DRAFT BASIC MANAGEMENT PLAN
Baranof Salmon Facility
Sustainable Salmon Institute

I. Introduction

The Baranof Lake watershed has been recognized as having considerable potential for fisheries enhancement. However, despite several efforts to plan and construct a hatchery there, no facility has been built. Sustainable Salmon Institute (SSI) is proposing to build the Baranof Salmon Facility (BSF) to develop the Baranof Lake watershed for salmon fishery enhancement. The Baranof Lake flows into the Baranof River, Alaska Department of Fish and Game (ADF&G) Anadromous Waters Catalog (AWC) number 112-11-10050.

A hatchery application submitted by SSI was accepted by the Alaska Department of Fish and Game (ADF&G) on November 13, 2017. Sustainable Salmon is applying for a multiple species salmon hatchery and release site within Warm Springs Bay on the eastern side of Baranof Island. The proposed site is in the Baranof Warm Springs town-site on private land (Appendix A). Alternatively, the hatchery may be in a tidal lagoon across the bay from the small community of Baranof on state lands *(pending lease)*. The tidal lagoon is connected to Warm Springs Bay by a narrow passage. The primary building site is in the south end of the lagoon on a large flat area of bedrock and beach gravel (Appendix B).

The applicant proposes to release pink salmon (Oncorhynchus gorbuscha), chum salmon (O. keta), coho salmon (O. kisutch), and Chinook salmon (O. tshawytscha) from the facility, with adults returning to the site. The returning adults are expected to contribute to common property fisheries in Chatham Strait and in a terminal harvest area (THA) located in Warm Springs Bay. Returning adults excess to hatchery broodstock needs will be harvested in cost recovery fisheries in the proposed special harvest area (SHA).

The hatchery application suggests developing the hatchery in three phases. However, the current proposal will be limited to the initial permitted capacity level, in green eggs, of 2 million pink salmon, 10 million chum salmon, 2 million coho salmon, and 500,000 Chinook salmon. All proposed production numbers are tentative and may be adjusted based on joint analysis by SSI and ADF&G during the development of the facility.

Per 5 AAC 40.820, a basic management plan (BMP) is to be developed for not more than the first five years of facility development. Therefore, this BMP does not correspond to the phased production approach described in the BSF application. This BMP describes the proposed Phase I facility to develop hatchery broodstock and evaluate contribution and effects of production at the site. Any future increases in permitted capacity will be required to proceed through the permit alteration request (PAR) process. Approval will be dependent upon demonstrating little significant adverse effect resulting from currently permitted production levels.

II. Goals

2.1 Production goals

The maximum permitted capacity for BSF will be 2 million pink salmon, 10 million chum salmon, 2 million coho salmon, and 500,000 Chinook salmon; up to 2.5 million coho salmon green eggs may be taken in years of limited Chinook returns, but not to exceed 500,000 Chinook green eggs or 2.5 million eggs in combination.

2.2 Broodstock source and development

The proposed hatchery would be located approximately 10 miles south of Hidden Falls Hatchery (HFH), approximately 60 miles north of Port Armstrong Hatchery (PAH), and 50 miles north of the NOAA Little Port Walter Research Station (LPWRS). Therefore, the department recommends that the chum salmon and coho salmon broodstock used at Warm Springs Bay be the same as broodstocks used at HFH and PAH, given the potential stock interactions between the facilities due to their proximity. Keta River broodstock is being developed at the LPWRS and is recommended for use as broodstock at the BSF. Pink salmon will be collected locally.

2.2.1 Pink Salmon

Pink salmon eggs will be collected from naturally occurring populations of pink salmon in Warm Springs Bay. Collection of eggs from local populations will be required for at least four years to build broodstock returns to the site. The number of eggs collected annually from naturally occurring populations will be based on the estimated escapement needs as potential sources are identified. Egg take and instream escapement goals will be included in all required fish transport permits and included in each year's Annual Management Plan (AMP).

2.2.2 Chum Salmon

Chum salmon from Port Armstrong Hatchery (PAH) and/or Hidden Falls Hatchery (HFH) will be used for broodstock development at BSF. Both sites use a chum salmon stock that originates from

the Kadashan Bay, Clear, and Seal Bay rivers and is collectively known as "Hidden Falls stock". The Kadashan Bay and Seal Bay rivers flow into Tenakee Inlet, which is approximately 60 miles north of Warm Springs Bay, on the east side of Chichagof Island. The Clear River flows into Kelp Bay, on the northern east side of Baranof Island. The Clear River is approximately 20 miles north of Warm Springs Bay.

Chum salmon eggs from an offsite source will be required for at least four years. The initial egg numbers will be determined by the number of eggs available from PAH and/or HFH, up to 10 million chum salmon green eggs. Chum salmon will be evaluated for at least three years of adult returns to BSF, from full production releases, before an increase in permitted capacity will be considered. Egg-take goals will be included in each year's AMP.

2.2.3 Coho Salmon

Coho salmon from Port Armstrong Hatchery (PAH) and/or Hidden Falls Hatchery (HFH) will be used for broodstock development at BSF. Both sites use coho salmon from Sashin Creek/Deep Cove ancestral stock. The ancestral population of Sashin Creek stock coho salmon originates from Sashin Lake located at the head of Little Port Walter (LPW), at the southeast tip of Baranof Island (near the site of the LPWRF). Little Port Walter is in lower Chatham Strait 20 miles from Cape Ommaney and the open Gulf of Alaska. Sashin Creek is approximately 50 miles south of Warm Springs Bay. The ancestral population of Deep Cove stock coho salmon originates from a cove located approximately 45 miles south of Warm Springs Bay, along the west arm of Patterson Bay, on the southeast coast of Baranof Island. Remote egg takes could also be conducted at Sashin Creek and Deep Cove as needed.

Coho salmon eggs from an offsite source will be required for at least three years. The initial egg numbers will be determined by the number of eggs available from PAH and/or HFH, up to 2 million coho salmon green eggs. Coho salmon will be evaluated for at least three years of adult returns to BSF, from full production releases, before an increase in permitted capacity will be considered. Egg-take goals will be included in each year's AMP.

2.2.4 Chinook Salmon

Sustainable Salmon has requested the use of Keta River stock Chinook salmon. The LPWRS began a broodstock development program by collecting Chinook salmon eggs from Keta River in 2013–2015 and 2017. The first Keta River stock adults from releases at LPWRS returned in 2017. Due to the small-scale of the LPWRS a remote egg take in Keta River may be necessary to collect enough eggs to start a broodstock program at BSF.

King salmon eggs from an offsite source will be required for at least five years. The initial egg numbers will be determined by the number of eggs available, up to 500,000 green eggs. King salmon will be evaluated for at least five years of adult returns to BSF, from full capacity releases, before an increase in permitted capacity will be considered. Egg-take goals will be included in each year's AMP.

2.3 Release Numbers and Locations

Permitted species, stocks, associated release sites, and maximum release numbers by life stage:

Species	Stock	Release Site	Number	Life Stage
Pink salmon	Warm Springs Bay	Warm Springs Bay	2 million	Fry
Chum salmon	HFH[1]	Warm Springs Bay	10 million	Fry
Coho salmon	HFH	Warm Spring Bay	2 million[2]	Smolt
Chinook salmon	Keta River	Warm Springs Bay	500,000[2]	Smolt

Note: Maximum numbers are specific to release site; in combination, may not exceed permitted capacity.
[1] "HFH" indicates Hidden Falls Hatchery stock. This stock is also used at Port Armstrong Hatchery (PAH). The HFH and PAH stocks are considered interchangeable.
[2] Up to 2.5 million coho and Chinook salmon may be taken in combination, not to exceed 500,000 Chinook salmon.

Fry may be short-term reared in net pens in Warm Springs Bay prior to release.

2.4 Principal Project Goals

At maximum permitted capacity, BSF will contribute an estimated 21,600 adult pink salmon, 130,000 adult chum salmon, 150,000 coho salmon, and 3,000 Chinook salmon annually to the common property fisheries (commercial, sport, personal use, and subsistence), primarily in Warm Springs Bay and along migratory corridors. Local economic benefit in addition to common property fisheries is provided through direct employment at the hatchery and indirectly to support industries.

The contribution estimates assume all the egg-take goals are met and the following assumptions:

- Pink salmon
  - 90% freshwater survival from green egg to release
  - 2.0% marine survival from release to return
- Chum salmon
  - 90% freshwater survival from green egg to release
  - 2.5% marine survival from release to return
- Coho salmon
  - 80% freshwater survival from green egg to release
  - 12% marine survival from release to return
- Chinook salmon
  - 80% freshwater survival from green egg to release
  - 1.25% marine survival from release to return (age-1 release)
  - 0.25% marine survival from release to return (age-0 release)

Additionally, estimated marine survivals are based on long-term average survivals of nearby facilities. The long-term marine survival rate of HFH chum salmon is 3% and the long-term marine survival rate of Port Armstrong Hatchery pink salmon is 2.5%.

2.5 Annual Fish Culture Objectives

1) Develop adult broodstock capture and holding protocols to maximize adult survival to spawn.
2) Maximize egg to fry survival to attain 70% or better over the life of the program.
3) Minimize bacterial kidney disease (BKD) by developing a site-specific disease management plan according to Fish Pathology Lab recommendations.
4) Produce quality fry for release at optimum ocean conditions each year and thereby maximize marine survival.
5) Maximize facility efficiency and benefit to cost ratio.
6) Maximize contribution to common property fisheries.

III. Hatchery Operations

3.1 Water Supply and Distribution

The water source will be Baranof Lake, which drains via Baranof River into Warm Springs Bay. Baranof Lake has a surface area of 698 acres. It has a drainage area of 32 square miles. It is 300 feet deep. The surface is 145 feet above mean sea level, and has a storage capacity of approximately 24,430 acre feet, without a dam. The annual mean flow of Baranof River is 418 cubic feet per second (cfs) and mean monthly flows range from a low of 96 cfs in March to a high of 793 cfs in June (from USGS Gage 15098000 located at the outlet of Baranof Lake; period of record 1915-28 and 1958-1974). Cutthroat trout are fish known to be present in the lake. Baranof River has a barrier falls near tidewater that prevents fish from migrating upstream.

ADF&G has an instream water reservation to reserve flows in Baranof River to protect fish and wildlife habitat. The expected peak demand for hatchery needs is up to approximately 20 CFS. Based on the historical Baranof River hydrograph, there may be periods of low flow where an adequate amount of water may not be available for hatchery needs in order to maintain the instream reservation flows. Therefore, the proposed maximum production as described in hatchery permit application may be limited. Water reuse and recirculation at the hatchery may be used to conserve water in the event of prolonged reduced flow from the lake. Lake levels will be monitored, as required in the water permit issued by the Department of Natural Resources, and flow to the hatchery reduced as needed to prevent excessive drawdown of Baranof Lake during the critical low flow periods. Any additional monitoring requirements will be described in the AMPs.

Water will be supplied from Baranof Lake by gravity-fed HDPE pipelines. Multiple pipelines will be used to provide redundancy in the case of a pipeline failure. The intakes will be located to take full advantage of lake temperature profiles, which will allow hatchery water temperatures to be controlled. Eventually, these pipelines may also be used to supply hydroelectric power. The pipelines will feed a centralized water distribution manifold where water will be directed to incubation and rearing systems. The distribution system will contain a degassing tower and other water treatment equipment as needed.

3.2 Facility Description

Due to the limited footprint available, at full production a multi-story hatchery building will be used to maximize space (Appendix C). The top floor of the building will contain the incubation room, initial rearing tanks, and office space. The main freshwater rearing tanks and storage will be located on the first floor. The multi-story design will allow gravity flow for moving various life stages of fish throughout the facility.

The incubation facilities will be located separate from other rearing facilities. Initial plans anticipate using Heath tray type incubators, NOPADs, and larger capacity R30 or R48 style incubators, depending on species. Water will be fed from an incubation head box equipped with separate valves for each stack of incubators. Water passing through the incubators will be collected in a central sump where it can be discharged, reused for freshwater rearing, or pumped back into the head tank for incubation reuse. An adjacent area will contain start tanks for ponding and initial rearing of emergent fry. Rearing will be in a variety of standard rearing units such as standard raceways, Swedish tanks, circular tanks, or vertical raceways dependent on final facility design plans.

An adjacent warehouse area will be used for fish food and equipment storage. Adult holding will be accomplished initially with temporary salt water net pens and/or temporary land based freshwater holding ponds until a permanent adult holding facility is designed based on the observed behavior of adult returns.

3.3 Broodstock collection/holding

Beginning with the first returns of adults, hatchery broodstock will be collected within the SHA as part of an integrated cost recovery and broodstock collection operation. Returning adult salmon will be captured using seine gear and transferred to saltwater net pens. Fish to be used for broodstock will be transferred to saltwater holding pens, or to upland freshwater holding ponds. A pescalator, or other fish transfer system, may be used to transfer fish from saltwater pens to freshwater raceways. Broodstock will be collected to represent the full run timing of each species. Surplus adults will be used for cost recovery.

The techniques used for broodstock collection and holding may be modified based on observation and experience after the initial adult returns. A barrier net may be required to prevent broodstock from entering the Baranof River and becoming unrecoverable. A ladder or other fish transfer system may be installed to allow more efficient broodstock collection.

3.4 Fish Culture

Egg takes will be performed in late summer (Chinook and chum salmon) fall (pink salmon) and late fall (coho salmon) using standard salmon propagation protocols.

Gametes will be collected using standard procedures, including iodine disinfection. Fertilization occurs in the spawning area. Eggs are then transported to the incubation room where they are rinsed and then water-hardened in bulk incubators.

For family tracking purposes, Chinook and coho salmon to be spawned are first disinfected then assigned a family tracking number. A spawning ratio of at least one male to one female will be used. Parents will have their gametes extracted into a disinfected container for fertilization. Following fertilization, eggs are rinsed in running non-contaminated water and loaded into incubators.

When family tracking, disinfected eggs from a single family are placed into an incubator tray with the corresponding family tracking number. Kidney samples from the parents are sent to the state pathology lab to be analyzed for the presence of BKD. Eggs from BKD positive parents are destroyed, per the ADF&G Pathology Laboratory policy as directed by the State Pathologist. Remaining eggs are developed to the eyed-egg stage.

At the eyed-egg stage of development, a shock event is used to help distinguish live eggs from dead eggs. Live and dead eggs are enumerated to determine percent survival and live inventory. Egg take protocols may be modified and/or altered based on experience at the facility and with ADF&G concurrence.

Emergent fry will be ponded into starter tanks for initial rearing. As densities increase, fish will be transferred to raceways, tanks, or silos for additional rearing.

Net pens will be used for saltwater rearing. The use of saltwater rearing is expected to ensure adequate imprinting and reduce possible straying of returning adults. Smolts will be transferred to saltwater net pens located in Warm Springs Bay (Appendix D) for saltwater rearing prior to release in the spring. Initial target release weight goals will be used in order to achieve the best success depending on species. The specific rearing and release strategies may be modified as experience with the site is developed.

IV. Fisheries Management

The proposed chum salmon returns are expected to run concurrent with HFH chum salmon, which start to return in late-June. The proposed pink salmon returns are expected to occur near the tail end of the chum salmon run. SSI would like to use Keta River stock Chinook salmon, currently in the early broodstock development phase at the LPWRS. If Keta River stock Chinook salmon have a similar return timing as HFH Chinook salmon, returning adults would be harvested in Southeast Alaska common property fisheries from late April through early July. The proposed coho salmon returns are also expected to occur similar to HFH coho salmon, which are harvested in Southeast Alaska common property fisheries from July through September.

Pink salmon and chum salmon released at the site are likely to contribute primarily to seine fisheries. Coho salmon released from BSF are expected to contribute to troll fisheries and traditional seine fisheries in Chatham Strait. Chinook salmon released at this site are likely to contribute primarily to troll fisheries. Chum salmon fisheries in the Hidden Falls THA will also harvest returning BSF Chinook salmon.

Findings of the Alaska Board of Fisheries through the Southeast Alaska Allocation Task Force state that the management of traditional wild stock fisheries are not to be restricted for the purpose of providing for hatchery cost recovery goals. It further states that management actions may be implemented in close proximity to the hatchery terminal areas for the purpose of providing for hatchery broodstock.

4.1 Commercial Fisheries

4.1.1 Troll Fisheries

Chinook Salmon Troll Fishery: We assume that Chinook salmon produced at BSF will demonstrate a similar pattern of catch in the troll fishery as HFH Chinook salmon. HFH Chinook salmon are harvested in the troll fishery throughout the region. Chinook salmon released at BSF are likely to contribute primarily to the troll fisheries in Districts 109, 110, 112, 113, and 114. The contributions will be greatest in the spring troll fisheries during May and June, and less so during the first summer troll fishery in July. Harvest rates of HFH Chinook salmon have been estimated to be 15% of the return. Applying the HFH average annual harvest rate to the projected annual Chinook salmon return of 5,000 fish from BSF gives an annually projected harvest in the troll fishery of 750 fish. At these projected troll fishery harvest rates, the number of Chinook salmon that would escape to the terminal area would be approximately 4,250 fish.

Coho Salmon Troll Fishery: We assume that coho salmon produced at BSF will demonstrate similar pattern of catch in the troll fishery as HFH coho salmon. Coho salmon released at BSF are likely to contribute to the troll fisheries in Districts 109, 110, 112, 113, and 114. The majority of the catch will most likely occur in Districts 113 and 114. Harvest rates of HFH coho salmon have been estimated to be 33% of the return. Applying the HFH average annual harvest rate to the projected annual BSF coho salmon returns of 192,000 fish gives an annually projected harvest in the troll fishery of 63,360 coho salmon. At these projected troll fishery harvest rates, the number of coho salmon that would escape to the terminal area would be approximately 128,640 fish.

4.1.2 Seine Fisheries

Hidden Falls Hatchery Terminal Seine Fishery: The southern boundary of the HFH THA is located about 2 nautical miles north of Warm Springs Bay. The HFH THA extends approximately 2 nautical miles offshore of the Baranof Island coastline, with the northern boundary at the latitude of South Point at the southern entrance to Kelp Bay. Historically, HFH released around 50 million chum salmon fry in Takatz Bay and 40 million chum fry in Kasnyku Bay with a 10-year average adult chum salmon return of around 1.3 million fish. The HFH chum salmon return is a critical early-season opportunity for the Southeast Alaska seine fleet and is typically fished intensively from the end of June through the third week of July. Historically, up to 200 seine vessels have participated in openings at the HFH THA with the highest effort occurring in late-June or early-July. Given the close proximity of Warm Springs Bay to the HFH THA, it can be expected that a significant number of BSF Chinook and chum salmon would be harvested by seiners in the HFH THA chum salmon fishery. The amount of BSF salmon harvested in the HFH THA chum salmon fishery would depend on whether BSF salmon return through the northern or the southern reaches of Chatham Strait, and the overall effort in the HFH THA chum fishery.

An abundance of BSF salmon passing through the HFH THA may attract additional seine effort and/or affect the distribution of fishing effort in that fishery. The HFH chum salmon fishery is over by the first week of August and would not be a factor with the BSF coho salmon return.

In 2016, HFH began efforts to move the Takatz Bay chum salmon releases to Thomas Bay and Bear Cove, due to extremely poor marine survivals of hatchery-produced salmon on the east side of Baranof Island. The effects on fleet behavior from moving the Takatz Bay chum salmon release is unknown at this time.

Traditional Seine Fisheries and Chinook Salmon: Traditional seine fisheries occur along the Baranof Island shoreline in Section 9-A, and Section 12-A, beginning as early as mid-July. Specific areas opened to seining in July nearest to Warm Springs Bay include the Kelp Bay area in Section 12-A, immediately north of the HFH THA to target both pink and summer chum salmon and the shoreline south of the latitude of Point Gardner and north of Red Bluff Bay in Section 9-A to target mid-run pink salmon returning to Red Bluff Bay. There have been some years of high pink salmon abundance when Section 12-A along the Baranof Island shoreline, including the shoreline immediately outside of Warm Springs Bay, has also been opened to seining. Other July seine openings in Section 12-A include Point Augusta, Tenakee Inlet, and the Hawk Inlet shoreline. However, mid-July seine openings in either Section 9-A or Section 12-A occur after most of the Chinook salmon would be expected to have returned to Warm Springs Bay. BSF Chinook salmon harvest in these seine fisheries would likely be minimal.

Traditional Seine Fisheries and Coho Salmon: It can be expected that substantial numbers of BSF coho salmon would be harvested in seine fisheries when coho salmon production is at full capacity. According to HFH coded wire tag recovery data for the period 1991-2016, seine gear harvests about 9% of the total HFH coho salmon return on average. Assuming a similar harvest rate and survival expectations are achieved with BSF coho salmon, the expected harvest in seine fisheries would be approximately 17,500 fish when the BSF is at full capacity. With a large number of hatchery coho salmon potentially accessible in the traditional seine areas in August, it is fair to assume that a higher than normal seine effort might be attracted to these areas, particularly to areas nearest the hatchery.

Traditional Seine Fisheries and Chum Salmon: Traditional seine fisheries occur along the Baranof Island shoreline in Section 9-A, and Section 12-A, beginning as early as mid-July. Specific areas opened to seining in July nearest to Warm Springs Bay include the Kelp Bay area in Section 12-A, immediately north of the HFH THA to target both pink and summer chum salmon and the shoreline south of the latitude of Point Gardner and north of Red Bluff Bay in Section 9-A to target mid-run pink salmon returning to Red Bluff Bay. There have been some years of high pink salmon abundance when Section 12-A along the Baranof Island shoreline, including the shoreline immediately outside of Warm Springs Bay, has also been opened to seining. Other July seine openings in Section 12-A include Point Augusta, Tenakee Inlet, and the Hawk Inlet shoreline. However, mid-July seine openings in either Section 9-A or Section 12-A occur after most of the chum salmon would be expected to have returned to Warm Springs Bay. Assuming similar run timing as HFH chum salmon, BSF chum salmon harvest in these traditional seine fisheries would be minimal.

Traditional Seine Fisheries and Pink Salmon: Traditional seine fisheries occur along the Baranof Island shoreline in Section 9-A, and Section 12-A, beginning as early as mid-July. Specific areas opened to seining in July nearest to Warm Springs Bay include the Kelp Bay area in Section 12-A, immediately north of the Hidden Falls THA to target both pink and summer chum salmon and the shoreline south of the latitude of Point Gardner and north of Red Bluff Bay in Section 9-A to target mid-run pink salmon returning to Red Bluff Bay. There have been some years of high pink salmon abundance when Section 12-A along the Baranof Island shoreline, including the shoreline immediately outside of Warm Springs Bay, has also been opened to seining. Other July seine openings in Section 12-A include Point Augusta, Tenakee Inlet, and the Hawk Inlet shoreline. BSF pink salmon harvest in these seine fisheries could be fairly significant.

4.1.3 Terminal Harvest Area (Warm Springs Bay)

The department will consult with the BSF manager prior to any openings in the THA (Appendix A), to ensure that hatchery cost recovery and broodstock needs are met. These openings would be restricted to the THA in order to minimize incidental harvest of wild stocks.

Chinook Salmon: At full BSF production, an adult return of 5,000 Chinook salmon could be expected. In 2016, the total regional commercial Chinook salmon harvest was 319,000 and the combined common property hatchery contribution was around 42,000, or 13.1%. The long-term average troll harvest rate of HFH Chinook salmon is 27% (range from 9%–36%). Additionally, HFH Chinook salmon are harvested in the seine fishery with a long-term average harvest rate of 25% (range from 0%–51%), mostly in the HFH THA chum salmon fishery. It is impossible to predict the harvest rate of BSF Chinook salmon in the nearby HFH THA chum fishery but assuming a harvest rate of 10%, the total expected harvest rate of BSF Chinook in all common property fisheries could be around 25%. Based on these numbers at full production, a total of 3,750 Chinook salmon could be expected to return to the BSF terminal area.

If it is determined that terminal common property seine openings are needed to maintain fish quality or are desired to achieve the 60% common property contribution goal, a THA will need to be established. The department would likely restrict the THA to within Warm Springs Bay to minimize harvest to wild stocks with the option to expand the THA outside the bay, by emergency order, if wild stock concerns are minimal.

Coho Salmon: At full BSF production, there could be an estimated adult return of 192,000 coho salmon. Common property troll gear harvests of HFH produced coho salmon (from 1991–2016) have averaged 34% and all-gear harvests have averaged 45%. Expected seine harvest rates of 9% combined with troll harvest rates provides a common property harvest rate of 34%. Based on a harvest rate range of 34–46%; 65,280 – 88,320 coho salmon would be expected to return to the BSF terminal area at full production. As with Chinook salmon, achieving a 60% harvest rate of coho salmon in common property fisheries would likely require the need for directed terminal common property seine fisheries in Warm Springs Bay. The THA would be restricted to within Warm Springs Bay to minimize impacts to numerous wild stock coho salmon transiting Chatham Strait during that time.

Chum Salmon: At full BSF production, an adult return of 225,000 chum salmon could be expected. Based on a harvest rate of 30%; 67,500 chum salmon could be expected to return to the BSF terminal area at full production. Achieving a 60% harvest rate of chum salmon in common property fisheries will likely require the need for directed terminal common property seine fisheries in Warm Spring Bay. The THA would be restricted to within Warm Springs Bay to minimize impacts to numerous wild stock salmon transiting Chatham Strait during that time.

Pink Salmon: At full BSF production, an adult return of 36,000 pink salmon could be expected. Based on a harvest rate of 20%, 7,200 pink salmon could be expected to return to the terminal area at full production. Achieving a 60% harvest rate of pink salmon in common property fisheries would likely require the need for directed terminal common property seine fisheries in Warm Springs Bay. The THA would be restricted to within Warm Springs Bay to minimize impacts to numerous wild stock salmon transiting Chatham Strait during that time.

4.2 Special Harvest Area

Cost recovery fisheries will be conducted in the designated SHA (Appendix A). The goal of cost recovery fisheries will be to harvest salmon returning to the hatchery in excess of broodstock needs. Cost recovery operations will be managed to keep pace with returns so that potential straying is minimized.

The operator will notify the Division of Commercial Fisheries Area Management Biologist prior to conducting any SHA cost recovery fishing. Cost recovery fisheries will be opened and closed by ADF&G emergency order until authorizing regulations are adopted. The department retains the option to modify the SHA and THA in season as necessary.

4.3 Sport fishery

The initial production of Chinook and coho salmon at BSF would receive limited local sport effort. Some targeted effort would likely occur near the terminal area. BSF salmon would likely be taken in outside fisheries, or the corridor fisheries. It is anticipated that Chinook and coho salmon returning to BSF will be harvested in marine sport fisheries. Most sport harvest is expected in fisheries near Sitka or along migration corridors, where existing sport regulations would apply.

Sport fisheries will be managed as described in general codified regulations for those waters. The department may use emergency order (EO) authority to address issues inseason. Bag limits and restrictions may be liberalized or reduced in the terminal area by ADF&G emergency order if necessary to increase harvest of surplus returns or to conserve broodstock for the hatchery.

V. Evaluation and Monitoring

5.1 Evaluation plan

One of the most important tools for managing this project will be an evaluation plan to assess impact and measure success as outlined in the *Comprehensive Salmon Enhancement Plan for Southeast Alaska: Phase III* (ADF&G 2004) (CSP). The CSP states that all pink and chum salmon

are to be mass marked (otolith marked); and Chinook and coho salmon require a coded wire tag (CWT) program to evaluate marine survivals, compare success between release groups, and evaluate fishery contributions. More recently with new increments of coho salmon, mass otolith marking is used to supplement CWT data. Otolith marking can be used for stray sampling, improved terminal sampling, or for sampling fisheries for stock composition and return timing.

The evaluation plan will consist of marking and recovery programs; assessment of interactions with wild stocks; assessment of fishery management impacts; and requirements for reporting information about the project. Components of the evaluation plan are described below. The specifics of the plan will be determined in cooperation with the department and described in each year's Annual Management Plan (AMP). If impacts to wild stocks, other hatchery programs, or traditional fisheries are determined to be significantly adverse by the department, release strategies will be reevaluated and production may be altered, reduced or curtailed.

5.2 Coded Wire Tag Programs

Chinook and coho salmon will be tagged at appropriate rates to be determined by ADF&G and described annually in the AMP. It is anticipated that Chinook salmon will be tagged at rates of approximately 10%, with a minimum of 30,000 per release treatment, and coho salmon will be tagged at rates of approximately 5–10% for initial releases. Required tagging rates are determined by the department based on recovery rates for sampling strata. Exact rates required will need to be evaluated based on sampling goals. Higher rates for Chinook salmon allow for spring troll fishery sampling which allows management to target stocks of Alaska hatcheries Chinook salmon in specific spring fishing areas.

Data from CWT recoveries will be used to determine migration routes, contributions to common property fisheries, and to evaluate rearing and release strategies. Tagging rates are reevaluated over time during the annual management plan process based on performance history.

5.3 Otolith marking

Pink and chum salmon produced at BSF will be differentially otolith marked. Otolith mark data is used to evaluate marine survivals, compare success between release groups, straying, and to evaluate fishery contributions and stock composition when sampling fisheries.

Chinook and coho salmon produced at BSF may also receive otolith marks in addition to CWT to document straying and to evaluate stock composition in terminal and traditional fisheries. Specific sampling and mark recovery plans will be developed in cooperation with ADF&G and described in each year's AMP.

5.4 Escapement monitoring

Escapement monitoring of nearby streams may be used to evaluate wild stock escapements and the extent of straying and may include stream surveys or weir(s). Data from stream surveys or weirs on anadromous streams near BSF may be used to monitor trends in escapement to these

streams and detect the presence of stray hatchery-produced salmon. Specific sampling plans will be developed in cooperation with the department and described in each year's AMP.

5.5 Fishery management impacts

Fishery management impacts of BSF production should become apparent as the facility approaches full permitted production and all age classes of adults are represented in the harvest. An evaluation of common property fishery contributions, mixed-stock fishery impacts, straying effects on in season fishery management, and/or terminal harvest area management will be required prior to granting increases in permitted capacity.

VI. Approval

The Baranof Salmon Facility Basic Management Plan is hereby approved.

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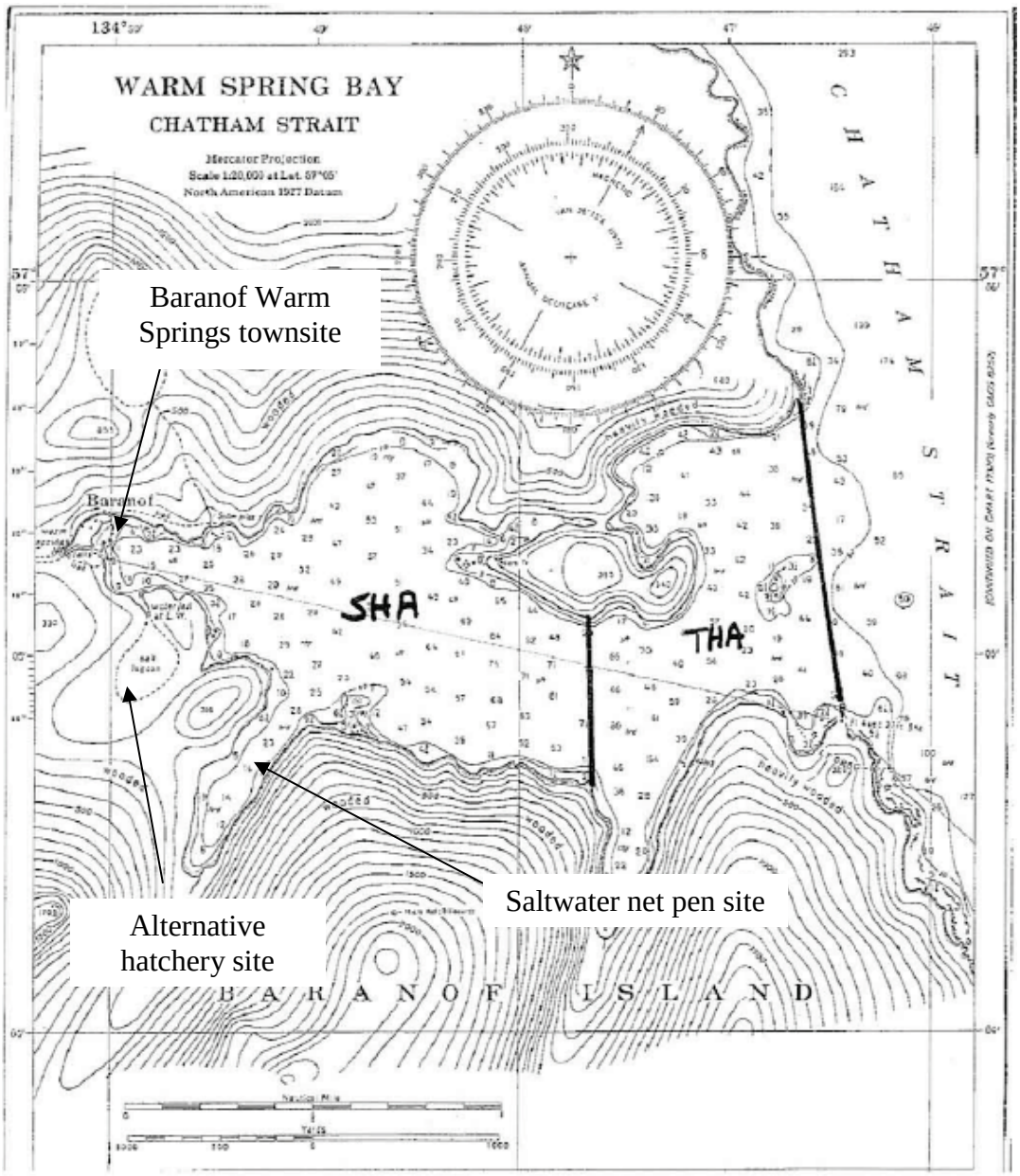
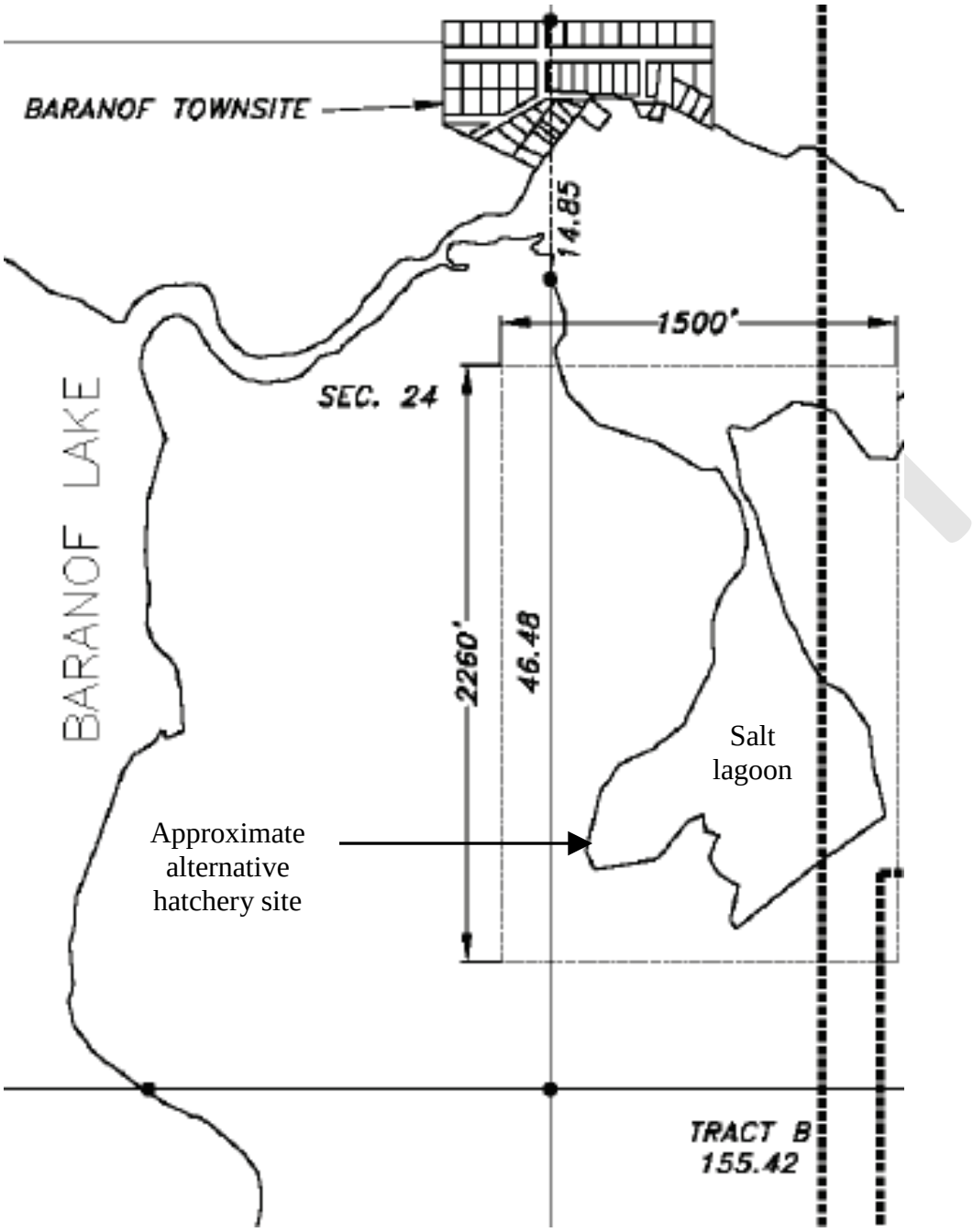
Sam Cotten Date
Commissioner
Alaska Department of Fish and Game

VII. Appendices

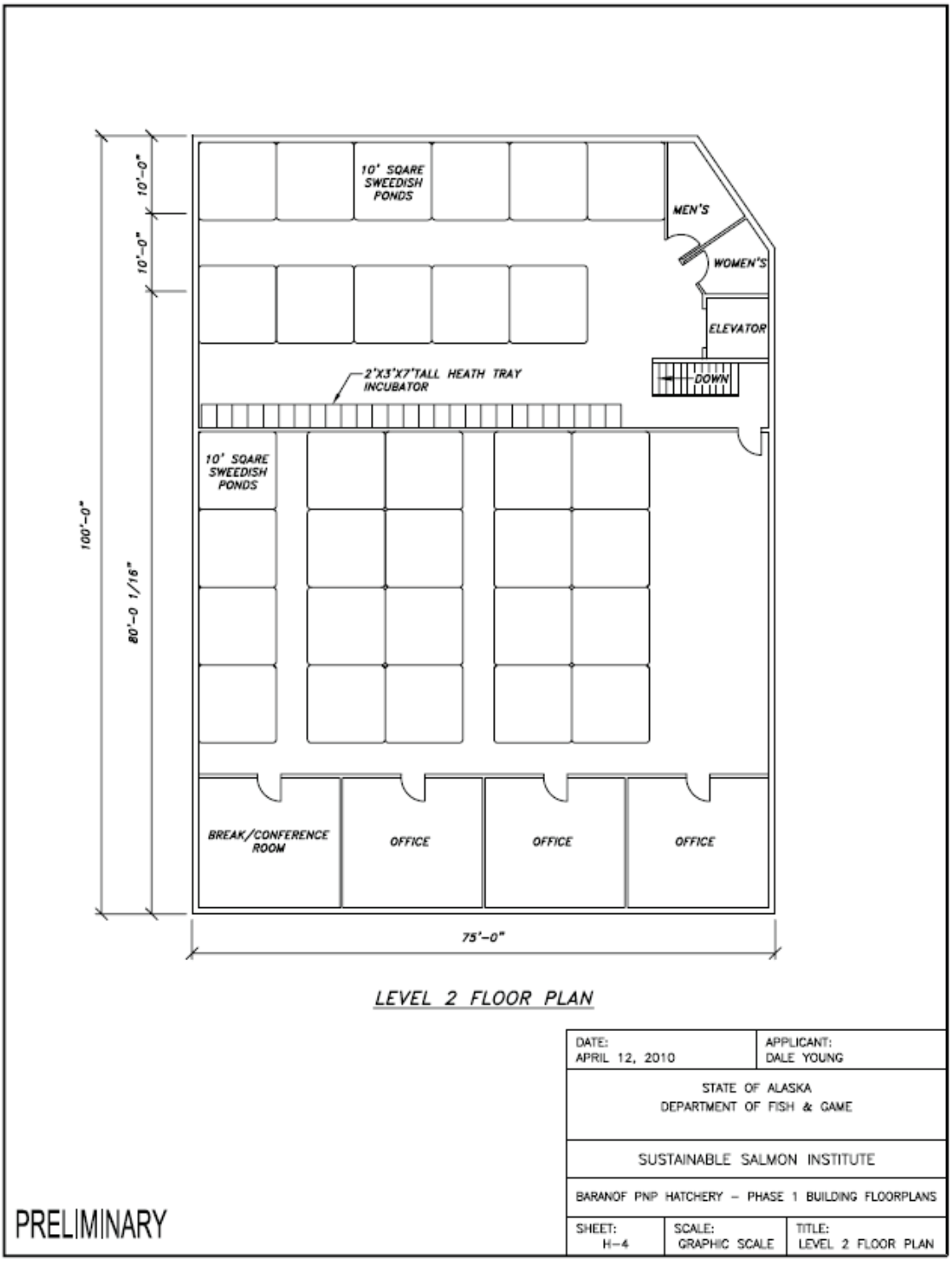
Appendix A. Hatchery location, Terminal Harvest Area (THA) and Special Harvest Area (SHA)



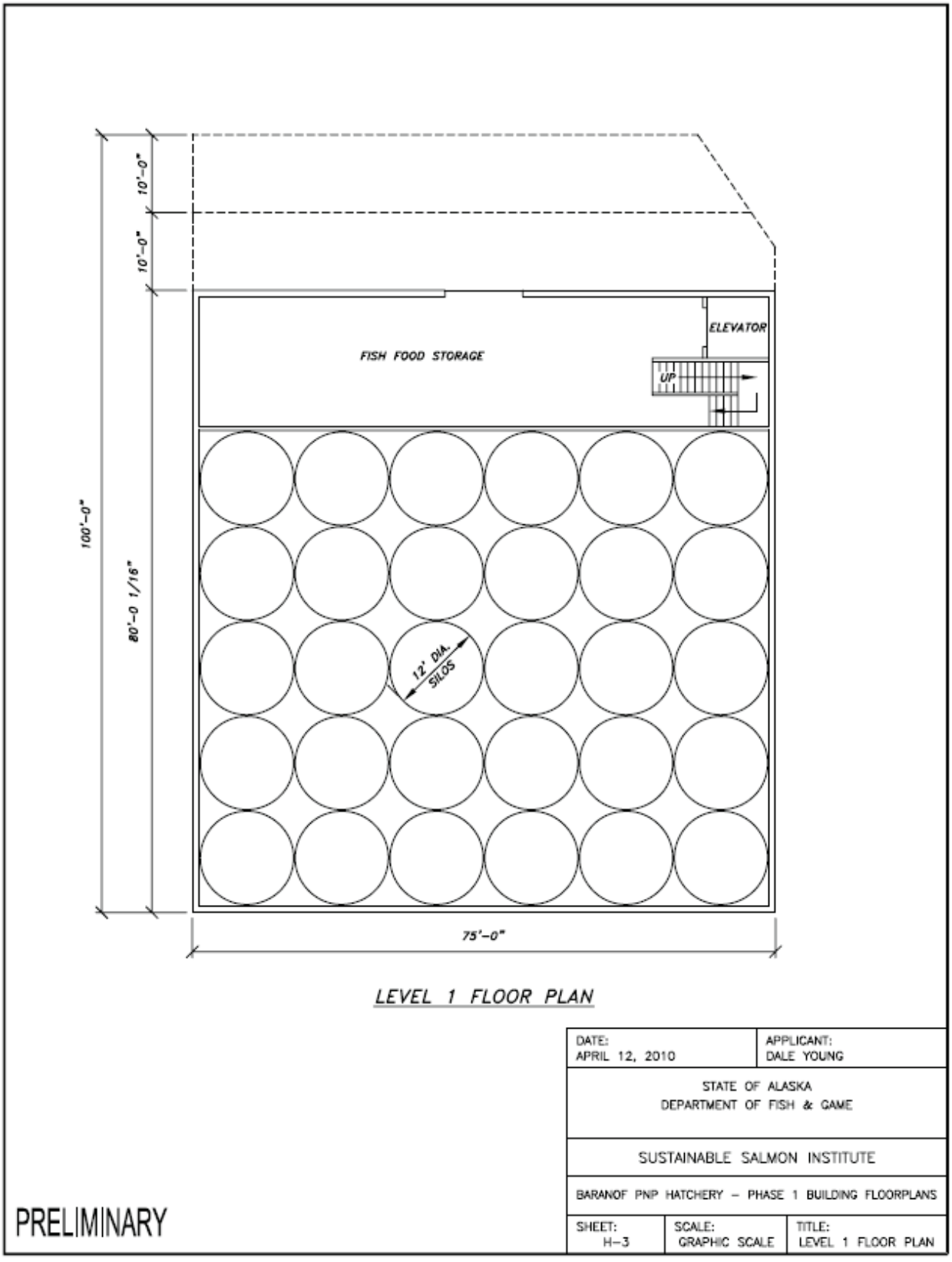
Appendix B. Location map of Baranof and hatchery building site.



Appendix C. Facility Drawings



Appendix C. Facility Drawings (page 2 of 2)



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Appendix D. Salt water net pen drawings