WELCOME
LCSG Cape Disappointment
27 April 2009

Navigational SAFETY from the End User Prospective

What the Crab Fleet Experiences
Typical Crab Fleet, Warrenton
Weather the way we like it
Outer SWS off the stern

Typical Load Condition
That was a BIG ONE
20 - 22 foot Sluffer Extremely Dangerous Operating Condition
REALITY

BOATS

WAVES

WEATHER CONDITIONS

MOUNDS

PEOPLE

DON’T FORGET THE PEOPLE
3rd Cape D Technical Forum
Mound Induced Impacts to
Navigational Safety
took 10 Years
for
Open Discussion
THANK YOU LCSG!
Model vs. Reality

Remember which is which

$2^{nd}$ Chance vs. No $2^{nd}$ Chance

*ref/dif wave model – October 2001 bathymetry*
Dredge Disposal Mounds

Substantially Increase

**RISK**

Of Marine Casualties

And

Change Significantly Navigation at the MCR

From Quartering into the Waves to Broadside

Dramatically Increased when Disposal Mounds must be

Circum-Navigated
Dredge Disposal Mounds

Eliminate

**Predictability**

Especially

*Long Period Waves (13 - 14 second or more)*

That are not wind driven, but propagated from distant storms

These are our **Largest Concern**

Related to Mound Induced Wave Amplification

*No Wind, Large Swell = Fleet Crab Fishing*

Wave Model that best fits this criteria needs application

*If the Wind is Excessive the Fleet will be snugly in Port*

And then there is everything in-between
And then

There is always

The Tide

To Date Tidal Analysis
Is pretty WEAK
Related to Wave Amplification Impacts
The Reality
Mound Induced Wave
AMPLIFICATION
IS MORE THAN WAVE MODELING

WAVE – Height & Period
WIND – Calm to Non-fishable
Currents – Highly Variable
Tides – Up to 5 – 6 knots
Sometimes these forces act in opposite directions
And all of this is happening over a Disposal Mound
CRCFA NEEDS DREDGING
The Corps has improved SAFETY dramatically at the MCR
However – Disposal Mounds are a significant RISK for small vessels
LIFE SAFETY is often SUBBORDINATED to “Least Cost”
There is a need to reduce the RISK of ADVERSE CONSEQUENCES
No 2\textsuperscript{nd} Guessing

You have to be RIGHT 100\% of the time!

The Crab Fleet Decisions are not Graded on the CURVE

NO 2\textsuperscript{nd} Chance if you make the WRONG Navigational choice!

\textbf{Immediate onset accidents} = \textbf{casualties}
MCR Crabbers are BEST NAVIGATORS in THE WORLD

Stems from a Healthy *Respect* for the MCR Notorious Reputation
I can only remember one crab related casualty on the “BAR” in 50 years at the MCR
Have we been LUCKY???
Some may say YES

but I believe it is the **PREDICTABILITY**

Of a deep draft channel – Thank you Corps
Wave Theory

MUST TRANSLATE TO NAVIGATIONAL PREDICTABILITY
WAVE THEORY

1. Must be truly CONSERVATIVE
2. Ocean is arrhythmic, not harmonic
3. Wave amplifications occur routinely in any given wave field – without mound influence
4. Casualties occur at the upper end of the natural wave spectrum
5. Mounds accentuate an arrhythmic ocean wave pattern BEYOND PREDICTABILITY
Wave Theory

Not a Phishing Expedition
But A Pathway to Safer Navigation

Model but Verify
FV/Network Casualty – Garibaldi Bar
A vessel crossed safely just before this tragic event

Nothing can help this insanity, the pressure to get one’s gear out at the beginning of the crab season is incredible, the fleet now has a built in GOLD RUSH mentality as up to 50% of our entire year’s income can come in as little as two weeks at the beginning of the crab season in a mid-winter crab fishery.

The only real answer is to engineer solutions that control mound induced wave amplification to acceptable levels that the fleet can handle and reduce the broadside travel in and around dredge disposal mounds.
Making Way Through the TREACHEROUS

NOTORIOUS

HEART STOPPING

MOODY Waters of the MCR
In the Dark of Night in Mid-winter

There is NO Working Day
That does not Present
Some PERIL from Powerful Ebb Tides
Facing the BRUTAL GAUNTLET of Dredge Spoils Caustic Effect
On the Edge
Network Remains
No 2\textsuperscript{nd} Chance when you are WRONG
When you are WRONG you’re GONE!

![Image of a sunken ship](image-url)
THERE IS NO PLACE ON EARTH LIKE THE MCR
Safety is very personal

- Allen Larson
- Gene Andrews
- Dean Ellsworth
- Steve Gray
- Robert Greenfield
- Dale Beasley

Have all survived to tell our bone chilling stories
Many more have not

One thing I will GUARENTEEE you, we are – forever CHANGED
Primary Job

Reduce the RISK of FATALITY

INCREASE SAFETY

Realize “least cost” Disposal must include

LIFE SAFETY

Emphasis Emphasis Emphasis Emphasis
KEEP IN MIND

The DEEPWATER SITE
For all its faults
Has many many years of
SAFE DISPOSAL
NEEDS TO BE BASED IN THE REALITY OF THE INDIVIDUAL WAVE

AVERAGES ARE MEANINGLESS

It is the IMMEDIATE Incident that counts

The OCEAN is highly ARRYTHMIC
AVERAGE WAVES ARE JUST AVERAGE PEAK WAVES CAUSE FATALITIES
WAVE MODEL ANALYSIS

MUST FOCUS ON THE TOP END OF THE WAVE SPECTRUM IN ANY GIVE WAVE FIELD THAT IS WHERE DISASTER STRIKES
Wave parameters that make a difference to the crab fleet — for a recreational boater

1) 10 feet 10 seconds is generally of NO concern
2) 12 feet 12 seconds with some wind, depends on if increasing or decreasing
3) 15 feet 15 seconds with any amount of wind generally a cancelled fishing day
4) 20 feet 20 seconds only a fishing day on NO wind and prediction of NO wind
5) 25 feet, generally a NO fishing day
In the Ocean the Mariner faces every wave
One at a time
There is NO Average Wave
Every Single WAVE has to be negotiated as encountered
There is NO Exception
Boats don't FLY they CAPSIZE in Excess Events
Prior to dredge disposal at expanded SWS waves were generally 10 – 40% smaller compared to NWS buoy 46029 18 miles offshore
After dredge disposal waves are often larger at the SWS – we have little direct comparison but what we do have is clear and the waves are much larger – In 2002 there was only 1.9 mcy at the site, there is often 3 mcy or more there now in December.
Eliminate Predictability
Rapidly Increase the Wave Climate
&
Can Change Wave Direction
that
Interacts Radically with Ambient Ocean Conditions
Sites A, B, and E provide Classic Examples
Mound Wave Amplifications

Are Cumulative And Interactive
Example is Site B + natural bank swallowing + SWS
Historical Navigation Routes

Provide a Relative Degree of Safety
If a Navigator and his Associates
Travel a Route a 1000 times without incident
For a given Weather Set
It is believed SAFE for the next 1000 transits
Mounds Disrupt

PREDICTABILITY
Mounds Neutralize and Dismantle Years of Navigational Aptitude
NORTH HEAD
40 TO 60 FEET

Is
A Well Used Historical Navigation Route
Our Primary JOB is to GUARENTEE SAFETY
from
Excess Mound Induced Wave Amplification
Disposal Areas need to be
PREDICTABLY SAFE
Often it is Strangers to the Area that suffer

Classic Example
Is
The New Janet Ann
Lost with all hands inside Site B in Large Seas
Our Job is to Guarantee Strangers Safety
Strangers
Come in
All Sizes
ALL OVER THE COAST

- New Janet Ann – 70 foot drag boat
- New Carissa – 700 foot Freighter attempting to anchor too close to a Dredge Disposal Mound at Coos Bay
- 19 foot recreational craft lost in the fog or even heavy seas
- Caroline – 43 crab vessel
- The list is endless of those on the “business end” of their

LAST WAVE
Many Are Not
Strangers
They are my Friends

Allen Larson
Gene Andrews
Dean Ellsworth
Steve Gray
Robert Greenfield
Dale Beasley

All CRCFA survivors of marine casualties — forever CHANGED
Desired Outcome
Of
3rd LCSG Cape D Technical Forum
Do Our Best
STOP THE LIST FROM EXPANDING
Remember this Forum is about
“LIFE” Consequences
To Real People!
Crab Fishery
Functional Operation

Mid Winter
Dark of Night
Gale Warning Flying expecting Strom Warnings
Incoming Storm Front – Hopefully 12 Hours Off
Seas are Building & Currently 10 feet 14 seconds
Two Hours till High Water
200 Pots still to run
Dredge Mound in the Middle of Historical Navigation Route
12 miles to Cape Disappointment – over top of the SWS

15 miles around the SWS to Cape Disappointment if one can sneak inside B

DECISION TIME
No Weather Buoy on the Bar – NO current real-time information other than fellow navigators
Next Opportunity to Safely Cross the Bar will be 10 Hours out
In 10 Hours a good fisherman might run 250 more pots, 20# to the pot, $2.50/#
Do the math – tough choice!
In 10 hours the seas might be 15 feet at 15 seconds or more
AHA – the National Weather Service is **PREDICTABLY late** with their front arrivals

- We may have 24 hours, we can run 500 pots before making Cape Disappointment
- For the crab fleet in early December this is a $1,000,000 DECISION
- Literally a **MILLION DOLLAR DECISION** each day
- Dollars can and do CLOUD this DECISION MAKING PROCESS
- NWS Forecast are often ignored because they are **PREDICTABLY** late in arriving
- This places more **BURDEN** on reducing mound induced wave amplification
WHOOPS
A NEW DREDGE SITE OFF NORTH HEAD

CAN’T CHARGE DOWN HILL IN 55 FEET ANY MORE

OR

CAN WE?
PREDICTABILITY

SAFETY
IT’S ALL ABOUT
PREDICTABILITY
Cape D Technical Forum

Can
And
MUST
Bring

CONSERVATIVE PREDICTABILITY

To
Dredge Disposal Mounds
to
GUARENTEE NAVIGATIONAL SAFETY
PREDICTABILITY

CAN LITERALLY TAKE YEARS TO LEARN

IT CANNOT BE DONE FROM A BOOK OR FROM BEHIND A DESK

DREDGE DISPOSAL MOUNDS ARE NOT PREDICTABLE

Or are they? You can decide!
Remember the Crab Fleet is the Surrogate for all small vessels
The Crab Fleet operates under the most extreme conditions
Crab Fleet REALITY can begin to change today!

This is the REALITY if we do not get it RIGHT –

10% wave increase from mounding is the current standard
It is the top end of the wave spectrum that causes Fatalities