

**NAVIGATION IMPROVEMENTS
SITKA HARBOR, ALASKA
CHANNEL ROCK BREAKWATERS**

DEFICIENCY CORRECTION EVALUATION REPORT

APPENDIX F

ECONOMIC CONSIDERATIONS

August 2010

PROVIDED BY ResourcEcon

Report

Sitka Harbor Design Deficiency Update: Economic Considerations



Eliason and Thomsen Harbors in Sitka, Alaska

Corps of Engineers, Alaska Region Project W911KB-07-D-0004

by ResourcEcon, August 2010

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Introduction

The Corps of Engineers is conducting a study to reduce vessel motion at floats in Eliason and Thomsen harbors in Sitka. Breakwater sections were completed in 1994 and the breakwater contains 'gaps' to allow vessel and seaplane traffic to transit the area, and provide for passage of fish and enhance water circulation in the harbor areas. Long-period swells enter the harbor area and cause damage to the inner harbor float system within Eliason and Thomsen harbors, as well as to vessels utilizing the harbors for moorage.

ResourcEcon was given the task of investigating some of the economic impacts that have resulted from the float motion problem. As part of the project, Jim Richardson with ResourcEcon traveled to Sitka in February 2010 and spent a week conducting interviews with harbor users; meeting with employees from the harbormaster's office; discussing the problems with representatives of the City and Borough of Sitka and other groups. Jim Richardson also attended and participated in a meeting of the Sitka Ports and Harbors Commission on February 23, 2010 and provided an overview of the study investigation.

Based on the results of data collected and analyses completed, this report provides estimates of several different types of economic impacts that have occurred and are continuing under the existing situation. Impacts are likely to continue until a solution to the float motion problem is determined and the problem is resolved.

The harbor user interviews were focused on vessel owners using moorage slips in either Eliason or Thomsen harbors. However, it was necessary to include other users of marine facilities in the area, such as air charter operators, to gain a fuller perspective of the overall impacts.

Sitka is a marine community. A large portion of the community's economy is directly related to marine activities such as commercial fishing, commercial recreational activities, recreational boating and/or fishing, subsistence harvesting and many other uses. The main harbors are Eliason Harbor, Thomsen Harbor, ANB Harbor, Sealing Cove and Crescent Harbor. The City and Borough of Sitka would like to continue to develop harbor facilities for both vessels and float planes. As of February 2, 2010, there was a waiting list of 300 vessel owners seeking a permanent moorage slip in one of Sitka's harbors. As of February 2, 2010, there was also a waiting list of 5 floatplane owners for a moorage stall at the State-owned facility that is managed by the harbormaster's office. The Sitka Harbormaster and staff with the City and Borough of Sitka believe there is unmet demand for moorage of vessels and floatplanes.

Summary of Types of Economic Impacts

There are several types of economic impacts that are analyzed in this report as follows:

- (1) Increased costs to the City and Borough of Sitka from decreased life of the inner harbor facilities. The ongoing damage from waves and surges means that the inner harbor float system will not last as long as designed. The inner harbor floats in Eliason Harbor were built in 1995 and opened for operation in 1996 - 14 years ago.
- (2) The excessive wave and surge activity coming into the Eliason and Thomsen Harbors results in increased maintenance costs to the City and Borough of Sitka from annual repairs - above and beyond normal levels due to excessive movement and wear in the inner harbor float system. A portion of maintenance costs are accrued as deferred maintenance, since the Port of Sitka does not have a sufficient budget to address and repair all of the damage each year.
- (3) There are direct costs to harbor users as a result of damage to vessels from excessive surges and waves within the harbor areas. This damage includes loss of service from difficult harbor conditions and occasional catastrophic losses, such as the total loss of the '*Sea Dog*' in November 2009.
- (4) Because harbor users are wary of storm damage to their vessels, the City and Borough of Sitka is not able to rent most of the transient moorage along the West Transient Dock and the North Transient Dock in Eliason Harbor during winter months. As a result, annual harbor revenue is reduced and moorage stalls go unutilized.
- (5) The existing situation also provides a substantial impediment to the City and Borough of Sitka in their planning to manage and improve marine facilities throughout Sitka. This problem is not limited to just the two facilities closest to the breakwater - Eliason Harbor and Thomsen Harbor. The impacts include such diverse effects as (a) delaying development of a new Seaplane base, and (b) delaying a needed upgrade of Crescent Harbor to shift commercial users and concentrate recreational and charter users in a core area. As part of the study, Jim Richardson met with representatives of the 18-member Southeast Alaska Pilots Association to gain their group's perspective on needs for additional floatplane moorage in Sitka. The City and Borough of Sitka contracted for a Seaplane Base Master Plan that was completed in August 2002. One of the areas identified for possible development of new seaplane moorage is within the area

affected by the surge coming through the breakwater. Until that problem is resolved, development is not likely to occur.

Estimates of Economic Impacts

The Corps of Engineers typically looks at costs and benefits associated with potential projects over a 50-year planning horizon. As part of this study, a spreadsheet model was developed to estimate several economic impacts. As part of that model development, several important assumptions were utilized, and are noted below with additional information provided in Part 2 of the report.

A: Eliason Harbor reduced inner harbor float system cost. The Corps of Engineers typically uses a 50-year planning horizon for analysis of harbor improvements. Under the 45-year life expectancy for the inner harbor float system as noted above, the model shows Eliason Harbor being rebuilt in 2041. Over the 50-year Corps planning horizon, years, the Present Value (PV) of replacement costs under these assumptions totals \$1.524 million, with an average annual cost of \$30,500. This would be the cost situation if the wave and surge problem did not exist.

Under the existing conditions, with the reduced life expectancy for the inner harbor float system of 25 years, the PV of replacement costs over 50-years totals \$4.820 million, with an average annual cost of \$96,000. The current Corps of Engineers discount rate of 4.375 percent was utilized in this calculation and the others described below.

An equivalent calculation for a reduced life expectancy for the inner harbor float system for Thomsen Harbor was not made. Due to the greater distance from the breakwater, and the moderating effect of Eliason Harbor, the wave and surge effects for Thomsen Harbor should be significantly less than for Eliason Harbor. This does not mean that the economic effect is zero, it just means that given the conditions, it is much more difficult to estimate.

B: Increased annual maintenance costs for Eliason Harbor. The spreadsheet model of economic effects also calculated the cost of annual inner harbor float maintenance under the two different sets of assumptions provided by Harvey Smith at ADOT&PF noted above. He recommended 5 percent of capital cost for annual maintenance, if there was no extraordinary surge and wave damage; and wear versus annual maintenance of 10 percent of capital cost for annual maintenance under the current conditions. We recognize that due to funding limitations, the City and Borough of Sitka does not currently spend even 5 percent of the capital cost of the inner harbor floats per year on maintenance. However, this just means that the amount of deferred maintenance increases each year, and the level of service and safety to harbor users is diminished. In both cases (5 percent and 10

percent), the cost of annual maintenance is in 2010 dollars, consistent with Corps of Engineers methodology for making these calculations. The cost model assumes a zero maintenance costs for the years where the inner harbor float system would have to be replaced.

The present value of Eliason Harbor maintenance costs at 5 percent of capital cost annually over 50 years totals \$5.9 million, with an average annual cost of \$119 thousand. The present value of Eliason Harbor maintenance at 10 percent of capital cost annually (under the current wave/surge conditions) over 50 years totals \$11.6 million, with an average annual cost of \$232 thousand. It is probably most useful to focus on the difference between these two cost estimates - rather than the absolute amount - to show the comparative cost effect of the extraordinary wave and surge damage.

C: Direct annual costs for vessel owners moored in Eliason Harbor. Based on the interviews with harbor users, about half of all harbor users in Eliason Harbor experienced annual damage costs range from \$300 to \$500 per year. This amount covers replacing lines and float bumpers between two to three times per year. This amount does not include some of the more extensive damages experienced by some vessel owners (i.e. pulled cleats, boards worn, and in one extreme case a 100 percent loss). Using this base number for estimated damage, we can estimate the average annual damage to vessels using Eliason Harbor of approximately \$50 thousand annually (242 stalls times \$400 per vessel times half the 242 moorage stalls). The PV of this loss over the 50-year planning horizon is approximately \$1 million, or an average annual cost of \$20 thousand.

Based on the interview information, vessel damage is not consistent throughout the harbor. Vessels moored near to the transient floats nearest the breakwater and those near a shallow area near Float #3 and Float #4 reported the highest occurrences of vessel damage.

Again, we did not calculate a similar damage estimate for vessels moored in Thomsen Harbor. Our interviews suggested a much lower level of annual damage for vessels moored there, probably due to the moderating effects of distance from the breakwater gaps, the moderating effects of floats and vessels in Eliason Harbor, plus the new float system installed in Thomsen Harbor in 2007.

D: The existing situation is an impediment to marine facility management and development. We did not quantify an economic effect for this impact of the existing surge/wave situation, however, it is important to recognize that slowing development and management of Sitka's harbors affects all user groups. As noted above, two specific examples are slowing the development of additional floatplane moorage and constraints to rebuilding and changing the composition of users within Crescent Harbor.

Additional information and discussion for each of these impacts is covered in the main report sections that follow.

Part I: Damage to Vessels using Eliason and Thomsen Harbors

The Sitka Ports and Harbors Department has been concerned with tidal swell/wave surge activity coming through the rubblemound breakwater for a number of years. In 2001, the Sitka Harbor Department completed a report on the problem for the Corps of Engineers, outlining their perspective on the problem¹. The main concern has been the damage to inner harbor floats and damage to vessels moored in the harbors.

The Corps of Engineers has analyzed the problem using a wave model of the breakwater and the harbors in 2007². The State of Alaska has also investigated the issue, and provided a report on wave analysis within the Sitka harbor³.

The purpose of this section of the report was to interview moorage users in Eliason and Thomsen harbors and determine the level of damage they have is to investigate the potential economic impacts associated with excessive long-period swells that pass through the gaps in the breakwater.

Eliason Harbor has 242 moorage stalls and Thomsen Harbor has 226 stalls. At the time of the visit to Sitka in February 2010, almost all of the stalls, with the exception of the outside transient stalls, were utilized. While the existence and possible causes of wave surges within Eliason and Thomson Harbors have been studied, some vessel owners and operators using moorage stalls have experienced different types of loss and damage.

As part of this report, informal interviews were conducted randomly at Eliason and Thomson Harbor users to determine their specific experience in vessel damages from wave surges. The results of these interviews are presented in Appendix 1.

It is apparent that there are many types of damage that are reported, varying from moorage lines, to cleats, vessel planks and rails, all the way to a case last year where a vessel broke free from its moorings, went aground and became a total loss.

For the purpose of an annual estimate of potential damage to vessels mooring in Eliason Harbor, we noted that about half the vessel owners reported some type of damage, most typically mooring lines and fenders. The annual costs for these items over the past year ranged in cost from \$300 to \$500. Taking the average of this range (\$400) and multiplying it by half and by the number of moorage stalls in Eliason Harbor results in an

¹ Sitka Harbor Department, Rubblemound Breakwater Project, Sitka Alaska, February 1, 2001.

² U.S. Army Corp of Engineers, Research and Development Center. Physical Model Study of Wave Action in New Thomsen Harbor, Sitka Alaska, October 2007.

³ Harvey N. Smith, State Coastal Engineer. Sitka Harbor Wave Data Analysis, September 20, 2005.

average damage of approximately \$50 thousand per year. As noted above, this estimate does not include the occasional much larger damage to vessels, but the more extensive damage is likely to vary widely from year to year. And also as noted above, the vessel damage calculation was not applied to vessels mooring in Thomsen Harbor. Vessel owners and operators mooring in Thomsen harbor did not provide responses that indicated an annual economic loss from wave-induced damage.

Taking the annual estimate of damage (\$50 thousand) over the Corps of Engineers planning horizon of 50 years provides a PV of \$1 million and an average annual cost of \$20 thousand.

An interesting consideration that is immediately apparent walking around Eliason and Thomsen Harbors is that vessel owners have developed innovative methods to help secure their vessels in challenging conditions. One vessel owner pointed out that he had seven lines connecting him to the dock in his slip in Eliason Harbor. The tie up system he had developed kept him tied securely when weather conditions brought heavy wave action into the harbor, however he wondered how fast he could get away in the event of some sort of catastrophe, such as a fire.

Part II: Economic Impact of Extraordinary Maintenance Costs

Due to the wave-induced motion, the harbor float system in Eliason Harbor receives a great deal more wear than it would in the absence of this motion. During the visit to Sitka, Jim Richardson worked extensively with Ron Pratt, the harbormaster's staff responsible for most of the maintenance and repairs to all of Sitka's docks, including the seaplane dock.

It was apparent that the staff was very innovative and efficient with repairs, but with an overall maintenance budget of approximately \$100 thousand annually, some damage to the float system does not get repaired and accrues as deferred maintenance. The long-term result of damage to the float system is that it will not last as long as it would in the absence of the rigorous conditions within Eliason Harbor.

Crescent Harbor seemed a good candidate for a 'control' facility. It was built in 1966, 44 years ago. Since Crescent Harbor is not affected by a tidal surge, Harvey Smith suggested that we might expect Eliason and Thomsen Harbors to last a similar life cycle were it not for the extraordinary wear and tear they receive. Harvey Smith recommended a potential reduced life of 25 years for the float system in Eliason Harbor, given the wave-induced motion versus a likely life of 45 years were that extra wear not to occur.

Further, Harvey Smith suggested that we use annual maintenance costs of 5 percent and 10 percent of initial capital cost, respectively, for annual maintenance costs without the wave-induced motion and with the wave induced motion.

An excel spreadsheet model was developed to calculate the Present Value (PV) of the two maintenance cost scenarios, using the assumptions noted below, over a time period of 50 years and using the current Corps of Engineers discount rate of 4.375 percent. The resulting estimates of comparative maintenance costs are presented below:

- The replacement cost of Eliason Harbor was needed. The most recent data available was the \$5,500,000 cost of replacing the Thomsen Harbor inner harbor float system in 2007. The respective moorage capacity for the two harbors is Eliason Harbor 242 stalls and Thomsen Harbor 226 stalls. Although Eliason Harbor is slightly larger, the 2007 cost of the new float system in Thomsen Harbor was used as the most reasonable data available, updated to 2010 dollars (approximately \$6,000,000). The factor utilized to update the harbor cost from 2007 to 2010 dollars was the 20-year average cost of living index for Anchorage (the only location available in Alaska), giving an average annual CPI increase of 2.75 percent annually. All future dollars costs are based on 2010 dollars.
- Crescent Harbor has been in use for 44 years and still has economic life left in the inner harbor float system. Because of its location, Crescent Harbor is not affected by the type of wave and surge action that causes damage at Eliason and Thomsen harbors. Therefore, the life expectancy of 45 years was used as the best estimate of an expected life for Eliason Harbor, absent the excessive wearing that occurs from wave and surge activity.
- At the time of the site visit in February 2010, Eliason Harbor had been in service 14 years, having opened in 1996. The issue of diminished life for the inner harbor floats for Eliason, as a result of wear and tear to the dock from wave action and surges cannot be determined with certainty. To gain perspective on this important assumption, ResourceEcon relied on discussions with Harvey Smith, Coastal Engineer for the Alaska Department of Transportation and Public Facilities (ADOT&PF). Mr. Smith is familiar with the Sitka harbor situation, having authored a report on the issue⁴. Mr. Smith recommended using an inner harbor float life expectancy of 25 years under the existing conditions for Eliason Harbor, compared with the control life expectancy (Crescent Harbor) of at least 45 years. Mr. Smith also suggested that the annual maintenance costs for Eliason Harbor with the current

⁴ Harvey N. Smith, State Coastal Engineer. Sitka Harbor Wave Data Analysis, September 20, 2005.

conditions should be approximately 10 percent of the capital cost per year, versus 5 percent of the capital costs if excessive wave and surge wear did not occur. His opinions were utilized for our cost model.

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The above calculations are based on the assumptions shown. If the assumptions were changed, the results would also change.

Part III: Sitka Seaplane Dock and Link to Boat Harbor Issues

Representatives of the City and Borough of Sitka believe that all of the marine facilities that they manage are linked, and that the surge and wave issues created by the breakwater affects their ability to plan and develop⁵. One example of this interrelated planning is the work the City and Borough of Sitka is currently conducting which evaluates options for new infrastructure to support cruise ship passengers visiting Sitka⁶. In 2002, the City and Borough of Sitka contracted a report that provided a Sitka Seaplane Base Master Plan⁷. This report showed potential sites for a new seaplane dock off Japonski Island, but the City and Borough planners believe that area would not be suitable due to wave surges. The current floatplane dock is shown in Figures 2 and 3.

Information on the opinions and unmet needs of seaplane operators was primarily based upon two interviews. The first interview was with Ron Henderson who is the current president of the Southeast Alaska Pilots Association. This group includes approximately 25 members, including both private and commercial operators from a number of Southeast Alaska communities. A current membership list for the association is included in Appendix 4. The second person interviewed, who happened to land and moor a plane at the dock while Jim Richardson was photographing the facility was Ken Bellows. He owned and operated a commercial air charter business in Sitka for 18 years, known as Belle Air. His current business includes operation of a bed & breakfast business catering to sport fishermen.

The current seaplane dock provides space for 9 planes. One of the stalls is utilized by the Alaska Department of Fish & Game, leaving 8 stalls for other users. There is a current waiting list for seaplane stalls (5 plane owners on the list as of February 2010). Commercial operators are not allowed to lease tie up stalls at dock. There is no fuel available at the dock, and no transient space is available.

⁵ Michael Harmon, Public Works Director and Marlene Campbell, Government Relations Director, City and Borough of Sitka, personal communication, February 2010

⁶ Sitka Passenger Fee Fund Implementation Plan, by MRV Architects; Jones and Jones; and the McDowell Group, December 3, 2009.

⁷ HDR Alaska, Inc. Sitka Seaplane Base Master Plan, completed for the City and Borough of Sitka, August 2002.



Figure 2. Sitka Seaplane Dock



Figure 3: Access Walkway to Sitka Seaplane Float

According to Henderson and Bellows, there are a number of limitations with the existing seaplane dock. There is no dock to load and unload passengers for transient visitors to Sitka. The existing dock is unsuitable for larger seaplanes. For example, a Grumman Beaver can't pull up on the dock because it is too heavy and would sink it.

There is no place to operate a straightforward seaplane commercial business in Sitka at present. There is also no fuel available at the existing facility. The existing mix of use in the Sitka Channel, with both seaplane and boat traffic in a relatively small channel results in too close a proximity for the different types of users.

The two persons interviewed agreed that the City and Borough of Sitka consideration of a new seaplane base off Japonski Island, as identified in the Sitka Seaplane Base Master Plan, may help to meet the needs of seaplane operators. However, they believe there is quite a surge there presently, and that condition is not conducive to floatplane operation.

Appendix 1: Harbor User Interviews

1. The first interviewee has been moored in Eliason Harbor for three years. They were moored on the outside float for a while, but moved inside the harbor (hot berthed to a vacant stall) for the winter months. They moor a 38 foot commercial fishing boat and have had chaffed lines and squashed fenders after storms. They do have to double up lines mooring the vessel. They have had some boat damage due to rubbing and chafing. A plank on the transom that was damaged this year cost \$1,000 to repair. Including the mooring lines and fenders lost, their cost for the past year has been about \$1,300.

They believe it is unfortunate that the transient floats can't be used due to exposure to waves. The outside moorage allows quick exits from the harbor, but the wave situation prevents their use during winter. Waves come over the NW corner of the transient dock up to 4 feet, sweeping over the float and into the vessels moored on Float 7.

They pointed out that the excessive waves on the outer transient floats kept vessels from wanting to moor there. Boats were going to be headed to Sitka shortly for the herring seine fishery, and if moorage were available, more commercial boats would be moored in the harbor.

2. This person has a small troller moored in one of the outside transient stalls in Eliason Harbor. The biggest problem is that the outside corner of the transient area seems to divide the waves that surge directly into the outside vessels. They have seen four-foot waves in the outside corner of the harbor. The harbor user spent the month in Thomsen Harbor at the outer end of 'A' Float and does not recall being subject to surge related problems. Damage in Eliason Harbor has cost about \$300 this year so far.
3. This interviewee has been in Sitka for seven years and moors a commercial seiner. The surging on Float 3 is worse than other areas of Eliason Harbor. They wanted to move to another area, but space was not available. Earlier in the winter, they broke three mooring lines and were up for two nights with their vessel slamming against the dock. They blew out two fenders and had to replace lines after the storm. A pole on the boat broke off, but they have not yet paid to make repairs. This winter was the worst in seven years for bad wave conditions in the harbor.
4. This interviewee had a 50-foot commercial longliner. They have not experienced problems with surges. They have not replaced any lines or floats.

5. This interviewee moors a "work boat" in Eliason Harbor. They have not experienced any damage to their vessel, but have had to replace lines and floats two times last winter.
6. This vessel owner has moored in both Thomsen and Eliason Harbors. They indicated that they had no problems with surge waves in Thomsen Harbor and moored a 22-foot vessel there for five years. They have moored in Eliason Harbor for three winters in a 36-foot boat. They have not experienced damage to their vessel, but it is difficult to use power to use power tools because of the vessel movement all day every day when conditions are rough. The harbor is "uncomfortable" during rough weather. The owner has moored in Juneau as well as other places and has not experienced a similar surge.
7. This person moors in Thomsen Harbor and operates a dive boat. The wave surges in the harbor are "annoying" and cause enough movement to make you not want to live there. They tried to move to another harbor in Sitka, but there is currently no space available. No indication of vessel damage.
8. This interviewee moors in Eliason Harbor, one float in from the transient float. They have not experienced vessel damage as a result of the wave surges in the harbor. Out near the transient dock, there is a lot more current that makes landing difficult in rough weather. Vessel owners have to learn how to tie up their vessels in Eliason Harbor. You can't tie to rail straight from the rail or it will chafe through quickly.
9. This interviewee has been in Thomson Harbor for three years. There are not real surges where they moor, and they have experienced no broken lines, etc. or damage to the vessel.
10. This interviewee has been moored in Thomsen Harbor since October and has not experienced surge problems or damages.
11. This vessel operator moved to Sitka from Pelican. They spent a year in the outside transient float in Eliason Harbor and experienced a great deal of difficulty. When the wind is from the northwest, it would throw the whole boat up against the dock. They had cleats pulled out and had some damage to the vessel because it has some areas of wood rot. The wave action almost ripped their boat apart. They do not have an inside moorage stall and do not have such a problem.
12. This interviewee has not had broken ropes, but they have had to have three bilge pumps and a hand pump to keep water out during storms. They were moored on Float 3 in Eliason Harbor.

13. This interviewee moored on the inside of the floating breakwater. They like their moorage spot because it is safe from most of the wave surge in the harbor. They have snapped a couple of lines in the past year, but not experienced other types other vessel damage. The cost to replace the lines twice a year is approximately \$200. They live on board.
14. This interviewee has moored in Eliason Harbor for five years. They get the worst wave conditions when the wind is from the south. They are on the wait list for moorage in another harbor.
15. This interviewee has a 36-foot Tollycraft. They are on Float 7 and have not experienced a great deal of problem with wave surges.
16. This interviewee moors a 50-foot seiner, which is a "big strong boat". They have not experienced problems with vessel damage or other problems from wave surges in the harbor.
17. This interviewee has moored in Eliason Harbor for four years. They find it "uncomfortable" when the weather is rough, but have not experienced damage to their vessel.
18. This interviewee has a 50-foot vessel moored in Eliason Harbor. This was their third year in the harbor, and has been the worst for wave problems. They had storm lines break in November and had to have help during the storm to keep the vessel moored. Aside from ropes and fenders, they have not experienced vessel damage. The lines that broke in the storm were $\frac{3}{4}$ inch hard nylon line with banal loop cushions. They frayed and were just about to break through.
19. This interviewee has a 40-foot vessel on float 4 and has not experienced problems related to wave surges within the harbor.
20. This interviewee has a 50-foot sailboat moored on float 9 in Eliason harbor. They have not experienced problems associated with wave surges in the harbor.
21. This interviewee has a "big commercial boat" and has moored in Eliason Harbor for 12 years. They have popped mooring fenders occasionally and have to replace lines once or twice per year.
22. This interviewee has a small troller and moors in one of the inside floats in Eliason Harbor. They feel the surge, but have not had vessel damage associated with it.

23. This interviewee has moored in the transient area and has experienced lines wearing grooves in the dock. They decided not to move on the boat until they could get a hot berth in an inner moorage stall. They have replace "lots" of fender buoys and lines.
24. This interviewee moors on Float 3 in Eliason Harbor. They have popped fender buoys and had to replace lines a couple of times per year. They live aboard. This November, the harbor conditions were the worst they have experienced. There is a shallow spot under Float 3 that seems to cause more flexing than other areas of the harbor. The harbor floats move and clank. They spent one winter on Float 4 and it had surges, but not as badly as their current location.
25. This interviewee pointed out excessive wear on the finger floats adjacent to his vessel, where the hinge pins were all worn out. When the wind is from the south or southeast, they do not have any problems. However, when the weather is from the north or northwest, they have a hard time walking on the docks. The combination of a high tide and westerly wind causes particularly nasty conditions. They have lived aboard their vessel for five years in Auke Bay and Sitka. They did not have surge wave conditions in Juneau like they have experienced in Sitka.
26. This interviewee owns a moorage watch business in Sitka. They replaced mooring lines on 8 to 10 vessels this winter. Some were brand new lines that just wore through in a storm. They cover the lines with fire hose and other cushioning materials to reduce chaffing.
27. This interviewee is on Float 1. They noted badly scuffed bull rails from their mooring lines and also the need for repeated repair of the finger pier adjacent to their moorage slip. The dock condition is really suffering from the excessive movement. They have probably broken seven lines in the past couple of years. If there were an emergency that would require evacuation of the harbor (such as a fire) during a storm, the wave surges would make that extremely hazardous. They believe most vessels spend at least \$300 to \$400 per year on lines and floats.
28. This interviewee has been in transient moorage for six months. They are uncomfortable during rough weather, but have not experienced popped lines or floats on their 40-foot vessel.
29. This interviewee has a 50-foot sailboat in Eliason Harbor. They have not experienced damage due to their extra care in rigging mooring lines. They use 3 springlines with four different diameters of lines. They have probably gone out at night in storms and helped 35 to 40 vessel owners replace and repair lines during storms.

30. This interviewee has had lots of waves roll through their mooring stall in Eliason Harbor. They moor a 38-foot vessel. Along the outside of floats four and seven, waves crash into windows 6 $\frac{1}{2}$ to 7 feet out of the water. Their damage has been limited to lines and the occasional fender. They used to moor on Float 5 and had lots of damage their. Lines along cost about \$200 per year.
31. This interviewee had fenders snapped last winter and had a rub rail on their vessel damaged. The repair took the boat out of the water for two days and cost \$1,000.
32. This interviewee has a 28-foot sailboat moored in Eliason Harbor. Over recent years, they have had one dock line break, two fenders break and the gel coat on their hull has been rubbed and damaged. They did not have an estimated cost for gel coat repairs.
33. This interviewee is hot berthed in Eliason Harbor for their 5th winter. They have a 42-foot vessel. They regularly break or chaff lines during bad weather conditions and also mash or break fenders occasionally. They believe they spend about \$300 per year replacing damaged gear. They have been hit by other boats that have broken free in the harbor during storms, but have not sustained damages in these collisions.

Appendix 2: Contacts

This is a non-inclusive list of individuals contacted during completion of this report.

Ken Bellows, Fly-In Fish Inn, Sitka, Alaska.

Marlene Campbell, Government Relations Director and Coastal Management Coordinator, City and Borough of Sitka.

Stan Eliason, Harbormaster, Ports and Harbors, City and Borough of Sitka.

Chuck Hackett, Deputy Harbormaster, Ports and Harbors, City and Borough of Sitka.

Ron Handerson, Owner, Coastal Collision Repair, Sitka, Alaska and President of the Southeast Pilots Association.

Michael Harmon, P.E., Public Works Director, City and Borough of Sitka.

Theresa Hillhouse, City Attorney, City and Borough of Sitka.

Dan Jones, Engineer Manager, City and Borough of Sitka.

Kristi Jones, Office Manager, Ports and Harbors, City and Borough of Sitka.

Ron Pratt, Harbor Department Maintenance, Ports and Harbors, City and Borough of Sitka.

Harvey Smith P.E., Coastal Engineer, Alaska Department of Transportation and Public Facilities.

Various moorage users for the Thomsen and Eliason harbors in February 2010.

Appendix 3: Potential Update Project for Crescent Harbor, Sitka Alaska

On February 4th, 2010 during his visit to Sitka to complete this project, Jim Richardson with ResourceEcon met with two representatives of the City and Borough of Sitka - Marlene Campbell, Government Relations Director and Michael Harmon, Public Works Director. The purpose of the meeting was to learn their perspective of the community's desire to upgrade and rebuild Crescent Harbor to more effectively and efficiently meet the community's needs.

Built in 1966, Crescent Harbor has been in use for 44 years. The harbor has 364 moorage stalls and serves a variety of vessels, including recreational sport, commercial charter, commercial fishing. The northern edge of Crescent Harbor nearest Centennial Hall is also used as a docking area for vessels lightering passengers ashore from cruise ships anchored in deep water just offshore Sitka.

Crescent Harbor is different from Sitka's other harbors in Sitka due to its central location. It is directly adjacent to Sitka's Centennial Hall, the venue for community meetings, arts performances and tourism-related presentations. It is also adjacent to a portion of Sitka's downtown business core and one of the most desirable residential areas in Sitka.

The City and Borough of Sitka is working on plans to upgrade Crescent Harbor as part of a revision of their overall harbor services. Realization of their plans for Crescent Harbor will require several prior or concurrent changes to other facilities. Some of the Major points made by Marlene Campbell and/or Michael Harmon include the following:

- The City and Borough of Sitka would like to renovate and upgrade the lightering dock and surrounding area to provide a higher level of service. Cruise ship passengers are an important component of Sitka's tourism business, and the City and Borough of Sitka believes this sector of their economy should provide a higher level of service than it can offer with current facilities. As part of the upgrade to the harbor, they would like to move the covered pavilion that is currently used by a variety of different users, including commercial fishermen from other harbors seeking a covered work area to mend nets, etc. to another harbor.
- The City and Borough of Sitka would like to shift the uses among the harbors and dedicate Crescent Harbor to focus primarily on recreational sport, sport charter and tourism-related vessels. This change would require additional capacity elsewhere in Sitka's harbor system to be able to shift the large commercial vessels currently utilizing moorage in Crescent Harbor into other areas. Accomplishing this will likely require an expansion of Eliason Harbor,

adding some new floats to the area just to the north of the existing float system. Marlene Campbell and Michael Harmon stressed that this improvement and expansion of Eliason Harbor cannot occur unless the surge and problems in the harbor are corrected.

- The inner harbor floats in Crescent Harbor are in relatively good condition and there are no specific problems with the existing breakwater. However, renovation of the harbor would mean reconfiguring the inner harbor float system. It might also include changes to the breakwater to make a different harbor entrance.
- There are constraints to Crescent Harbor that make it difficult to increase the level of support to harbor users. One of the most important constraints is the location of the harbor, directly adjacent to an exclusive residential area. There is currently very limited parking for the harbor as a result (see Figure A-1 of one of the two main access points). There is very little potential for expanding parking, due to opposition from neighborhood residents to changes at Crescent Harbor.



Figure A-1: parking area at Crescent Harbor

- There are no loading areas for heavy equipment or supplies in the harbor. One possible option would be to provide a bulkhead off the south end of the harbor. However, this might create problems with adjacent community uses. There is a popular park and tennis court in that location currently. And the Sitka Sound

community salmon hatchery is located just to the south of Crescent Harbor where a small creek enters the bay. The presence of these long-established facilities would make it difficult to alter access and parking to Crescent Harbor.

- There is no fuel available in the Crescent Harbor.
- One potential area for expansion, as explained by Marlene Campbell, is around the end of the harbor entrance to make use of the small inlet directly behind Centennial Hall. This is an area that could be utilized in a renovation design for a greatly expanded cruise ship passenger dock. However, there would likely be strong community concern with this encroachment into the view area behind Centennial Hall as well as by the adjacent museum, businesses and homeowners.
- The City and Borough of Sitka has funding in hand for a feasibility study of renovations to Crescent Harbor.
- The Sitka planning department sees the Crescent Harbor part of an upgrade to their overall harbor system that would also include expansion of Eliason Harbor and development of a new floatplane dock. They believe the major impediment to implementation of the needed changes is a resolution to the surge wave problem at Eliason and Thomsen Harbors.
- The maintenance staff with the harbormaster's office suggested that the new cruise ship dock near the mouth of the harbor had created a new problem with reflected waves. The old floating dock was constructed of wood and waves angling into the mouth of the harbor from the southwest went under the dock, piled into the large riprap along the shore behind the dock and were largely dissipated. The new floating dock is constructed with concrete and is much heavier than the old dock. Now (according to comments), waves entering the mouth of the harbor come up against the more substantial loading dock and are reflected back, directly across to the boats moored along the outside edge of float 1. This issue could potentially be addressed in a reconfiguration of the harbor.

Appendix 4: Membership of the Southeast Pilots Association as of February 2010

NAME	Address	Email	Phone
Ron Handerson	165 Price St	rhanderson@yahoo.com	747-1077 738-1380
KEN BELLows	485 KATLIAM	KEN@FLYINFISHING.COM	738-336 828 817530
JEN ALLEY	407 DEGROFF	gweniver463@YAHOO	747 5498
Jim Edson	PO BOX 2383	jjie@gci.net	907-747-5615
S. E SMOTHERMAN	Box 6270	Liltom@pt.alaska.net	7-6759
Chuck Olson	3009 H.P.R.	SITKA crolson48@hotmail.com	758-3947
Mike Bills	415 Arrowhead St.	SITKA mikebills@gci.net	747-8023
Sonny Cropley	236 LINCOLN	Sonny@Cropley.com	738-3553
Alain Saarman	204 Lakeview Dr.	Alaskaalain@gmail.com	747-4599
Bill LANTZ	105 KAASIDA HEEN	WM.LANTZ@MSN.COM	758-3075
FRANCIS BAKKES	Box 112 SITKA	francisbakkes@yahoo.com	907-5517433
MARK HACKETT	500 Lincoln B4	FLYHACKETT@hotmail.com	738-1990
TOR SVEUDSEN	508 HARRIS ST.	svendsentora@hotmail.com	738-6113
KEVIN SORBAULT	Box 6134	KRSORBAULT@gci.net	747-2825
Kimberly Merris	Box 6237	kimberlymerris@hotmail.com	738-1312
Bill Salt	201 Price St	SALTYMARINE1@Alaska.com	738-3016
Kari Lundgren	415 DeArmond	KARI@SEARCH.Org	738-2081
Shane Snyder	118 Lincoln	AK Slumlord@hotmail.com	738-3288

Jim Edson FF Instructor
 MARK HACKETT Director of Operation (Harris Air)
 Tor Sveudsen INSTRUCTOR, fish + GAME SERVICE
 Bill Salt / SALTY MARINE
 Ron Salmon Salmon Air 907 735-2229

Appendix 5: City of Sitka, - Harbor Department, Moorage Wait List as of 2/1/2010

Wait List WAIT LIST POSITIONS
Name Order

Name	List	Date on List	Remark
95381	ABBOTT-JONES, JULIE	# 70 on 30' - 36' 07/31/09	WL 31'
95164	ABELE, ERIC	# 16 on 22' - 29' 07/23/09	25'
95441	ADICKES, WILLIAM	# 76 on 30' - 36' 09/15/09	36'
86186	ALLEN, DENNIS	# 6 on 37' - 46' 10/21/05	WL 38'
94641	ALLEN, DENNIS	# 101 on 37' - 46' 12/04/08	WL 38'
94246	ALLEN, JAMES	# 53 on 37' - 46' 06/28/07	WL 37'
95273	ALLISON, ALEXANDER	# 111 on 37' - 46' 07/10/09	WL 45'
94461	ALLRED, KIM	# 13 on 30' - 36' 09/17/07	WL 36'
94174	ANTHONY, ALAN K.	# 51 on 37' - 46' 06/21/07	WL 41'
94429	ARMER, JACK	# 67 on 37' - 46' 11/01/07	WL 38'
95171	BACH, BRYAN	# 11 on 22' - 29' 07/08/09	24'
93658	BAKER, KARL	# 40 on 37' - 46' 03/14/07	WL 40'
94452	BARCHEK JR., JOHN J.	# 34 on 30' - 36' 05/15/08	35'
95288	BARGE, STAN	# 69 on 30' - 36' 07/24/09	WL 34'
95443	BARKHOEFER, TY	# 41 on 47' - 58' 09/17/09	58'
94334	BARRETT, JOSEPH B.	# 55 on 37' - 46' 07/20/07	WL 44
95085	BARRY, DAVID	# 27 on 47' - 58' 02/11/09	WL 52'
87498	BARTH, DAVID	# 34 on 47' - 58' 07/06/09	49'
92606	BARTOLABA, GENE	# 4 on 30' - 36' 06/01/07	WL 31'
92353	BAUER, TOM	# 119 on 37' - 46' 09/01/09	WL 38'
93826	BAUMAN, CHRISTINE	# 23 on 37' - 46' 07/31/06	WL 37'
94020	BAYNE, TODD	# 38 on 37' - 46' 01/23/07	WL 45'
92903	BEAN JR., PATRICK	# 7 on 37' - 46' 11/01/05	WL 46
95122	BEASON, RANDY	# 45 on 47' - 58' 01/07/10	WL 53'
94215	BEHNKE, NANCY	# 6 on 30' - 36' 06/22/07	WL 31'
95377	BELL, STEVE	# 38 on 47' - 58' 07/30/09	WL 53'
94130	BERGE, SHAWN	# 45 on 37' - 46' 05/24/07	WL 40'
84636	BETZINA, KIM	# 64 on 37' - 46' 09/26/07	wl 38'
93469	BIGELOW, CALVIN MARK	# 25 on 37' - 46' 08/21/06	WL 41'
7100	BILLINGS, RICHARD	# 3 on 59'+ 10/15/08	WL 60'
94508	BIXBY, DAVE	# 12 on 22' - 29' 07/08/09	26'
95432	BLACKWELL, BOB	# 77 on 30' - 36' 09/23/09	WL 30'
94629	BLACKWELL, DOUG	# 86 on 37' - 46' 06/25/08	42'
94554	BLAKE, TERRY	# 24 on 30' - 36' 02/19/08	WL 33'
94706	BLOCK, THOMAS	# 84 on 37' - 46' 06/18/08	WL 40'
95005	BLOMBERG JR., RICHARD	# 47 on 30' - 36' 09/10/08	WL 30'
92752	BOARDMAN, JOHN	# 46 on 37' - 46' 06/08/07	WL 38'
95226	BOLES, VERGIL E.	# 73 on 30' - 36' 09/08/09	WL 31'
93412	BORGLUND, JOHN (RYAN)	# 13 on 37' - 46' 01/26/06	WL 41'
95138	BRADLEY, BETH	# 3 on 22' - 29' 04/28/09	26'
93336	BRENNAN, JAMES	# 2 on 37' - 46' 09/27/05	WL 37'
93095	BROWN, JEREMY	# 22 on 37' - 46' 07/21/06	WL 42'
86566	BUCHAN, WILLIAM	# 59 on 30' - 36' 02/23/09	WL 30'
94469	BUTH, ANDREW	# 18 on 30' - 36' 10/11/07	WL 33'
95486	CALLISTINI, ANDREW	# 87 on 30' - 36' 01/13/10	35'
94160	CAMPPELL, JEROMEY	# 5 on 30' - 36' 06/08/07	WL 36'
94745	CAMP, RICHARD	# 53 on 30' - 36' 10/30/08	36'
94500	CAMPBELL, NEIL	# 69 on 37' - 46' 11/06/07	42'
93347	CAMPBELL, STEVE	# 4 on 37' - 46' 10/06/05	WL 40'
94170	CARABINI, CHRIS	# 44 on 30' - 36' 08/06/08	35'
95167	CARABINI, CHRIS	# 108 on 37' - 46' 05/27/09	42'
94812	CARTWRIGHT, ROBERT	# 39 on 30' - 36' 07/14/08	32'
94962	CAULFIELD, ANNIE	# 93 on 37' - 46' 09/12/08	37'
95077	CHAMBERLAIN, JEFFREY	# 56 on 30' - 36' 01/29/09	WL 30'
93144	CHILDERS, JOE	# 44 on 37' - 46' 04/24/07	WL 38'
93867	CHRISTOPHER, LUTHER (SPIK	# 17 on 47' - 58' 08/13/08	WL 48'
95087	CLARK, BRIAN	# 58 on 30' - 36' 02/19/09	WL 32'
94442	CLARK, ERNEST	# 10 on 30' - 36' 08/21/07	WL 35'
95453	CLARK, ERNEST	# 81 on 30' - 36' 10/21/09	WL 30'
95457	CLARK, JENIFER	# 25 on 22' - 29' 10/16/09	WL 26'
790	CLOUGH, RAY	# 103 on 37' - 46' 01/26/09	WL 44'
94472	CONATSER, TAMARA	# 15 on 30' - 36' 09/25/07	WL 32'
94106	COX, SCHAEFFER	# 2 on 30' - 36' 04/24/07	WL 33'
93327	CRENNA, PATRICK J.	# 24 on 37' - 46' 08/03/06	WL 46'

300 boats
on the
wait list.

Name	List	Date on List	Remark
95143	CROW, KYLE	# 61 on 30' - 36' 04/30/09	36'
93916	CROWDER, KELLY	# 28 on 37' - 46' 08/24/06	WL 40'
95425	CURPHEY, TONY	# 79 on 30' - 36' 09/29/09	34'
91170	DANIELS, JOE	# 123 on 37' - 46' 09/22/09	44'
94545	DANIELS, STEVE (JAMES)	# 9 on 47' - 58' 04/24/08	50'
94070	DAVID, JOHNSON	# 42 on 37' - 46' 03/27/07	WL 40'
95168	DAVIS, ARLO	# 15 on 22' - 29' 07/20/09	25'
95053	DAVISSON, BILL	# 100 on 37' - 46' 11/24/08	38'
94607	DEFEVER, KIT	# 8 on 47' - 58' 04/18/08	WL 50'
93203	DELONG, MIKE	# 86 on 30' - 36' 01/12/10	34'
94573	DESROSIERS, KEN	# 78 on 37' - 46' 03/14/08	WL 42'
95244	DESROSIERS, MICHAEL	# 115 on 37' - 46' 07/31/09	WL 42'
94522	DICK, CLARENCE	# 74 on 37' - 46' 12/12/07	WL 40'
94301	DRUMM, DON	# 75 on 37' - 46' 01/31/08	40'
93138	DUGGER, TORIN	# 1 on 37' - 46' 09/20/05	WL 38 POSS 36'
94560	DUGGER, TORIN	# 76 on 37' - 46' 02/22/08	WL 38'
95450	DUNAWAY, AMANDA	# 127 on 37' - 46' 10/06/09	WL 38'
90733	DYBDAHL, JAMES	# 79 on 37' - 46' 04/14/08	WL 41'
95299	EDDY, TYLER	# 13 on 22' - 29' 07/08/09	WL 24'
95194	EELLS, CLEVELAND E.	# 124 on 37' - 46' 09/24/09	WL 38'
94274	EELLS, DANIEL J.	# 8 on 30' - 36' 07/23/07	WL 36'
94195	EELLS, TYLER	# 3 on 47' - 58' 08/27/07	WL 50'
94102	EKSTROM, CHRIS	# 113 on 37' - 46' 07/24/09	WL 40'
93433	ELLINGSEN, DAN	# 15 on 37' - 46' 03/08/06	WL 42'
94492	EMANUEL, TRACEY	# 21 on 30' - 36' 11/13/07	36'
92940	EMANUEL, TRACEY	# 8 on 37' - 46' 11/14/05	WL 38'
93124	ERB, GARY H.	# 128 on 37' - 46' 10/09/09	38'
95479	ERIE, JAY	# 132 on 37' - 46' 12/14/09	WL 40'
85008	ESQUIRO, GEORGE	# 2 on 47' - 58' 06/29/07	WL 54'
94726	FIDIAM, JOSH	# 85 on 37' - 46' 06/24/08	43'
93949	FINN, MIKE	# 28 on 47' - 58' 02/27/09	52'
94347	FINZEL, ROBERT	# 61 on 37' - 46' 09/17/07	WL 40'
90530	FLYNN, CHRIS	# 19 on 30' - 36' 10/22/07	WL 35'
94447	FORD, YUNG	# 42 on 30' - 36' 07/28/08	36'
93517	FOWLER, DAVE	# 17 on 37' - 46' 05/15/06	WL 40'
94907	FROSTAD, KNUT	# 92 on 37' - 46' 09/12/08	44'
95181	GAU, LARAINÉ	# 7 on 22' - 29' 06/02/09	28'
95070	GERMAN, FOREST	# 102 on 37' - 46' 01/01/09	40'
95478	GILLIAN, RICHARD	# 84 on 30' - 36' 12/11/09	32'
93984	GIRARDOT, DENNIS	# 4 on 47' - 58' 10/10/07	WL 50'
94491	GRAY, ED	# 65 on 37' - 46' 10/19/07	WL 42'
94178	GREINER, KEITH	# 49 on 37' - 46' 06/14/07	WL 40'
93911	GRISWOLD, ANN	# 26 on 37' - 46' 08/21/06	WL 37'
95080	GRUN, LAVONNE	# 57 on 30' - 36' 02/06/09	WL 32'
93921	GUNDERSÉN, MARTIN	# 29 on 37' - 46' 08/26/06	WL 38'
93994	HAAG, KEVIN	# 45 on 30' - 36' 08/25/08	36'
93976	HACKETT, MARK/PHYLIS	# 34 on 37' - 46' 10/27/06	WL 45'
95440	HACKETT, PHYLLIS	# 121 on 37' - 46' 09/15/09	38'
94140	HANSON, CATHY	# 3 on 30' - 36' 05/29/07	WL 35'
91253	HARDWICK, JOHN	# 18 on 47' - 58' 08/20/08	WL 49'
94874	HARLOW, ALICE (KITKA)	# 43 on 30' - 36' 08/04/08	33'
93644	HARMON, LARRY	# 39 on 47' - 58' 08/04/09	WL 56
95253	HARMON, MICHAEL	# 10 on 22' - 29' 06/26/09	WL 26'
95436	HARRIER, MICHAEL	# 74 on 30' - 36' 09/11/09	WL 34'
95378	HARTMAN, JIM	# 40 on 47' - 58' 08/20/09	50'
95459	HASELTINE, ERIC	# 26 on 22' - 29' 10/26/09	WL 28'
84287	HENDRICKS, JIM	# 37 on 30' - 36' 07/02/08	WL 36'
90998	HENRY, LARRY	# 105 on 37' - 46' 02/17/09	37'
95477	HENSHAW, TOM	# 28 on 22' - 29' 12/09/09	WL 26'
88332	HERCHENRIDER, JOHN	# 122 on 37' - 46' 09/21/09	37'
95074	HERT, KYLE	# 55 on 30' - 36' 01/26/09	34'
94978	HINES, CRAIG	# 120 on 37' - 46' 09/02/09	46'
94643	HIPP, MARCUS	# 33 on 30' - 36' 05/13/08	WL 31'
95309	HIRAI, JARRETT	# 22 on 22' - 29' 08/26/09	29'
88530	HOROSCHAK, ALAN	# 50 on 30' - 36' 10/06/08	WL 32'
95418	HOUSTON, NATE	# 21 on 22' - 29' 08/26/09	26'
95044	HOWARD, DARRYL	# 54 on 30' - 36' 11/04/08	WL 30'
95029	HOWEY, BRYAN	# 22 on 47' - 58' 10/02/08	58'

Name	List	Date on List	Remark
95424	HUBER-CURPHEY, SUSANNE	# 125 on 37' - 46' 09/29/09	43'
94582	HYDE, LARRY	# 98 on 37' - 46' 10/20/08	WL 39'
94667	INGMAN, ROGER	# 10 on 47' - 58' 06/06/08	WL 52'
94454	INGRAM, WALT	# 11 on 30' - 36' 08/31/07	WL 32'
90252	JANSSEN, TERRY	# 25 on 47' - 58' 11/24/08	WL 48'
94950	JEAN, DEREK	# 90 on 37' - 46' 08/20/08	WL 40'
93415	JOHNSON, BEN	# 14 on 37' - 46' 02/02/06	WL 38'
94006	JOHNSON, BRET	# 66 on 37' - 46' 10/25/07	WL 45'
95434	JOHNSON, ERIC	# 42 on 47' - 58' 09/24/09	WL 47'
94490	JOHNSON, JEFF	# 1 on 59'+ 11/06/07	64'
93760	JOHNSON, KENNETH B.	# 58 on 37' - 46' 08/10/07	WL 45'
93320	JOHNSON, LUCAS	# 99 on 37' - 46' 10/28/08	WL 40'
95145	JOHNSON, MIKE	# 63 on 30' - 36' 05/06/09	WL 32'
92769	JOHNSON, STEVE	# 19 on 37' - 46' 06/06/06	WL 44'
93948	JONES, PETER	# 31 on 37' - 46' 09/20/06	WL 40'
94546	JONES, WALT	# 6 on 47' - 58' 02/20/08	50'
94813	KAMINSKY, MIKE	# 13 on 47' - 58' 07/14/08	53'
94371	KEENAN, MICHAEL	# 56 on 37' - 46' 07/27/07	WL 42'
95376	KELLY, RYAN	# 114 on 37' - 46' 07/30/09	47'
39450	KERR, CARL	# 88 on 30' - 36' 01/18/10	32'
94792	KETAH, JEFF	# 38 on 30' - 36' 07/08/08	35'
95144	KONECCI, SEAN	# 5 on 22' - 29' 05/01/09	24'
94475	KORT, STEVE	# 14 on 30' - 36' 09/24/07	WL 35'
94451	KORTH, TODD	# 59 on 37' - 46' 08/29/07	WL 45'
957	KORTHUIS, BERNARD J.	# 14 on 47' - 58' 07/23/08	WL 50'
93970	KOSCHMANN, DAVID	# 35 on 37' - 46' 11/01/06	WL 43' X 20'
95452	KRANTZ, THOMAS	# 126 on 37' - 46' 10/05/09	43'
86328	KYLE, FRANK A.	# 30 on 47' - 58' 04/10/09	53'
90589	LAITY, EDWIN H.	# 83 on 37' - 46' 06/02/08	40'
94550	LAMADE, TEKA	# 25 on 30' - 36' 02/21/08	31'
90041	LAPERRIERE, ZACH	# 107 on 37' - 46' 04/20/09	WL 39'
94337	LARSEN, JOHN	# 54 on 37' - 46' 07/20/07	WL 37'
93621	LENNING, ZACH	# 11 on 37' - 46' 12/14/05	WL 44'
87227	LICARI, JOHN P.	# 106 on 37' - 46' 04/15/09	WL 45'
85009	LUNDQUIST, LOREN D.	# 16 on 47' - 58' 08/08/08	WL 55'
88678	MACKLIN, TOM & KAREN	# 48 on 30' - 36' 09/22/08	30'
95415	MAGIE, MATT	# 80 on 30' - 36' 10/12/09	36'
95439	MAGNUS, DAVID	# 75 on 30' - 36' 09/14/09	32'
95250	MALATESTA, JOE	# 72 on 30' - 36' 08/31/09	WL 35'
93817	MANOS, WILLIAM J.	# 35 on 47' - 58' 07/06/09	58'
95488	MARTIN, JON A.	# 29 on 22' - 29' 08/18/10	27'
95008	MATTINGLY, MIKE	# 20 on 47' - 58' 09/10/08	50'
94463	MCCONNELL, LUCAS	# 12 on 30' - 36' 09/13/07	WL 36'
95310	MCCREHIN, MARK	# 17 on 22' - 29' 07/24/09	WL 26'
95163	MCGRAW, STEVE	# 109 on 37' - 46' 05/27/09	WL 40'
94480	MCKEE, BARRY	# 31 on 47' - 58' 04/23/09	58'
95342	MCPAHON, SHAUN	# 20 on 22' - 29' 08/12/09	WL 27'
94150	MCVEY, MIKE	# 67 on 30' - 36' 06/29/09	34'
94173	MEACHAM, ROBERT	# 60 on 37' - 46' 09/11/07	WL 38'
94741	MEADOR, JOE	# 87 on 37' - 46' 06/28/08	WL 38'
50475	MEIER, STEVEN	# 11 on 47' - 58' 06/13/08	WL 48'
92022	MEURET, HEATHER	# 18 on 37' - 46' 05/25/06	WL 42'
84739.03	MILES, FRANK	# 48 on 37' - 46' 06/12/07	WL 42'
84739.04	MILES, FRANK	# 37 on 47' - 58' 07/16/09	50'
1013	MILLER, RUSSELL E	# 118 on 37' - 46' 08/27/09	WL 46'
94437	MONJOIN, ANDRE	# 40 on 30' - 36' 07/24/08	31'
94657	MOORE, HENRY	# 35 on 30' - 36' 05/23/08	35'
87020	MOORE, JONATHAN	# 50 on 37' - 46' 06/19/07	WL 46'
94674	MORK, FRED	# 49 on 30' - 36' 09/26/08	WL 36'
88848	MORK, FRED	# 32 on 37' - 46' 09/28/06	WL 44'
1025	MOSES, TERRY D.	# 41 on 30' - 36' 07/25/08	WL 32'
1026.01	MULLIGAN, GARY/PHYLLIS	# 44 on 47' - 58' 11/30/09	WL 49'
92660	MUNSON, MARK	# 52 on 30' - 36' 10/13/08	WL 34'
95322	NEEL, DAVID	# 14 on 22' - 29' 07/13/09	24'
95472	NELSON, JOEL	# 131 on 37' - 46' 11/30/09	45'
93378	NELSON, STEVE	# 9 on 37' - 46' 11/15/05	WL 41'
95324	NEUMANN, ALBERT	# 18 on 22' - 29' 08/03/09	26'
92826	NORBISRATH, EVAN	# 12 on 47' - 58' 06/26/08	49'

Name	List	Date on List	Remark
94523	NURCO, MIKE # 2 on 59'+	01/07/08	60'
94208	OHLIN, SARA # 52 on 37' - 46'	06/21/07	WL 43
93137	OLSEN, THOMAS P. # 5 on 37' - 46'	10/17/05	WL 42'
95027	ONEILL, DAN # 96 on 37' - 46'	09/29/08	39'
94569	OTTO, GEORGE # 80 on 37' - 46'	05/06/08	WL 42'
95198	PANSANO JR., DEAN JOSEPH # 5 on 59'+	06/08/09	60'
85964	PAWLAK, TOM # 29 on 47' - 58'	03/26/09	WL 58'
93030	PAYANT, CHAD # 71 on 37' - 46'	11/19/07	40'
84174	PEARSON, DENTON # 68 on 37' - 46'	11/02/07	WL 39'
94670	PELHAM, COY # 36 on 30' - 36'	06/03/08	32'
92229	PELLETT, COLLEEN # 9 on 30' - 36'	07/31/07	wl 30'
95117	PENDELL, CORAL # 60 on 30' - 36'	04/14/09	32'
93176	PEREZ, JAMES # 20 on 37' - 46'	06/30/06	WL 42'
92761	PERKINS, BILL # 46 on 47' - 58'	01/27/10	WL 49'
95069	PETERSEN, BRANDT # 71 on 30' - 36'	08/10/09	35'
93968	PHILLIPS, GEORGE CASEY # 33 on 37' - 46'	10/11/06	WL 42'
94608	PLETNIKOFF, ROBERT # 19 on 47' - 58'	09/04/08	WL 58'
95151	PODLAS, MARILYN # 33 on 47' - 58'	06/27/09	WL 52'
94444	POFFENBARGER, SEAN # 16 on 30' - 36'	09/28/07	WL 34'
88961	POOK, STEWART # 9 on 22' - 29'	06/05/09	WL 27'
94650	POWERS, BRIAN # 88 on 37' - 46'	06/30/08	40'
93229	PREBLE, RICHARD # 22 on 30' - 36'	01/02/08	36'
92355	PRESTON, LANCE # 116 on 37' - 46'	08/12/09	WL 46'
95421	PREWITT, RUSSELL # 23 on 22' - 29'	08/31/09	27'
95413	PRICE, PARIS # 117 on 37' - 46'	08/20/09	WL 42'
94064	PUCKETT, JERRY # 41 on 37' - 46'	03/23/07	WL 40'
95064	RABB, IAN # 26 on 47' - 58'	12/08/08	50'
89722	RAMP, STEVEN # 30 on 30' - 36'	04/21/08	WL 32'
93326	REAR, KEN # 95 on 37' - 46'	09/23/08	WL 40'
94636	REMUND, JESSE # 32 on 30' - 36'	05/09/08	WL 30'
94999	RICHEY, DAVID # 91 on 37' - 46'	09/03/08	WL 37'
95451	RICHEY, DAVID # 43 on 47' - 58'	10/05/09	47'
88720	RIGHTER, CHRISTINA # 89 on 37' - 46'	07/14/08	38'
95020	RIGHTER, CHRISTINA # 94 on 37' - 46'	09/19/08	38'
95314	RIGHTER, CHRISTINA # 36 on 47' - 58'	07/11/09	WL 50'
95345	RINNER, DAN # 6 on 59'+	07/22/09	60'
93980	RIVERA, MARIO # 1 on 47' - 58'	11/03/06	WL 53'
94507	ROMINE, MICHAEL # 70 on 37' - 46'	11/14/07	41'
94562	ROSS, RON # 26 on 30' - 36'	02/25/08	31'
95140	ROTTER, THOMAS # 4 on 22' - 29'	04/29/09	26'
95417	RUHLE, NICHOLAS # 27 on 22' - 29'	11/05/09	28'
95236	SATER, LANE # 66 on 30' - 36'	06/22/09	30'
95033	SCALLION, TAMARA # 51 on 30' - 36'	10/08/08	WL 31'
93421	SCHALOW\$\$, JUSTIN # 82 on 30' - 36'	10/30/09	36'
93446	SCHMIDT, JEFF # 16 on 37' - 46'	05/12/06	WL 43'
91154	SCHUMEJDA, LEWIS # 3 on 37' - 46'	09/30/05	WL 38'
95119	SEARS, FRED # 2 on 22' - 29'	04/16/09	27'
93663	SEARS, HEATHER # 30 on 37' - 46'	09/12/06	WL 40'
94514	SEITHER, RUSS # 72 on 37' - 46'	12/03/07	WL 41'
94544	SEUBERT, RICH # 5 on 47' - 58'	01/28/08	55'
93478	SEXTON, TIMOTHY # 39 on 37' - 46'	02/13/07	WL 38'
86428	SINE, ANTHONY # 17 on 30' - 36'	10/03/07	WL 32'
93380	SITKA TRIBE OF ALASK, # 10 on 37' - 46'	11/22/05	WL 40'
94552	SKORDAHL, JERRY # 27 on 30' - 36'	03/25/08	WL 36'
95024	SKORDAHL, KELSEY # 21 on 47' - 58'	09/23/08	WL 48'
94536	SLACK, LAURA # 23 on 30' - 36'	02/01/08	30'
94082	SMILEY, DAVID # 1 on 30' - 36'	04/09/07	WL 34'
87913	SMITH, JAMES (JIM) # 24 on 22' - 29'	09/21/09	WL 26'
93078	SNELL, ROBERT # 21 on 37' - 46'	07/06/06	WL 42'
94001	SOLLARS, AUSTIN T # 7 on 47' - 58'	03/31/08	WL 54'
94009	STEINSON, JAMES # 6 on 22' - 29'	05/14/09	WL 24'
94471	STENSON, ZACH # 62 on 37' - 46'	09/21/07	WL 42'
94093	STEWART, WILLIAM C. # 64 on 30' - 36'	05/20/09	WL 30'
94123	STROEKER, BEN # 47 on 37' - 46'	06/12/07	WL 41'
93988	STROEMER, MATTHEW P. # 36 on 37' - 46'	11/13/06	WL 42'
95127	SUTTON, RUSTY # 8 on 22' - 29'	06/03/09	27'
95406	SWANSON, ANDREW # 19 on 22' - 29'	08/10/09	26'
95335	SWIFT, JAMES # 112 on 37' - 46'	07/17/09	WL 40

Name	List	Date on List	Remark
95034 TEAS, DAN	# 97 on 37' - 46'	10/13/08	45'
95001 TODD, CHRIS	# 46 on 30' - 36'	09/05/08	WL 36'
93549 TOFIELD, JOSH	# 37 on 37' - 46'	12/26/06	WL 40'
95082 TOTTEN, JOHN	# 4 on 59'+	02/06/09	WL 60'
93915 TRANI, LARRY	# 27 on 37' - 46'	08/22/06	WL 42'
94620 TRANI, MICA	# 31 on 30' - 36'	04/28/08	31'
95188 TURNER, SHELDON	# 110 on 37' - 46'	06/03/09	WL 44'
95480 WADE, MIKE	# 85 on 30' - 36'	01/04/10	32'
94727 WAIKEL, SAM	# 78 on 30' - 36'	09/29/09	36'
94830 WAINER, CLAUDIA	# 15 on 47' - 58'	08/02/08	WL 50'
95079 WAITE, BOB	# 104 on 37' - 46'	02/06/09	WL 42'
94558 WALLACE, GREG	# 1 on 22' - 29'	04/14/08	26'
92303.02 WALLISCH, MIKE	# 62 on 30' - 36'	05/04/09	33'
91244 WARD, DUSTIN	# 29 on 30' - 36'	04/18/08	WL 31'
91659 WARREN, CRAIG	# 20 on 30' - 36'	11/09/07	WL 30'
94630 WEHLING, WALT	# 81 on 37' - 46'	05/09/08	43'
92808 WHITE, MIKE W.	# 130 on 37' - 46'	11/04/09	WL 37'
94568 WIEDEL, LUKE	# 28 on 30' - 36'	04/07/08	32'
95083 WILLIAMS, DAVID G.	# 32 on 47' - 58'	06/11/09	50'
94220 WILLIAMS, RONNY L.	# 82 on 37' - 46'	05/15/08	WL 45'
88103 WILLIAMS, RORY	# 65 on 30' - 36'	06/04/09	WL 33'
94159 WILLOUGHBY, JULIE	# 7 on 30' - 36'	07/12/07	WL 34' (MAY FIT 32' STALL
94091 WILSON, RYAN	# 43 on 37' - 46'	04/17/07	WL 45' THOM
94679 WINDAHL, ETHAN	# 68 on 30' - 36'	07/10/09	WL 35'
93360 WOOD, GARY	# 23 on 47' - 58'	10/09/08	WL 52'
94283 WOOD, RYAN & MARY	# 57 on 37' - 46'	07/31/07	WL 40'
93956 WRIGHT, JERRY	# 73 on 37' - 46'	12/11/07	43' WL
93402 WUMKES, MARK	# 12 on 37' - 46'	01/05/06	38'
95039 WYMAN, TODD	# 24 on 47' - 58'	10/23/08	50'
94478 YOCUM, JENSON	# 63 on 37' - 46'	09/26/07	WL 42'
95462 YOUNG, MARK	# 129 on 37' - 46'	10/28/09	WL 40'
92226.02 YOUNGER, GWEN	# 83 on 30' - 36'	11/19/09	32'
94574 YSTAD, CHRIS	# 77 on 37' - 46'	03/14/08	42'

Appendix 6:View of Eliason and Thomsen Harbors, Japonski Island and Breakwater

