# QUALITY OF ALASKAN MARICULTURED OYSTERS (*Crassostrea gigas*)

## A ONE-YEAR SUMMARY

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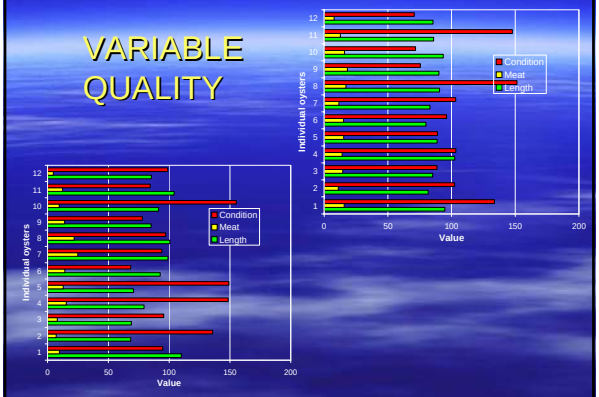
# WHY STUDY QUALITY?

- There is inconsistent quality in Alaska Grown oysters
- Shellfish farming is a growing rural based enterprise
- The market requires quality for a premium price
- Cooperative marketing requires
  - Product definition
  - Standards
  - Best management practices

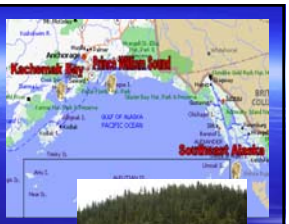
*FITC photos*

# VARIABLE QUALITY




# THE PROJECT

- Project objectives
  - Intrinsic quality
  - Regional sampling
  - Monthly basis
- Sampled from the best farmers at the wholesale level




Prince William Sound

Kachemak Bay

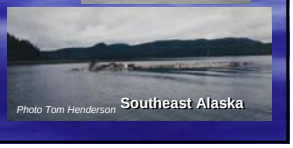


*Photo Tom Henderson* Southeast Alaska

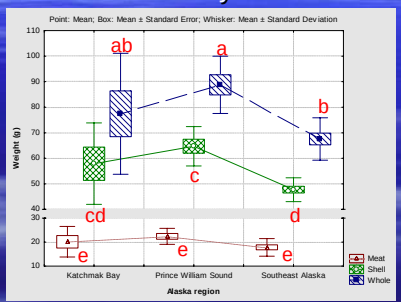
# INTRINSIC QUALITY

- Physical measurements
  - Shell dimensions (length x width x thickness)
  - Whole, shell and meat weights
- Condition index
  - Designate quality through economical and ecophysiological point of view
- Proximate Composition
  - Moisture, ash, protein, lipid, glycogen and total solids
- Microbial content and identification

*FITC photos*

# REGIONAL VARIABILITY

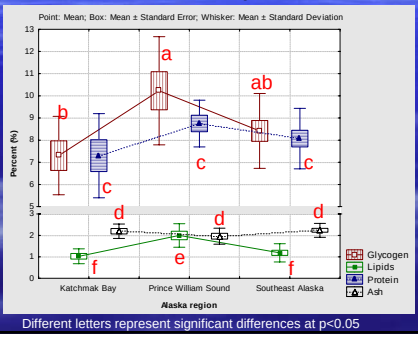
## Meat, shell and whole weights of Alaska oysters




Different letters represent significant differences at p<0.05

# REGIONAL VARIABILITY

Glycogen, lipids, protein and ash content of Alaskan oysters




Different letters represent significant differences at p<0.05

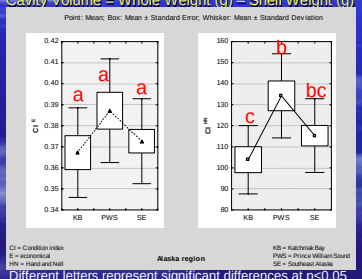
# REGIONAL VARIABILITY

Shell fullness (Cavity volume)

| Size class | Location: Southeast Alaska | Location: Prince William Sound | Location: Kachemak Bay |
|---|---|---|---|
| 75-80 | 23.80 (3.89) | | 20.70 (0.01) |
| 80-85 | 23.13 (4.44) | - | 21.09 (5.65) |
| 85-90 | 19.11 (4.41) | 32.41 (2.94) | 23.32 (6.69) |
| 90-95 | 24.99 (5.08) | 31.54 (5.12) | 29.32 (7.21) |
| 95-100 | 24.47 (8.46) | 38.28 (10.82) | 32.46 (10.89) |
| 100-105 | 28.66 (5.26) | 35.85 (4.26) | 30.69 (6.97) |

# CONDITION INDICES

- Imai and Sakai (1961)
  - $CI^{E}$ = Shell Thickness x [0.5 (Shell Length + Shell Width)] $^{-1}$
- Hand and Nell (1999)
  - $CI^{HN}$ = Dry Meat Weight (g) x 1000 / Cavity Volume
  - Cavity Volume = Whole Weight (g) – Shell Weight (g)

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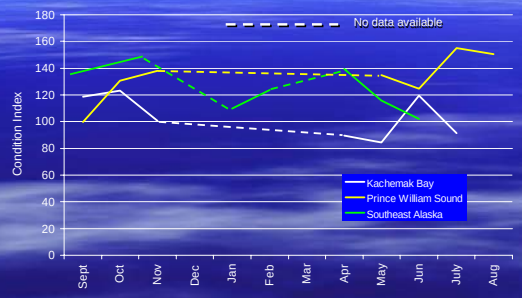
# SEASONAL RELATIONSHIPS




# CONDITION INDEXES

| Region | Sept | Oct | Nov | Jan | Feb | Mar | Apr | May | June | July | August |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Average** | | | | | | | | | | | |
| Katchemak Bay | 118.56 | 123.07 | 100.48 | | | | 89.73 | 84.38 | 119.7 | 91.38 | |
| Prince William Sound | 99.96 | 134.26 | 148.1 | | | | | 134.91 | 124.72 | 155.28 | 159.51 |
| Southeast Alaska | 128.39 | | 140.14 | 109.78 | 110.39 | 125.68 | 115.78 | | 102.59 | | 118.89 |
| **Min Max** | | | | | | | | | | | |
| Katchemak Bay | | | | | | | | | | | |
| Max | 152.72 | 154.82 | 152.72 | | | | 127.1 | 132.11 | 155.3 | 133.63 | |
| Min | 73.69 | 44.7^ | 65.46 | | | | 66.57 | 69.96 | 70.64 | 68.63 | |
| Prince William Sound | | | | | | | | | | | |
| Max | 124.53 | 177.66 | 196.75* | | | | | 178.53 | 227.32^ | 200.19# | |
| Min | 57.53 | 70.35 | 112.86 | | | | | 78.6 | 84.32 | 129.87 | |
| Southest Alaska | | | | | | | | | | | |
| Max | 186.69* | | 182.35 | 151.77# | 146.65# | 174.17* | 154.76 | | 146.74 | | 154.29 |
| Min | 99.49# | | 107.23 | 82.71 | 76.17 | 90.78 | 58.76 | | 78.46 | | 58.76 |

* 3" oyster # 4" oyster ^ 5" oyster

# MEASURING CONDITION INDEX

- Clean shell, blot dry and weigh (grams)
- Open shell (leave shell on), drain fluid
- Place in oven at 175º for 12 hrs
- Cool, remove meat and weigh (grams)
- Weight the shells
- Compute index
  - CI = dry meat wt x 1,000/ (whole weight – dry shell weight)

## MEASURING CONDITION INDEX EXAMPLE

### DATA

| Whole Weight | Dry Shell Weight | Dry meat Weight |
|---|---|---|
| 94.29 | 45.32 | 4.53 |

### CALCULATIONS

CI = (4.53 X 1,000) / (94.29 – 45.32)

CI = 4,530 / 48.96 = 92.53

## CONCLUSIONS

- High quality compared to international standards
- Regional quality differences
- Seasonal quality differences
- Regional oceanographic influences on quality
- Regional and interregional variability in quality
  - High variability even within a single farm and oyster size classes
    - Handling practices
- Beginning of BMP program

*AK Shellfish Growers Assoc. photo*

## FUTURE RESEARCH

- Controlled spoilage studies to investigate variables such as packaging conditions and shipping temperatures for extending shelf life
- Sensory especially organoleptic taste comparisons between AK oysters and those from other states
- Link actual farm practices and site characteristic with quality
- Value added process and quality changes
- Look for broodstock differences in quality

## ACKNOWLEDGEMENTS

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