

**STATE OF MAINE
DEPARTMENT OF MARINE RESOURCES
Standard Aquaculture Lease Application
Black Island South site, Frenchboro
Net pen culture of finfish;
Suspended and bottom culture of shellfish**

**Phoenix Salmon US, Inc.
Lease SWAN BIS
Docket #2010-09**

March 21, 2011

FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION

On February 23, 2010, the Department of Marine Resources (“DMR”) received an application from Phoenix Salmon US, Inc., a Maine corporation, for a standard aquaculture lease on 38.5 acres located in the coastal waters of the State of Maine, in the Atlantic Ocean off the west side of Black Island in the Town of Frenchboro in Hancock County, for net pen culture of Atlantic salmon (*Salmo salar*), halibut (*Hippoglossus hippoglossus*), arctic char (*Salvelinus alpinus*), and Atlantic cod (*Gadus morhua*) and suspended and bottom culture of blue mussels (*Mytilus edulis*).

The application was accepted as complete on April 27, 2010. DMR biologists conducted the site visit on July 7, 2010. A public hearing on this application was scheduled for Frenchboro on October 15, 2010. The organization Friends of Blue Hill Bay intervened. Public access to Frenchboro is available only by limited ferry service; owing to a severe storm, the hearing was cancelled. The Department attempted to reschedule the hearing on Frenchboro, but the transportation logistics proved impossible to resolve, so the hearing was held on December 20, 2010, in the Town of Mount Desert with a videoconferencing link to Frenchboro, allowing for real-time attendance and participation by the island’s residents.

1. THE PROCEEDINGS

Notices of the hearing and copies of the application and DMR site report were sent to numerous state and federal agencies for their review, as well as to a number of educational institutions, aquaculture and environmental organizations, the Town of Frenchboro and the Frenchboro Harbormaster, members of the Legislature, representatives of the press, riparian landowners, and other private individuals. Public notice of the hearing was advertised in the *Mount Desert Islander*, first on Sept. 9 and Sept. 30, and again on Nov. 18 and Dec. 9, 2010 and in the October and December issues of *Commercial Fisheries News*. One written comment was received from a summer resident of Gott’s Island, approximately 9,000 ft. to the northeast of the proposed lease site, opposing the proposed lease because of concerns that it would degrade the water quality in the area.

Testimony was given at the hearing by Cooke Aquaculture staff members David Miller, Marine Production Manager; Nell Halse, Communications Director; and Jennifer Robinson,

Compliance Officer (Cooke Aquaculture is the parent company of Phoenix Salmon). Christopher Heinig, President of MER Assessment Corporation, which performs environmental monitoring for Cooke Aquaculture, also testified on behalf of the applicant. Jon Lewis, DMR's Aquaculture Environmental Coordinator, testified on behalf of the Department and showed the videotape of the sea bottom made at the time of the site visit. Each witness was sworn and was available for questioning by the Department, the applicant, other local, state, and federal agencies, the intervenor, and members of the public.¹ The applicant was represented by attorney Andrew Hamilton. The intervenor was represented by attorney Sally Mills. The hearing was recorded by both DMR and the applicant. The Hearing Officer was Diantha Robinson.

The evidentiary record before the Department regarding this lease application includes twelve exhibits admitted at the hearing (see exhibit list below) and the testimony at the hearing itself. The record was held open until January 7, 2011, to receive the written closing arguments of counsel for the applicant and the intervenor and copies of the applicant's Power Point slides presented as part of the testimony of its witnesses.

The closing arguments of the parties are contained in the case file (Exhibit 1). The "Written Closing Argument of Applicant" is cited as "Applicant's Argument"; the "Closing Statement of Friends of Blue Hill Bay, Intervenor" is cited as "Intervenor's Argument". The evidence from all of these sources is summarized below.²

LIST OF EXHIBITS

1. Case file, Docket # 2010-09 (cited below as "CF").
2. Application signed by Jennifer Robinson and dated Feb. 22, 2010 (cited below as "A" with page number).
3. DMR site report dated August 10, 2010 (cited below as "SR" with page number).
4. Letter from True North Salmon US, signed Jennifer Robinson, to Steve Timpano of Maine Dept. of Inland Fisheries & Wildlife, dated 6-18-09, one page letter and attached one-page chart.
5. Chain of 6 emails titled "Letters Regarding Leases" sent between June 22, 2009 and Oct. 18, 2010 between Jennifer Robinson, Steve Timpano of Maine Dept. of Inland Fisheries & Wildlife, and Kelly Disley; 2 pages.
6. Document titled "MER Assessment Corporation, Black Island (South) proposed salmon aquaculture site/Baseline summary and adjacent Black Island (North) site history", 2 pages of text and 6 pages of graphics.
7. Resume of Christopher S. Heinig, 4 pages.

¹ Three Frenchboro residents spoke via the video link to the island: Arthur Fernald (a Frenchboro selectman), Ann Fernald, and Jessica Bellah.

² Testimony cited as (Smith/Jones) means testimony of Smith, being questioned by Jones.

8. Letter from Matthew Young of Maine Dept. of Environmental Protection to Atlantic Salmon of Maine, Attn: Jennifer Robinson dated 3-30-09, one page.

9. Letter from Jennifer Robinson of Cooke Aquaculture to Matthew Young of Maine Dept. of Environmental Protection dated 4-27-09, 2 pages with a one-page attachment titled "Environmental management plan for Black Island".

10. Document of two pages titled "Environmental Monitoring Plan for Black Island, 19 March 2010; Revised April 2010".³

11. Letter from Matthew Young of Maine Dept. of Environmental Protection to Cooke Aquaculture dated 5-18-10, one page (two sides).

12. Letter from Matthew Young of Maine Dept. of Environmental Protection to Cooke Aquaculture dated 6-14-10, one page.

NOTE: Paper copies of the applicant's Power Point slides are not marked as a separate exhibit but are included in the record of the case. The slides supporting the primary direct testimony of the applicant's four witnesses are cited below as "PS" with page number. The slides supporting the testimony of Jennifer Robinson about a different lease site, SWAN BI, are cited below as "PSB" with page number.

2. DESCRIPTION OF THE PROJECT

A. Site History

The proposed lease site (the "south site") lies in the waters of the Atlantic Ocean south of Mt. Desert Island on the west side of Black Island, northeast of Swan's Island.

David Miller, Marine Production Manager for the applicant, testified that Phoenix's parent, Cooke Aquaculture, USA, operates salmon aquaculture sites in three general areas of the Maine coast: Cobscook Bay, Machias Bay, and the areas around Jonesport and Mt. Desert Island. Cooke also operates three fish hatcheries in Maine and a fish processing plant in Machiasport. Cooke's goal is to establish three separate growing areas, each with a level of production that is sufficient both to use the output of the hatcheries efficiently and to maintain an adequate supply of fish to the processing plant. Cooke has reached this level in Cobscook Bay, Mr. Miller testified, and it is approaching this level with its Machias Bay lease sites. Now the company is trying to secure additional lease sites in the area it calls "points south", i.e., between Jonesport and Swan's Island (Miller, testimony; PS3-7). The proposed lease for the south site is part of that plan.

An existing 15-acre net-pen lease site, SWAN BI, lies 1,000 feet to the north of the proposed lease site (SR Figures 1 and 2). This lease (the "north site") is held by Island Aquaculture Corp., a subsidiary of Atlantic Salmon of Maine, which, like Phoenix Salmon, is a

³ According to the applicant, this plan was not ultimately accepted by the DEP. The applicant objected to its admission.

subsidiary of Cooke Aquaculture USA.⁴ The north site lease was originally granted in 1999 and renewed in 2009; it is used to raise Atlantic salmon and is also authorized for halibut, cod, haddock, and mussels. Although the leaseholder is a different corporation from Phoenix, the north site lease is managed as part of Cooke Aquaculture's Maine operations, just as the proposed south site would be.

Information about the north site is included here because the proximity of the two sites and the environmental problems experienced at the north site prompted questions about whether and how operations at each site might affect the other. Those issues were addressed in the Department's site report, in testimony and exhibits presented at the hearing, and in the parties' written arguments. They underlie the intervenor's argument against granting the lease for the south site, which is addressed in section 3 (D), below.

B. Proposed Operations⁵

The applicant plans to raise Atlantic salmon at the proposed lease site using net pen culture. It is seeking permission also to cultivate halibut, arctic char, and Atlantic cod as alternate species for net pen culture, and blue mussels, using suspended and bottom culture (A1).

Mr. Miller testified that the applicant will install 20 floating net pens 100 feet in diameter at the lease site, set in a mooring grid system of 4 spaces by 5 spaces (PS10). "The floating area of the grid system will measure 600' x 750' or approximately 10.4 acres"; the cages themselves occupy approximately 3.9 acres of surface area (PS9). The remainder of the 38.5 acres contains the mooring gear. The cages are served by a "centralized feeding system housed in a floating barge" (PS9).

Phoenix plans to raise a maximum of approximately 800,000 harvest-sized fish (6 kg.), with a target maximum density of 25 kg/m³ and single year class stocking at this site, i.e., all fish on the site will be the same age (PS12). Fish will be raised from hatchery smolts to market size over 18 to 36 months (A4). Underwater cameras or other technology will be used to monitor feeding. Underwater lights will be used to prevent maturation of fish (PS12).

According to the application, Phoenix and its affiliates "have been raising fish in the Mount Desert Island area for more than 15 years". The 100 meter – circumference cages "have been used throughout the industry", and "All gear and equipment is at or above industry standard and will undergo routine maintenance" (A5).

According to the application and Mr. Miller's testimony, the work crew will travel daily to the site from a pier in Bernard, on Mt. Desert Island. Fish will be fed two to three times daily as weather permits, using automatic feeders monitored by cameras. Divers will maintain the lease area, collecting mortalities, repairing gear, and monitoring the site. Nets will be changed two to

⁴ Island Aquaculture Corp. and Atlantic Salmon of Maine were acquired by Cooke Aquaculture in 2005.

⁵ This description of the proposed operations summarizes information contained in the application and presented at the hearing. DMR relies on this information as indicative of how the applicant intends to operate the project on the lease site.

three times during the production cycle. Market-size fish will be harvested by boat at the site and taken to shore for processing (A5). Vessels serving the site include a 40-ft. lobster-style dive boat, a 50-ft. barge-style feeding boat, and a 60-ft. barge-style feed delivery boat (A4).

In addition to the aquaculture lease, the applicant must obtain permits from DMR to transfer fish to the site and from the U.S. Army Corps of Engineers to install structures at the site (Lewis, testimony). A Maine Pollutant Discharge Elimination System (MEPDES) waste discharge permit from the Maine Department of Environmental Protection (DEP) is required to discharge substances such as fish feed into the water; this permit will require Phoenix to conduct extensive environmental monitoring of the site (A4).

Other finfish species will be cultured with techniques similar to those for salmon. Mussels will be cultivated either on the bottom or on ropes suspended from finfish cages or floats. Harvested mussels will be taken to shore for processing (A11A).

Further details of the proposed operation are contained in the application.

C. Site Characteristics

Although the Department sent a Harbormaster Questionnaire to the Town of Frenchboro, it was not returned, so there is no information available in this record from the local harbormaster. The proposed lease is in an area currently classified by the Department of Marine Resources Water Quality Classification program as “open/approved for the harvest of shellfish” (SR7).

The proposed south site lies approximately 340 ft. off the west side of Black Island in water ranging from approximately 50 to 120 feet deep. According to the site report, the pens will be moored in water approximately 100 ft. deep, “more than adequate for fish pens that will be constructed with nets falling 12.8 meters (approximately 42 feet) into the water column” (SR3). According to Mr. Miller, this site would be the deepest salmon farming site in Maine (PS30).

More than 1800 ft. of open water lie between the western side of the site and Placentia Island to the west (SR3-4). The shore of Black Island to the east is steep and rocky with “mature forested uplands with no residential development observed from the proposed lease area” (SR2).

The site report describes the sea bottom at the proposed lease site as follows:

The topography of the proposed lease consists of soft mud graduating to scoured bottom with a mixture of sand, gravel and cobble on approach to the shoreline of Black Island. Currents run primarily in a northeast/southwest direction depending upon tidal stage. Page 6 of 22 in the Baseline Site Survey Report submitted by the applicant as part of the lease application, indicates mean currents of approximately 8 cm/sec or approximately 945 feet per hour. The bottom topography of the site generally follows the upland characteristics, with water depths decreasing toward the northeast (SR3).

Tidal flow at the proposed site is northerly on the flood tide and south-southeasterly on the ebb tide. According to both Mr. Heinig and Mr. Lewis, there do not appear to be any bathymetric features at the proposed south lease site that would alter this “bi-directional” tidal flow (PS40; Lewis, testimony).

Mr. Heinig testified that the proposed south site is substantially deeper than the existing north site. Sediments at the northern end are coarser than those in the southern part of the north site, which has experienced problems with accumulation of organic matter, “suggesting less of a predisposition to deposition” at the south site. In addition, the cages on the south site would be located farther from shore, beyond the shallow area around the bar to the north (PS46).

Other aspects of the site are discussed below.

3. STATUTORY CRITERIA & FINDINGS OF FACT

Approval of standard aquaculture leases is governed by 12 M.R.S.A. §6072. This statute provides that a lease may be granted by the Commissioner of DMR if s/he determines that the project will not unreasonably interfere with the ingress and egress of riparian owners; with navigation; with fishing or other uses of the area, taking into consideration the number and density of aquaculture leases in an area; with the ability of the lease site and surrounding areas to support existing ecologically significant flora and fauna; or with the public use or enjoyment within 1,000 feet of beaches, parks, docking facilities, or conserved lands owned by municipal, state, or federal governments. The Commissioner must also determine that the applicant has demonstrated that there is an available source of organisms to be cultured for the lease site; that the lease will not result in an unreasonable impact from noise or lights at the boundaries of the lease site; and that the lease will be in compliance with visual impact criteria adopted by the Commissioner relating to color, height, shape and mass.

A. Riparian Access

Black Island is a largely undeveloped, wooded island with few landowners, no year-round residences, and minimal development. All owners of property interests on Black Island, not solely those shorefront landowners within 1,000 ft. of the proposed lease site, were provided with personal notice of the application and the public hearing; none of them submitted comments or participated in the hearing.

Mr. Miller testified that he and Ms Robinson met with representatives of the National Park Service (holder of conservation easements on most or all of Black Island) and the Maine Coast Heritage Trust (owner of much, but not all, of the shoreline within 1,000 ft of the proposed lease site). They discussed minimizing the impact of the aquaculture operations on the riparian land. According to Mr. Miller, “Phoenix remains open to further dialogue with MPA and MCHT” (PS13). No comments or testimony on the proposed lease site were provided by either the National Park Service or the Maine Coast Heritage Trust.

At the time of the site visit on July 7, 2010, DMR biologists observed a single dock, with no ramp or float installed, on the western shore of Black Island. The site report notes that:

A distance of approximately 340 feet separates the proposed eastern boundary and the Black Island shoreline. If the dock were installed there would be a minimum of 250 feet of navigable water between the dock and the eastern boundary of the lease site.

From this evidence, it appears that the shore and neighboring waters in the area of the proposed lease are not used to any significant degree for access to and from the island. Even if the single dock were in use, there would be ample room for access to and from it in the waters between the dock and the nearest lease boundary. It does not appear that the proposed lease site will interfere with riparian access.

Therefore, I find that the aquaculture activities proposed for this site will not unreasonably interfere with the ingress and egress of any riparian owner.

B. Navigation

According to the site report, the navigational channel on the west side of Black Island between the Black Island Bar and the eastern side of Placentia Island is 2,400 ft. wide. The proposed lease site would extend approximately 600 ft. into the channel from the eastern side, leaving 1,800 ft. of open water available for navigation (SR4). During the site visit, DMR biologists observed six vessels navigating through this area, one of which was hauling lobster traps within the proposed lease boundaries, and two of which transited across the proposed lease site. The other three traveled “within the main channel and outside the western boundary of the proposed lease” (SR5).

The site report concludes:

Vessels would be required to travel in a more westerly channel between Black and Placentia Islands. Only small vessels or those with local knowledge and experience around salmon farms and fish pens would be expected to transit east of the farm and west of Black Island (SR5).

Mr. Miller testified that the State-run ferry “runs within 300 to 500 yards of the lease site” and that there is “ample navigable water” to the west of the site (Miller, testimony; PS18-19).

It is clear from this evidence that there is more than adequate room for all types of navigation to occur between Black Island and Placentia Island and that the presence of the proposed lease site will not interfere significantly with navigation in the vicinity. The mandatory application for marking requirements will ensure that the site is marked as the Coast Guard sees fit to warn mariners of its location.

Therefore, I find that the aquaculture activities proposed for this site will not unreasonably interfere with navigation. The applicant is required to consult the U.S. Coast Guard, Boston, Office of Private Aids to Navigation, for marking requirements.

C. Fishing & Other Uses

No report was submitted by the Frenchboro Harbormaster. No fishermen testified at the public hearing. Department biologists noted in the site report that:

On July 7, 2010 a great deal of lobster fishing was observed throughout the area. We estimated approximately 50 buoys observed within the proposed lease site boundaries. One vessel was noted hauling traps within the proposed boundaries during the Departmental site visit. The highest density of buoys appeared to be in shallower water (~50-60 depth contour) nearer the Black Island and Placentia Island shoreline. Lobster fishing was occurring throughout the Placentia I. / Black I. passage however.

Some scallop dragging may occur in the area during winter months although no scallops were observed in the area (SR5).

Mr. Miller noted that, were the lease granted, the area within which lobster fishing could not be conducted (within the shadow of the mooring grid) would amount to 10.3 acres, or 0.016% of the total area of Blue Hill Bay. He said there was “limited seasonal lobstering” at the site, with lobster buoy counts made by the applicant in August, 2008 and October 2010 of 22-23 buoys within the 38.5-acre site. Phoenix has coexisted with lobstermen for years, according to Mr. Miller. He also noted that, based on the observations listed in the site report, “no commercially exploitable quantities of marine organisms (i.e., scallops, mussels, and urchins) were observed” within the proposed lease site (Miller, testimony; PS23-25).

It is apparent that lobster fishing is actively conducted within the lease boundaries of the south site and in the surrounding waters. Local fishermen have had ample notice of the proposed lease, and neither they nor the Frenchboro Harbormaster have expressed concerns that the lease would interfere with lobstering or other fishing in the area. Lobster and crab fishing can continue in the 28 acres of the lease site that lies outside of the shadow of the mooring grid. Based on this evidence, the proposed lease would not unduly hamper fishing in the area.

Exclusivity. The applicant has requested that dragging be prohibited on the site, to avoid entanglement with the moorings. Lobstering can continue within the lease boundaries but outside of the shadow of the mooring grid, according to Mr. Miller (Miller, testimony; PS24).

These restrictions are clearly necessary “to carry out the lease purpose”, in the words of 12 MRSA §6072 (7-B); they will be included as conditions on the lease.

Other aquaculture leases. The nearest aquaculture lease is the north site at Black Island, lease SWAN BI, also held by a Cooke subsidiary. The site report states:

The nearest aquaculture activity is the existing 15 acre Black Island lease (SWAN BI) operated by the applicants. This farm is located ~1,000 feet to the north and is used for raising Atlantic salmon although other species such as Atlantic halibut, Atlantic cod, haddock and blue mussels are permitted. As stated under “Bottom Topography and Currents”, hydrologic interaction between these two farms would be anticipated and issues surrounding the stocking and management of the two farms would be addressed by the Fish Health Technical Committee under the Department’s Fish Stocking and Transfer Permit program.

The relationship of these two sites is discussed in detail below in section 3 (D). The evidence as described there indicates in part that the proposed south site will not interfere with operations at the north site, particularly since the two sites will be under common ownership and management.

The evidence in the record supports the conclusion that the proposed aquaculture lease will not interfere unreasonably with fishing and other activities in the area.

The lease must be marked in accordance with DMR Rule 2.80.⁶

Therefore, considering the number and density of aquaculture leases in the area, I find that the aquaculture activities proposed for this site will not unreasonably interfere with fishing or other uses of the area. Dragging will be prohibited on the site. Lobster and crab fishing can continue within the open areas inside the lease boundaries but outside of the shadow of the mooring grid.

D. Flora & Fauna

The site report states that “The greatest diversity of epibenthic fauna was observed around sporadically occurring rocks; particularly toward the near shore, northeastern portion of the proposed lease” (SR6). Species observed included shrimp, sponges, lobsters, anemones, sea cucumbers red fish, sculpin, sea stars, and harbor porpoises.

⁶**2.80 Marking Procedures for Aquaculture Leases**

1. When required by the Commissioner in the lease, aquaculture leases shall be marked with a floating device, such as a buoy, which displays the lease identifier assigned by the Department and the words SEA FARM in letters of at least 2 inches in height in colors contrasting to the background color of the device. The marked floating device shall be readily distinguishable from interior buoys and aquaculture gear.
2. The marked floating devices shall be displayed at each corner of the lease area that is occupied or at the outermost corners. In cases where the boundary line exceeds 100 yards, additional devices shall be displayed so as to clearly show the boundary line of the lease. In situations where the topography or distance of the lease boundary interrupts the line of sight from one marker to the next, additional marked floating devices shall be displayed so as to maintain a continuous line of sight.
3. When such marking requirements are unnecessary or impractical in certain lease locations, such as upwellers located within marina slips, the Commissioner may set forth alternative marking requirements in an individual lease.
4. Lease sites must be marked in accordance with the United State’s Coast Guard’s Aids to Private Navigation standards and requirements.

While both the applicant and the Department asked the Maine Department of Inland Fisheries and Wildlife (MDIF&W) to review and comment on the proposal, no response was received (Exhibits 1, 4, 5). The site report notes that according to MDIF&W maps, “there are no Essential or Significant Wildlife Habitats surrounding the proposal (i.e. seabird nesting islands) (SR6).

Bathymetry of the north site. The existing north lease site has experienced problems with a buildup of organic matter (uneaten fish feed and feces from the pens) on the sea floor, particularly in the southern part of the site, when fish are being raised on the site (Exhibits 6, 8, 9, 10, 11, 12; PS 37-45). According to both Mr. Heinig and Mr. Lewis, this is likely attributable to the bathymetry of the north site, which includes deeper water and faster currents at the north end, an undersea mound just west of the site rising approximately 40 ft. above the bottom, a slightly depressed area south of the fish pens that may trap organic material, and a shallower area south of the site where a bar projects westward from the shore of Black Island.

The northerly flow of the incoming tide is diverted by the mound, causing part of it to veer east and then south over the southern part of the site, even while the remainder of the incoming tide is flowing north. On the ebb tide, the flow is southerly over the entire north site. The direction of the currents on the southern part of the site is therefore predominantly southerly, regardless of the stage of the tide, while the northern part of the site experiences northerly currents on an incoming tide and southerly currents when the tide ebbs. These southerly currents sweep any organic debris farther south, and as the currents slow in the shallows around the bar, the debris falls to the bottom and accumulates, even in the area beyond the pens to the south (Heinig, testimony; PS38-39; Exhibit 6; Lewis, testimony).

Organic loading at the north site. Organic loading (organic matter from the fish pens accumulating on the bottom) at the north site eventually resulted in levels of sulfides and *Beggiatoa* bacteria on the sea bottom that exceeded the “impact limits” specified in the leaseholder’s MEPDES permit. This led the DEP to issue a letter of warning dated March 30, 2009, based on sampling and monitoring results at the site in the fall of 2008 (Exhibit 8). Mr. Heinig characterized the *Beggiatoa* at the south end of the north site as “occurring at various densities from a light covering to dense mats” (Exhibit 6, p. 1).

The *Beggiatoa* bacterium is naturally present on the sea bottom in Maine and world-wide. It forms mats on sulfide-rich marine sediments. When organic material accumulates on the bottom faster than natural processes can decompose it, oxygen in the marine sediments is depleted and relative sulfur levels rise, encouraging the growth of *Beggiatoa*.⁷ If the bacterium is extensive enough, other forms of oxygen-dependent marine life, unable to survive the anoxic conditions, die or move away. Thus, the presence of *Beggiatoa* above certain levels is used as an indicator of environmental imbalance in the MEPDES permits issued to salmon farms.

⁷ See <http://www.csc.noaa.gov/benthic/resources/species/species6.htm>

Anoxic conditions on finfish sites can be remedied by removing or reducing the number of fish, altering feeding practices, or taking other steps to decrease the amount of organic material reaching the sea floor. Natural processes eventually decompose the accumulated material, causing oxygen levels in the sediments to rise. Eventually, other marine species that died or left the area in response to the anoxic conditions return, and monitoring and sampling results will reflect a more balanced, healthy environment on the sea floor. Mr. Lewis noted that in all cases, monitoring is the key to determining the balance between what a site can handle biologically and what can be done successfully in terms of raising fish there (Lewis/Ann Fernald).

Over the 15 months following the DEP letter of warning, the leaseholder worked with the DEP to alter its operations at the north site in order to reverse the effects of organic loading. Although other operational changes proposed by the leaseholder were implemented by agreement with the DEP, the DEP ultimately required a one-third reduction in the number of fish re-stocked on the north site in the summer of 2010 and ordered the leaseholder not to place fish in the four southern-most pens (Exhibit 12). The leaseholder had apparently proposed a much smaller reduction in stocking and had not offered to discontinue use of the four southern pens.

By the fall of 2010, following a 7-week fallow period (no fish in any of the pens) and 13 weeks with fish restocked at lower levels and no fish in the 4 south pens, monitoring at the north site indicated that sulfides had fallen below the warning level at all measuring stations. In addition, *Beggiatoa* was “substantially improved”, according to Mr. Heinig, compared to levels shown in monitoring in September 2009 and April 2010 (Heinig/Mills).

Phoenix describes these improvements as a “reasonably prompt recovery” (Applicant’s Argument, p. 14). The Intervenor characterizes the outcome as an “unacceptable two-year time lag in reaching, what is hoped to be, a reasonable solution” (Intervenor’s Argument, p. 4).

No organic loading between sites. Addressing the possibility that organic matter from the north site might be washed onto the proposed south site, Mr. Heinig testified that given the 1,000 foot distance between the sites, it is “extremely improbable that additive negative effects will occur” (PS41). In his experience, Mr. Heinig said, “negative benthic effects have never been detected more than 100 meters (approximately 300 ft.) from a cage system and are usually confined to less than 30 meters” (PS41). Mr. Lewis also testified that the majority of such buildup is normally found within 30 meters of a pen (Lewis, testimony).

The site report concludes that the water depths and currents at the proposed south site

would likely make the area toward the northeast of the proposed boundaries and toward the bar to the north the most vulnerable location for organic loading [*referring to loading coming from the south site itself*]. Uneaten feed that falls to the bottom generally falls almost directly under the salmon pens and is not carried long distances from pen footprints. At the proposed location, there would likely be some transport of uneaten feed toward the northeast; however it is very unlikely that it would be transported beyond the lease boundaries (SR3).

Thus, any organic material from the south site likewise would not be carried onto the north site. Mr. Lewis testified that there will be no overlap or interaction of benthic impact or organic loading between the two sites; they will be separate entities in that respect (Lewis, testimony).

Water exchange between sites. The site report also addresses the potential for mixing of the sea water between the two sites:

Considering proximity to the existing lease at Black Island, water exchange between the two sites would be expected. Any dissolved organics or potential pathogens should be anticipated to be shared between the two farm locations, if granted. Potential disease issues and management and stocking schedules would be addressed by the Department's Fish Health Technical Committee; a group of fish health experts from state and federal agencies, academia and industry formulated to advise the Department on matters such as these (SR3).

Thus, while the two sites will not share the undissolved organic matter that causes organic buildup on the bottom, they are certain to share sea water that could transport disease organisms between the two sites. Mr. Lewis testified that this is not an ecological or environmental concern; it is a potential fish health issue.

Mr. Miller testified that the applicant's long-term goal is to operate both the north and south sites separately but with the same year-class of fish stocked at both sites. Before this can happen, however, the rotation of production at all of Cooke's Maine sites needs to be coordinated in a 3-year cycle, he said, and in the short term each of the two sites could be stocked with fish of a different year class (Miller/Lewis).

Mr. Lewis testified that, while an argument could be made that the two sites should operate as a single entity (raising fish of similar ages on a similar schedule and allowing the sites to lie fallow simultaneously between crops to break any disease cycle), the risk of disease is ultimately borne by Phoenix and its parent, since both sites are owned by Cooke Aquaculture (Lewis/Mills). That risk will be considered by DMR, however, when Phoenix applies for a permit to transfer fish from hatcheries onto either lease site. Mr. Lewis noted that the Fish Health Technical Committee will advise the Department, and a transfer permit could be denied or delayed, or the level of stocking could be reduced, depending on site conditions at the time (Lewis/Mills).

Differences between the north and south sites. In his summary of the baseline survey for the south site and history of the adjacent north site (Exhibit 6), Mr. Heinig states the following conclusion:

Given the rather unique combination of conditions that may have led to the far-field impacts observed at the south end of the existing Black Island site, combined with the greater depth and distance from shore and higher current velocity of the proposed Black Island south site, it seems reasonable to conclude that environmental effects will be less at the proposed site than observed at the existing site. Indeed, cage systems are currently located at sites with much shallower depths, slower current

velocities, and with substantially softer sediments than found at the proposed site, yet environmental impacts remain manageable (Exhibit 6, p. 2).

Mr. Heinig explained that where ocean currents are slower, as at the south end of the north site, discharges of organic matter from the fish pens “are concentrated and confined to the immediate area of the cages; under faster current conditions discharges from the cages are dispersed and distributed over a wide area.” When discharges are dispersed over a wide area, he said, “the effects are generally indiscernible but where discernable often result in ‘benthic enhancement’ or ‘bio-stimulation’” (Heinig, testimony; PS41).

Mr. Lewis testified that he agreed completely with Mr. Heinig’s characterization of the south site and the likelihood that it would not experience the problems faced at the north site. He testified that the key to the MEPDES permit is monitoring in spring and fall for sediment chemistry and *Beggiatoa*. DEP prescribes and oversees this monitoring, but Mr. Lewis collaborates with DEP in reviewing monitoring results and determining whether remedial action is needed (Lewis, testimony).

Mr. Lewis explained that greater water depth at the south site means a greater likelihood that uneaten feed falling from the pens will either be eaten by another creature or will dissolve and be dispersed in the water column before it can reach the bottom. In addition, the coarseness of the cobble bottom means that currents are scouring the bottom, carrying away the small particles of organic matter that might otherwise accumulate between the larger rocks. Mr. Lewis noted that coarseness of particles on the bottom is clear evidence of scouring and a very good measure of what kind of deposition is likely there (Lewis, testimony).

Mr. Lewis noted that while these two sites would be relatively close to one another, salmon farms in many places in Canada and Europe are closer together. In Maine, he said, there are multiple fish farms in proximity to one another both in Machias Bay and in Cobscook Bay; some “have problems” and some do not, but monitoring will show which operating methods work and which do not. Mr. Lewis said that more experience at the north site (only two batches of fish have been stocked by Cooke on the site to date) will tell Phoenix what level of stocking will allow the site to operate successfully (Lewis/Ann Fernald).

Arguments of the parties. The intervenor contends that the system whereby DMR, DEP, and DMR’s Fish Health Technical Committee “fix problems as and when the problems arise” is “not working”. Under these circumstances, “it is unreasonable to further add to the density of aquaculture leases in the area, adding to the intensity and frequency of use, without a careful, incremental approach...It is unacceptable to allow a project to go forward on the understanding that someone else will sort out the mess when the time comes.”

The intervenor also complains that the applicant did not amend its application to DMR for a lease on the south site to reflect the warning letter from DEP regarding the north site (Intervenor’s Argument, pp. 4- 5).

The intervenor argues that the Commissioner should deny the lease proposed for the south site because environmental problems at the north site have not been completely corrected, and more time is needed to see if the revised operating plan at the north site succeeds in alleviating the organic loading before salmon aquaculture operations are allowed at the south site. Alternatively, the intervenor argues that if the south site lease is granted, the two sites should not be allowed to operate at the same time (Intervenor's Argument, p. 6).

The applicant argues that the south site lease application satisfies all the legal criteria and therefore should be granted (Applicant's Argument, pp. 1, 19).

Relationship of the two sites. The intervenor argues that because the conditions at the north site have not been completely corrected, the south site lease should be denied. The evidence shows, however, that conditions at the two sites differ with respect to bathymetry, currents, water depth, and the coarseness of the sea bottom. Fish pens on the south site would be located farther offshore than those on the north site, where currents are faster. Both Mr. Lewis and Mr. Heinig, who have investigated the two sites extensively, agree that there is no reason to expect the deposition problems experienced at the north site to be replicated at the proposed south site.

Both witnesses testified that some amount of deposition can be expected to occur under fish pens; the issue is whether it reaches a level that overwhelms the natural processes before they can decompose it. As Mr. Lewis noted, monitoring is the key to catching problems before they seriously degrade a site. But even when degradation occurs, it can be remedied, as the ongoing experience at the north site demonstrates.

While the intervenor argues that the length of time it has taken to improve conditions at the north site shows that this particular regulatory system is not working, the fact is that the lessee monitored the site in accordance with the MEPDES permit, the monitoring showed elevated levels of sulfides and *Beggiatoa*, DEP and the lessee took remedial action, and site conditions have improved as a result. It is reasonable to conclude from the evidence that the environmental conditions at the north site will continue to be addressed by the enforcement of the MEPDES permit by DEP and by additional oversight by DMR in connection with the issuance of fish transfer permits.

As Mr. Lewis testified, salmon farming in Maine is not a new or unfamiliar activity (Lewis/Ann Fernald). It is an ongoing process. Each site is unique, although experience has identified certain physical characteristics that can be key to success or to problems. DMR and DEP together have many years' experience in overseeing farm operations and responding to issues including both disease outbreaks and environmental degradation.

The north and south sites are separate, with separate characteristics, as Mr. Lewis noted, and in terms of deposition, events at one site will not affect the other. If significant environmental problems are unlikely at the south site, then denying the lease would not serve either to protect the south site's environment or to improve the north site, but would only penalize the applicant.

Amending the application. The applicant was not remiss in not describing the letter of warning for the north site in its application for the south site, as the intervenor asserts. The application does not ask for such information. DMR is informed of monitoring results at all aquaculture sites operating under MEPDES permits.

Site operations. While it is clear from the evidence that undissolved organic matter will not be transported between the sites, it is equally clear that sea water will be shared between them. As Mr. Lewis explained, the potential exists for disease to spread from fish at one site to fish at the other. The intervenor contends that if DMR grants the lease for the south site, it should require that only one site can be operated at a time. This is the opposite of what Mr. Lewis described when he mentioned the possibility of requiring the sites to be operated as a single entity as a precaution against disease.

Mr. Lewis noted that he does not have concerns about the sea water exchange between the sites that single-site management would mitigate at this time. Following both sites simultaneously and requiring them to be stocked with same-aged fish on the same growing cycle are techniques for eradicating disease, should disease occur. Mr. Lewis noted that the risk of disease falls entirely on Cooke, since they control both sites. Surveillance would be required, he said, and the Fish Health Technical Committee would advise the Department on these issues.

It is worth noting that Maine experienced a significant salmon disease outbreak in 2001. The Department's fish health rules and its approach to siting aquaculture lease operations are informed by that experience. It is possible that circumstances could develop at Black Island that the Department could conclude would justify requiring the two lease sites to be managed as one. In this case, given the absence of evidence that significant environmental problems are likely to occur during operations, tailoring fish stocking and management requirements to ongoing experience at the sites is preferable to restricting operations from the start.

Mussel culture. Mr. Lewis noted his concern that if mussels were grown on the bottom, a matrix of shells could develop that might trap organic debris from the salmon pens, potentially leading to bottom conditions that could jeopardize compliance with Phoenix's MEPDES permit. He also noted the difficulty of harvesting mussels from the bottom under the pens, considering the presence of mooring equipment there (Miller/Lewis; Lewis, testimony). He asked Mr. Miller whether, in light of these issues, bottom mussel culture was a good idea.

Mr. Miller responded that Phoenix would evaluate harvest techniques and DEP compliance issues before undertaking bottom seeding. He noted that suspended mussel culture "has good potential" (Miller/Lewis). Mr. Lewis agreed that suspended culture of mussels is "fine" at salmon aquaculture sites (Lewis, testimony). The Intervenor argues that if the Department grants the lease, it should be limited to salmon only, contending that the application fails to "provide sufficient detail as to how [culture of alternate species] is to be addressed", and stating that "At the very least, we agree with Mr. Lewis's suggestion that bottom mussel culture is inappropriate" (Intervenor's Argument, p. 5).

The Department recently denied Phoenix permission for bottom mussel culture on an expanded existing lease site in Machias Bay (Lease MACH CI2) where site conditions appeared likely to combine with mussel buildup to create anoxic conditions. Conditions at the proposed site here, however, are substantially different from those at the Machias Bay site; in particular, water depths are greater, currents are faster, and the bottom composition is firmer and more scoured. Degradation of the bottom at the proposed site caused by bottom mussel culture appears less likely than at the Machias Bay site. In addition, it is possible that mussels could be grown in areas of the lease where organic loading is not likely to occur in any event, such as on bottom well beyond the fish pens.

According to the testimony, the applicant is aware of the potential problems and will evaluate DEP compliance issues before engaging in bottom mussel culture. There appears to be no reason to prohibit bottom mussel culture from the outset at this proposed site, provided the applicant consults with DEP on the advisability of such operations before planting mussels on the bottom. The lease will contain a condition to this effect.

The Department's Public Health Division recommends that mussels grown on this lease site, whether by bottom or suspended culture, be harvested only with six months' notice to, and a harvest permit from, the Public Health Division. The notice requirement is intended to allow the Division time to review the public health implications of growing mussels on a finfish site and to develop appropriate safeguards. This recommendation will be included as a condition on the lease.

Culture of other alternate species. As to the Intervenor's concerns about alternate finfish species, the Department declared the application to be complete after an initial review that included a determination that adequate information had been presented about culture techniques for the species other than salmon (i.e., halibut (*Hippoglossus hippoglossus*), arctic char (*Salvelinus alpinus*), and Atlantic cod (*Gadus morhua*). These species are obviously not the primary focus of aquaculture at the proposed south site, and Mr. Miller testified that the likelihood that Phoenix would stock cod at the site was "low" (Miller/Hamilton).

All of these species can be legally cultivated in Maine; except for Arctic char, they all are authorized to be cultivated at the north site. Department biologists did not recommend denying permission to culture these species, and no evidence was presented to support denying such permission. Culture of these species will therefore be granted. Permits from the Department are required before any species of fish can be stocked at the site.

Summary. The evidence supports a finding that the marine life on the site or in its vicinity will not be adversely affected to any significant degree by the proposed aquaculture operation. Deposition problems at the north site will not affect the south site. Deposition problems are unlikely to develop at the south site, but if they do, they will not affect the north site. The monitoring required by the MEPDES permit will disclose any problems that may develop on the south site, and these can be addressed by DEP and DMR and remedied by the leaseholder.

DMR and the Fish Health Technical Committee will address fish health issues in the course of issuing transfer permits.

Therefore, I find that the aquaculture activities proposed for this site will not unreasonably interfere with the ability of the lease site and surrounding areas to support existing ecologically significant flora and fauna, provided that the applicant consults with DEP before planting mussels on the bottom and that mussels grown on this lease site, whether by bottom or suspended culture, be harvested only with six months' notice to, and a harvest permit from, the DMR Public Health Division.

E. Public Use & Enjoyment

According to both Mr. Miller and the site report (Miller, testimony; SR6), there are no government-owned beaches, parks, or docking facilities within 1,000 feet of the proposed lease site. According to information provided by the State Planning Office, there are no government-owned conserved lands located within 1,000 feet of the proposed lease site (see maps in case file, Exhibit 1).

Therefore, I find that the aquaculture activities proposed for this site will not unreasonably interfere with the public use or enjoyment within 1,000 feet of beaches, parks, or docking facilities or certain conserved lands owned by municipal, state, or federal governments.

F. Source of Organisms

The application indicates that the sources of stock for this proposed lease site are as follows: Atlantic salmon (*Salmo salar*) stock will come from company-owned hatcheries. Halibut (*Hippoglossus hippoglossus*) and Atlantic cod (*Gadus morhua*) will come from DMR certified sources such as the University of Maine or GreatBay Aquaculture. Arctic char eggs (*Salvelinus alpinus*) "would be obtained from an approved source (such as Pisciculture Des Alleguany of Quebec)." Mussel spat (*Mytilus edulis*) will be collected locally from the wild (A1).

Therefore, I find that the applicant has demonstrated that there is an available source of stock to be cultured for the lease site.

G. Light

The application states that "100, 400 watt submerged lights might be used to control maturation" and that lights would otherwise not be used at the site except in "unusual circumstances such as storm events and possible harvesting" (A6). Mr. Miller testified that underwater lights will be used to prevent early maturation of the salmon (Miller, testimony; PS 12).

The site report notes that any lights used to control maturation would be used between November and May and would be under water. It is also possible that the U.S. Coast Guard Office of Private Aids to Navigation might require lights to mark the site (SR7).

DMR Rule 2.37 (1) (A) (8) requires applicant to demonstrate that all reasonable measures will be taken to mitigate light impacts from the lease activities. Any lighting required for navigation by the U.S. Coast Guard will clearly be a reasonable use of light. Underwater husbandry lights, if used at this site, would have minimal impact on the surrounding area, particularly considering that they would be operated at a time of year when use of Black Island is likely to be minimal.

Therefore, I find that the aquaculture activities proposed for these sites will not result in an unreasonable impact from light at the boundaries of the lease site.

H. Noise

The site report states:

The applicant has proposed using diesel powered feed barges and work barges, a net roller, outboard and inboard powered boats, a portable welder/generator and a pressure washer. The applicant states that each of these is equipped with a muffler. Each of these pieces of equipment generates noise levels similar to those currently occurring from fishing and other vessel activity in the area. Noise levels would be similar to those produced at the existing Black Island lease site.

DMR Rule 2.37 (1) (A) (9) requires applicant to “demonstrate that all reasonable measures will be taken to mitigate noise impacts from the lease activities.” It provides that “All motorized equipment used during routine operation at an aquaculture facility must be designed or mitigated to reduce the sound level produced to the maximum extent practical.”

The equipment will be muffled and will be used during daylight hours only. The nearest land, Black Island, is mainly undeveloped. A salmon farm has operated at this location using similar equipment since 1999. Noise generated by operations on the site is unlikely to have a significant effect at the boundaries of the lease.

Therefore, I find that the aquaculture activities proposed for this site will not result in an unreasonable impact from noise at the boundaries of the lease.

I. Visual Impact

The application states that, while “colors are subject to change”, the gear colors are: cages are black, nets are red, bird cover is black, and the feeding system barge is almond or gray. The low profile of the pens, as well as their dark color, reduces their visual impact. The barge used for storing feed and feeding the fish measures 23 ft. long by 33 ft. wide by 14 ft. high. The application shows the feed barge as having 2.5 m of freeboard (8.2 ft.) when loaded, and 4.24 m. of freeboard (13.9 ft.) when empty (A29); this is the effective height of the top of the barge above the waterline, which is well below the 20-ft. limitation in the visual impact rule.

The site report notes that “No building is planned as part of this proposal” (SR7).

The visual impact rule requires that equipment colors blend in with the surrounding area and that buoy colors do not compromise safe navigation or conflict with U.S. Coast Guard requirements. A salmon farm has operated near this location using similar equipment since 1999. The black pens and nets will blend with the surroundings. Navigation markings will be reviewed by the Coast Guard. The lease operations as proposed will meet the requirements of the visual impact criteria in DMR Rule 2.37 (1) (A) (10), provided the colors of the equipment continue to blend with the surroundings. Marking buoys required by DMR and any navigation lighting required by the U.S. Coast Guard should be visible by their nature.

Therefore, I find that the proposed lease will comply with the visual impact criteria contained in DMR Regulation 2.37 (1) (A) (10).

4. CONCLUSIONS OF LAW

Based on the above findings, I conclude that:

1. The aquaculture activities proposed for this site will not unreasonably interfere with the ingress and egress of any riparian owner.
2. The aquaculture activities proposed for this site will not unreasonably interfere with navigation. The lease site shall be marked in accordance with U. S. Coast Guard requirements.
3. The aquaculture activities proposed for this site will not unreasonably interfere with fishing or other uses of the area, taking into consideration the number and density of aquaculture leases in the area. The lease boundaries must be marked in accordance with the requirements of DMR Rule 2.80. Dragging will be prohibited on the lease site. Lobstering will be permitted on the site outside the shadow of the mooring grid.
4. The aquaculture activities proposed for this site will not unreasonably interfere with the ability of the lease site and surrounding areas to support existing ecologically significant flora and fauna. The applicant must consult with DEP before planting mussels on the bottom. Mussels grown on this lease site, whether by bottom or suspended culture, may be harvested only with six months' notice to, and a harvest permit from, the DMR Public Health Division.
5. The aquaculture activities proposed for this site will not unreasonably interfere with the public use or enjoyment within 1,000 feet of beaches, parks, docking facilities, or conserved lands owned by municipal, state, or federal governments.

6. The applicant has demonstrated that there is an available source of Atlantic salmon (*Salmo salar*), halibut (*Hippoglossus hippoglossus*), arctic char (*Salvelinus alpinus*), Atlantic cod (*Gadus morhua*), and blue mussels (*Mytilus edulis*) to be cultured for the lease site.

7. The aquaculture activities proposed for this site will not result in an unreasonable impact from light at the boundaries of the lease site.

8. The aquaculture activities proposed for this site will not result in an unreasonable impact from noise at the boundaries of the lease site.

9. The aquaculture activities proposed for this site will comply with the visual impact criteria contained in DMR Regulation 2.37(1)(A)(10).

Accordingly, the evidence in the record supports the conclusion that the proposed aquaculture activities meet the requirements for the granting of an aquaculture lease set forth in 12 M.R.S.A. §6072.

5. DECISION

Based on the foregoing, the Commissioner grants the requested lease of 38.5 acres to Phoenix Salmon US Inc. for ten years for the purpose of cultivating Atlantic salmon (*Salmo salar*), halibut (*Hippoglossus hippoglossus*), arctic char (*Salvelinus alpinus*), Atlantic cod (*Gadus morhua*), and blue mussels (*Mytilus edulis*), using net pen and suspended culture techniques. The applicant shall pay the State of Maine rent in the amount of \$100.00 per acre per year. The applicant shall post a bond or establish an escrow account pursuant to DMR Rule 2.40 (2) (A) in the amount of \$ 25,000.00, conditioned upon its performance of the obligations contained in the aquaculture lease documents and all applicable statutes and regulations.

6. CONDITIONS TO BE IMPOSED ON LEASE

The Commissioner may establish conditions that govern the use of the lease area and impose limitations on aquaculture activities, pursuant to 12 MRSA §6072 (7-B)⁸ Conditions are designed to encourage the greatest multiple compatible uses of the lease area, while preserving the exclusive rights of the lessee to the extent necessary to carry out the purposes of the lease.

⁸ 12 MRSA §6072 (7-B) states: "The commissioner may establish conditions that govern the use of the leased area and limitations on the aquaculture activities. These conditions must encourage the greatest multiple, compatible uses of the leased area, but must also address the ability of the lease site and surrounding area to support ecologically significant flora and fauna and preserve the exclusive rights of the lessee to the extent necessary to carry out the lease purpose."

The following conditions shall be incorporated into the lease:

1. The lease site must be marked in accordance with both U.S. Coast Guard requirements and DMR Rule 2.80.
2. Dragging is prohibited on the lease site. Lobstering and crabbing are permitted on the lease site, outside the shadow of the mooring grid.
3. The applicant must consult with DEP before planting mussels on the bottom. Mussels grown on this lease site, whether by bottom or suspended culture, may be harvested only with six months' notice to, and a harvest permit from, the DMR Public Health Division.

7. REVOCATION OF LEASE

The Commissioner may commence revocation procedures if s/he determines that substantial aquaculture has not been conducted within the preceding year or that the lease activities are substantially injurious to marine organisms. If any of the conditions or requirements imposed in this decision, in the lease, or in the law is not being observed, the Commissioner may revoke the aquaculture lease.

Dated: 3/21/11

/s/ Norman H. Olsen
Norman H. Olsen
Commissioner
Department of Marine Resources