OCEAN CONDITIONS AND WATER MONITORING

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Alaska Sea Grant Marine Advisory Program
to
Financial Management Workshop
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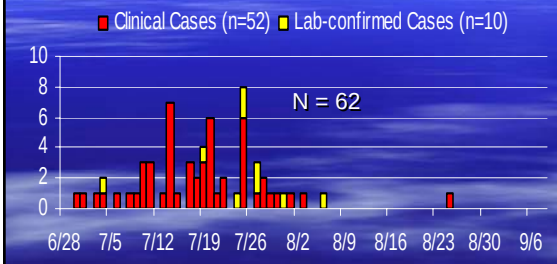
CASES OF *Vibrio parahaemolyticus* GASTROENTERITIS BY DATE OF ONSET



Alaska Heath and Human Services: Epidemiology section

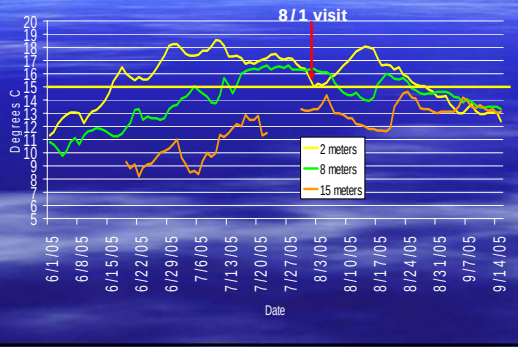
Vibrio parahaemolyticus (Vp)

- Gram-negative bacterium
- Naturally inhabits marine coastal waters
  - Over 1,500 strains
  - Less than 3% are pathogenic
- Most common cause of seafood-associated bacterial gastroenteritis in US
  - FDA risk assessment model predicts 4,500 cases annually
- Most commonly associated with consumption of raw oysters

Vp ANALYSIS

- Farm samples – Real time polymerase chain reaction (PCR), Gene probe, Bams procedure
  - Thermostable direct hemolysis (TDH+) for PCR
    - Regular screening of harvested oysters
    - Selected experiments
- Higher trophic level samples (+/-)
  - Presents absents for birds and mammals
  - Sick mammals later in the program
- Bivalves (PCR TDH+)
  - Mussels, Clams (razor, butter, littleneck)
- Others – Environmental samples (+/-, PCR)
  - Sediment, fouling, nursery sediment, water, etc

FARM A WATER TEMPERATURES 2005



FARM TESTING RESULTS

	Farm A		Farm B	
Date	2 meters	18 meters	2 meters	30 meters
	<0.03	<0.03		
28-Jun	0.36	<0.03		
7-Jul	0.03	<0.03	0.36	<0.03
12-Jul	4.3	<0.03	0.72	<0.03
19-Jul	93	<0.03	0.03	<0.03
26-Jul			0.92	<0.03
27-Jul	3.0	<0.03		
2-Aug	0.36	<0.03	<30	<0.03
9-Aug	<0.03	<0.03	0.74	<0.03
16-Aug	4.3	<0.03	2.1	<0.03
23-Aug			0.03	<0.03
25-Aug *	2.0	0.92	* Gene probe > 50 in one replicate	
30-Aug			<0.03	<0.03
1-Sep *	1.5	0.36	* Gene probe > 50 in one replicate	
7-Sep			<0.03	<0.03
Sep-05	<0.03	<0.03	<0.03	<0.03

ADDITIONAL OYSTER TESTING PWS tdh+ MPN

Temperature abused 5 days	46,000	Transit test 0 hrs	0.43
Beach hardened	9.3	Transit test 48 hrs	0.93
Shallow water 0 hrs then dropped deep	0.43	Transit test 72 hrs	430
Deep water 24 hrs	0.09	Tatitlek	1.5
Deep water 48 hrs	<0.03	Perry Island	0.04

ADDITIONAL OYSTER TESTING OUTSIDE PWS

PCR tdh+ MPN (s-shallow, D- deep)

1. Kachemak Bay - <0.03 (D,S)
2. Cook Inlet - <0.03 (Beach)
3. Stedman Cove - <0.03 (D,S)
4. Emily Island - <0.03 (S)
5. Koskiusko Bay - 0.38 (S)
6. Annette Island - <.03. 0.3 (D,S)

WHAT WE LEARNED

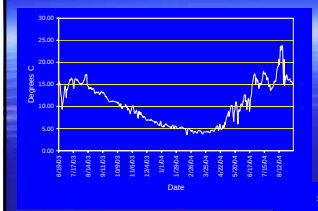
- Deep water deployment is promising to prevent Vp in oysters.
- Need to fine tune research to modify monitoring that reduces the burden to the farmer.
- Best management practices need to be developed to prevent *Vp* in Alaskan oysters
  - Farm practices, harvest management, cooling
- Environmental samples appears to indicate that Vp is widespread in PWS but not statewide yet
- We are learning how to deal with Vp.

CONTINUING

- Continue state-wide surveillance
  - Farmed product, other shellfish species, and environmental samples
- Conduct farm-specific research (CSREES)
  - Depuration time
  - Transport (Packaging, time/temperature)
  - Shellfish condition
  - Temperature abuse
  - Etc.

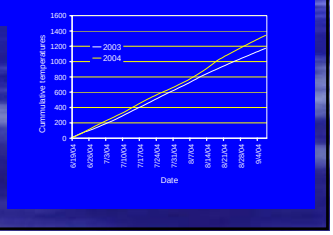
WATER TEMPERATURE

Prince William Sound

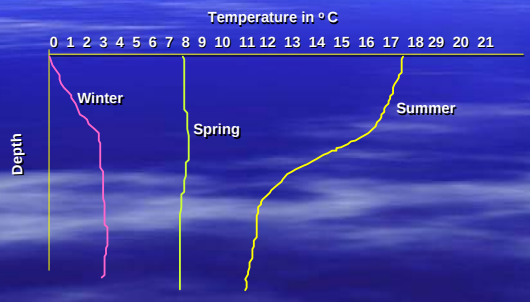


Average Daily Temperature

Cumulative Temperatures



SEASONAL CHANGES IN TEMPERATURE PROFILE



TEMPERATURE RECORDERS

Thermometers

- Nothing replaces a good thermometer
  - Accuracy ± 0.1º
- Max/Min – Always handy
- Electronic recording
  - Calibrate

TEMPERATURE RECORDERS

Electronic thermometers

Suppliers

Radio shack, Hannah, Aquatic Ecosystems

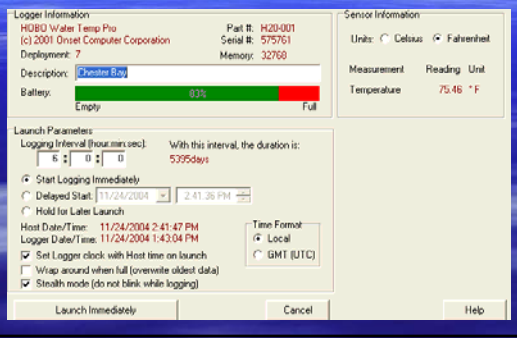
- Waterproof
- Record Max/Min
- Extension cords for outside
- Cost $15.00-60.00
- Accuracy 1ºC
- Calibrate with thermometer

TEMPERATURE RECORDERS

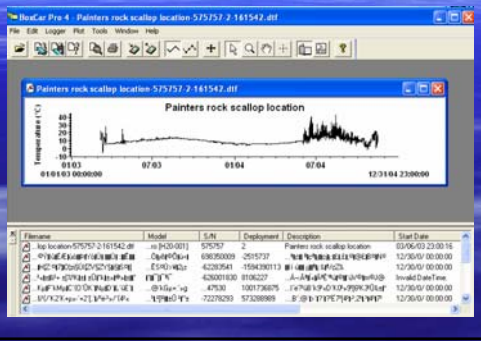
Temperature data loggers

- Hanna
- Hobo logger
  - Set timing period (sec-days)
    - **Set for every 6 hours**
    - **Deploy at top of lantern net to account for tide and solar influences**
  - 21,580 measurements
  - Accuracy 0.02º
  - Logger cost $110.00 each
  - Infrared base station $60.00
- Boxcar Pro for Readout
  - One-timer purchase $95.00
  - Export data to Excel

HOBO DATA LOGGER DEPLOYMENT



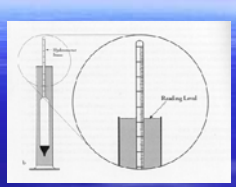
HOBO DATA LOGGER Readout



SALINITY RECORDERS

Hydrometers

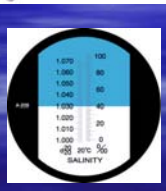
- Least expensive
  - $30.00 to 100.00
  - Compensate for temperature
- Accuracy ± 1.5 ppt



SALINITY RECORDERS

Refractometers

- Very simple to use
- Portable
- Ask for temperature compensation model
- $45.00-$205.00



WATER COLLECTION

Collection Bottles

- Van Dorn Bottle
- Walden Bottle

SUPPLIERS

- Radio Shack
  - www.radioshack.com (1-800-THE-SHACK)
- Aquatic Ecosystems
  - www.aquaticeco.com (1-877-347-4788)
- Hanna
  - www.hannainst.com/usa (800-426-6287)
- Wildco
  - www.wildco.com/ (800-799-8301)

SAMPLING DESIGN
Temperature

- Tides can range temperature nearly 0.5^{0}C during a single day
  - Maximum temperature usually in evening
  - Sample multiple times/day or recording thermometer
- Take surface temperature below the surface
  - ~ 3-6 feet if possible
- Check for thermocline development and stability
  - Regular temperature at each meter depth
  - Deploy a recording thermometer below 30-50 feet

DATA HANDLING
Recording and Storage

- If you want a HOBO recorder on your site, please contact me.
- Data sheets
- Store in dry protected area


Oceanography Study
Water Sampling Data Sheet

Water body		Date	
Location		GPS	
Weather Conditions		Tide	
Percent Cloud Cover		Time of Day	
Investigator Name			

Depth	Temperature	Salinity
Surface		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
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