

# Coastal Storms in Alaska

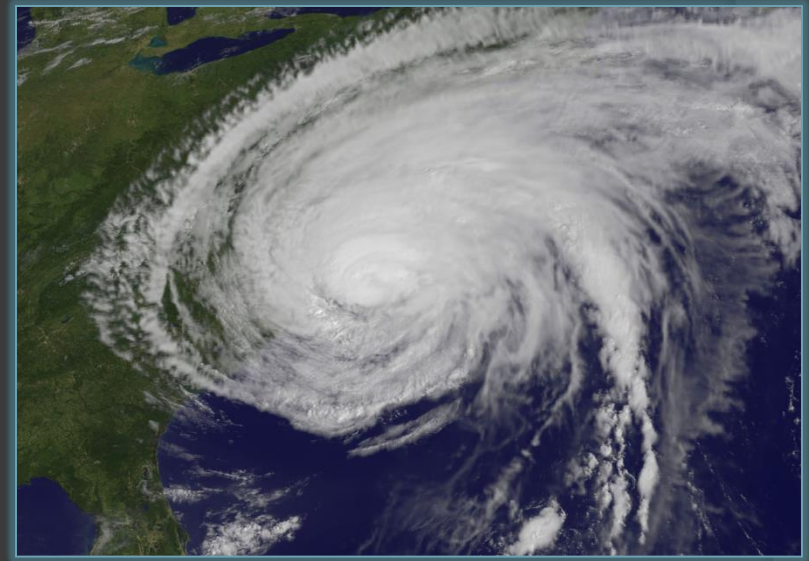
Louise Fode and Aimee Fish, NWS Alaska Region  
LEO Webinar: January 20, 2015

# Overview

- Storm Surge Projects (Nationwide)
- Alaska Projects
- Observation Network and how LEO plays a role

# NWS Storm Surge Project

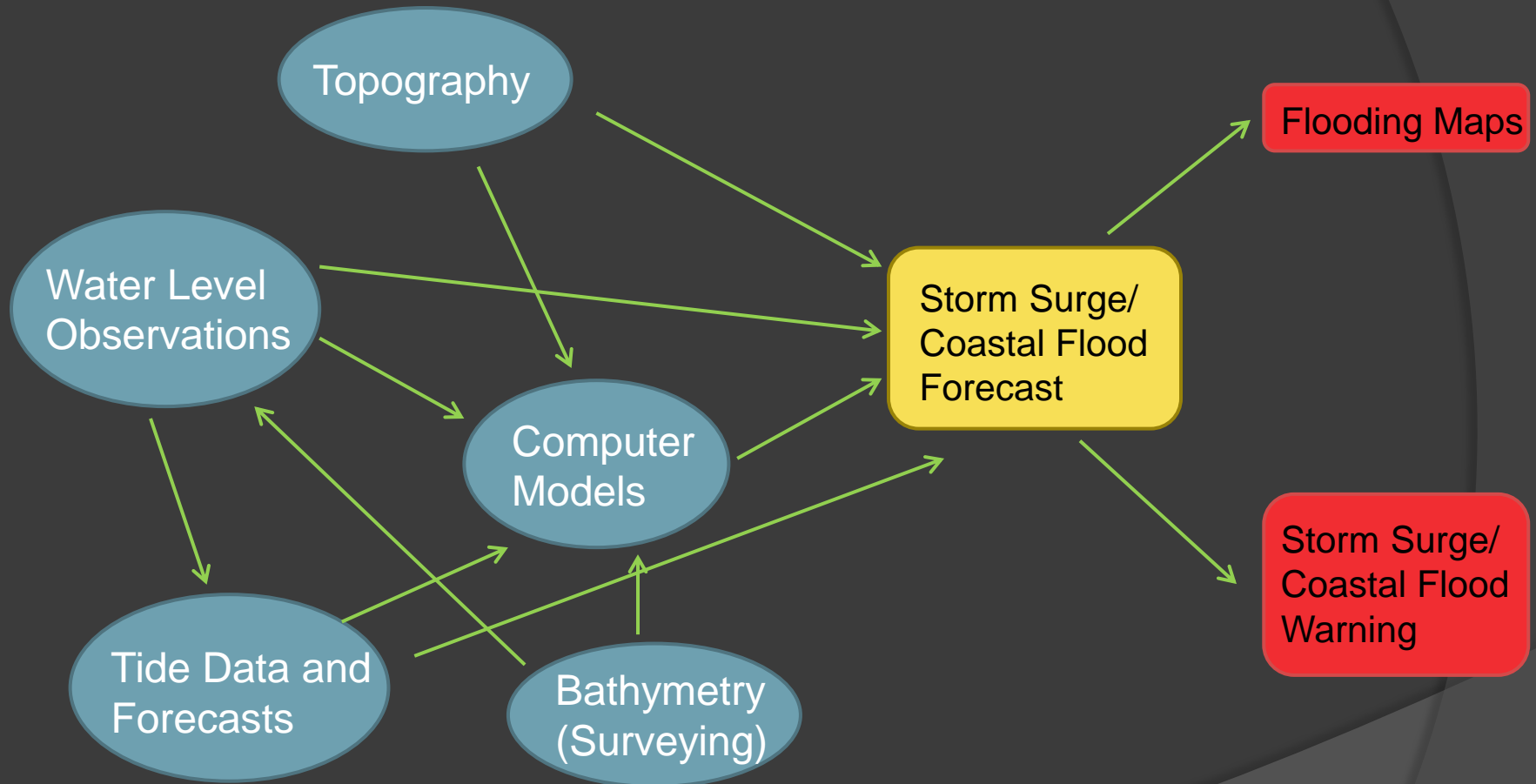
- ◉ Most damage from hurricanes comes from storm surge
  - Gulf Coast emergency managers wanted a separate storm surge warning
- ◉ Hurricane Irene and Hurricane Sandy
  - “coastal flooding” vs. “storm surge”?
  - Hurricanes → Extra-tropical storms??



Hurricane Irene, 2011

## What do Communities Need?

# Storm Surge Forecasting Components

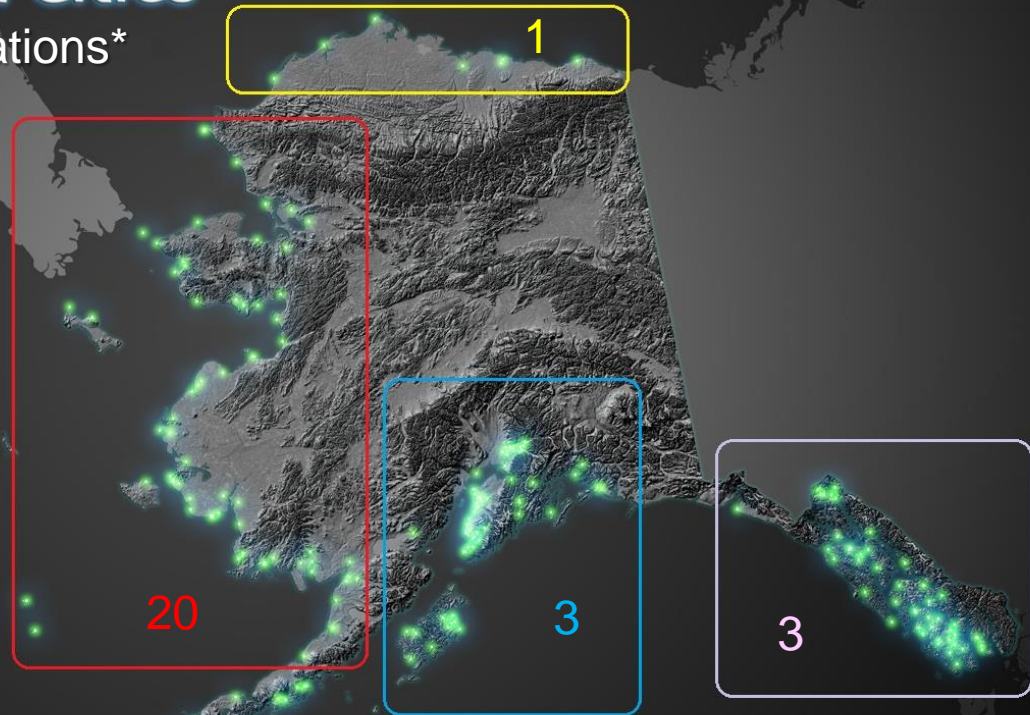


## What can we provide for Alaskans?

# Coastal Storm Disasters

## Alaskan Coastal Cities

State Disaster Declarations\*  
Coastal Storms  
1978-2013

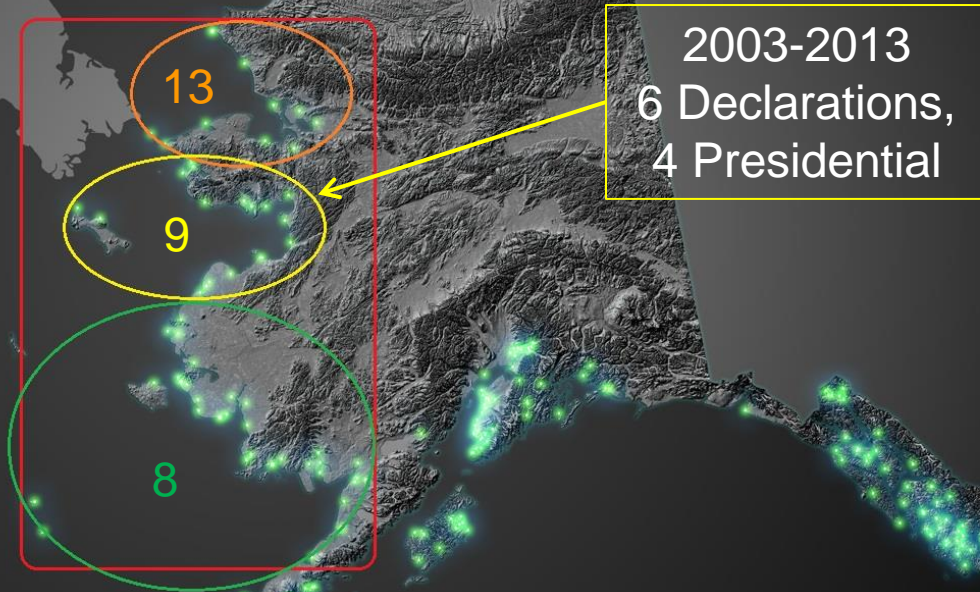


\*Declarations often consist of multiple storms

# Coastal Storm Disasters

## Alaskan Coastal Cities

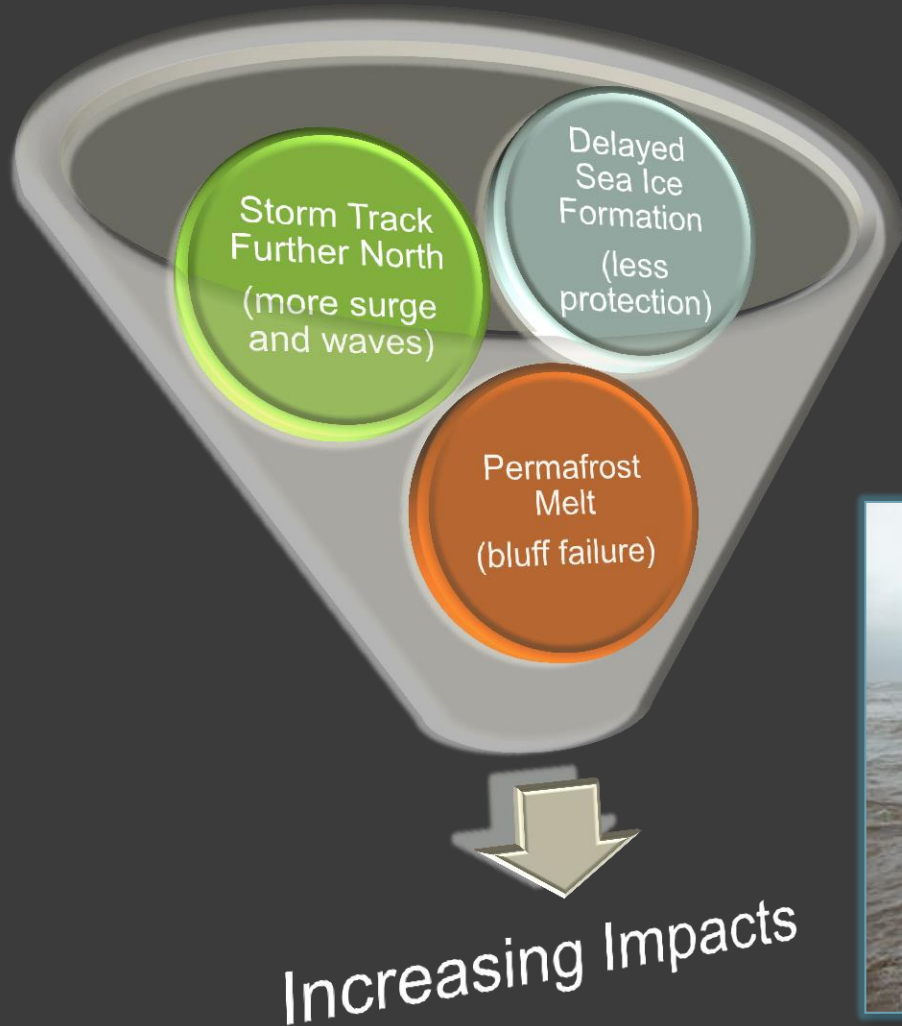
State Disaster Declarations  
Coastal Storms  
1978-2013



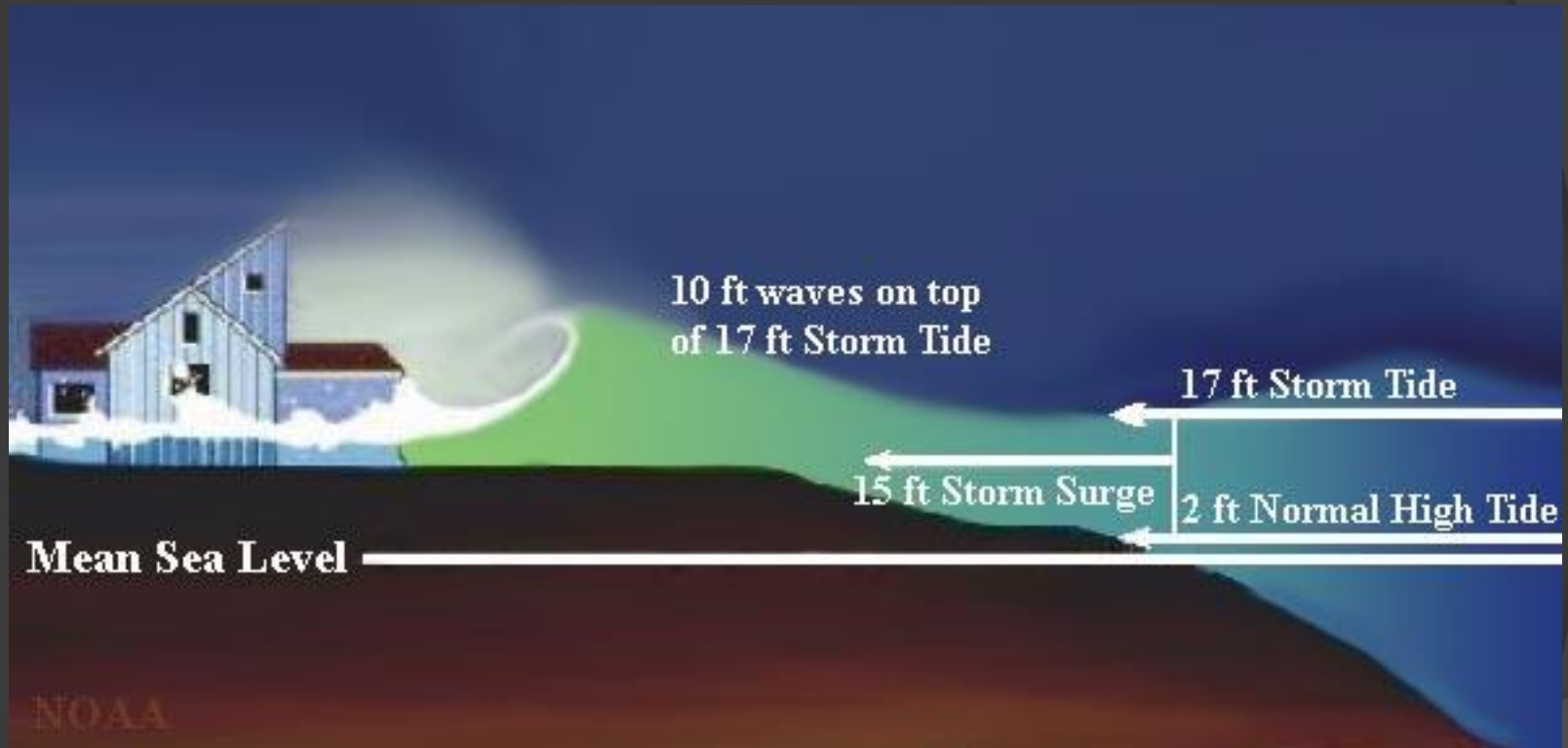
Typical Season: August – November  
with exceptions



# Coastal Storm Vulnerabilities

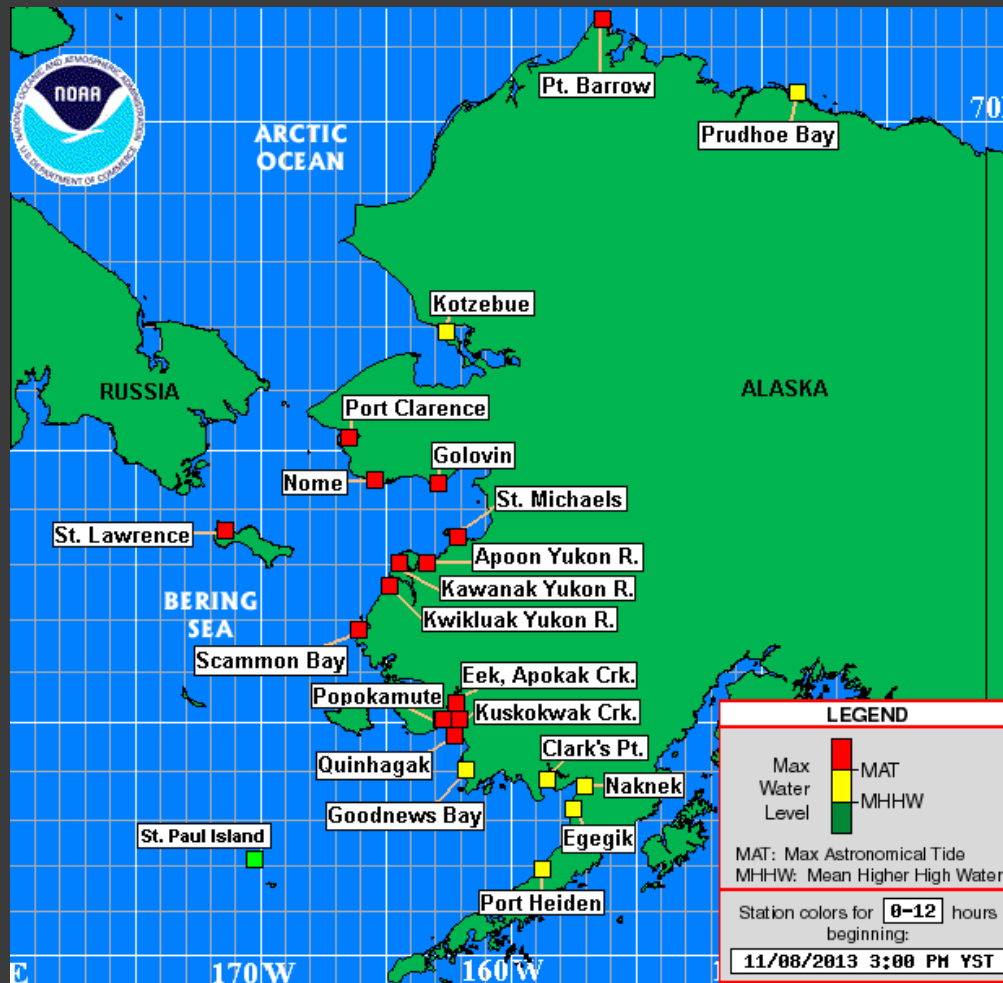


# Components of the Flood

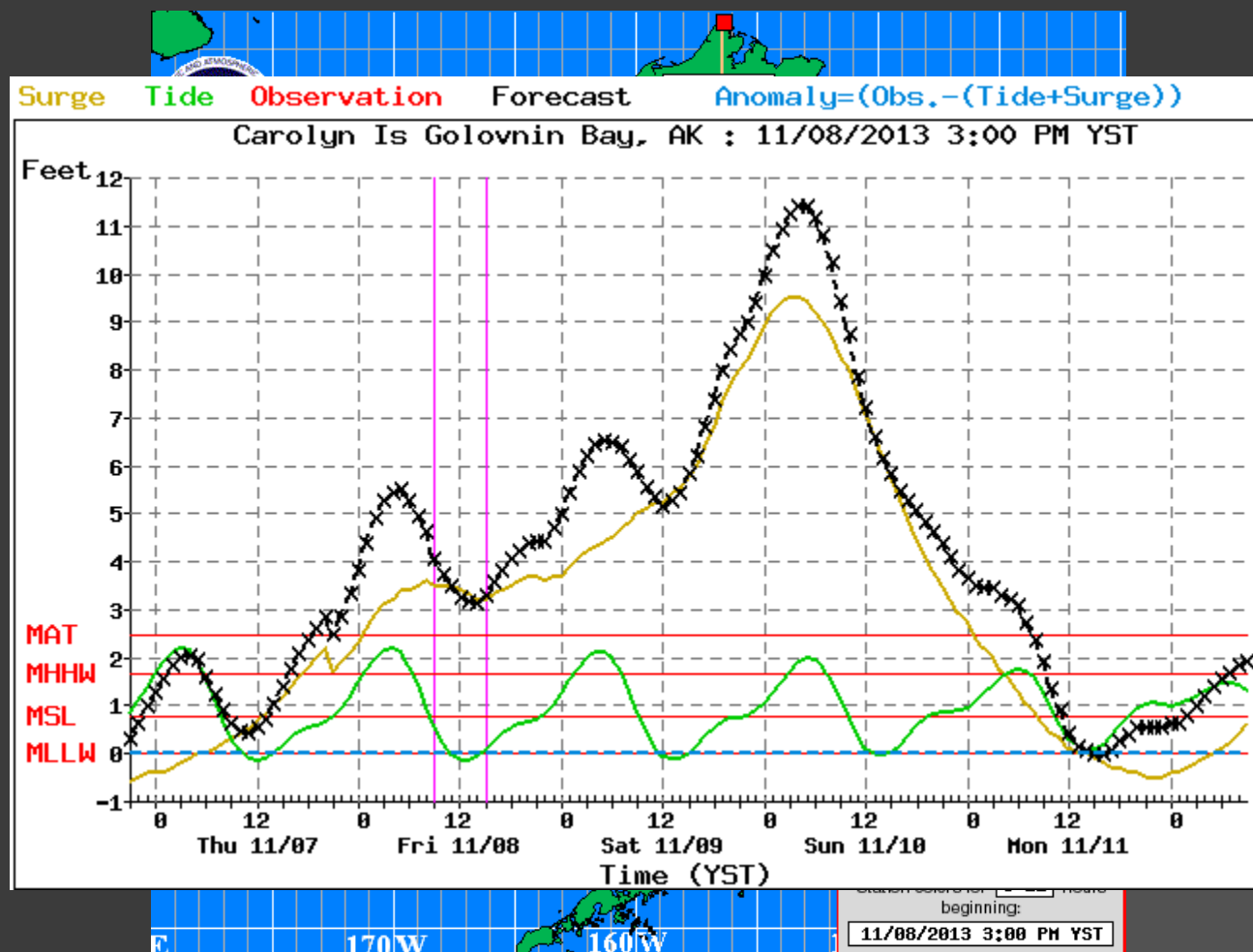




# Forecast Tools



# Forecast Tools



# Communication Challenges

- Timing: Complex coastline, multiple storms
- Water levels: Without tidal information, we can only talk about surge (only part of the impact)
- Need: Will critical infrastructure be impacted?

# Communication Challenges

AKZ207-080030-

/X.EXT.PAFG.CF.W.0004.111109T0600Z-111110T1500Z/

CHUKCHI SEA COAST-

INCLUDING...POINT HOPE...SHISHMAREF...KIVALINA...ESPENBERG

1024 AM AKST MON NOV 7 2011

...COASTAL FLOOD WARNING NOW IN EFFECT FROM 9 PM TUESDAY TO 6 AM AKST THURSDAY...

THE COASTAL FLOOD WARNING IS NOW IN EFFECT FROM 9 PM TUESDAY TO 6 AM AKST THURSDAY.

\* LOCATION...THE CHUKCHI SEA COAST FROM CAPE KRUSENSTERN TO POINT HOPE.

\* IMPACTS...MAJOR COASTAL FLOODING WITH SEVERE BEACH EROSION IS EXPECTED ALONG THE COAST FROM CAPE KRUSENSTERN TO POINT HOPE. THIS STORM WILL HAVE SEVERE IMPACT ON THE VILLAGE OF KIVALINA. MAXIMUM WIND SPEEDS ALONG THE CHUKCHI SEA COAST WILL BE NEAR HURRICANE FORCE...AROUND 75 MPH. STORM SURGE ALONG THIS PART OF THE CHUKCHI COAST MAY BE AS MUCH AS 3 FEET.

\* TIMING...WINDS AND SEAS WILL INCREASE THROUGH THE DAY ON TUESDAY. SEVERE BEACH EROSION AND MAJOR COASTAL FLOODING ARE EXPECTED FROM TUESDAY EVENING THROUGH WEDNESDAY NIGHT.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A COASTAL FLOOD WARNING MEANS THAT RISING SEA WATER THAT CAUSES FLOODING IS EXPECTED. THIS WILL BE ONE OF THE MOST SEVERE STORMS ON RECORD. COASTAL RESIDENTS IN THE WARNED AREA NEED TO BEGIN TO TAKE PRECAUTIONS NOW TO PROTECT LIFE AND PROPERTY...AND BE ON THE ALERT FOR RISING WATER LEVELS. DO NOT DELAY IN TAKING NEEDED PRECAUTIONS FOR THIS UNUSUALLY SEVERE AND POTENTIALLY LIFE THREATENING STORM.



# Communication Challenges

SOUTHERN SEWARD PENINSULA COAST-  
INCLUDING...NOME...WHITE MOUNTAIN...GOLOVIN  
1024 AM AKST MON NOV 7 2011

...COASTAL FLOOD WARNING NOW IN EFFECT FROM 1 AM WEDNESDAY TO  
6 AM AKST THURSDAY...  
ST LAWRENCE ISLAND AND BERING STRAIT COAST-  
INCLUDING...GAMBELL...SAVOONGA...BREVIG MISSION...TELLER...  
WHALES...DIOMEDE  
1024 AM AKST MON NOV 7 2011

THE COASTAL FLOOD WARNING IS NOW IN EFFECT FROM 1 AM WEDNESDAY TO  
6 AM AKST THURSDAY...

\* LOCATION...NORTON SOUND

\* IMPACTS...MAJOR COASTAL FLOODING AND SEVERE BEACH EROSION IS  
EXPECTED ALONG THE SOUTH AND WEST FACING COASTLINE. ALONG THE  
SOUTH SHORE OF NORTON SOUND...HIGH WATER LEVELS WILL CAUSE  
COASTAL FLOODING IN LOW LYING AREAS.

\* TIMING...WINDS AND SEAS WILL INCREASE BEGINNING LATE TUESDAY  
NIGHT AND CONTINUE THROUGH WEDNESDAY NIGHT.

THE COASTAL FLOOD WARNING IS NOW IN EFFECT FROM 1 AM WEDNESDAY TO  
MIDNIGHT AKST WEDNESDAY...

\* LOCATION...ON THE WEST COASTS OF  
LITTLE DIOMEDE

\* IMPACTS...MAJOR COASTAL FLOODING AND SEVERE BEACH EROSION IS  
EXPECTED ON THE SOUTH AND ALONG THE BERING STRAIT COAST...TIDES ARE  
ABOVE NORMAL. MAXIMUM WINDS OF 75 MPH OR HIGHER ARE EXPECTED.

\* TIMING...WINDS AND SEAS WILL INCREASE BEGINNING LATE TUESDAY  
AFTERNOON. MAJOR COASTAL FLOODING AND EXPECTED T

YUKON DELTA-  
INCLUDING...MOUNTAIN VILLAGE...EMMONAK...ALAKANUK...KOTLIK...  
PILOT STATION...ST MARYS...SCAMMON BAY...MARSHALL...NUNAM IQUA...  
PITKAS POINT  
1024 AM AKST MON NOV 7 2011

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\* LOCATION...WEST COAST OF  
CAPE ROMANZOF

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TUESDAY. SEVERE COASTAL FLOODING AND EXPECTED T

EASTERN NORTON SOUND AND NULATO HILLS-  
INCLUDING...UNALAKLEET...STEBBINS...ST MICHAEL...ELIM...KOYUK...  
SHAKTOOLIK  
1024 AM AKST MON NOV 7 2011

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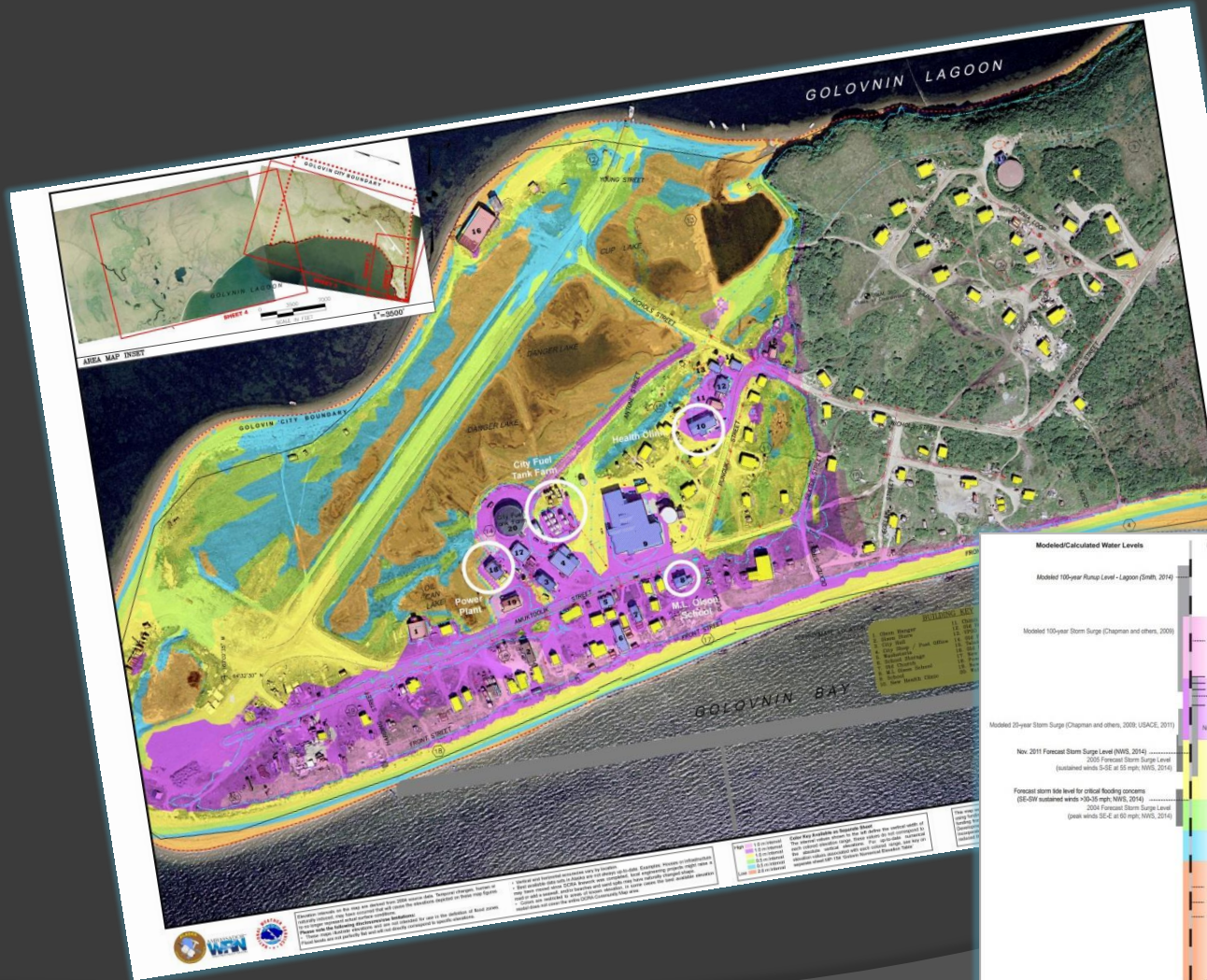
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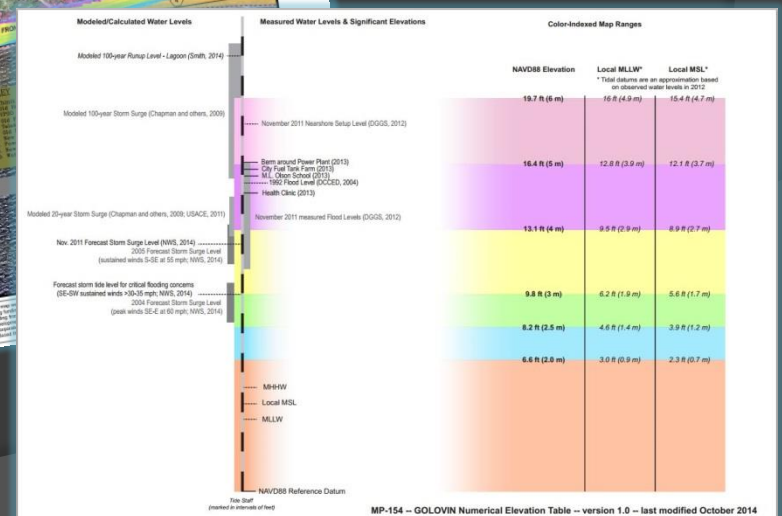
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# Communication Tool Pilot



Color coding  
elevation above  
MLLW or MSL

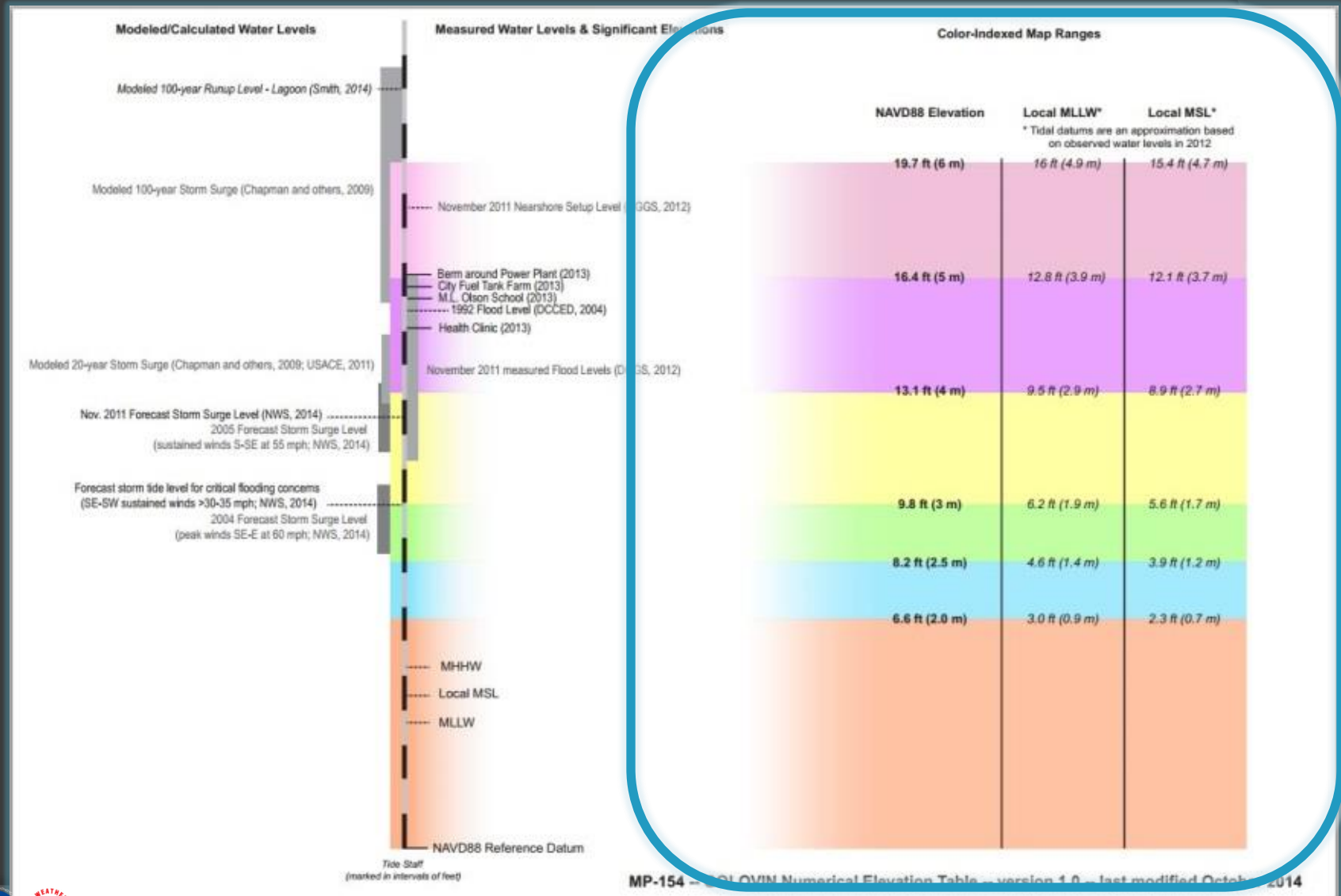




# Communication Tool Pilot

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# Communication Tool Pilot

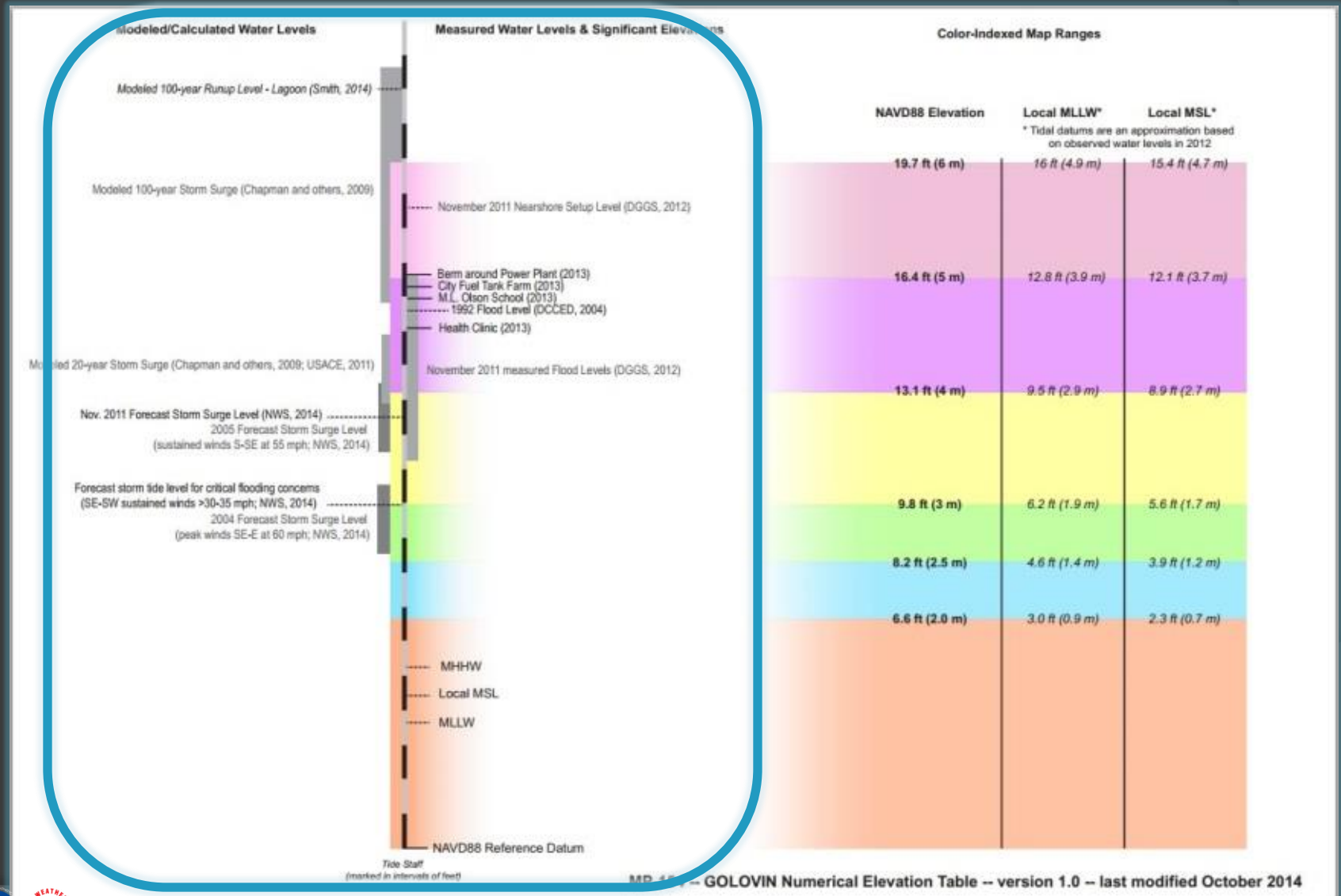




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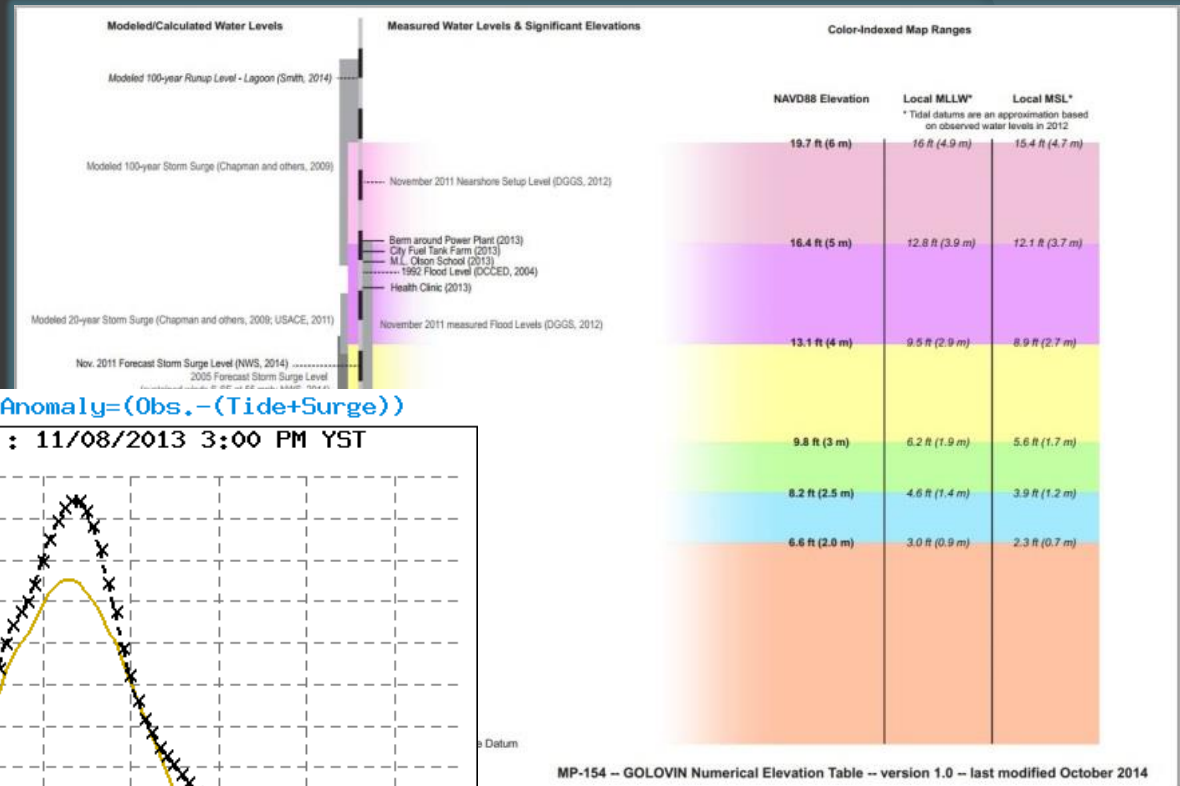
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# Communication Tool Pilot





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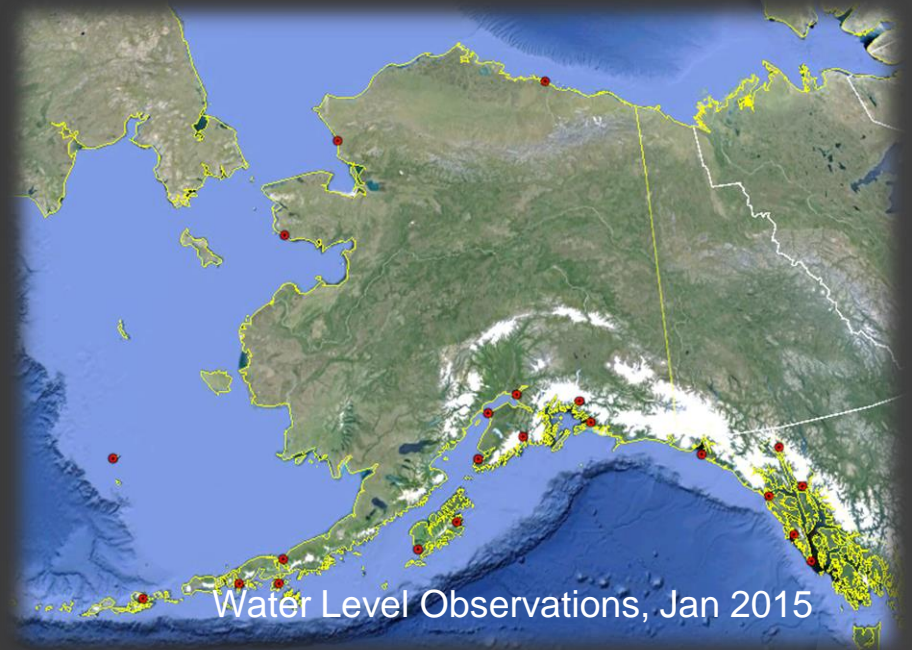


# Communication Tool Pilot

- ⦿ Also allow for feedback
- ⦿ A way to explain to forecasters where, and how high, the water went
- ⦿ Forecasters can improve forecasts and warnings for the next storm

# Alaska Observation Network

- ◉ Water level observations
  - Current water levels
  - Tide predictions
- ◉ Wave buoys
- ◉ Expanding observation network
  - National Oceanographic Service (NOS)
  - Alaska State Division of Geological Geophysical Surveys (DGGS)



# What do we need to know?

- How high did the water get during the storm?
- What was affected?
  - Homes?
  - Infrastructure (i.e. power plant, sewage lagoons)?
- Did the forecast match what happened?
  - If not – how was it different?
- Any unusual events (i.e. changes in tides)



A picture is worth  
1,000 words!

# In Conclusion

- ⦿ National Storm Surge project is looking at community needs
- ⦿ Alaska NWS and DGGs are developing communication tools
- ⦿ NWS is expanding the observation network
- ⦿ LEO can help provide valuable data

# THANK YOU!

Questions?