability Patch 01
101	0.2	Roughness Stability Patch 02
102	0.1	Roughness Stability Patch 02

6 <https://www.usgs.gov/centers/eros/science/national-land-cover-database>

7 <http://www.river-conveyance.net/>

8 Chow, V.T., 1959, Open-channel hydraulics: New York, McGraw-Hill.

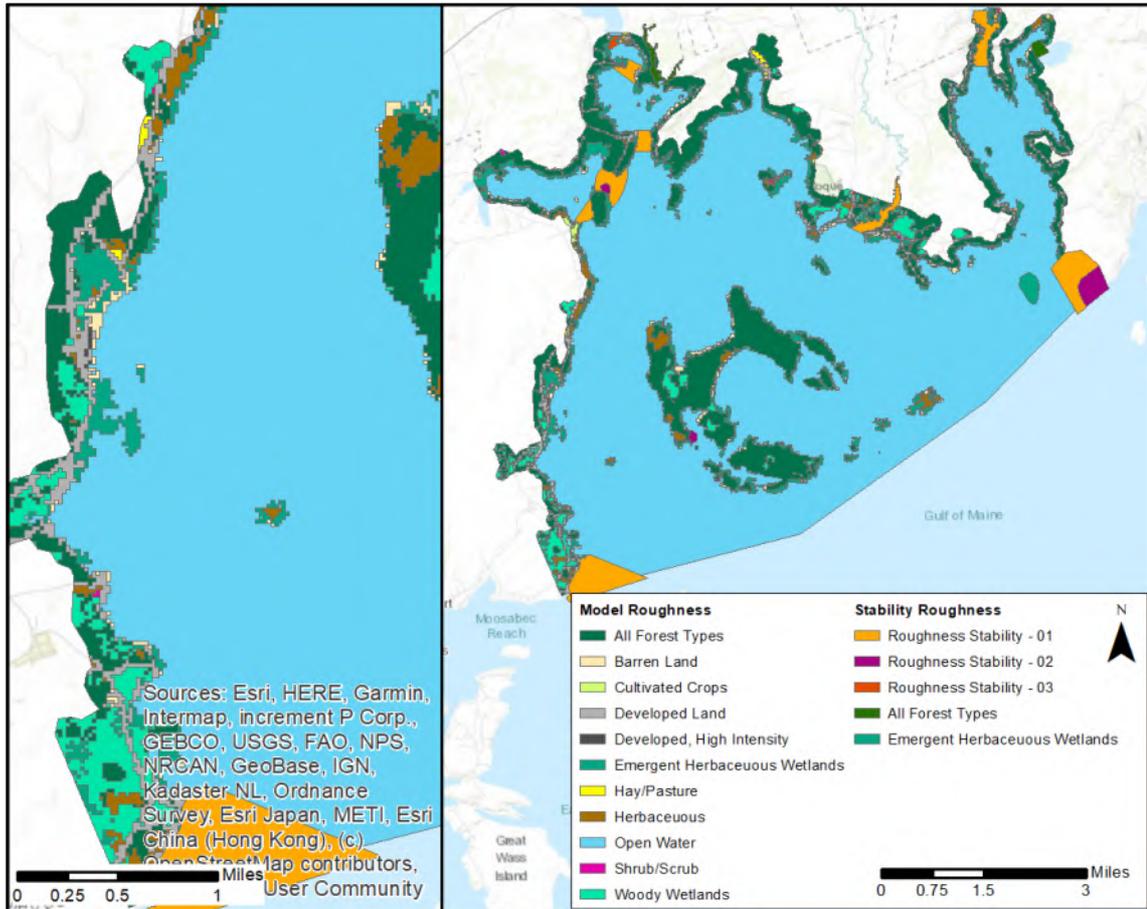


Figure 3-6: Roughness mapping applied in the Jonesport TUFLOW-FV model

Figure 3-6 also shows the locations of the Stability Roughness patches applied in the TUFLOW-FV model. These were applied in locations that caused model instability, where unrealistic flow rates were simulated or there were unnatural isolated spikes in the simulated water level. The patches are sufficiently distant from the key areas of interest to not interfere with model results.

3.6 Model Terrain

LiDAR and Bathymetry survey datasets were used to represent the base model terrain. The LiDAR dataset was sourced from the USGS⁹. The Bathymetry dataset was sourced from DHI’s C-MAP¹⁰ database.

3.6.1 USGS LiDAR

The Jonesport modeling study has utilized USGS NED 1/3 arc-second LiDAR data to represent the model terrain for the land surface. This data was made available through the USGS 3D Elevation Program (3DEP). 3DEP data comprise an elevation dataset of seamless, high resolution layers that represent the best available raster elevation data of the conterminous United States. 3DEP data are updated continually as new data become available. Seamless 3DEP data are derived from diverse source data that are processed to a common coordinate system and unit of vertical measure. The details for the LiDAR data are summarized in Table 3.4.

⁹ <https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services>

¹⁰ <https://www.c-map.com/>

Table 3.4: USGS LiDAR details

Source	U.S. Geological Survey
Publication Date	30/09/2019
Title	USGS NED 1/3 arc-second n45w068 1 x 1-degree GridFloat 2019
Format	Raster digital data
Survey date	2017
Horizontal datum	North American Datum of 1983 (NAD 83)
Vertical Datum	North American Vertical Datum of 1988 (NAVD 88)
Resolution	1/3 arc-second (approximately 10 meters)

3.6.2 C-MAP Bathymetry Data

The Jonesport model utilized bathymetry data sourced from C-MAP, an online licensed data platform of Bathymetry datasets. The bathymetry data available for Chandler Bay and Englishman Bay was surveyed in 2010. The data was provided in ESRI mesh format.

3.7 Wastewater Discharge Modeling

Total nitrogen is modeled as a scalar variable; physical quantities that are tracked within TUFLOW FV and can be represented by one value per cell using the TUFLOW-FV Advection Dispersion (AD) module.

3.7.1 Advection Dispersion Module Conceptual Framework

The TUFLOW AD module is an extension of the hydrodynamic engines, simulating constituent fate and transport. Both dissolved and particulate constituents can be simulated. The AD module takes hydrodynamic information computed by the TUFLOW-FV engine, using it in combination with initial and boundary conditions, to simulate the advection and dispersion of constituents.

3.7.2 Effluent model setup

Table 3.5 outlines the concentrations of constituents simulated to be released from the ocean outfall during different seasons of the year using the TUFLOW-FV model. The discharge rate, temperature, and concentrations of nitrogen were constant throughout each simulation, they did not vary with time. Figure 3-7 shows the diffuser location within Chandler Bay, situated 2625 ft (800 m) offshore and situated on the seabed (-41.3 ft NAVD88 (-12.6 m NAVD88)).

Table 3.5: Discharge, temperature and concentrations of total nitrogen released from the effluent diffuser locations for each model scenario

Season	Temp (°C)	Total Discharge	Number of Diffusers	Discharge per diffuser	Nitrogen Conc (mg/L)	Distance offshore	Elevation of Diffuser (bed level)
Summer	9.3	44.14 ft ³ /s (1.25 m ³ /s)	6	7.35 ft ³ /s (0.208 m ³ /s)	6.9	2,625 ft (800 m)	-41.3 ft NAVD88 (-12.6 m NAVD88)
Winter	0	44.14 ft ³ /s (1.25 m ³ /s)	6	7.35 ft ³ /s (0.208 m ³ /s)	6.9	2,625 ft (800 m)	-41.3 ft NAVD88 (-12.6 m NAVD88)

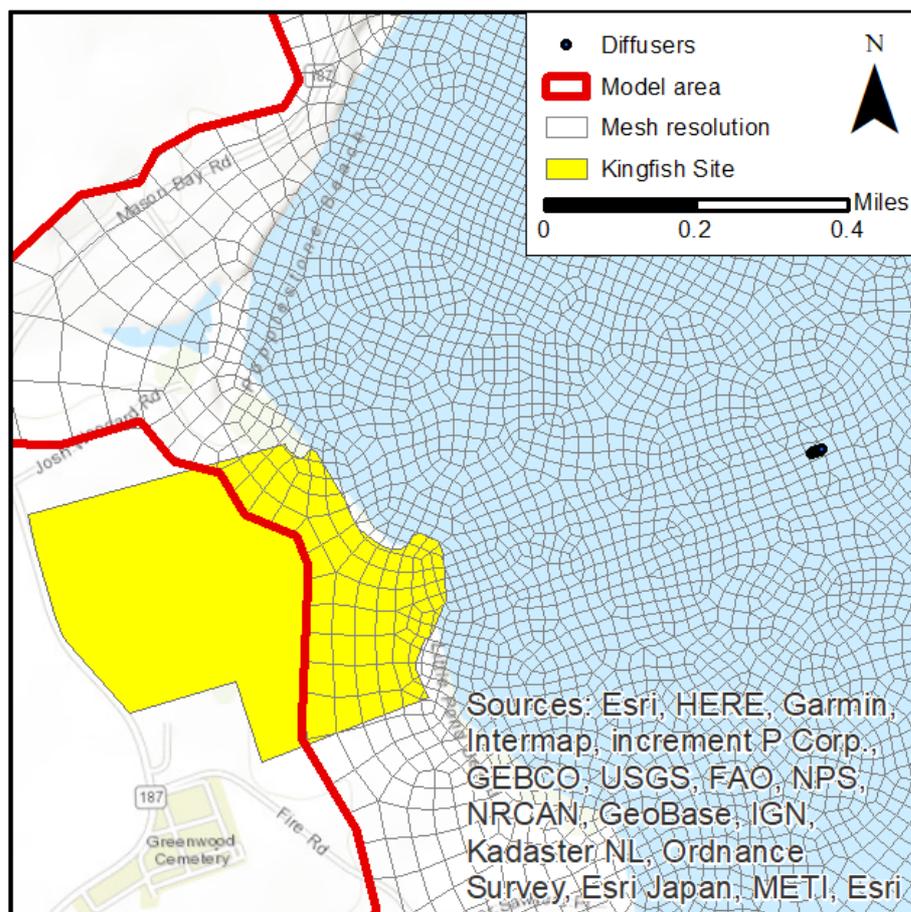


Figure 3-7: Diffuser locations within Chandler Bay

3.8 Model Parameters

3.8.1 Solution Terms

Various options are available which allow for the inclusion of a variety of solutions, including salinity, temperature, sediment, and atmospheric heat exchange. For the Jonesport TUFLOW FV model, the key interest is in the movement of the wastewater discharge in coastal waters and therefore, salinity, temperature, sediment, and tracer solutions have been included.

Complex flow regimes are in operation in Chandler Bay; a 2nd Order horizontal and vertical spatial scheme has been specified to capture these. For hydrodynamic simulations, the bed boundary resistances are described using a Bottom-Drag Model. The Jonesport TUFLOW FV model utilizes Manning, the default setting, where the Manning's 'n' coefficient is specified.

3.8.2 Model Timestep

The default time format (hours) for TUFLOW FV has been utilized. The model has been run for 175 hours (7 days), or 14 full tidal cycles from trough to trough. TUFLOW FV uses an adaptive timestep where a stable timestep must be bounded by the Courant-Friedrich-Lewy (CFL) criterion¹¹ for the wave propagation and advective terms and by Peclet criterion for the diffusive terms. The CFL number is a function of the cell size and shape, water depth, flow velocity and model timestep. The default setting is 1, which is the theoretical stability limit. In practice however, the value is commonly lowered to provide stability for models with large gradients. For the TUFLOW FV model, the CFL model is set to 0.6. The minimum and maximum variable time

¹¹ Courant, R.; Friedrichs, K.; Lewy, H. (March 1967) [1928], "On the partial difference equations of mathematical physics", IBM Journal of Research and Development, 11 (2): 215-234

step allowed according to the CFL stability criterion are set to 0.01 and 40 respectively. Sensitivity testing, which involved running the model for longer periods to see how this would affect the extent of the plume was carried out as presented in Appendix 1.

3.8.3 Turbulence Parameters

TUFLOW FV³ has a variety of options for simulating horizontal and vertical mixing options. The horizontal mixing eddy viscosity is set to be calculated using the Smagorinsky model¹² which sets diffusivity proportional to the local strain rate. The default global horizontal eddy viscosity (0.2) for the Smagorinsky coefficient is used. The vertical-mixing eddy viscosity is calculated using the external scheme General Ocean Turbulent Model¹³ (GOTM). This approach is recommended for systems with strong vertical gradients.

3.8.4 Bed Shear Stress

Bed shear stress is defined as the stress exerted by fluid on the channel bed. The opposing force is the critical shear stress, which is the stress required to initiate the motion of sediment at the channel bed. TUFLOW calculates bed shear stress using the following equation, where ρ is density, g is gravity, V is velocity, n is Manning's n and y is depth:

$$\text{Metric Units: } \tau_{bed} = \frac{\rho g V^2 n^2}{y^{\frac{1}{3}}}$$

3.9 Calibration

As with the near-field model, separate calibration of the results of the model has not been possible as there is insufficient data on water quality in the near vicinity of the proposed outfall (and as the outfall is not yet operational). However, some monitoring of flow currents has been undertaken and far-field modeling has been compared with this as presented in Appendix 2.

¹² Smagorinsky, Joseph (March 1963). "General Circulation Experiments with the Primitive Equations". *Monthly Weather Review*. 91 (3): 99–164.

¹³ Bolding, K.; Bruggeman, J.; Klingbell, K., GOTM, [online], Germany, Bootstapious.com (2016), February 2020, <https://gotm.net/>

4. MODEL RESULTS

4.1 Mixing Zone Criteria

Far-field dispersion and mixing patterns were assumed to be the relevant scale for describing the potential consequences of total nitrogen and temperature in the wastewater discharge on water quality in Chandler Bay. Total nitrogen and temperature are the focus because nitrogen is the limiting nutrient in coastal marine waters and temperature influences the response of aquatic communities in the vicinity of the point of discharge.

Maine DEP has not adopted numeric total nitrogen criteria for protection of coastal water quality that can be used for assessing modeling results for seawater conditions at the edge of mixing zones or in the far-field. At other sites, Maine DEP has used screening levels for total nitrogen in coastal waters that depend on site conditions such as a total nitrogen concentration of 0.32 mg/L where eelgrass beds have been historically mapped as present near an outfall or 0.45 mg/L for maintenance of dissolved oxygen concentrations in the receiving water body.¹⁴ Protective nutrient thresholds depend on site-specific conditions such as water depth and mixing and circulation patterns, among others and, throughout USEPA Region 1, numeric nutrient criteria for total nitrogen for the protection of eelgrass beds range from 0.30 mg/L to 0.39 mg/L and criteria for the protection of dissolved oxygen conditions range from 0.35 mg/L to 0.50 mg/L.¹⁵

In all cases, far-field results presented in this section are for concentrations above background conditions. Based on data collected by Maine DEP from Chandler and Englishman’s Bay in summers between 2004 and 2010, total nitrogen concentrations are variable, but the mean and median background concentrations are 0.27 mg/kg and 0.25 mg/kg, respectively.

4.2 Near-field

Findings from the near-field modelling are presented in Table 4.1 and present the distance to the edge of the NMZ and dilution achieved at that point. Full CORMIX outputs are available from Kingfish upon request.

Table 4.1: Maximum total nitrogen concentration along the shoreline for each scenario and diffuser location

Scenario	Distance to edge of Near-field Mixing Zone (NMZ) (ft)	Dilution Factor at Edge of NMZ
Summer	230	60x
Winter	230	60x

A 60-fold dilution is achieved at a distance of 230 ft from the point of release at the outfall. This distance is defined as the edge of the NMZ and indicates the spatial extent of the influence of the outfall diffusers on mixing and dilution of the wastewater discharge.

4.3 Far-field

4.3.1 Maximum Total Nitrogen Concentrations

Figure 4-2, shows the maximum extent of total nitrogen concentrations simulated from the outfall diffusers for both the summer and winter scenarios. Figure 4-3 shows how the plume moves within Chandler Bay over time. Table 4.2 shows predicted maximum excess

¹⁴ <https://www.epa.gov/sites/production/files/2019-03/documents/draftme0002780permit.pdf>,
<https://www.epa.gov/sites/production/files/2018-10/documents/draftme0037478permit.pdf>,
<https://www3.epa.gov/region1/npdes/permits/2017/finalme0102075permit.pdf>

¹⁵ <https://www.epa.gov/sites/production/files/2018-10/documents/draftme0037478permit.pdf>

concentrations of total nitrogen predicted in near-shore areas based on an observation line as presented in Figure 4-1.

Table 4.2: Maximum excess total nitrogen concentration along the shoreline for each scenario and diffuser location

Scenario	Maximum Excess Nitrogen Concentration Along Shoreline (mg/L)	Dilution Factor for Maximum Nitrogen Concentration
Summer	0.038	173x
Winter	0.038	173x

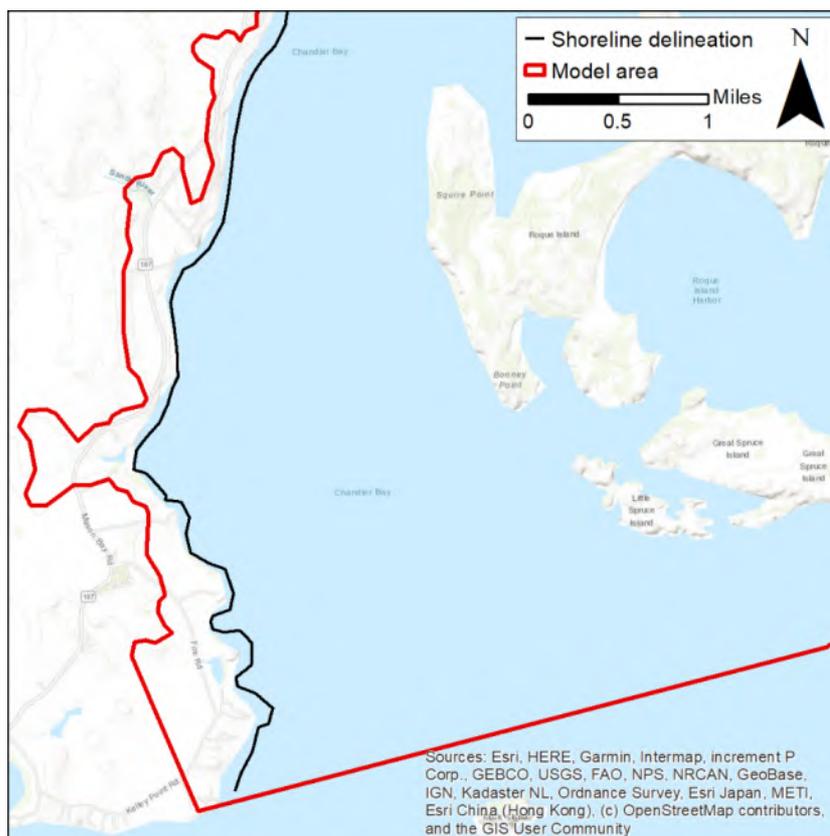


Figure 4-1: Line applied to calculate the maximum concentration at the shoreline

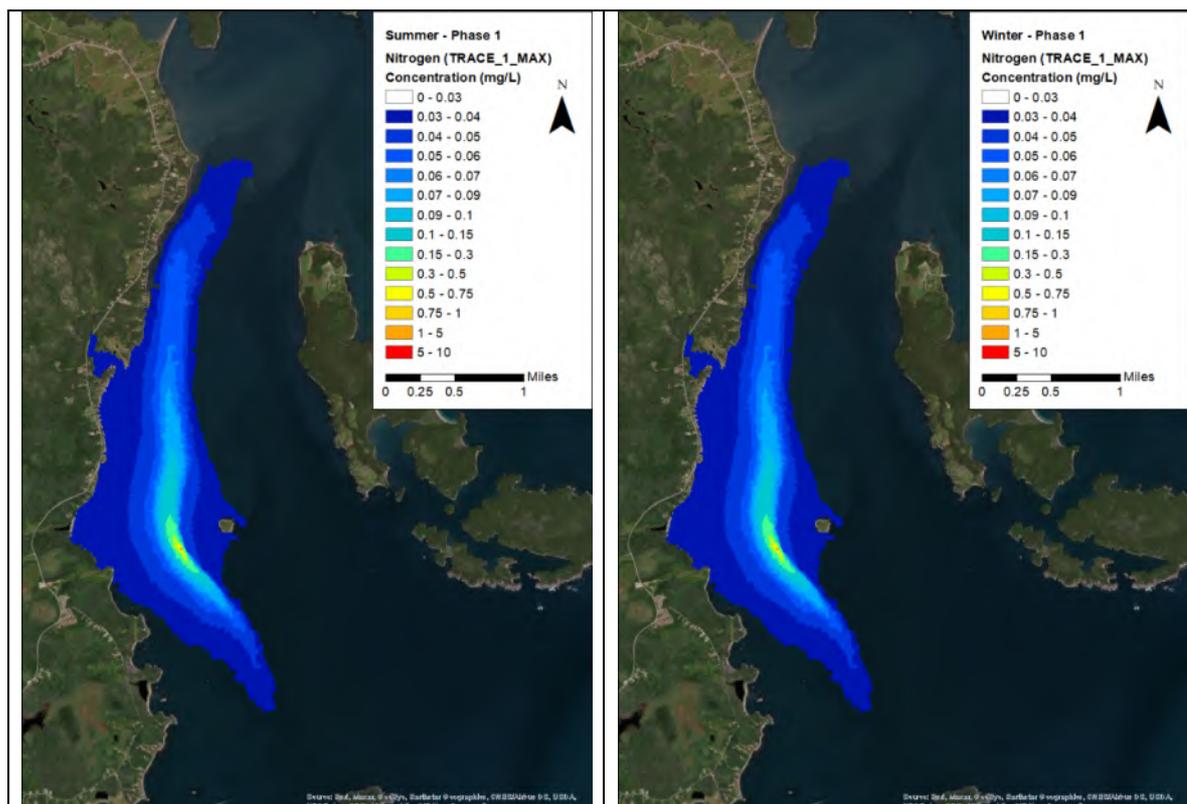


Figure 4-2: Maximum excess total nitrogen concentration under the two scenarios, Summer (left), Winter (right)

Figure 4-2 presents a composite depiction of the wastewater discharge plume indicating the maximum concentrations of total nitrogen predicted by the TUFLOW FV model across the entirety of the 7-day model run. In reality, the discharge plume moves up and down the bay (see Figure 4-3) such that the plume does not remain in one place. As presented in Appendix 2, model runs were also conducted over 14 days and 28 days. The spatial maximum extent of the discharge plume was not found to substantially increase in area after approximately 7 days of the model run, indicating that plume conditions approach equilibrium over these timescales.

4.3.2 Total Nitrogen Plume Characteristics

Figure 4-3 shows the movement of the wastewater discharge plume between 76 and 87 hours of the TUFLOW FV model run for the summer scenario. The total nitrogen content of the wastewater discharge plume moves in and out of Chandler Bay with the tide. Higher total nitrogen concentrations remain situated in the center of the plume and do not encroach to within near-shore areas.

The model results show that, as time progresses, the wastewater discharge plume moves further from the outfall location in both the north and south direction until it approaches equilibrium with ambient seawater conditions, whereby the plume is no longer predicted to reach any further north or south over time. Model results indicate the wastewater discharge plume moves no more than approximately 3 miles to the north of the outfall and no more than approximately 1 mile to the south. As described in Appendix 2, the movement of the plume was found to follow a similar pattern to this over model runs that lasted up to 4 weeks.

4.3.3 Contact with the Shoreline

As evident in Figure 4-3, the outer edges of the wastewater discharge plume are predicted to contact the shoreline in some locations on the western side of Chandler Bay. The maximum total nitrogen concentration above background in near-shore areas is predicted to be approximately 0.038 mg/L (Table 4.2). The model predicts seawater conditions at the shoreline represent a 173x dilution of the initial wastewater discharge plume. Based on the average background concentrations of total nitrogen in Chandler Bay (0.27 mg/L), seawater total nitrogen conditions at the shoreline may reach 0.31 mg/L.

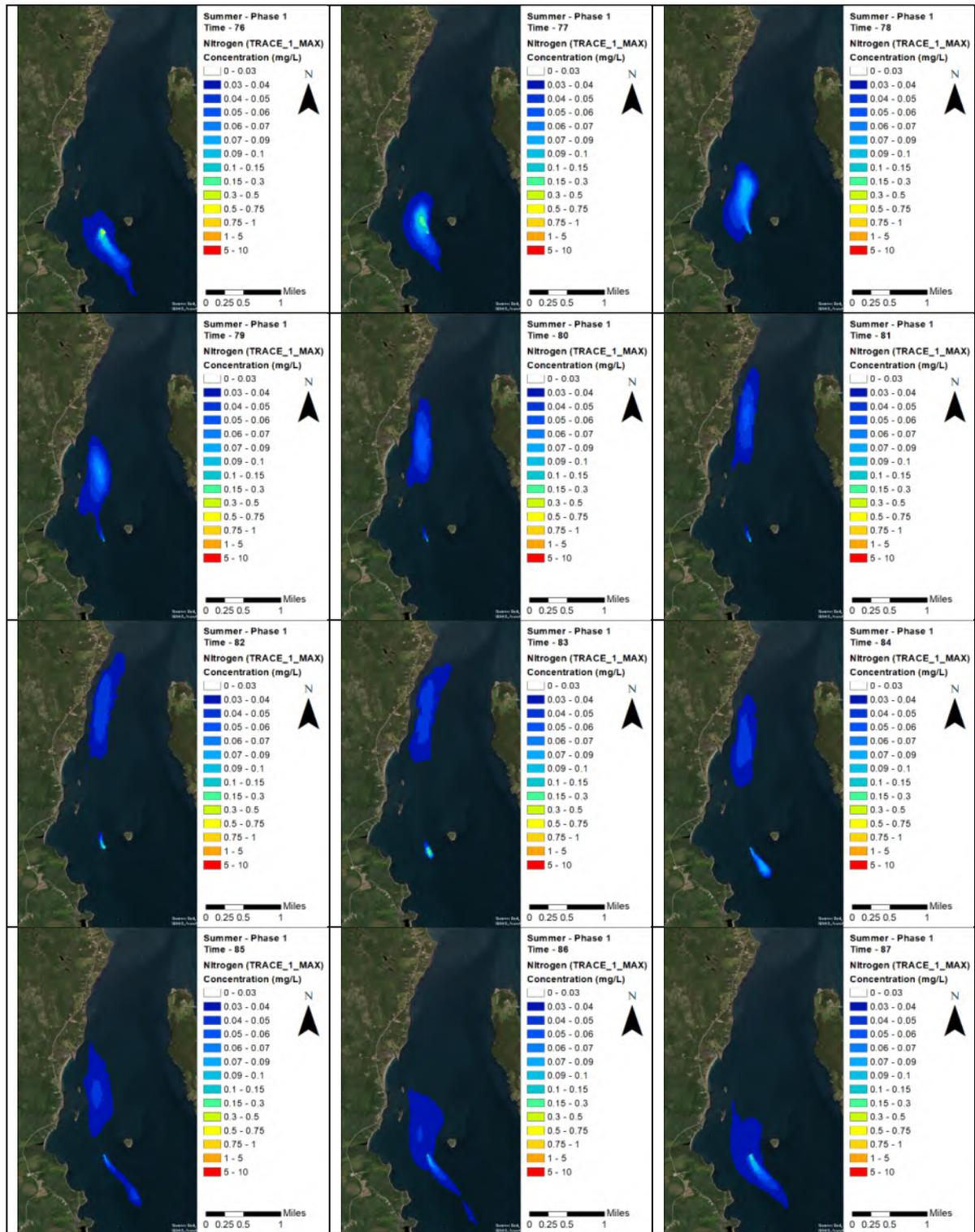


Figure 4-3: Excess total nitrogen concentrations - Summer Phase 1 - Model time 76 to 87 hours

4.3.4 Temperature

Because the wastewater will pass through the heat recovery system to maintain optimal growth conditions in the RAS, the temperature of the water released from the diffuser will be lower than temperatures in Chandler Bay during all but the coldest times of the year.¹⁶ Therefore, potential impacts to water temperatures in Chandler Bay were examined. This exercise was completed for the Summer scenarios only, as the wastewater temperatures during the coldest times of the winter are projected to be nearly the same as the ambient water temperature in Chandler Bay (near freezing). Therefore, summer conditions represent the time when temperature differential between the colder wastewater and ambient Chandler Bay water will be the largest.

The TUFLOW-FV model set the water temperature of the Bay to be 59°F (15°C). The temperature of the effluent released from the diffuser locations were set at a lower temperature of 48.7°F (9.3°C). Figure 4-4 shows the modeled temperature differences from background. Note that the model results are consistent with the available background data from Chandler Bay which indicates that the water is vertically mixed. The model results indicate a minimal impact to the temperature of the Bay. For much of Chandler Bay, the temperature difference is less than 0.09°F (0.05°C) below ambient surface water temperature.

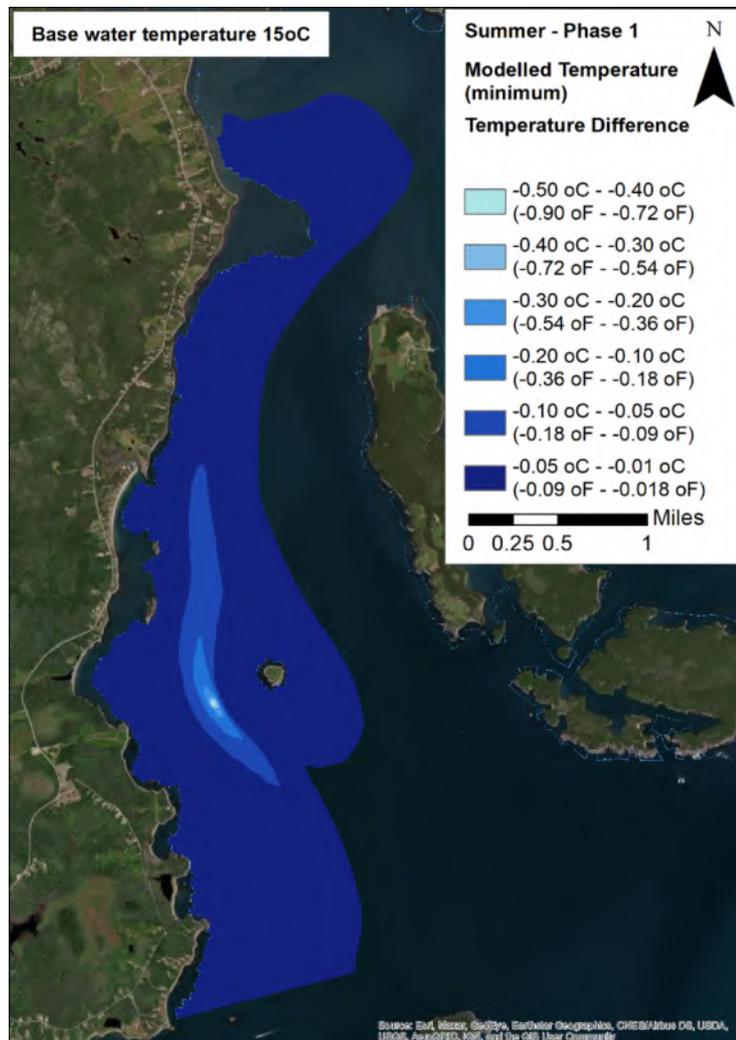


Figure 4-4: Modelled temperature differential from background for the Summer Phase 1 Scenario

¹⁶ Discharge water temperature will be equal to ambient surface water temperatures when the temperatures in Chandler Bay reach freezing.

5. SUMMARY

The results of the CORMIX model used to simulate near-field conditions after discharge of the wastewater at the outfall indicate the extent of the plume is likely to extend not more than approximately 230 ft from the location of the outfall during either summer or winter conditions. At the edge of the NMZ, the discharge plume will have been subjected to a dilution factor of 60x.

Once beyond the NMZ, the wastewater discharge plume in the far-field is predicted to move primarily by offshore flow currents and tidal flow. The plume may move up to 3 miles to the north and 1 mile to the south, further diluting as the plume disperses in the bay. TUFLOW FV modeling predicts that the wastewater discharge plume will not move beyond these limits approximately 7 days after the initial discharge, indicating that the plume reaches equilibrium with the surrounding ambient seawater. And while model results indicate that the diluted wastewater discharge plume may reach the western shoreline of Chandler Bay at some locations, the discharge plume in these areas will be diluted by as much as 173x. Total nitrogen concentrations in these areas, therefore, are predicted to be 0.038 mg/L above background conditions and temperature decreased by no more than 0.09 degrees F.

APPENDIX 1 OUTFALL LOCATION ANALYSIS

Four locations within Chandler Bay were examined for the location of outfall diffusers (Figure 5-1). Location 3 was the final choice presented in this report.

Figure 5-2 shows the maximum nitrogen concentration simulated at four proposed diffuser locations. The model results show that increases in nitrogen concentrations above 0.03 mg/L are limited to the confines of Chandler Bay for each of the diffuser locations. The location of the diffuser had an impact on nitrogen concentration levels, indicating that the further offshore the diffusers are located, the lower the simulated nitrogen concentrations, particularly at the shoreline.

Locations 1, 2, and 3 are located progressively further offshore, with location 1 nearest to the site. Location 4 is situated offshore of Rogue Island to the south west (Figure 5-1). Table 5.1 shows the maximum nitrogen concentration along the shoreline for each diffuser location. The maximum nitrogen concentration measured along the shoreline progressively decreased with increasing diffuser distance offshore.

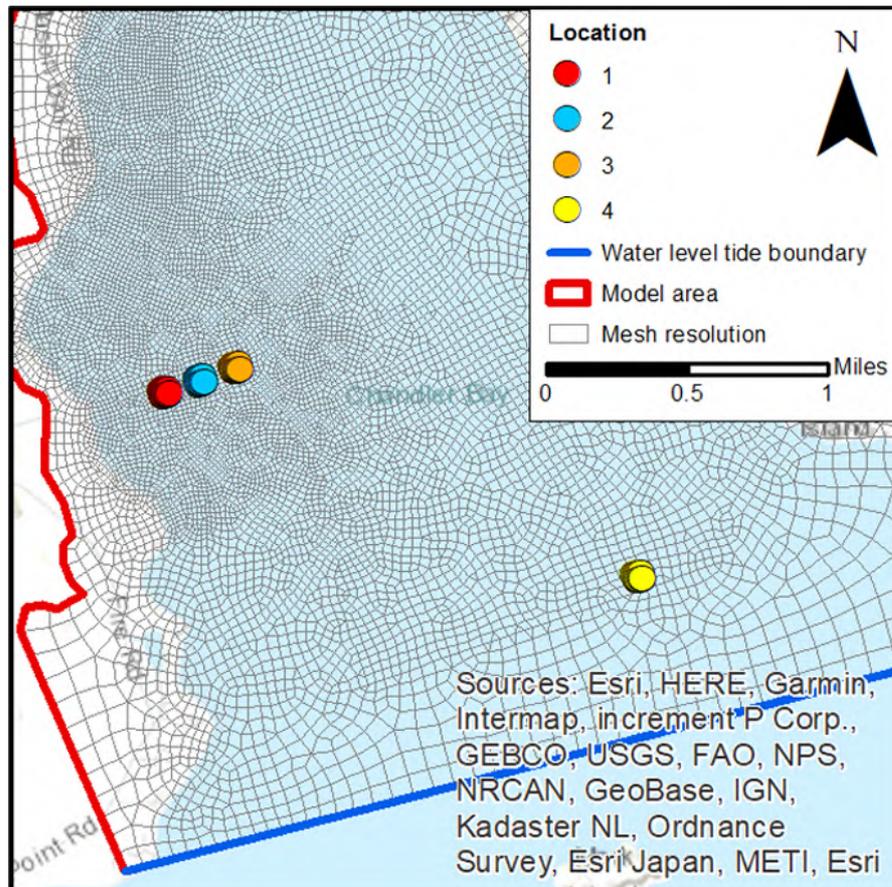


Figure 5-1: Proposed diffuser locations within Chandler Bay

Table 5.1: Maximum excess total nitrogen concentration along the shoreline for each scenario and diffuser location

Scenario	Maximum Nitrogen Concentration (mg/L) along shoreline			
	Location 1	Location 2	Location 3	Location 4
Summer Phase 1	0.101	0.053	0.038	0.007
Winter Phase 1	0.101	0.053	0.038	0.007

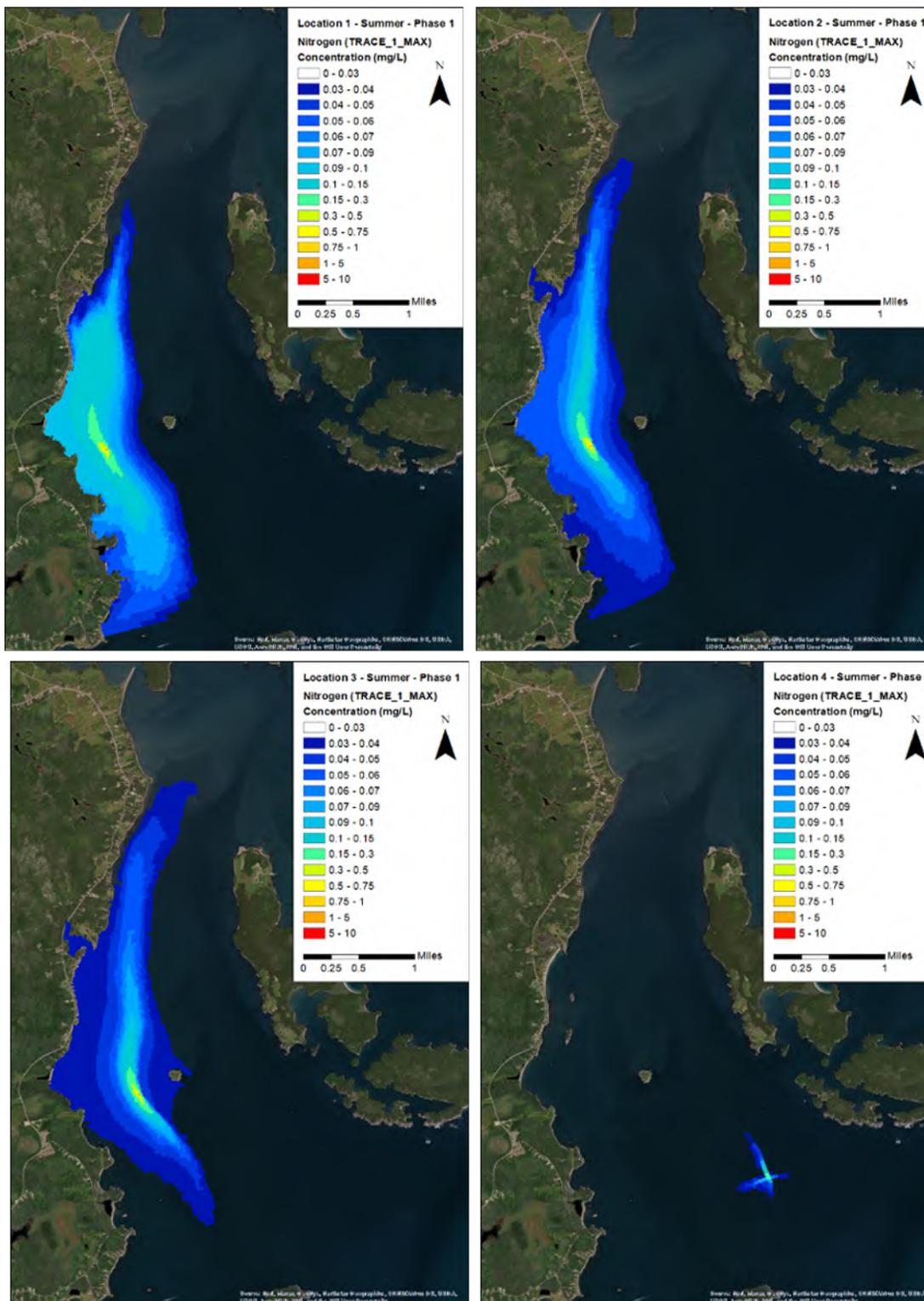


Figure 5-2: Maximum excess total nitrogen concentrations during summer at Locations 1 (top left), 2 (top right), 3 (bottom left), and 4 (bottom right)

APPENDIX 2 MODEL CALIBRATION

Georeferenced current velocity survey was collected was a vessel-mounted acoustic Doppler current profiler (ADCP) along the three transects in the project area, throughout as much of the tidal cycle as practicable to assess the variability in tidal currents in the project site. Water current velocity measurements were collected along these transects over a consecutive two-day period from the 20th to 21st November 2019.

The current velocity measurements were collected with a Teledyne RD Instruments (TRDI) 600 kHz Workhorse Sentinel ADCP mounted to an aluminum pole and from the starboard side of Normandeau's 24-foot Privateer vessel mounted 0.7m below the water surface at the transducer faces.

The November 2019 tides were simulated through the TUFLOW-FV model and the results were compared with the recorded data. Figure 5-3, Figure 5-4, Figure 5-5 and Figure 5-6 compares the ADCP recorded data and the TUFLOW-FV modeled velocity magnitude and vectors at the equivalent time for the Early Flood, Flood, Late Ebb and Near Low Slack respectively. Figure 5-7 shows the velocity magnitude for the ADCP recorded data and the TUFLOW-FV modeled data for Early Flood, Flood, Late Ebb and Near Low Slack. Comparison of the ADCP recorded and TUFLOW-FV modeled data shows the TUFLOW-FV model is replicating the overall velocity direction and magnitude at Chandler Bay. It is noted that the TUFLOW-FV modeled velocity is marginally larger than the ADCP recorded data however, the velocity magnitude changes recorded is comparable to the TUFLOW-FV modeled data. This indicates the TUFLOW-FV model is replicating the hydrodynamic environment of the Chandler Bay.

Simulation Time

The model simulation time was tested to assess the most appropriate simulation time to run the model. Figure 5-8 shows the maximum nitrogen concentration for the simulation times tested, 1 week, 2 weeks and 4 weeks. The model results show that overall, the shape and concentration distribution of the plume is generally constant for the various simulation times.

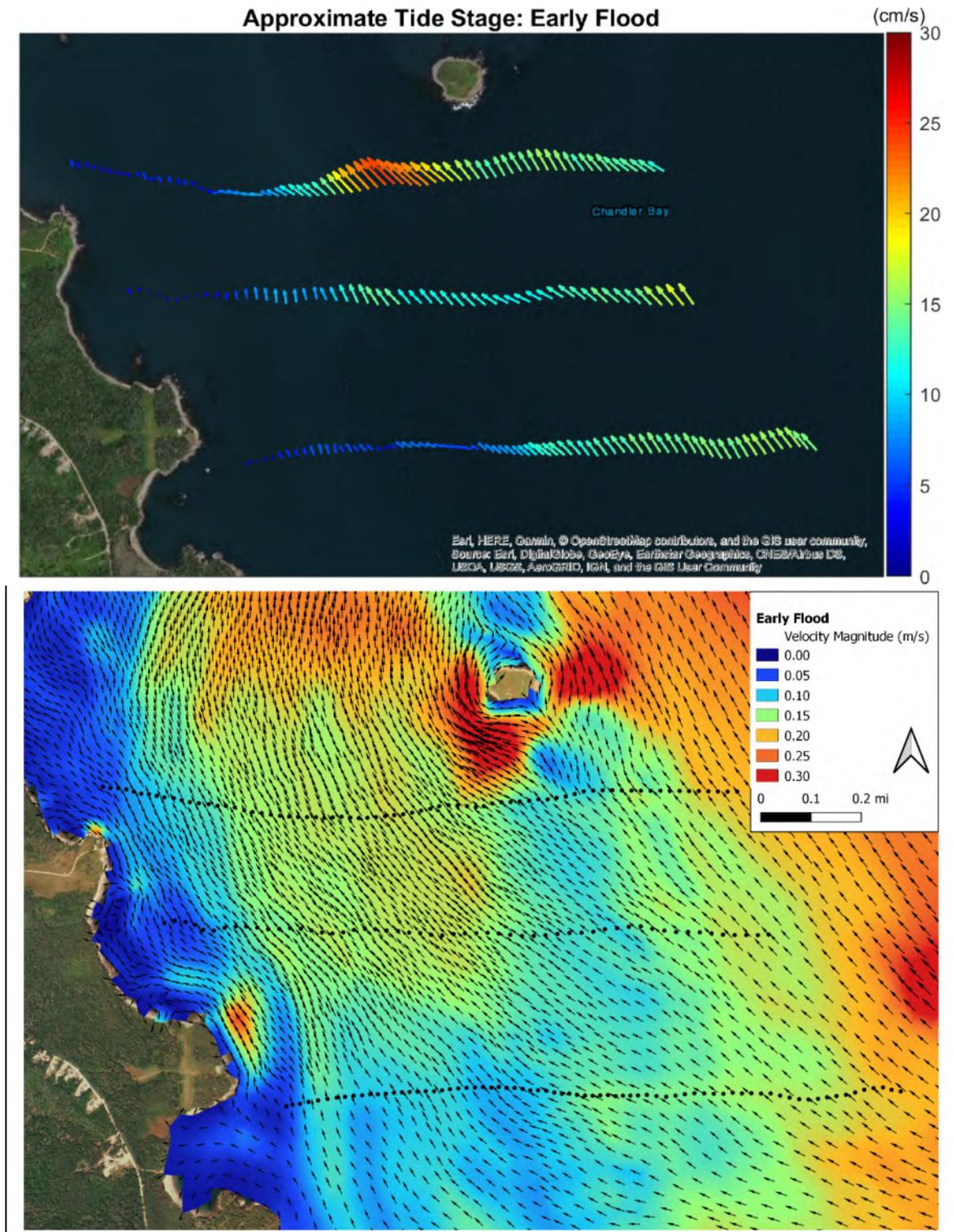


Figure 5-3: ADCP recorded data during Early Flood (top) and TUFLOW-FV modeled velocity magnitude and vectors at equal time (bottom)

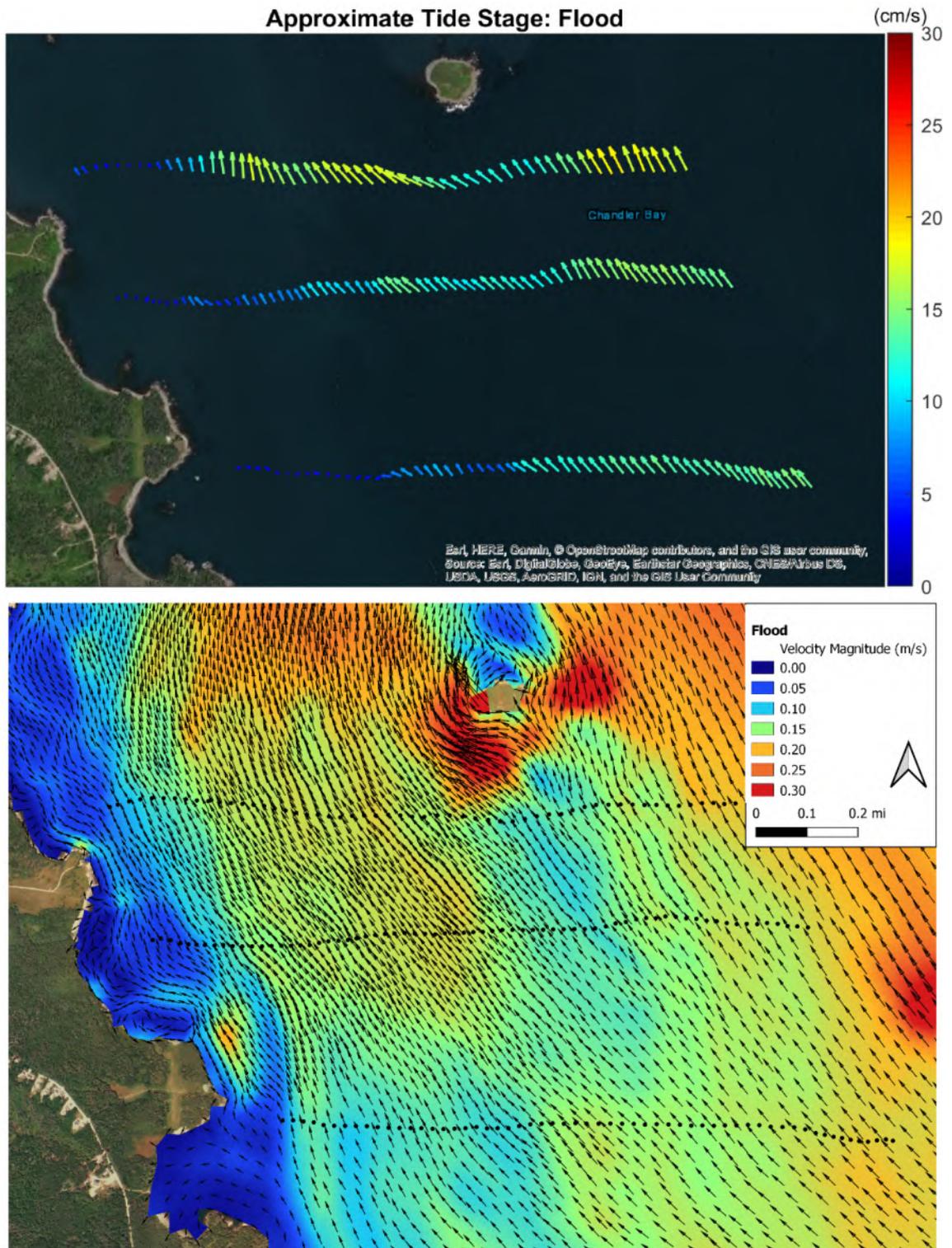


Figure 5-4: ADCP recorded data during Flood (top) and TUFLOW-FV modeled velocity magnitude and vectors at equal time (bottom)

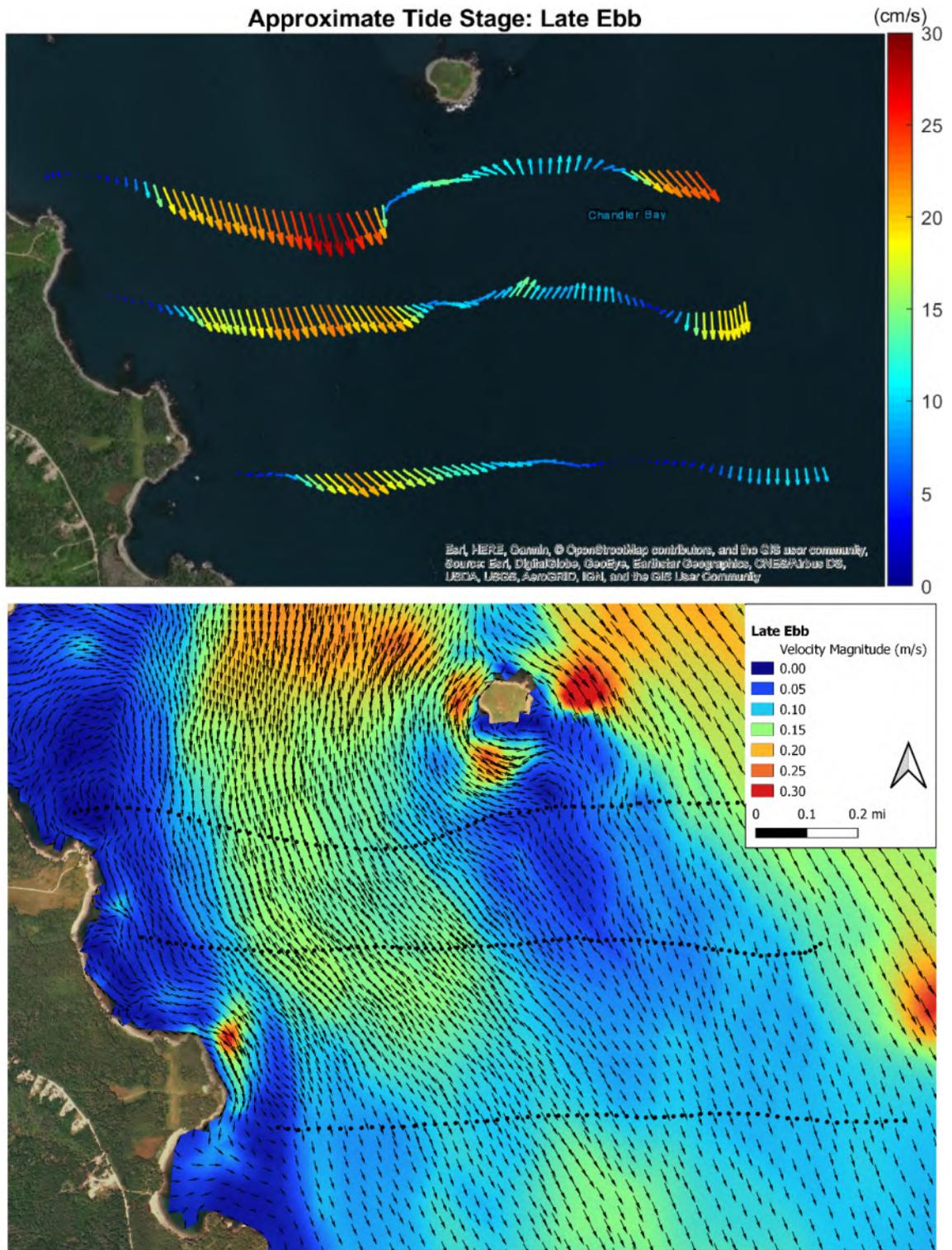
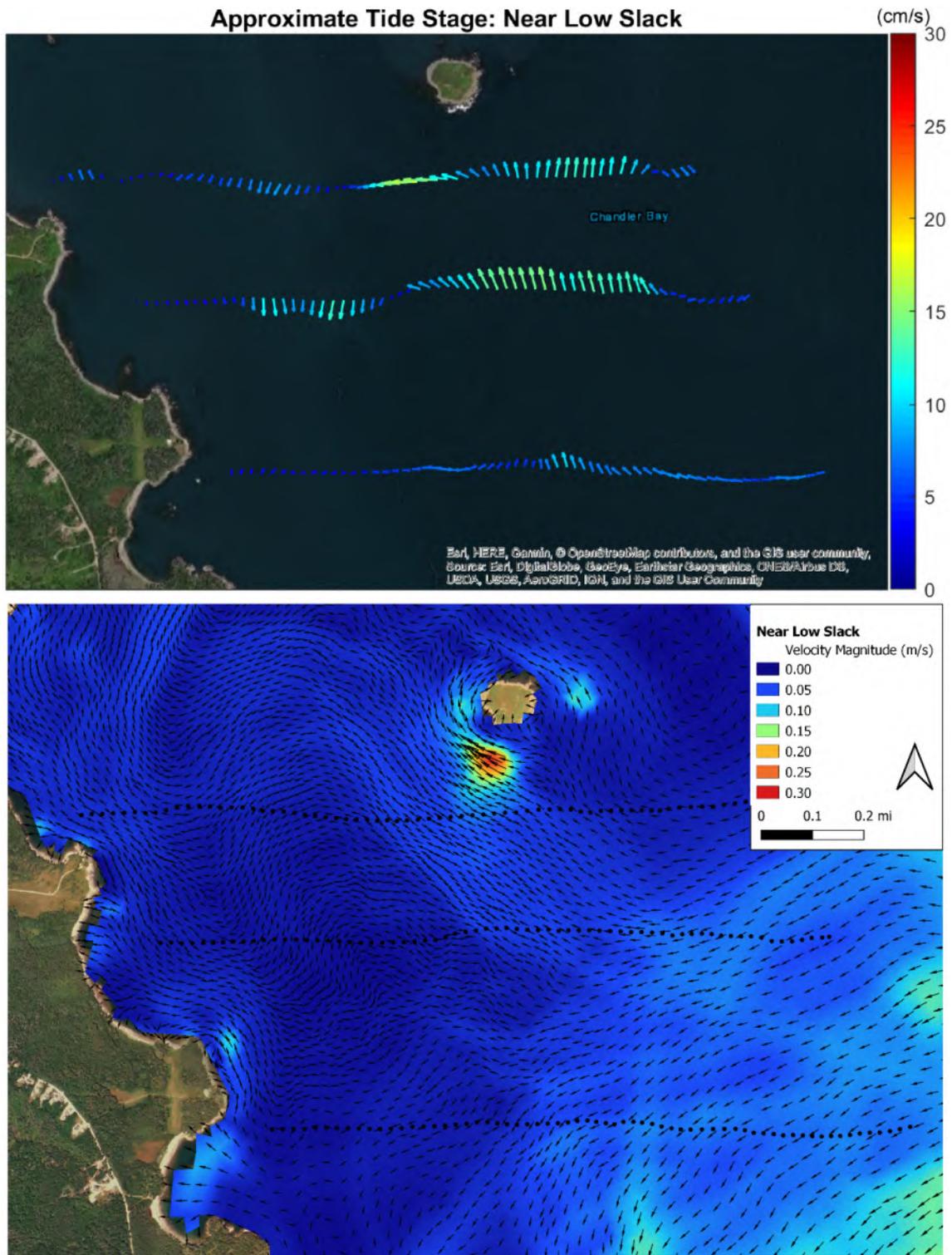


Figure 5-5: ADCP recorded data during Late Ebb (top) and TUFLOW-FV modeled velocity magnitude and vectors at equal time (bottom)



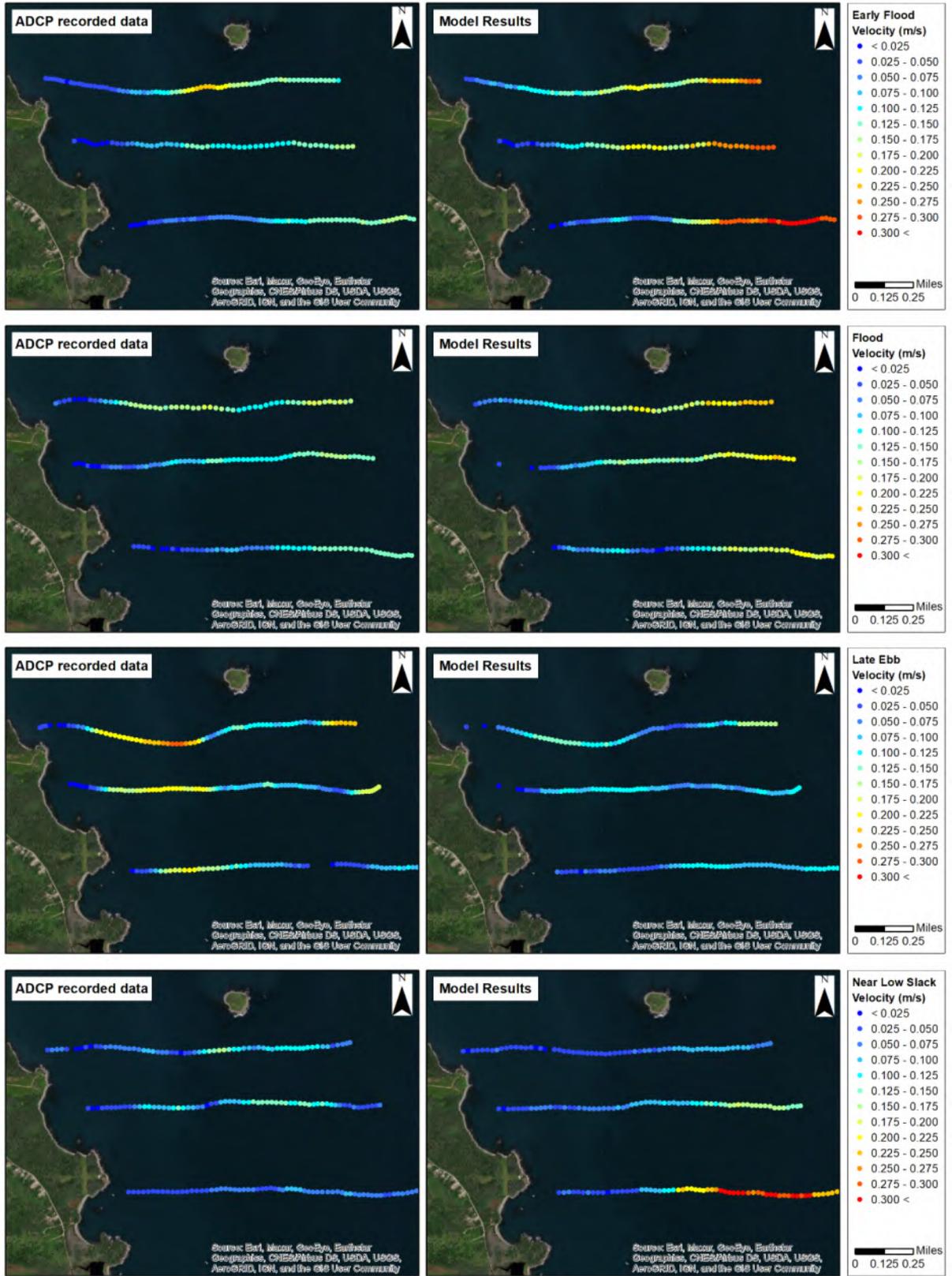


Figure 5-7: Velocity magnitude at ADCP recorded data (left) and TUFLOW-FV modeled data (right) during Early Flood (top), Flood (2nd top), Late Ebb (2nd bottom), Near Low Slack (bottom)

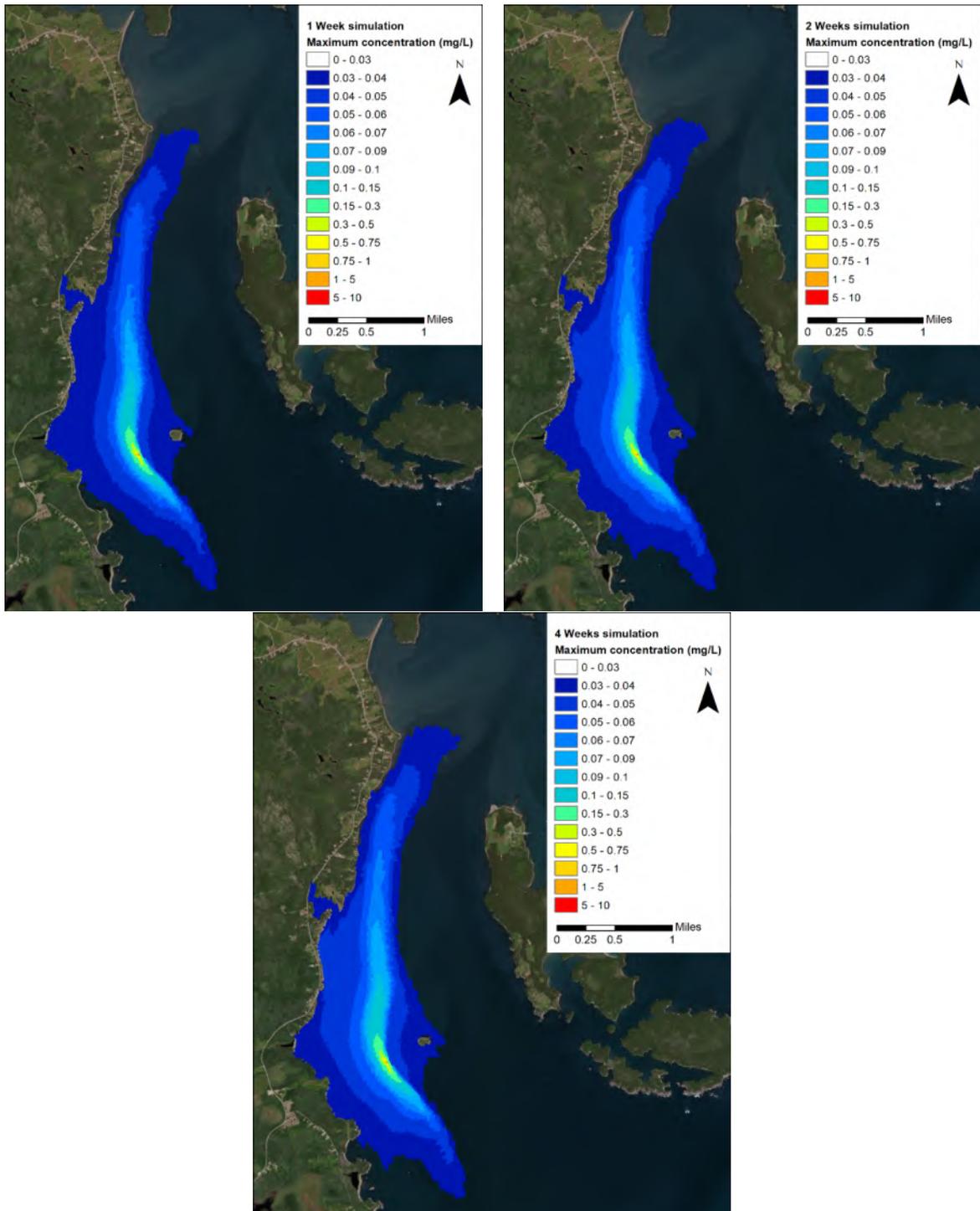
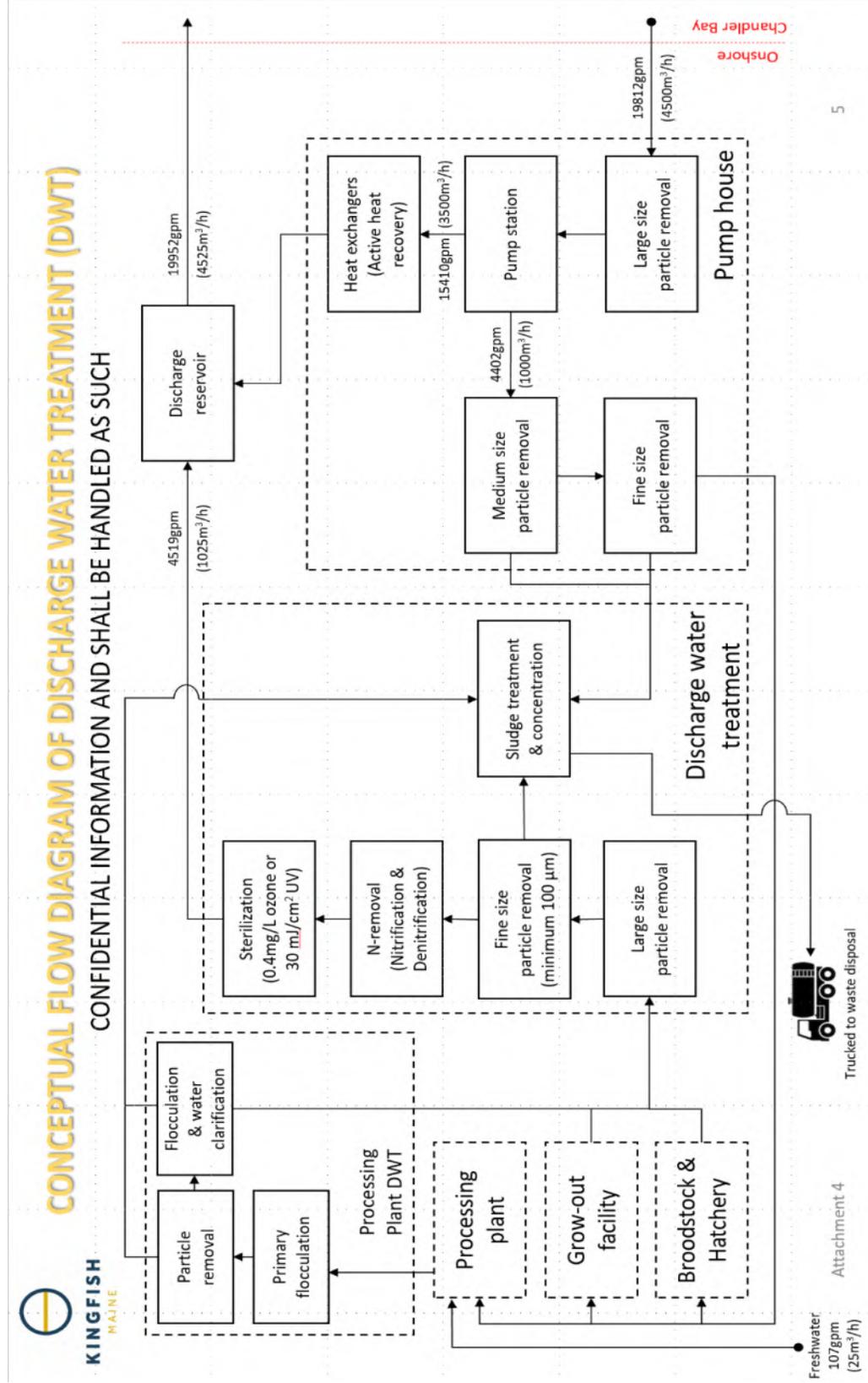


Figure 5-8: Maximum excess total nitrogen concentrations for simulation time of Week 1 (top left), Week 2 (top right) and Week 4 (bottom)

APPENDIX B Discharge Water Treatment



APPENDIX C *Kingfish Maine Economic Impact Assessment Summary, University of Maine*

ECONOMIC AND FISCAL IMPACTS OF A PROPOSED RECIRCULATING AQUACULTURE FACILITY IN
JONESPORT, MAINE¹

Prepared for: Kingfish Maine

Prepared by:

Megan Bailey² and Sheldon Green³

Margaret Chase Smith Policy Center
University of Maine

July 2020

¹ This research has been supported by Kingfish Maine. We would like to thank Drs. Todd Gabe and Andrew Crawley from the University of Maine School of Economics for their feedback on the input-output model throughout the process of preparing this report.

² Research Associate

³ Undergraduate Research Assistant

APPENDIX C *Kingfish Maine Economic Impact Assessment Summary, University of Maine*

HIGHLIGHTS OF MAIN FINDINGS

Planning and Construction Impacts

- Including multiplier effects, the planning and construction of the RAS facility (based on a total investment of \$108 million) would have an annual *statewide* economic impact – for the two years of the project – of an estimated \$44 million in output, and 366 full- and part-time jobs across Maine, with those workers earning an estimated \$19 million in labor income per year.
- The employment multiplier of 1.7 means that each worker directly involved with the planning and construction of the RAS facility would support an additional 0.7 workers across the state.
- Including multiplier effects, it is estimated that the planning and construction of a \$108 million RAS facility would support 180 full- and part-time jobs in *Washington County* annually – for the two years of the project – and would provide \$7 million in labor income to Washington County workers.
- The income multiplier of 1.28 implies that each dollar of income by Washington County workers directly involved in the planning and construction of the facility would lead to an additional \$0.28 earned by workers within the county.

Ongoing Operations Impacts

- Including multiplier effects, the ongoing operations and maintenance of Kingfish Maine’s RAS facility would have a *statewide* economic impact of an estimated \$28 million in output, 129 full- and part-time jobs, and \$8.4 million in labor income in 2023.
- The impact increases annually as estimated direct expenditures increase. In 2026, the estimated *statewide* economic impact would be \$52 million in output, 155 full- and part-time jobs, and \$9.4 million in labor income.
- The *statewide* employment multiplier (for 2026) of 2.2 (obtained by dividing the total *statewide* employment impact by the direct employment impact) implies that each worker directly employed by Kingfish Maine’s facility would support an additional 1.2 workers within the state.
- It is estimated that Kingfish Maine would have a total, including multiplier effects, value-added impact of \$46 million. This is equivalent to approximately 0.1 percent of the state’s gross domestic product in 2019.

- Including multiplier effects, it is estimated that by 2026 the facility would support the employment of 126 Washington County workers and provide \$8 million in labor income.
- The Washington County income multiplier (for 2026) of 1.34 implies that each dollar of income by Washington County workers directly employed by the RAS facility would lead to an additional \$0.34 earned by other workers across the county.
- The estimated Washington County employment impact of 126 jobs is equivalent to about 2 percent of all private employer jobs in Washington County as of 2018.

FINAL DRAFT FOR REVIEW

MEPDES Application – Attachment 7 – Summary of Notice Filing & Public Meeting

Kingfish Maine held a public meeting in accordance with Chapter 2, Section 8 of the Department's rules on Tuesday, July 21st, 2020 from 6-7:30pm. This meeting could be attended in person at the Jonesport Fire Station (state guidance on adequate social distancing observed) or online via Zoom link provided in the attached Notice of Intent to File.

The notice was published in the Machias Valley News Observer on July 8th, 2020 and again on July 15th, 2020 as well as being posted on the local post office door per a public request. Documentation of copies sent to abutters and municipality is attached.

Attendance at the Public Meeting:

In person: 10-12

Online: 13, not including panel of The Kingfish Company management joining from the Netherlands

A recording was kept of the Zoom call and in-person questions for company reference.

Listing of Abutters and Parcel Numbers

North: (008-026) -Kent Ingves, Paula Stahl - Josh Woodward Road

46 Bellevue St
Willimantic, CT. 06226

Also owns interest in the property:

Maine Coast Heritage Trust
1 Main St
Bowdoin Mill suite 201
Topsham ME 04086

South: (008-020) - USCG Housing - Mason Bay Road

475 Kilvert St
Suite 100
Warwick, RI 02886

South: (008-001) - Agnes Patterson - 54/56/57 Elmer Sawyers Point

18 Frost Lane
Orono, ME 04473

West: (008-022) - Worcester Peat Company Inc - Mason Bay Road, Jonesport, ME, 04649

241 Lane Rd
Dublois, ME 04622

West: (008-024) - New England Diversified - 300 Mason Bay Road, Jonesport, ME, 04649

927 Mason Bay Rd
Jonesport, ME 04649 same for below---- Sanford Kelley Jr

West: (008-025) - Kelley Jr., Sanford - Mason Bay Road, Jonesport, ME, 04649

Sanford Kelley Jr. and his son have both passed.

The notice should be sent to the address for New England Diversified.

NOTICE OF INTENT TO FILE MAINE WASTE DISCHARGE LICENSE / MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION

Please take note that, pursuant to 38 MRSA, Sections 413 and 414-A, Kingfish Maine Inc. intends to file a wastewater discharge permit application with the Department of Environmental Protection (DEP). The application is for the discharge of a land-based aquaculture facility in Jonesport, Maine at 9 Dun Garvin Road. The application proposes a new or increased discharge that may lower existing receiving water quality within its legal classification, and the application contains a statement regarding important social and economic benefits resulting from the activity causing the discharge, pursuant to 38 MRSA, Section 464, Department of Environmental Protection Antidegradation Policy. This permit evaluates the facility's discharge to ensure that Kingfish Maine will maintain the water quality of the area based on the location of the discharge point and the make-up of the effluent water.

Kingfish Maine is owned by the Kingfish Company, which currently operates a land-based recirculating aquaculture system (RAS) in a Natura 2000 nature reserve in the Netherlands. Kingfish Zeeland has been awarded a number of sustainable practice certifications: It's the first land-based farm to receive Best Aquaculture Practices certification and the first Aquaculture Stewardship Council certified source of yellowtail kingfish. Kingfish Maine will utilize the same advanced technology solutions used at Kingfish Zeeland, to mitigate the impacts of the effluent discharged and will abide by the parameters required by Maine DEP to protect the water quality and marine habitat.

Kingfish Maine has been actively developing its plan for the Jonesport facility over the last 18 months, communicating the details of the proposed land-based facility to the residents of Jonesport and listening to the concerns of the local community in order to minimize the operation's impact. Therefore, this application addresses the two primary areas of interest as outlined in Kingfish Maine's ongoing dialogue: The length of intake and discharge pipes and protecting the environment from water temperature increases.

The proposed position and length of the intake and discharge pipes, as outlined in the permit application, minimizes the pipe footprint to ensure as little intrusion on fishing activity as possible in Chandler Bay. To minimize the length of pipe, Kingfish Maine is investing in significant filtration of effluent, which allows for the length of the discharge pipe to be limited to just under half a mile.

The permit application fully outlines Kingfish Maine's solids and nutrient filtration system as well as its heat recovery process. The facility's advanced technology will allow the reclamation of heat energy before it is discharged, therefore preventing temperature rise impacts on the bay.

Kingfish Maine has currently engaged the University of Maine to conduct an economic impact study for Jonesport and the region. Preliminary data from the study shows a potential value-added, multiplier impact of \$46 million to the region. Kingfish Maine is expected to employ 70 full-time positions at full production.

Kingfish Maine is looking forward to continued conversations and close cooperation with the residents of Jonesport regarding the permitting process. The application will be filed on or about August 7, 2020 and will be available for public inspection at DEP's Augusta office during normal business hours. A copy may also be seen at the Jonesport municipal offices at 70 Snare Creek Lane, Jonesport, ME.

Please take note that Kingfish Maine Inc. will hold a public meeting on Tuesday, July 21 at 6pm at the Jonesport Fire Station, 44 Main Street, Jonesport. The meeting will also be available online via Zoom at <https://zoom.us/j/97684896684>. At that time, the company will present project details pertaining to its wastewater discharge application, take any questions, and provide information on further opportunity for public comment related to this application (Chapter 2, Department of Environmental Protection Rules).

A request for a public hearing or request that the Board of Environmental Protection assume jurisdiction over this application must be received by the DEP, in writing, no later than 20 days after the application is found acceptable for processing, or 30 days from the date of this notice, whichever is longer. Requests shall state the nature of the issue(s) to be raised. Unless otherwise provided by law, a hearing is discretionary and may be held if the Commissioner or the Board finds significant public interest or there is conflicting technical information.

During the time specified above, persons wishing to receive copies of draft permits and supporting documents, when available, may request them from the DEP. Persons receiving a draft permit shall have 30 days in which to submit comments or to request a public hearing on the draft.

Public comment will be accepted until a final administrative action is taken to approve, approve with conditions or deny this application. Written public comments or requests for information may be made to

Maine Department of Environmental Protection
Division of Water Quality Management
Department of Environmental Protection
State House Station #17
Augusta, Maine 04333-0017
Telephone (207) 287-7688

Kingfish Maine welcomes questions and comments regarding permitting and project scope. The public can email the Kingfish Maine team at admin@kingfish-maine.com

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MAINE WASTE DISCHARGE LICENSE / MAINE
POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT APPLICATION**

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Public comment will be accepted until a final administrative action is taken to approve, approve with conditions or deny this application. Written public comments or requests for information may be made to

Maine Department of Environmental Protection
Division of Water Quality Management
Department of Environmental Protection
State House Station #17
Augusta, Maine 04333-0017
Telephone (207) 287-7688

Kingfish Maine welcomes questions and comments regarding permitting and project scope. The public can email the Kingfish Maine team at admin@kingfish-maine.com

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1. Article Addressed to:
 Agnes Patterson
 18 Frost Lane
 Orono, ME 04473



9590 9402 5445 9189 4276 55

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 019 1640 0001 1794 9038

PS Form 3811, July 2015 PSN 7530-02-000-9053

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A. Signature
 X *RHC C197372* Agent
 Addressee

B. Received by (Printed Name) *RVC* C. Date of Delivery *7-8-20*

D. Is delivery address different from item 1? Yes
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| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
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 241 Lane Rd.
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2. Article Number (Transfer from service label)
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PS Form 3811, July 2015 PSN 7530-02-000-9053

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 X *Kearns* Agent
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 If YES, enter delivery address below: No

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 Jonesport, ME 04849



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| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
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| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

United Gates Coast Edward
Housing
475 Kilvert Street
Suite 100
Warwick, RI 02886



9590 9402 5445 9189 4276 62

2. Article Number (Transfer from service label)

7019 1640 0001 1794 8864

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X Agent
 Addressee

B. Received by (Printed Name)

C. Date of Delivery

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Maine Coast Heritage
Trust
1 Main St
Bowdoin Mill, Suite 201
Topsham, ME 04086



9590 9402 5445 9189 4276 79

2. Article Number (Transfer from service label)

7019 1640 0001 1794 8871

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X JG 86003 C19 Agent
 Addressee

B. Received by (Printed Name)

C. Date of Delivery

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Kent Invesci Paula Stahl
46 Bellevue Street
Willimantic, CT 06226



9590 9402 5445 9189 4276 86

2. Article Number (Transfer from service label)

7019 1640 0001 1794 8895

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X Agent
 Addressee

B. Received by (Printed Name)

C. Date of Delivery

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |
| <input type="checkbox"/> Insured Mail | |
| <input type="checkbox"/> Insured Mail Restricted Delivery (over \$500) | |

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Town of Jonesport
 c/o Irene Rogers
 70 Snare Creek Lane
 Jonesport, ME 04869



9590 9402 5445 9189 4276 93

2. Article Number (Transfer from service label)

7019 1640 0001 1794 8888

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *CYLR RZ @19* Agent
 Addressee

B. Received by (Printed Name)

C. Date of Delivery

4/8/20

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery



Record of Kingfish Maine Pre-Application and Pre-Submission Meeting with DEP, held June 22, 2020.

Prior Pre-Application Meeting was held in person on March 10th, 2020 at 10:30am – Attendees, Cindy Dionne (DEP), Rob Mohlar (DEP), Gregg Wood (DEP), Megan Sorby (Kingfish Maine), Tom Sorby (Kingfish Maine), Derek Pelletier (Ramboll Environmental), and Bill Lane (Gartley & Dorsky)

The screenshot shows a Microsoft Teams chat window for a meeting titled "Kingfish Maine Pre-Application and Pre-Submission Review meeting". The chat history includes the following messages:

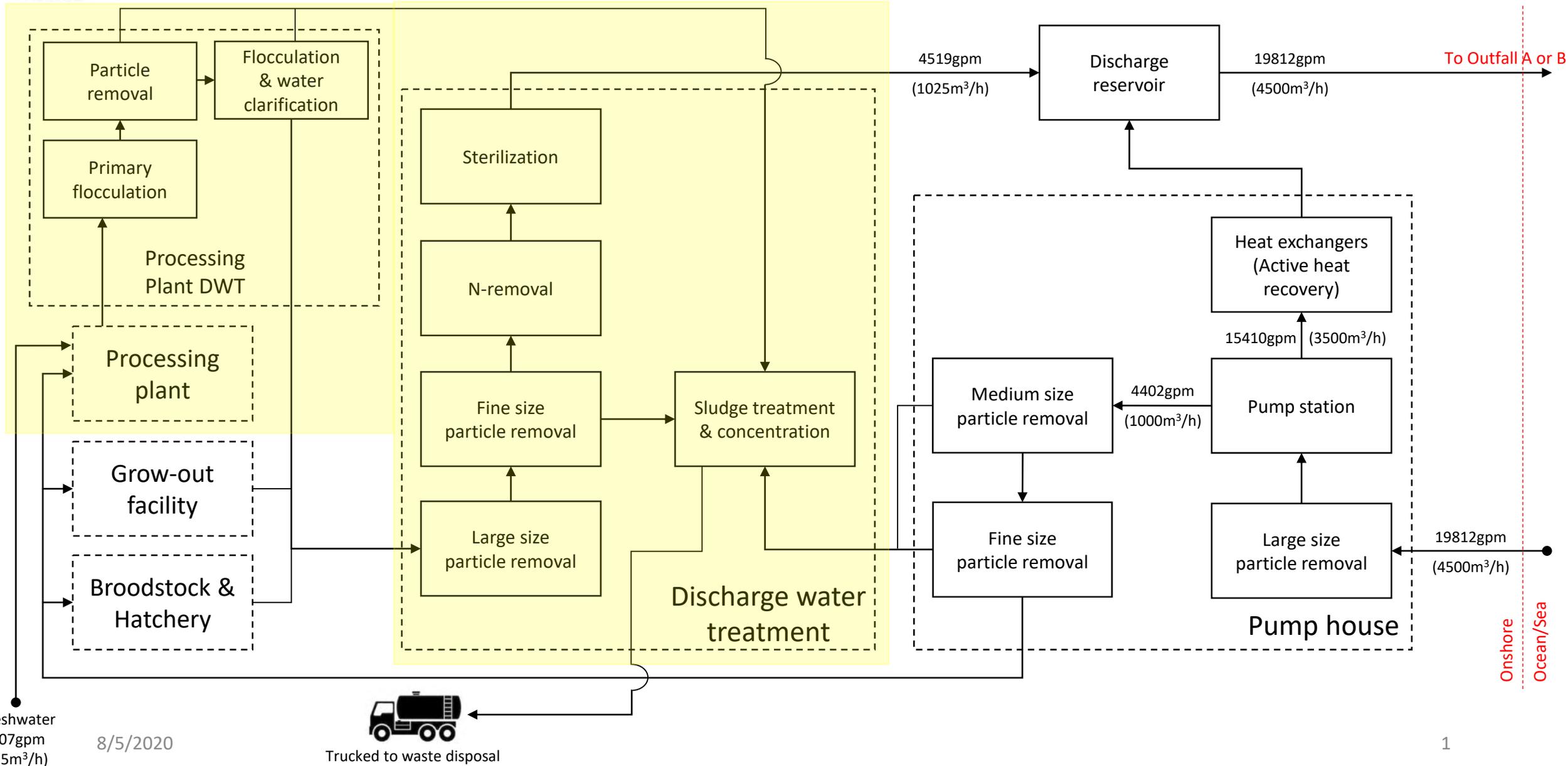
- Derek M Pelletier joined the meeting.
- June 22, 2020
- Derek M Pelletier renamed the meeting to Kingfish Maine Pre-Application and Pre-Submission Review meeting.
- Simon Gaskell joined the meeting.
- Today
- Meeting started 9:50 AM
- Megan Sorby (Guest) joined the meeting.
- Brewer, Angela D joined the meeting.
- Mohlar, Robert C joined the meeting.
- Mower, Barry F joined the meeting.
- Witherill, Donald T joined the meeting.
- Wood, Gregg joined the meeting.
- Sune (Guest) joined the meeting.
- Dionne, Cindy L joined the meeting.
- Mcglauflin, Arthur T joined the meeting.
- Sune (Guest) left the conversation.
- Megan Sorby (Guest) left the conversation.
- Mcglauflin, Arthur T has left the meeting.
- Meeting ended 1h 26m 11:17 AM

The interface includes a search bar at the top, a navigation sidebar on the left with icons for Activity, Chat, Teams, Calendar, Calls, Files, and Apps, and a "Join" button in the top right corner. The chat input field at the bottom contains the placeholder text "Type a new message".



CONCEPTUAL FLOW DIAGRAM OF PROCESSING PLANT DISCHARGE TREATMENT

KINGFISH
MAINE



8/5/2020

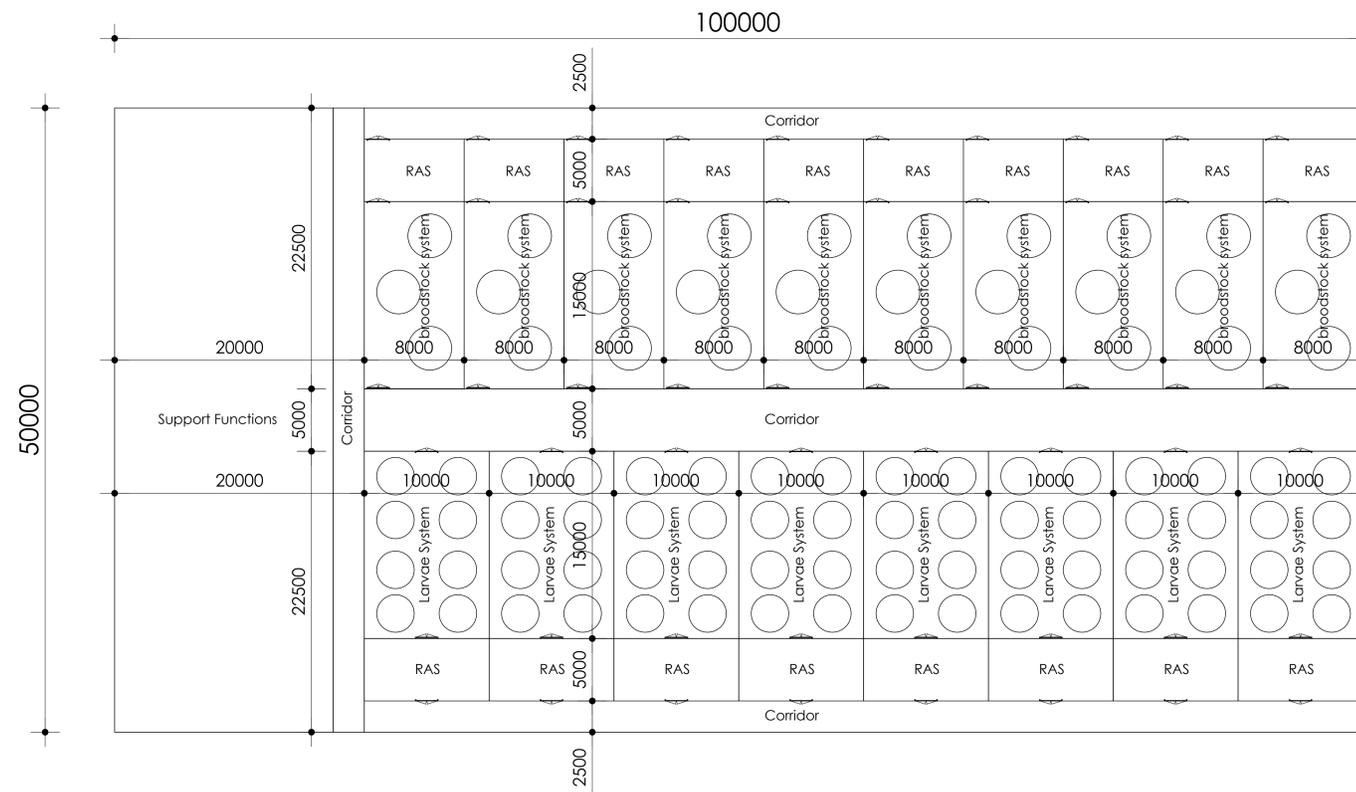
Trucked to waste disposal



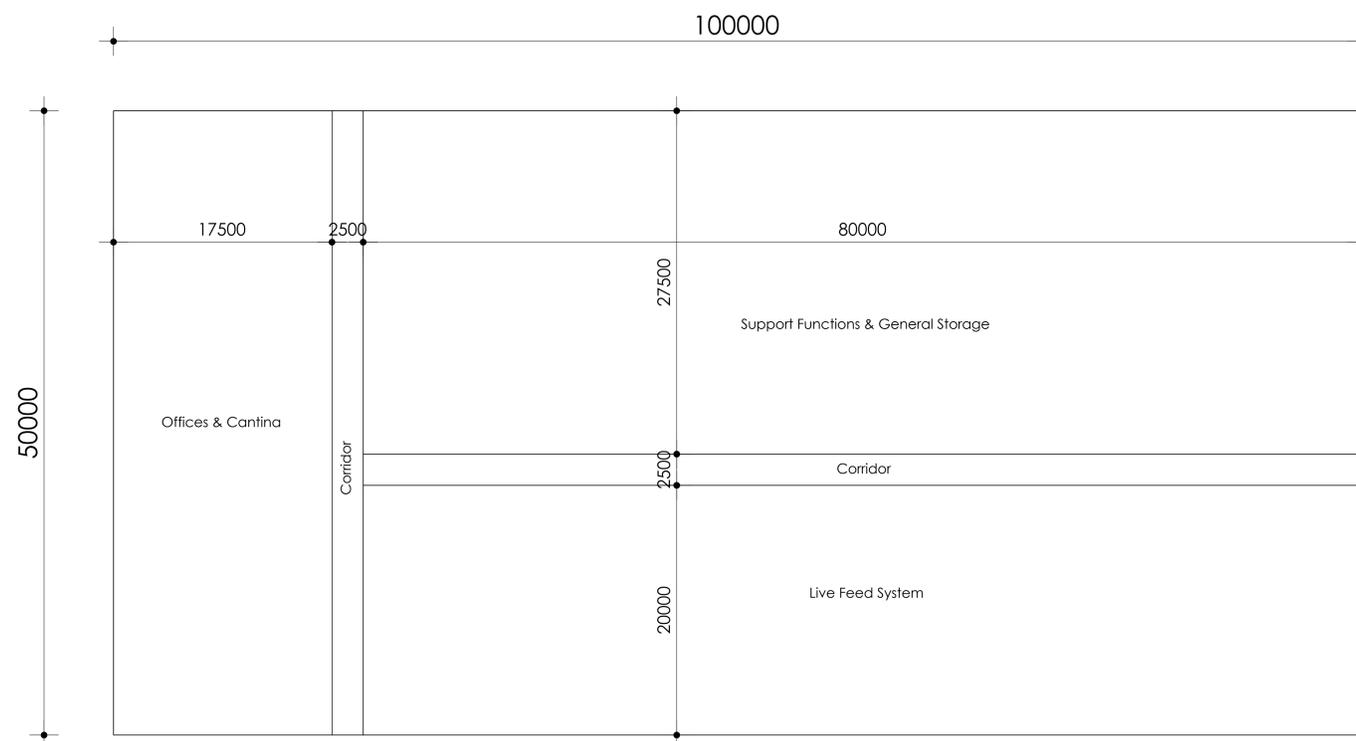
KINGFISH MAINE CHEMICAL LIST

<u>Chemical</u>	<u>Trade Name</u>	<u>Application</u>	<u>Method</u>	<u>Max Dosage</u>	<u>Areas of Potential Use</u>
Hydrochloric Acid		pH Balancing, Cleaning Equipment	Diluted and Applied	n/a	Hatchery/Growout
Sodium Hydroxide		pH Balancing, Cleaning Equipment	Diluted and Applied	n/a	Hatchery/Growout
Demineralized water		Calibrating Equipment	n/a	n/a	Hatchery/Growout/Processing
Sodium Bicarbonate		pH Balancing	Diluted and Applied	n/a	Hatchery/Growout
Sodium Hypochlorite		Cleaning and Disinfecting Equipment	Diluted and Applied	150ppm	Hatchery/Growout/Processing
Sodium Thiosulfate		Neutralizing Sodium hypochlorite	Added to water in proportion to sodium hypochlorite used	300ppm	Hatchery/Growout
Hydrogen Peroxide	Perox-aid, Perosan	Cleaning Equipment; External Fish Treatments	Spray or Bath Immersion	1000ppm	Hatchery/Growout
Formalin	Parasite-S	Extrenal Fish Treatment	Bath Treatment	200ppm	Hatchery/Growout
PVP Iodine	Ovadine	Disinfection of Fish Eggs	Bath Treatment	100ppm	Hatchery
Tricaine Methanesulfonate	MS-222, Tricane-S	Anesthesia	Bath Treatment	750ppm	Hatchery/Growout
Antimicrobial Hand Soap		General Cleaning	n/a	n/a	Hatchery/Growout/Processing
Citric Acid		General Cleaning	Diluted and Applied	n/a	Hatchery/Growout/Processing
Pentapotassium bis (peroxymonosulphate) bis(sulphate) & Sodium Dodecylbenzene Sulfonate	Virkon Aquatic	Cleaning & Disinfecting Equipment	Diluted and Applied	10g/l	Hatchery/Growout/Processing
Phosphoric Acid		Cleaning Processing Equipment	Diluted and Applied	As per label instructions	Processing
Chlorinated Alkaline		Cleaning Processing Equipment	Diluted and Applied	As per label instructions	Processing
Didecyldimethylammonium Chloride		Cleaning & Disinfecting Processing Equipment	Diluted and Applied	As per label instructions	Processing
Ferric Chloride					Hatchery/Growout
Ammonium Chloride		Biofilter Startup	Diluted and Applied	n/a	Hatchery/Growout
Sodium Nitrite		Biofilter Startup	Diluted and Applied	n/a	Hatchery/Growout
Methanol		Carbon source for Denitrification	Diluted and Applied	n/a	
Ethanol		Carbon source for Denitrification	Diluted and Applied	n/a	
MicroC		Carbon source for Denitrification	Diluted and Applied	n/a	

MEPDES ATTACHMENT 10 – Fish Rearing Facility Rearing Tank Number, Size, Arrangement

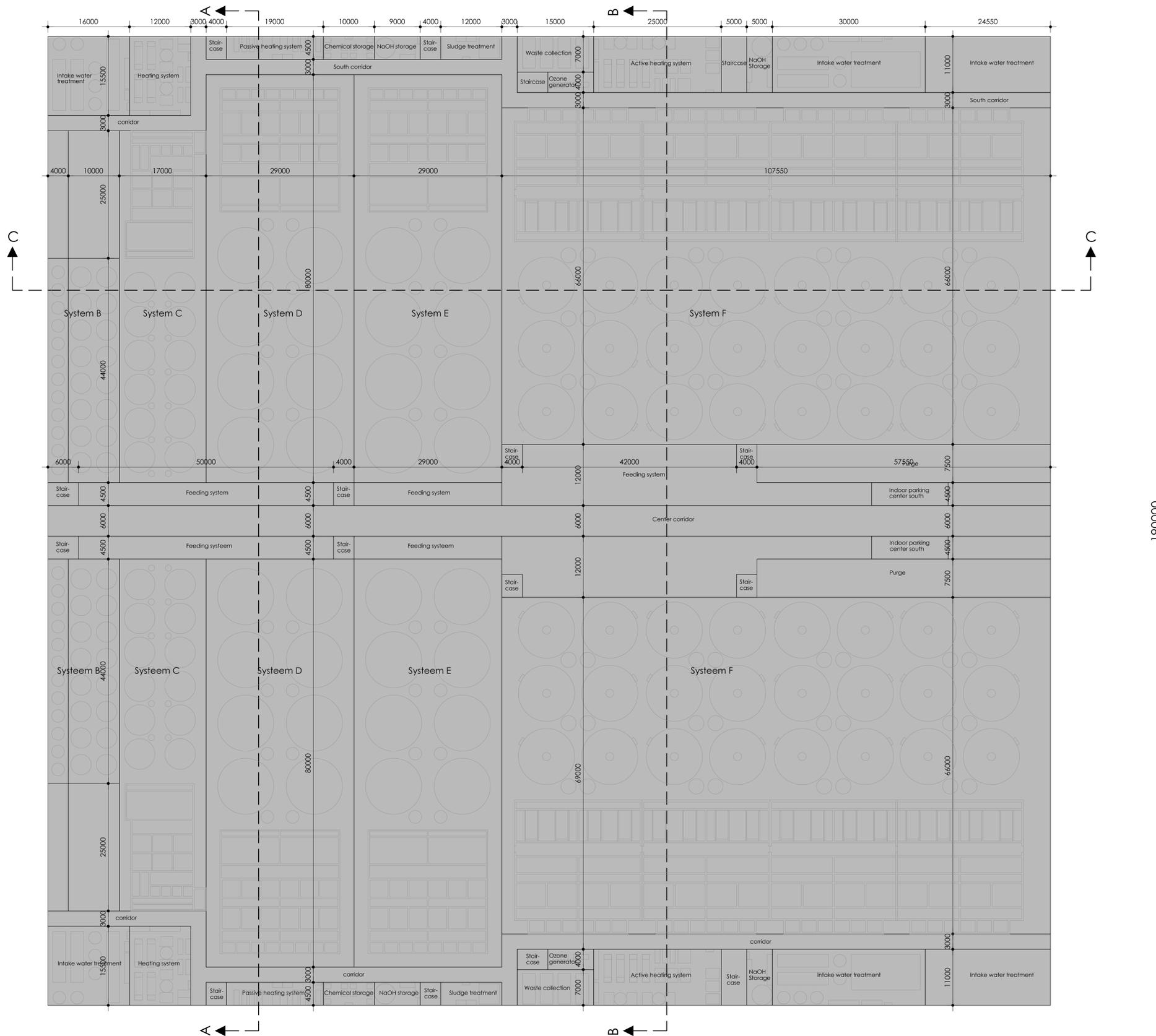


First floor



Second floor

196550



190000

1ST FLOOR

Kingfish Maine

Bouwkundig Buro Laban B.V.
buro voor
architectuur en constructies

Bouwkundig Buro Laban B.V.
Klaproos 2 - 4421 MB Kapelle
Tel: (0113)343883
buro@labanbv.nl
www.labanbv.nl

Opdrachtgever: Kingfish Zeeland BV, Oost-Zeedijk 13, 4326PM Ie Kats
Onderwerp: Nieuwbouw Kingfish Maine
Onderdeel: **CONCEPT DRAWING** 1st FLOOR

Datum:	061119	a	131119	b	040620	c	Werk no.:	19-34	Blad no.:	01
Schaal:	1:300	d		e		f				
Get:	AO	g		h		i				

MEPDES Application – Attachment 11 – Intake and Outfall Pipe, Screening, and Diffuser Figures

