Mutiny Bay Boat Ramp
Historical Observations

Objectives

The objective of this presentation is to show how Mutiny bay has change over the last 20 years and illustrate how the counties dredging operations to maintain the boat ramp is adversely effecting the bays ecosystem.

Note

Dredging is defined as gathering up bottom sediments and disposing of them at a different location. At low tide, the County is transporting hundreds of yards of bottom sediments on a weekly basis and disposing the sediment on adjacent private tidelines and shoreline.

Topics

- Changes over time
- 1999 Drainage Pipe
- Driftwood Line
- Arial Photo Illustrates the erosion process
- Effects of Erosion
- 2013 study by Coast and Harbor & Engineering documents Erosion
- Mutiny Bay Eelgrass
- Boat Ramp Cleaning/Dredging
- Conclusions

The following Arial photos illustrate the changes to Mutiny Bay over time, this changes are the result Island County's Mutiny Bay boat ramp cleaning and now dredging operation

CHANGES OVER TIME

Mutiny Bay 1977

The photo does show the outline of the boat ramp with some sand on the down drift side. The boat ramp went through regular cleaning to keep it open.

The start of the sand bar caused by boat ramp cleaning /dredging

Mutiny Bay 1980

The following picture is of the boat ramp in 1980s just after it was raised 3 feet. A step up was required to get over the ramp. There are no piles of sand just a flat beach.

Summary of change

The sand accumulations from cleaning/dredging in the 70s to 80s required 3 feet of concreate to be added to the boat ramp to keep it open. It is a given that you put an obstacle perpendicular to sand flow it will accumulate sand on the up draft side of the obstacle.

Boat ramp 1980

In the 1980s the boat ramp did not require much cleaning. You can see the top of the drain culvert which allow easy maintenance to keep it open. To day it is under 8 -10 feet of sand

Mutiny Bay 1993

In 1993 the beach line around the boat ramp has not changed much. No big piles of sand along side the boat ramp and not much evidence of a sand bar .

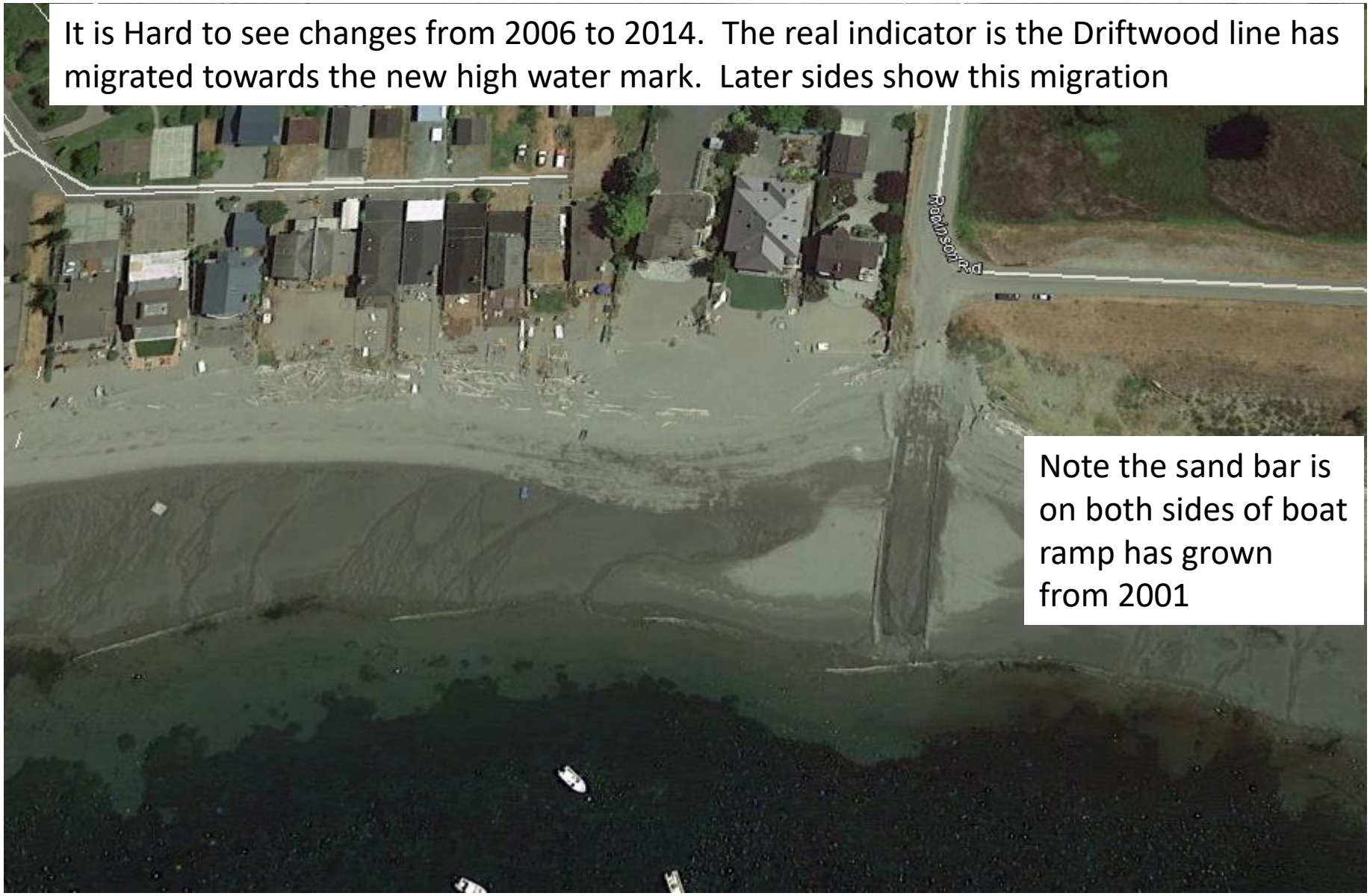
Mutiny Bay 2001

This Arial picture clearly shows the effect of continued cleaning/dreading of the boat ramp. Here is the fist evidence of the problem with sand bars starting to form on both sides of the boat ramp

Mutiny Bay 2006

This Arial picture clearly shows the effect of continued cleaning/dreading of the boat ramp. The sand bar has grown significantly in 5 years of continued boat ramp cleaning/dredging operations

Mutiny Bay 2014 Google Earth



Mutiny Bay 2016 Google Earth

Mutiny Bay 2017 Google Earth

The 2017 Google Earth photo clearly shows the sand bar created by Island Counties dredging operation the second photo is not as clear but shows the tire prints of the front end loader as it adds dredged sediment to the sand bay, Looking north you can see the homes where the shoreline is being eroded away by the sand bar

Mutiny Bay 2018 Google Earth

This series of photos illustrate the erosion damage down drift of the Island County's Cedar Street Drainage pipe

1999 DRAINAGE PIPE

Mutiny Bay 1999 – Cedar Street Drain Pipe

In 1999 Island county tried to solve the Cedar street drainage problem by installing a big drainage pipe on the beach. the following Historical photo show the result. A sand bar was created up-drift of the pipe similar to the current sand bar

Mutiny Bay 1999

Down-Drift side of the big pipe shows the erosion on the down drift side of the pipe

Mutiny Bay 1999 – Cedar Street Drain Pipe

You can see the erosion caused by the sand bar created by the drainage pipe. Island County is creating the same erosion scenario with the boat ramp dredging process.

It took Legal action against Island county to remove the pipe.

After a couple of years the sand returned

Mutiny Bay 1999 – Cedar Street Drain Pipe

This photo illustrates How much Sand was eroded down drift of the of the big pipe

Mutiny Bay 1999 – how Does this compare to todays situation?

1999

2017

The previous historical photos showed the erosion caused by the drain pipe. the drainage pipe created a sand bar up-drift of the pipe, resulting in erosion down-drift properties

The sand bar created by Island Counties dredging is creating the same situation, a bigger sandbar that results is the same erosion down-drift

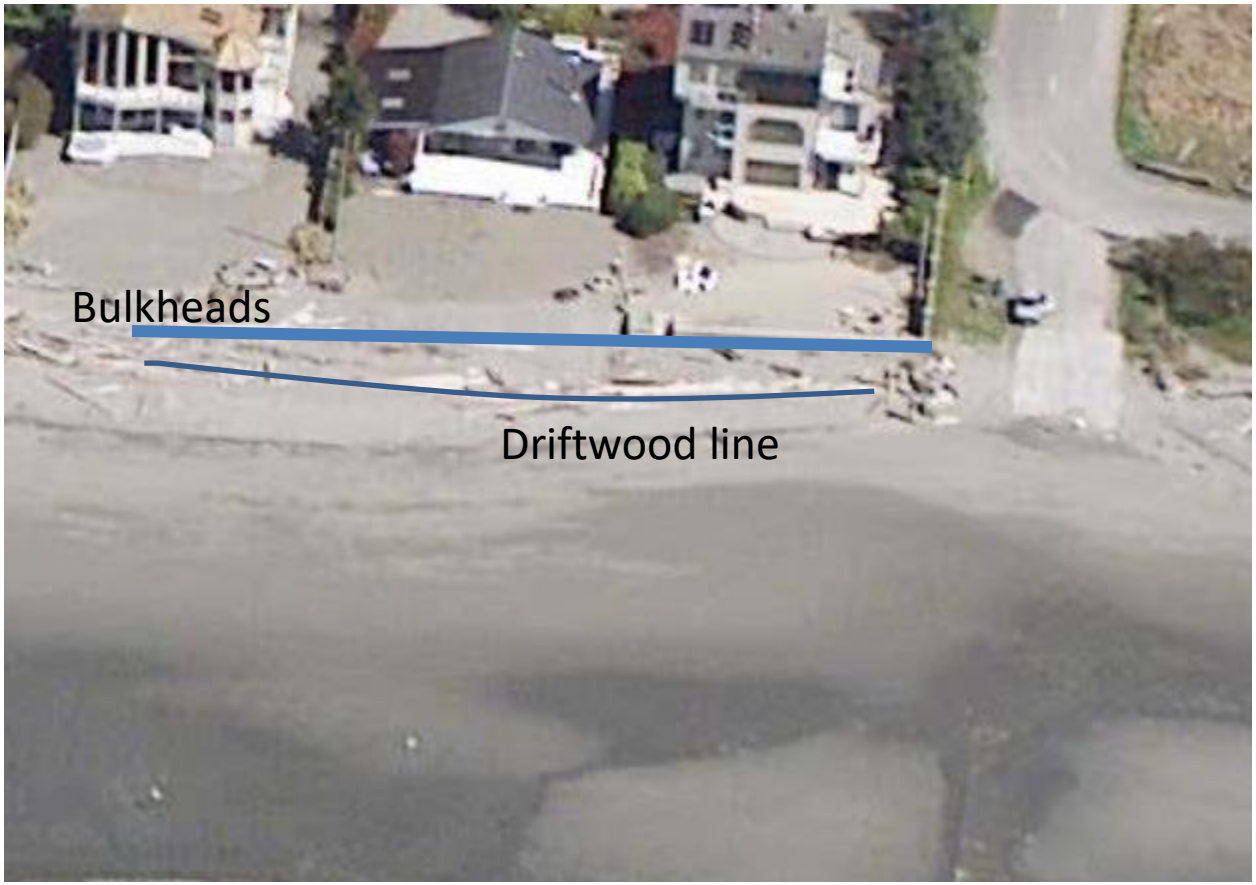
In 1999 the Island County did not permit this work, and required a legal action to remove it.

The current Mutiny Bay boat ramp cleaning dredging operation Island is in violation of it's Shore Line Management Plan and will eventually result in the same type of erosion as the drain pipe.

The Driftwood Line change over the years is another indicator of the magnitude of the effects of Island Counties boat ramp dredging operation. The following slides capture this change

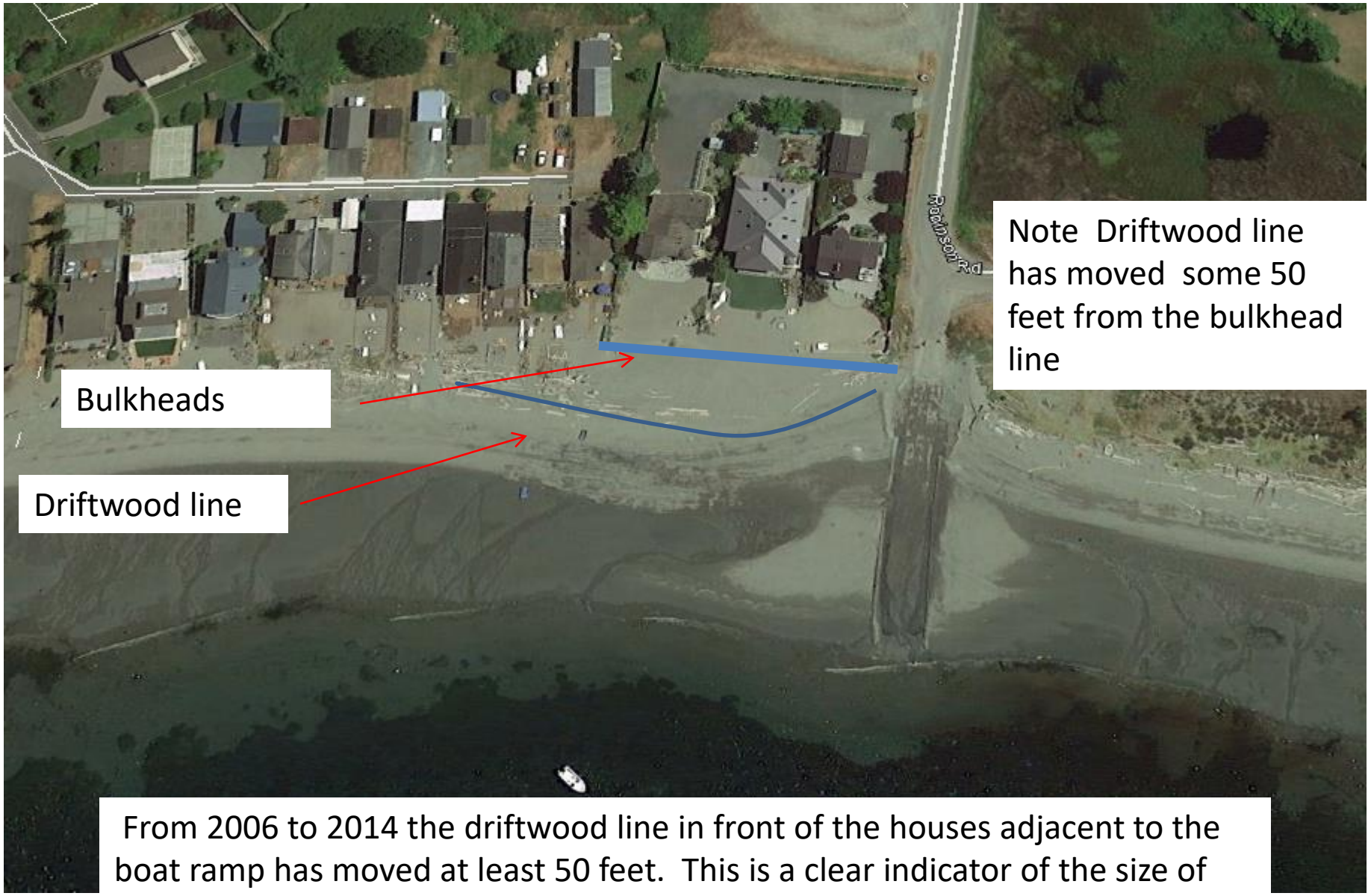
DRIFTWOOD LINE

Driftwood line 2001



Driftwood line 2006

Driftwood line 2014



From 2006 to 2014 the driftwood line in front of the houses adjacent to the boat ramp has moved at least 50 feet. This is a clear indicator of the size of the sand bar created by the Island County boat ramp dredging operation.

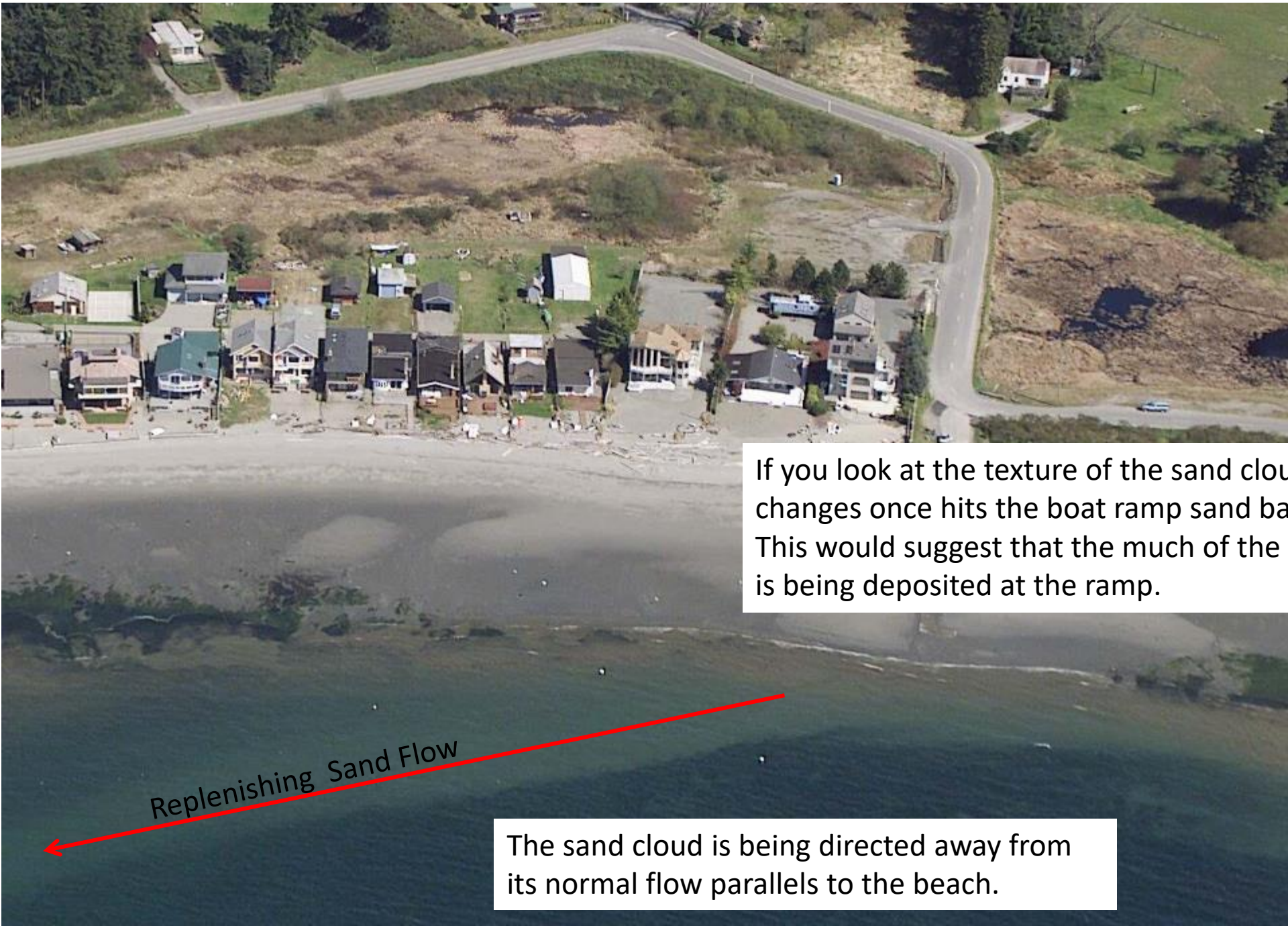
The objectives of this series of photos is to illustrate how the Island County Created Sand bar changes the traditional sand flows resulting in down Drift erosion

ARIAL PHOTOS ILLUSTRATES THE EROSION PROCESS

The following 3 slides illustrate how sand moves along Mutiny bay. The feeder bluff is Double bluff, which provides what I will call replenishing sand. I call it replenishing sand because if it stops the beach's north (down drift side) of it will start eroding. Replenishing sand comes from double bluff and moves along Mutiny bay all the way to Bush point. The 2001 aerial photo captures this sand flow. The first slide shows the murky water which is suspended sand moving parallel to the beach until it hits the Boat ramp sand bar. The following sides show how flows along the shoreline.

2001 Aerial photo

Sand flow moving along the beach driven by wind and tide


If you look at the texture of the sand clou
changes once hits the boat ramp sand ba
This would suggest that the much of the
is being deposited at the ramp.
Replenishing Sand Flow
The sand cloud is being directed away from
its normal flow parallels to the beach.

The existing sand along the beach is picked up and moved north, the replenishing sand misses those properties north of the boat ramp. This is why the beach is eroding.

The picture clearly shows the replenishing sand being diverted in 2001 when the sand bar was small compared to what it now !

The objective of the following slides is to show the effects of erosion One of the key policies of Island County's Shoreline Management Program

"Recreational use and development shall be design, constructed and operated in a manner facilitates appropriate use of the shoreline resources and does not result in a net loss of shoreline ecological functions and is compatible with the surrounding properties"

EFFECTS OF EROSION

View of the beach 2013 – pristine sand beach you can see all the way to old Mutiny Bay resort nothing but sand

View of the beach 2008 – pristine sand beach and the crescent shape of the bay

now

for those that have lived along Mutiny bay for 50 years can remember there were only a few rocks before the tide flats. That has changed, the quantity of exposed rocks are many – giving credence to the presented replenishing sand flows are being stopped and being redirected by the boat ramp sand bar.

Before

Now

This shows show the extent of the erosion

A 2013 study by Coast and Harbor & Engineering for a soft shore installation indicated that the 6 properties (the study area) just south of the old Mutiny documented the

2013 STUDY BY COAST AND HARBOR & ENGINEERING DOCUMENTS EROSION


Horizontal Offset
Project Reach
Predominant
Transport
Direction
Mutiny
Bay
Photography May 2007
Mutiny-Bay-Rd
Scholl-Ln
1340-E
Cedar-St

Figure 5b

The software Digital Shoreline Analysis System (DSAS) (Thieler *et al.* 2009) was used for organizing and comparing shoreline position data. Digitized shoreline positions for the years 1990, 2007, and 2012 are plotted by color in Figure 5a. Shoreline position change output by DSAS is plotted in Figure 5b. The figures show that the shoreline retreated about 10 ft. between 1990 and 2007 from near the south end of the project reach to about 1,200 ft. north of the project reach. From 2007 to 2013 the retreat continued another 10 ft. South of the project reach there was approximately no change, to slight shoreline advance.

Relationship between erosion and boat ramp

1990-2007 - 17 years - 10 feet of documented erosion
2007-2013 - 6 years - 10 feet of documented erosion

- The documented erosion is increasing at an increasing rate
- The historical photos document that the boat ramp dredging is increasing at a increasing rate

This demonstrates that there is a cause and effect relationship between down drift erosion and boat ramp dredging

1980

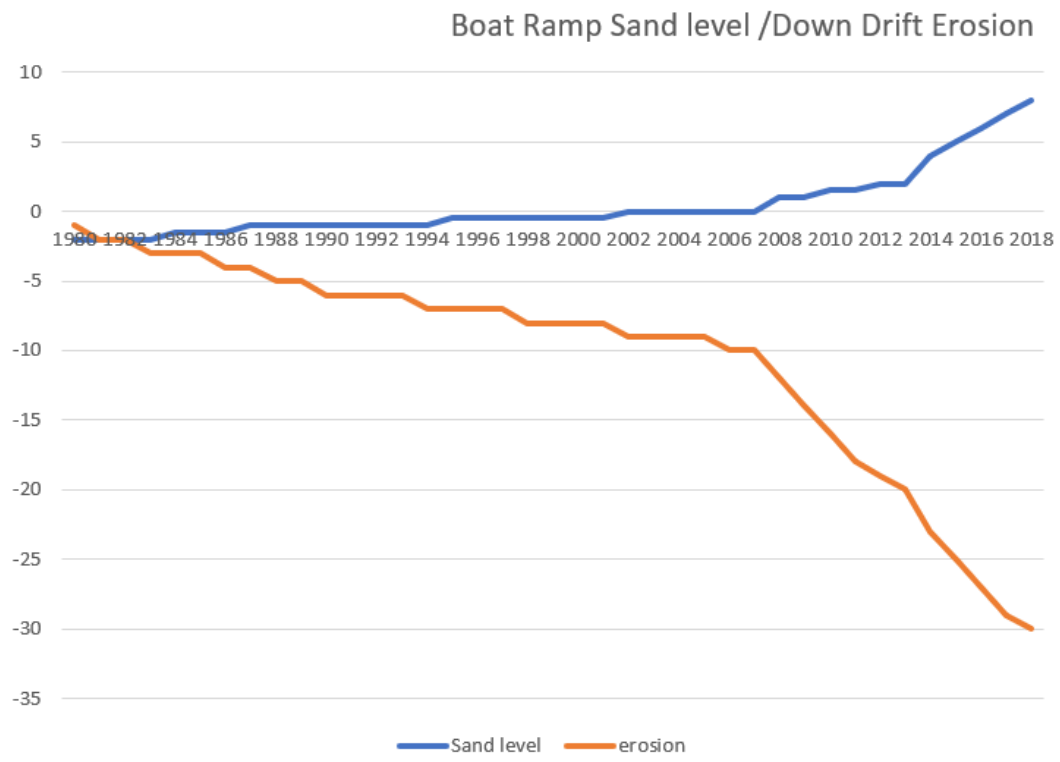
1993

2007

2015

Erosion Graph

The following graph shows the relationship between sand levels over the boat ramp surface based on photographic estimates and down drift errosion



Conclusions

- The rate of shoreline retreat (erosion) aligns with the rate of boat ramp dredging , cause and effect.
- The study documents the shoreline south or up drift of the studied area is advancing, Island county dredged material dumping ground and shoreline north or downdrift of the dredge material sandbar is eroding.

Eelgrass provides essential habitat to a wide range of fish and wildlife in Puget Sound. This essential marine plant serves as a food source, a safe haven for birds, salmon, herring, crabs and shell-fish., The Eelgrass meadows provide refuge from predators for juvenile fish. Thus they are an essential part of the Mutiny Bay ecosystem.

What is happening to the eelgrass of Mutiny Bay? The following picture tells the story. It seems to be healthy except around the boat ramp, where the county weekly moves tons of sand to keep the boat ramp open

MUTINY BAY EELGRASS


There is no ell grass along where the boat ramp is cleaned for ½ mile
There is ell grass through out the bay, always has been

The objective the following slides is to illustrate that the cleaning process may have started as a cleaning process but has evolved in a full fledge dredging process that dredges relocates on the order to 3000 cubic yards a year of bottom sediment

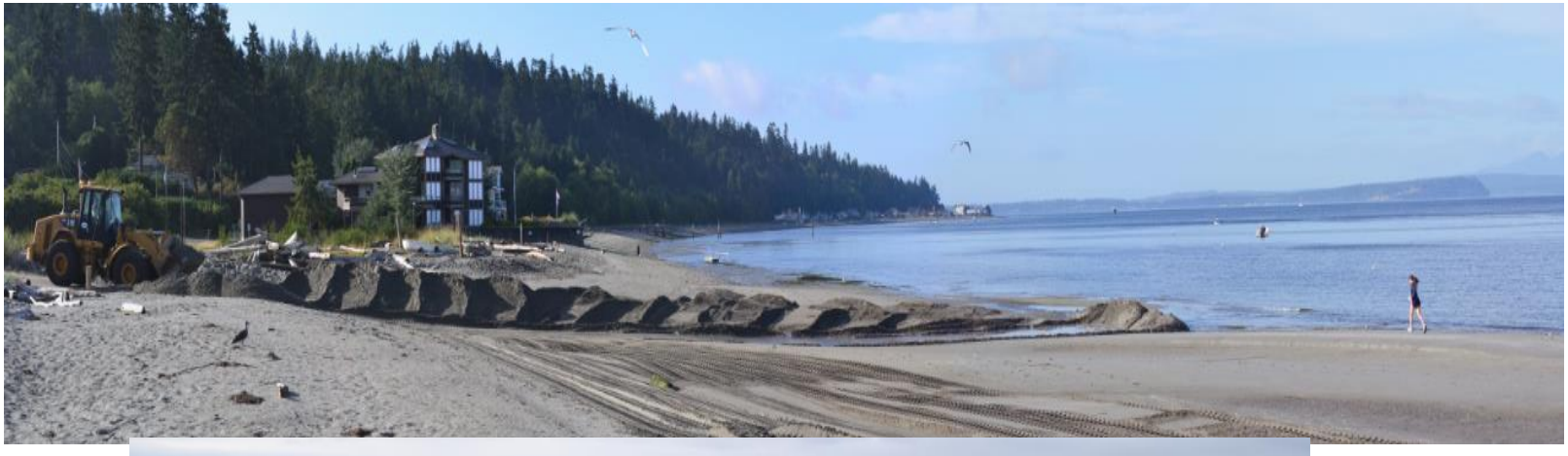
BOAT RAMP CLEANING/DREDGING

Boat ramp cleaning 2007

In 2007 the Mutiny Bay boat Ramp Cleaning operation was more of a cleaning operation

Boat ramp dredging summer 2015

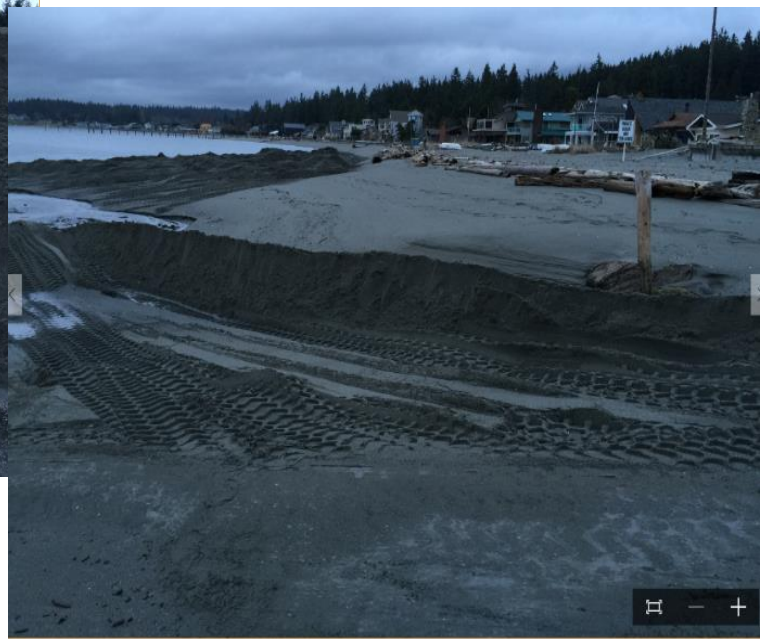
In 2015 the process evolved into a full fledged dredging operation



Boat ramp dredging Winter 2015

These photos show the boat ramp just before the dredging operation The depth of the sand over the boat ram is 7 to 8 feet.

Winter 2015



These photos show the results of the dredging operation and where the sediment was deposited on private tidelands with no written permission from the land owners

The estimated volume of sand “Cleaned” from the boat ramp is (100 feet*20feet*7)/27 = 518 Cubic yards. In a year this adds up to around 3000 cubic yards dredged and moved.

Winter 2016

The Ramp was not dredged as of Christmas 2016. The sand depth over the ramp is estimated to be 9 to 10 feet. Note: the drain line is almost plugged. A heavy rain storm would result it local flooding

2017

2018

Conclusions

The Mutiny Bay Boat Ramp Historical Observations documents that the Island Counties continued dredging of the Mutiny Bay boat ramp has and continues to change the natural-geologic process

- Is changing the naturally occurring coastal-geologic process
- Has created a net loss of shoreline Ecological functions
- Is not compatible with surrounding properties due to erosion cased by the sand bar created location of dredged material
- Is damaging the Mutiny bay ell grass
- The Mutiny bay boat ramp cleaning operation is actually a dredging operation
- There is a documented correlation between sand levels at the boat ramp and down drift erosion.

Google Earth 2017


2018 – Sand piled 15 to 20 feet
2007 – Sand piled 1 to 2 feet
left. hand side or boat ramp
2007 – Sand piled 1 to 2 feet
Rt. hand side or boat ramp
2018 – Google Maps shows the
sand bar created by the boat ramp
dredging growing
© 2018 Google
Imagery Date: 5/13/2018 47°59'38.03" N 122°32'24.27" W elev 9 ft

Google Earth 2020

This is the Google Earth photo take on the summer of 2020. This photo illustrates that nature is slowing returning the shape of the bay to is historical crescent curvature