

# Iniskin – Iliamna Estuary Nearshore Fish and Invertebrates

## Investigators:

Jon Houghton, J. Starkes, D. Ormerod, J. Stutes

(Pentec Environmental)

November 29, 2007



# Study Goals

- Gain understanding of fish assemblages in areas that may be affected by port development
- Existing conditions for project design and permitting
- Baseline for long-term monitoring



# Previous Work

- Blackburn et al. (1980) 1978 OCSEAP work in IIE

- Beach seine (9 sta; Apr – Oct)
- Tow net (surface) (9 sta; May – Oct)
- Gill net (1" – 2.5") (9 sta; May – Sept)
- Trammel net (bottom) (9 sta; May – Sept)
- Try net trawl (only fished outside IIE)
- Stomach analyses (22 species)

- ADF&G herring surveys 1978 – Present (T. Otis)

- April – June
- Aerial surveys
- Ship surveys

## Previous Work (Blackburn et al. (1980))

Species	Gill Net		Trammel Net		Tow Net	
	Rank	% of Total	Rank	% of Total	Rank	% of Total
Pacific Sand Lance					1	41.3
Pacific Herring	1	43.5	1	25.3	2	28.6
Capelin					4	5.2
Pink Salmon					5	4.7
Chum Salmon	2	17.4			7	3.5
Chinook Salmon	6	2.9			8	3.3
Sockeye Salmon	7	2.9			6	4.5
Dolly Varden Char	3	15.9				
Bering Cisco	4	5.8				
Whitespotted Greenling	10	1.5	2	25.3	3	6.3
Masked Greenling			5	5.4		
Starry Flounder	9	2.9				
Rock Sole			8	3.4		
Yellowfin Sole			4	9.6		
Pacific Staghorn Sculpin	8	2.9	6	5.4		
Sturgeon Poacher			3	11.3		
Spiny Dogfish	5	2.9				
Saffron Cod			7	3.7		

Note: 1978 data include Kachemak and Kamishak bays

## 2005 – 1978 Beach Seine Comparison

Species	EBD Sampling*		Blackburn et al.	
	Rank	% of Total	Rank	% of Total
Pacific Herring	1	51.9	5	7.2
Pink Salmon	2	22.1	4	8.3
Chum Salmon	3	11.5	2	13.6
Dolly Varden	4	3.5	3	11.8
Pac. Staghorn Sculpin	5	2.1	8	2.0
Sockeye Salm.	6	2.1	--	0
Starry Flounder	7	1.7	10	1.3
Pac. Sand Lance	8	1.6	1	38.5
Variegated Snailfish	9	1.1	--	0
Longfin Smelt	10	1.0	6	4.7
Whitespotted Greenling	14	0.12	7	4.2
Great Sculpin	23	0.03	9	1.7

\* based on 2005 sampling, May – August



**PENTEC**  
**ENVIRONMENTAL**

Note: 1978 data include Kachemak and Kamishak bays

# ADF&G herring spawn distribution 1978 – 1989



# Study Objectives

- Describe NS pelagic fish assemblages
- Describe demersal fish and invertebrate assemblages
- Clarify seasonal patterns
- Examine feeding relationships
- Sample for BG chemistry



# 2004-2007 Field Work



- Fish/Invert use of nearshore waters
  - Beach seining
  - Otter trawl
- Sampled:
  - (Aug 04; May-Aug 05; Apr, May, Sept 06; Sept-Oct 07)
- Tissue samples





# Beach Seine and Otter Trawl Sites

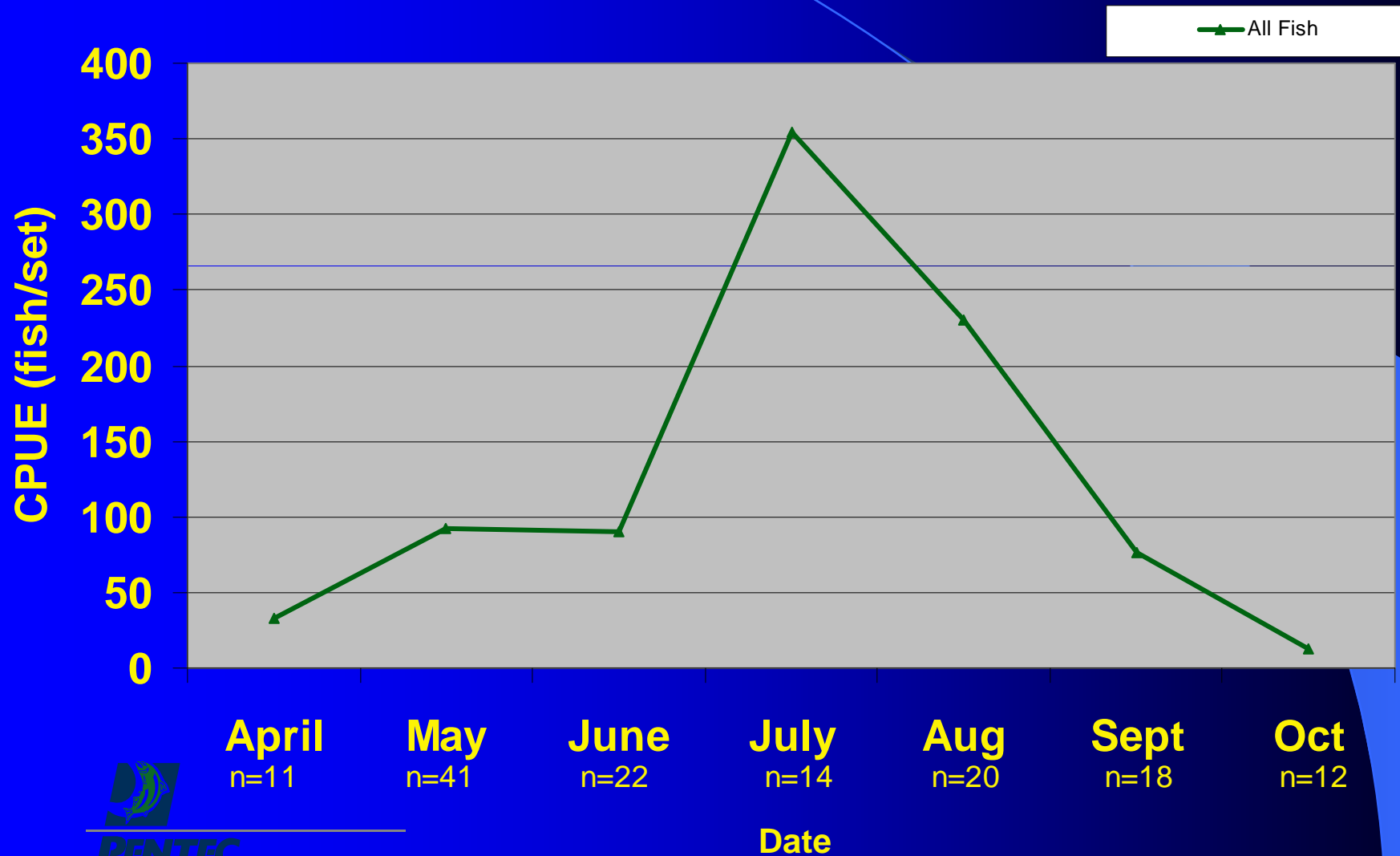
Cook Inlet

# Littoral Use by Fish (Beach Seine)

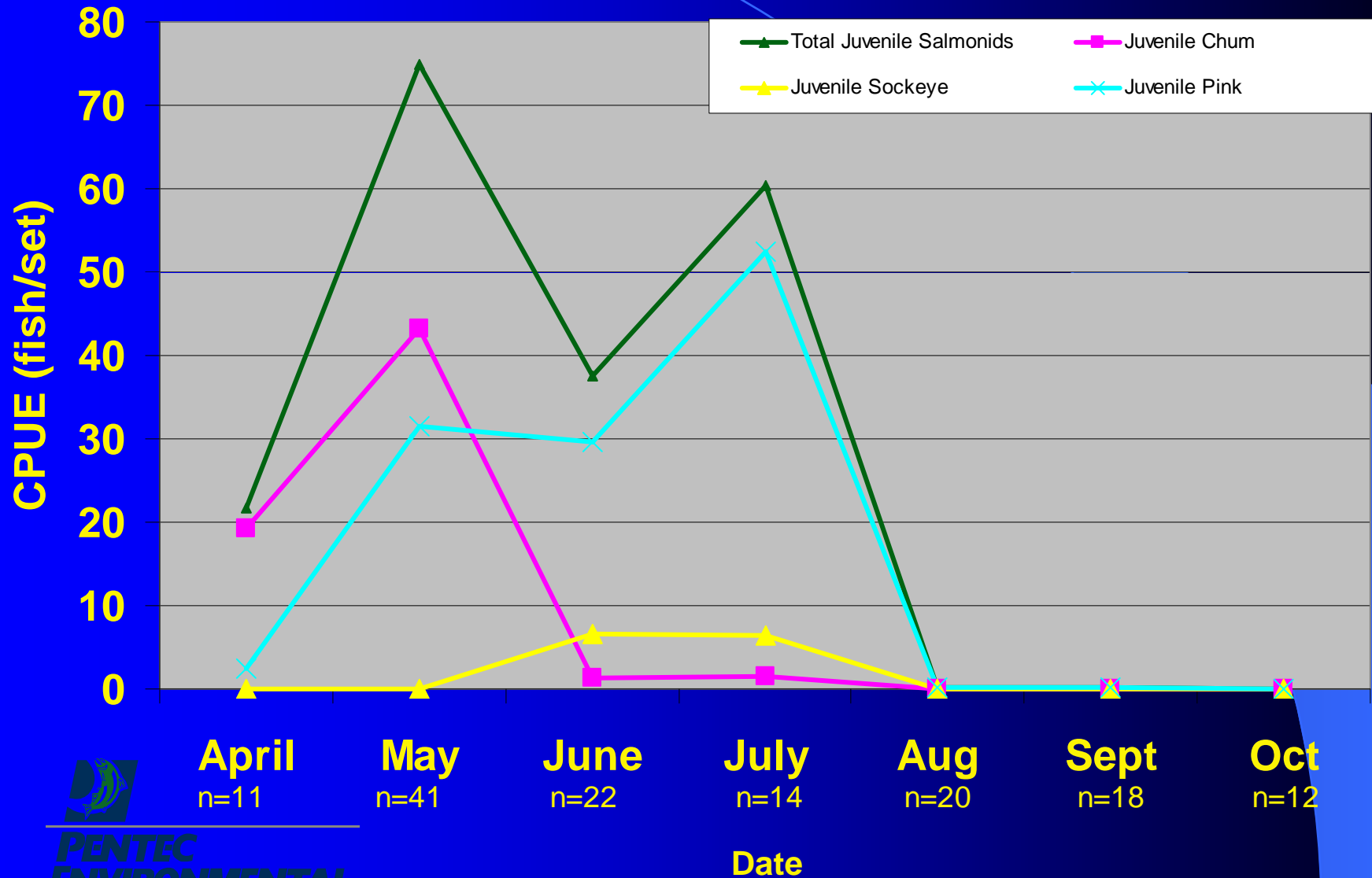
- Salmonids
  - Migration
  - Feeding
  - Osmoregulation
  - Refuge
- Forage fish
  - Herring
  - LF smelt
  - Sand lance
- Flat fish (sf)
- Cottids (Pss)



# Total Fish Catch per BS Set (2004 to 2007 all sampling)

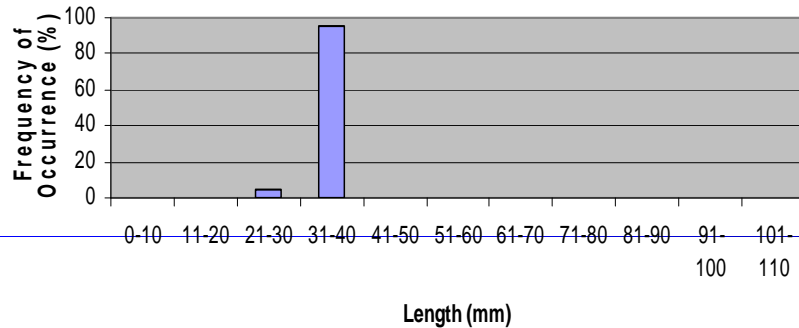


# Juvenile Salmon CPUE (2004-2007 all sampling)

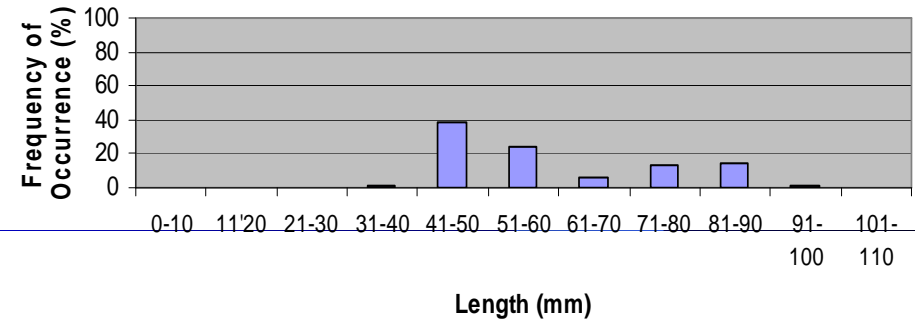


# Juvenile Pink Salmon L/F

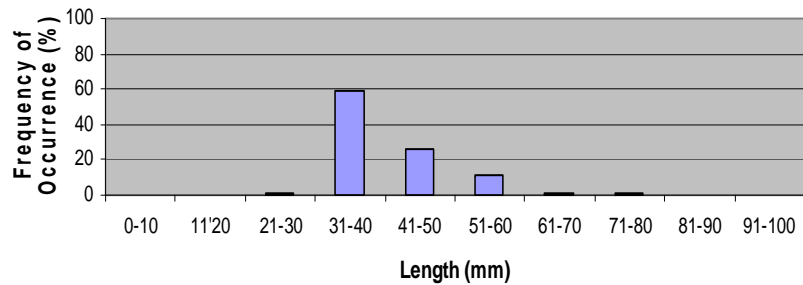
April 2006  
n=22



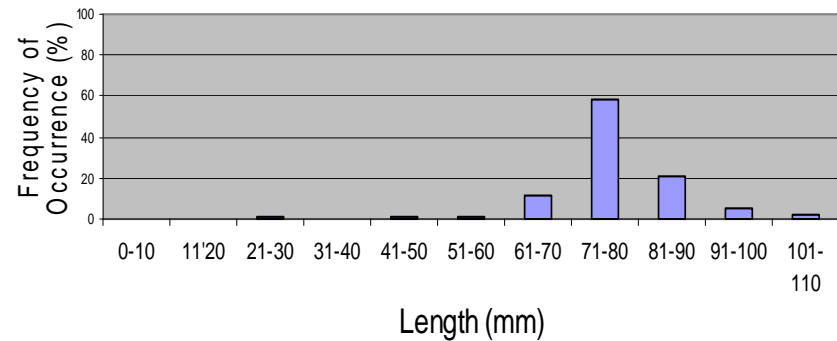
June 2005  
n=140



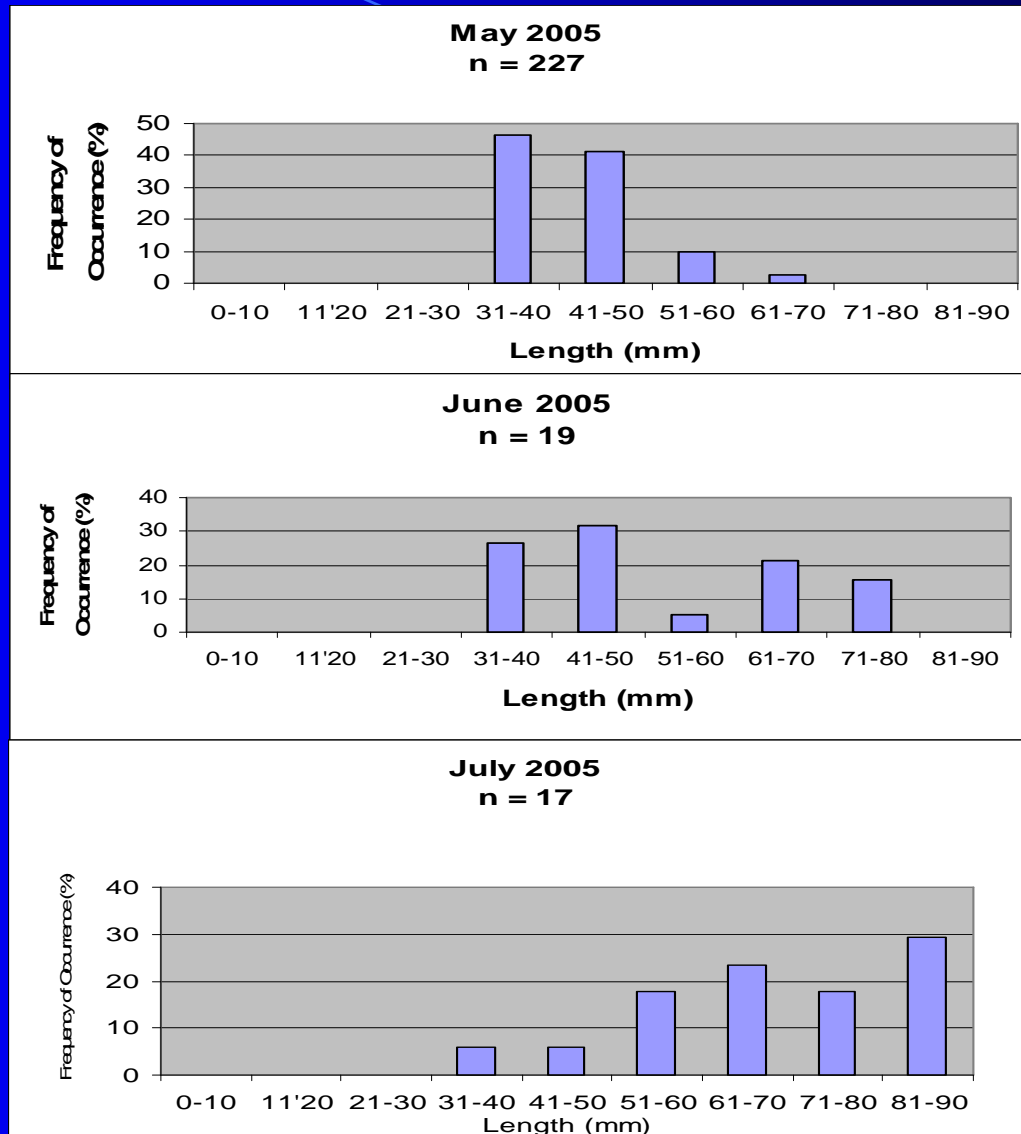
May 2005  
n=113



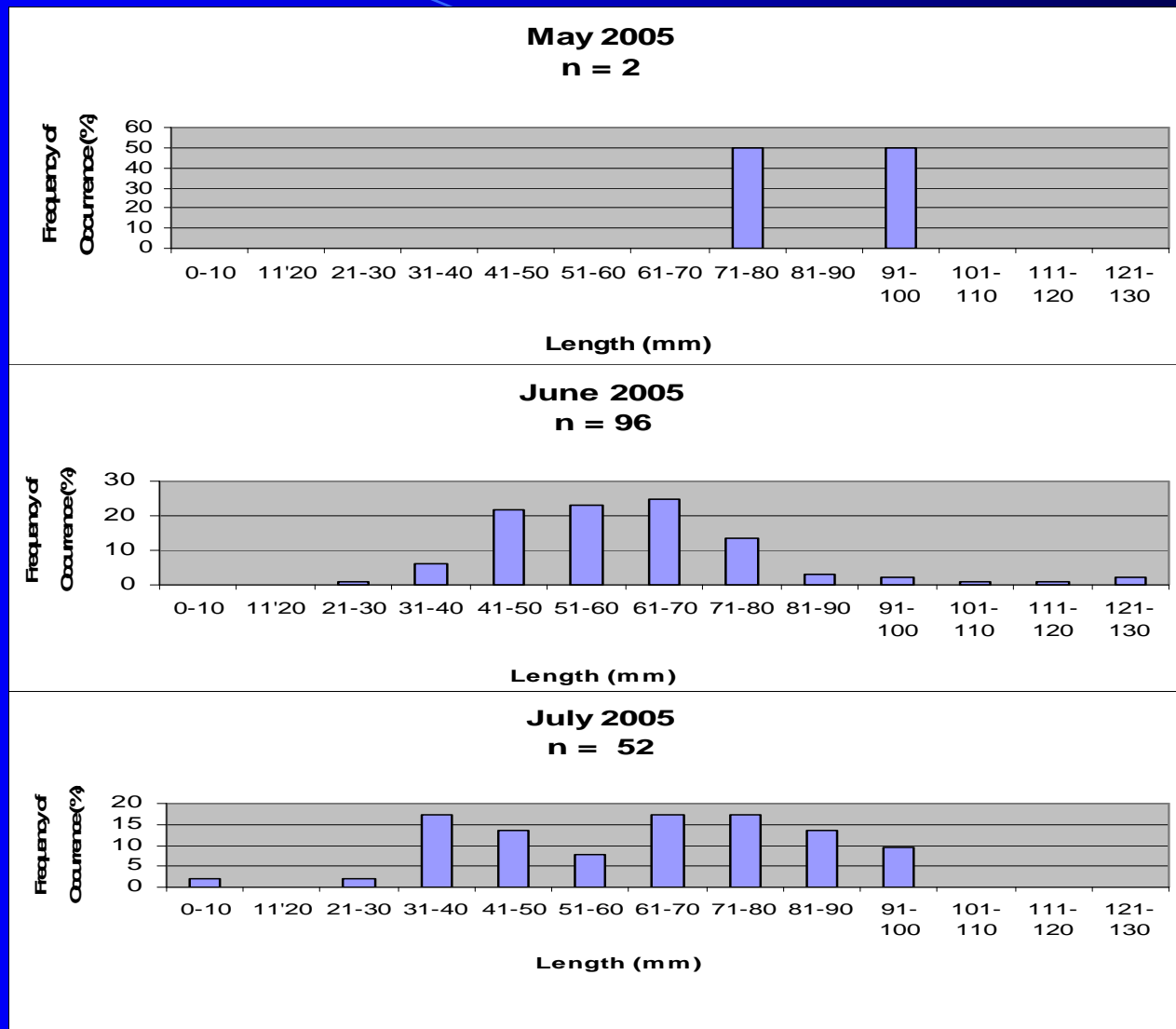
July 2005  
n=117



# Juvenile Chum Salmon L/F

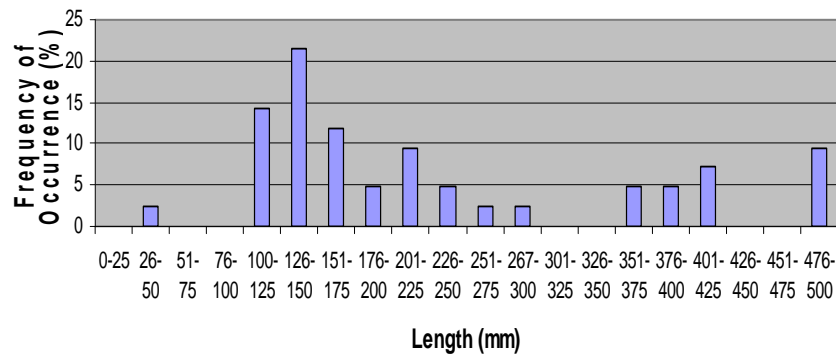


# Juvenile Sockeye Salmon L/F

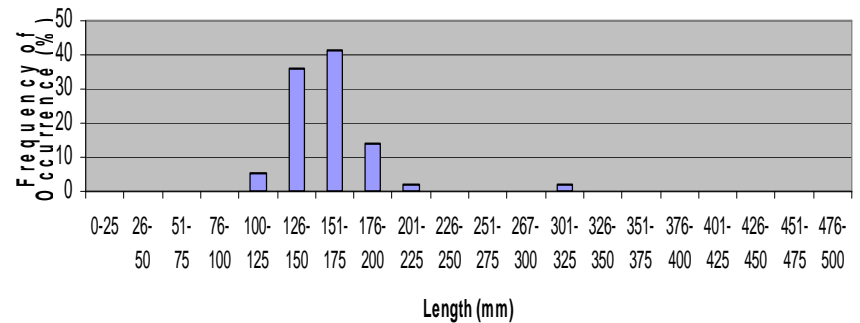


# Dolly Varden L/F

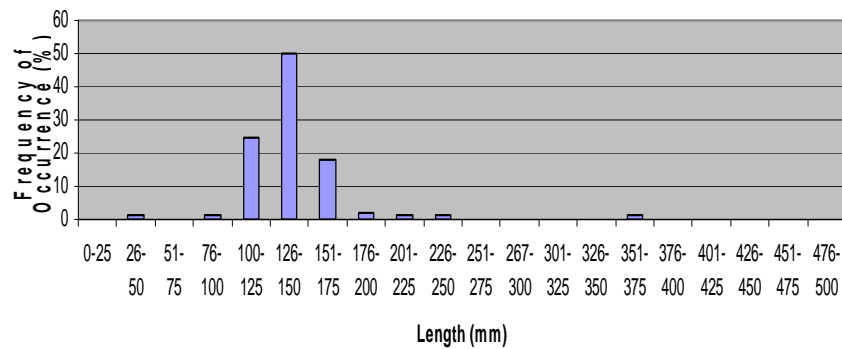
May 2005  
n = 42



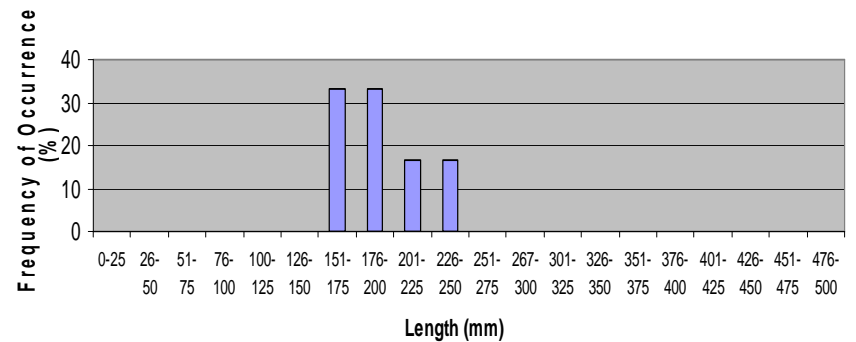
July 2005  
n = 58



June 2005  
n = 90



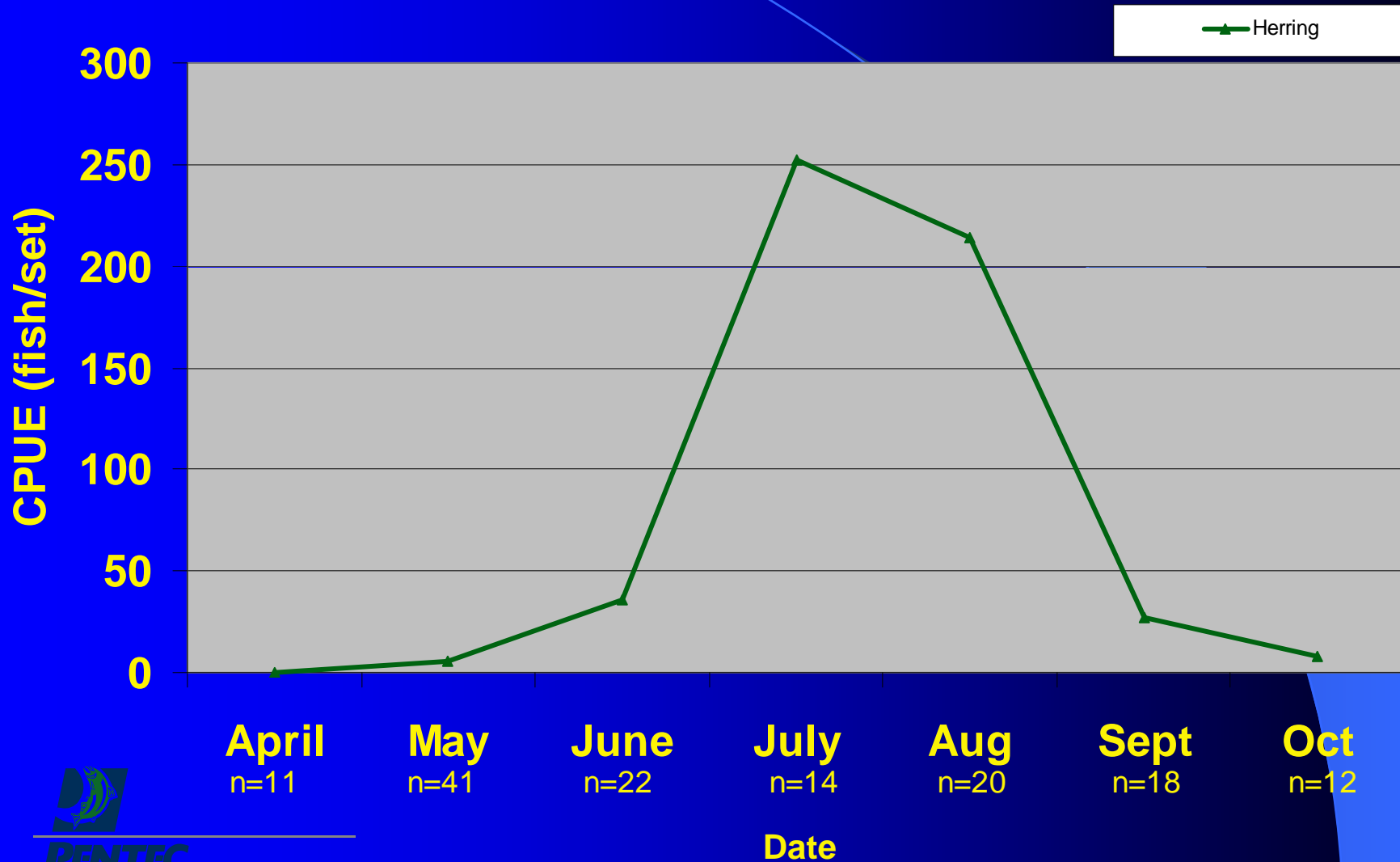
August 2005  
n = 6





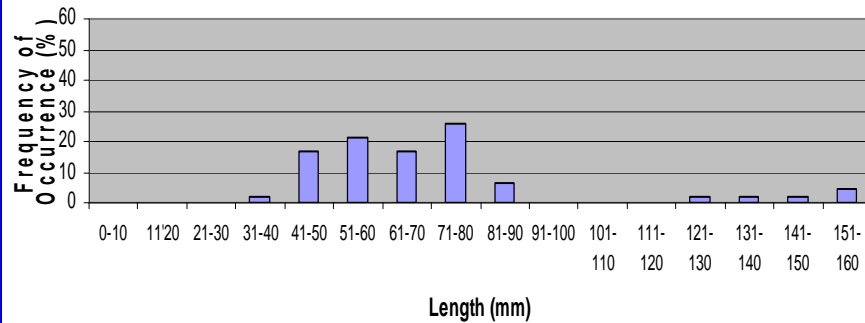
# Juvenile Herring CPUE

(2004 – 2007 all samples)

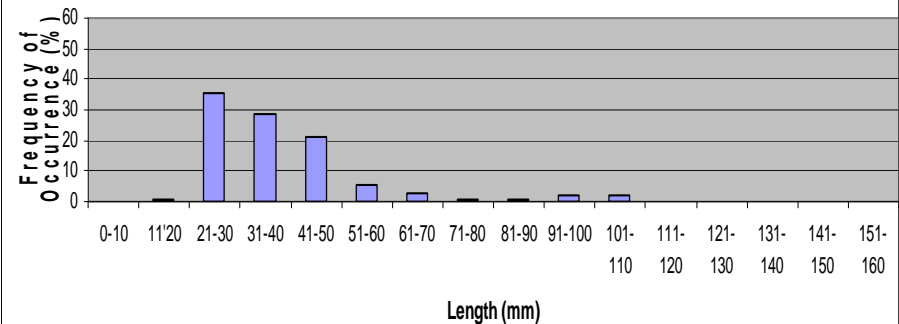


# Juvenile Herring L/F

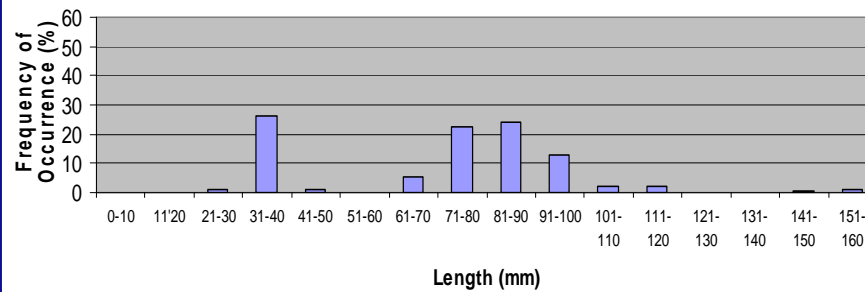
May 2005  
n = 47



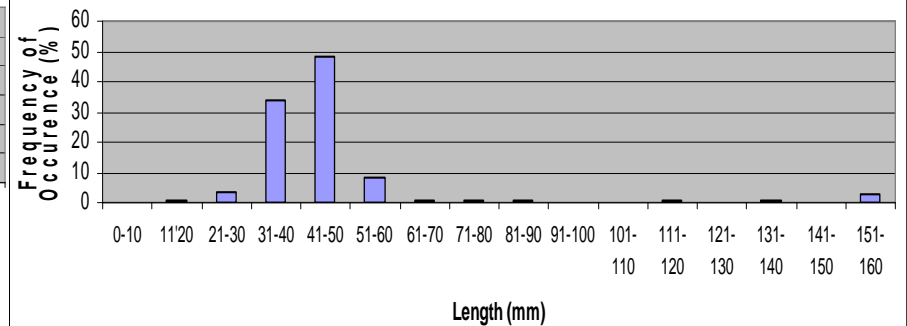
July 2005  
n = 143



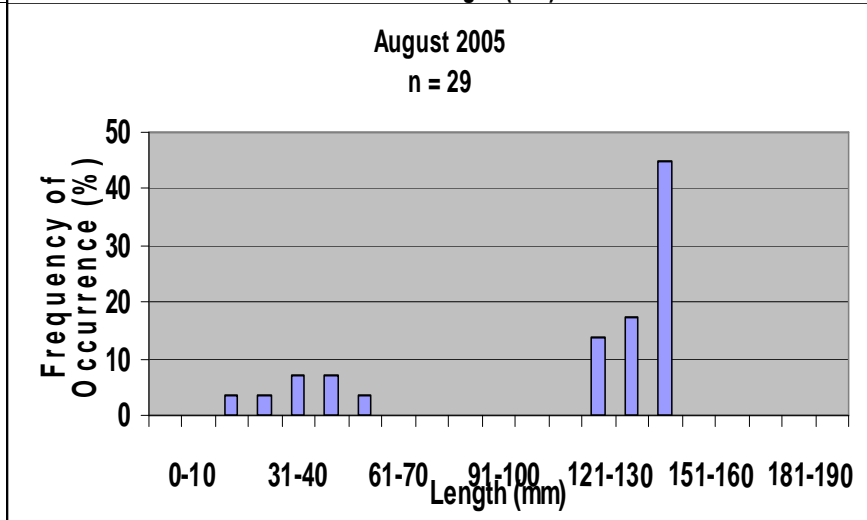
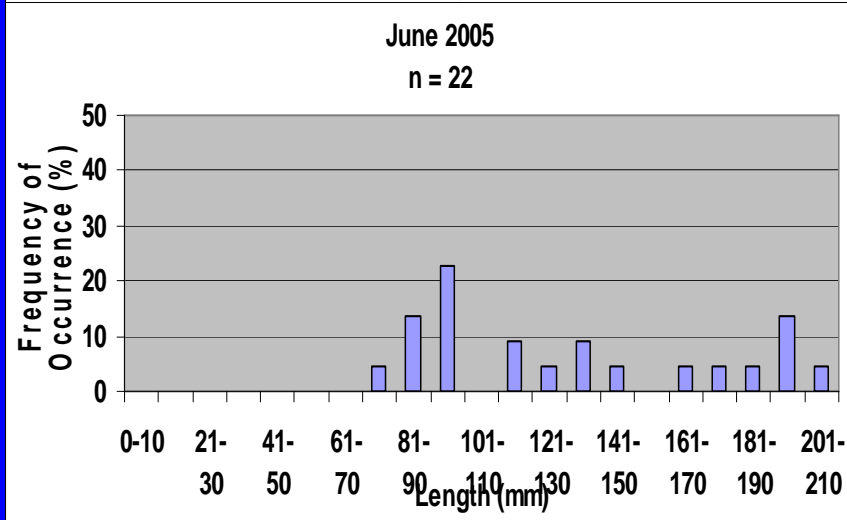
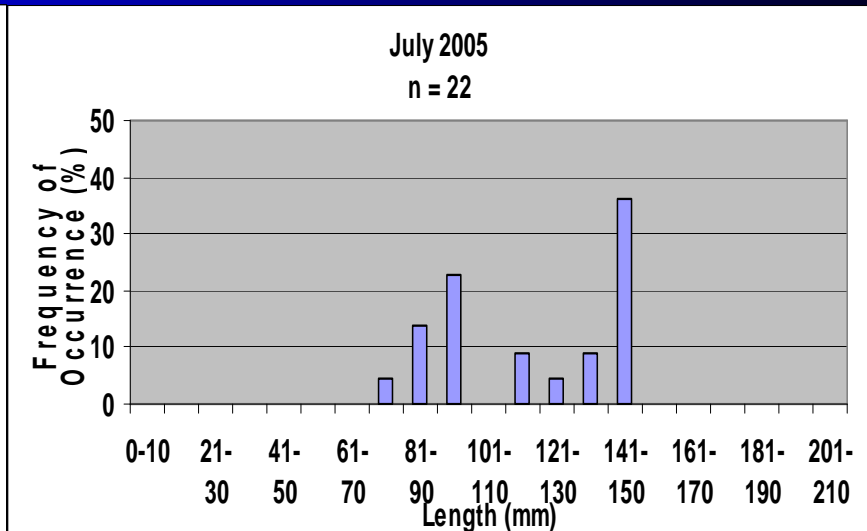
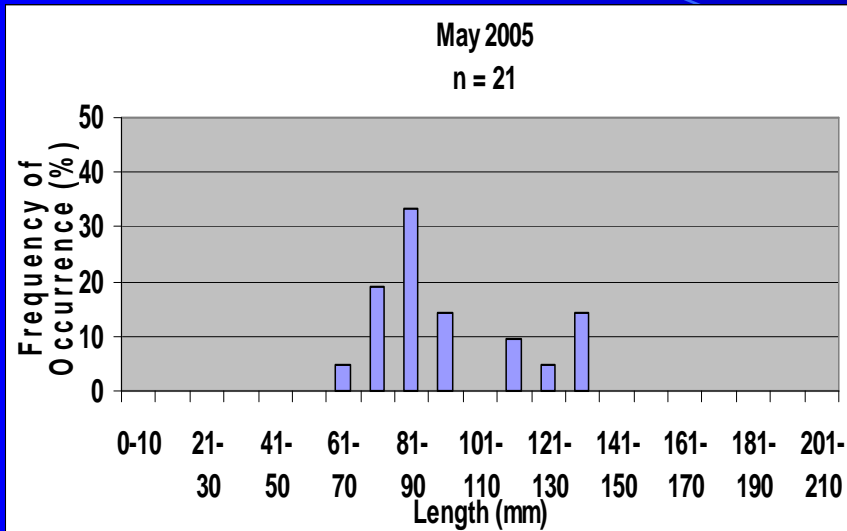
June 2005  
n = 169



August 2005  
n = 200



# Pac. Staghorn Sculpin L/F



# Littoral Use by Invertebrates (Beach Seine)

- Mysids
- *Crangon*
- Gammarids
- “Jellyfish”
  - *Polyorchis*
  - *Pleurobranchia*

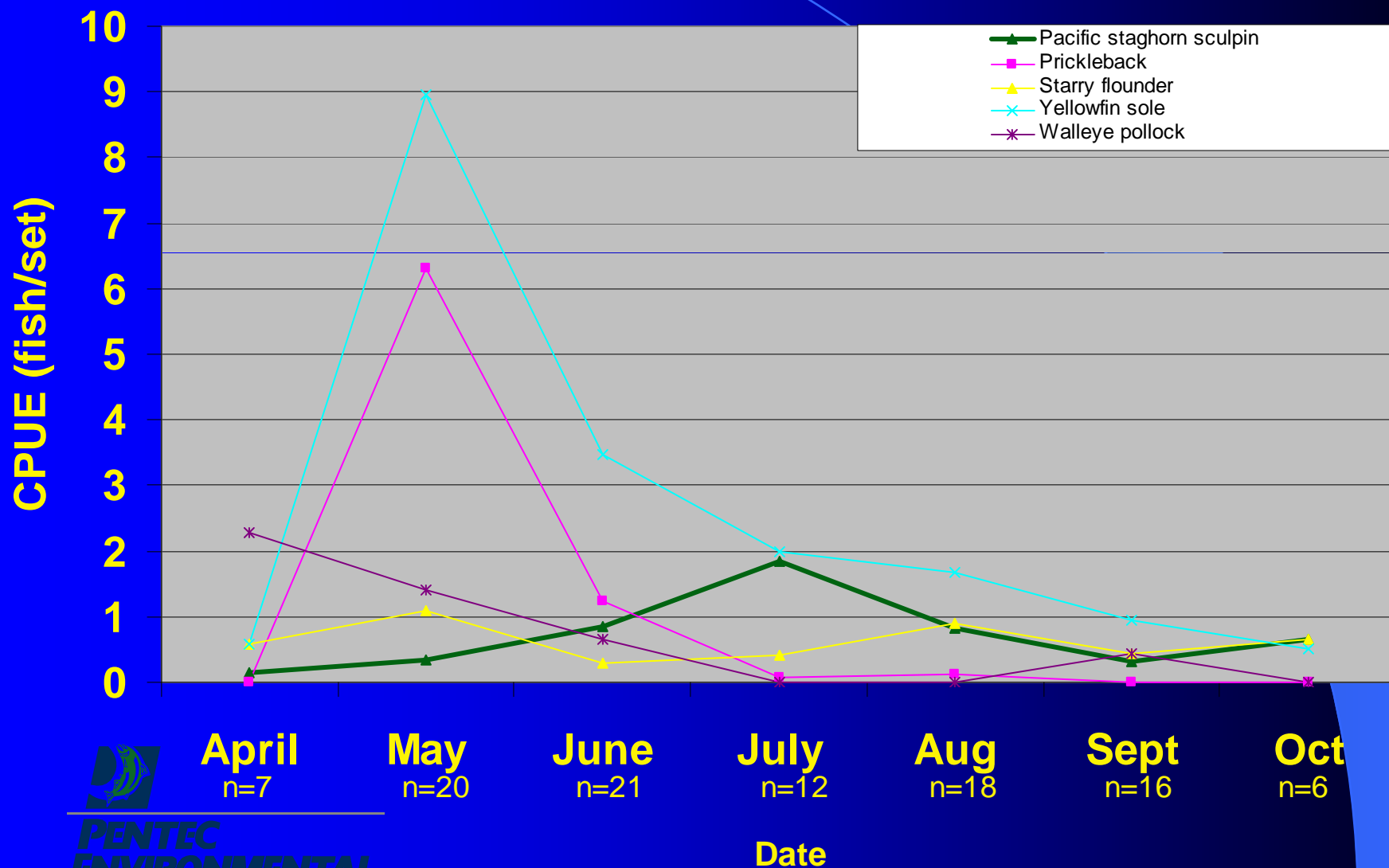


# Subtidal Fish (Trawl)



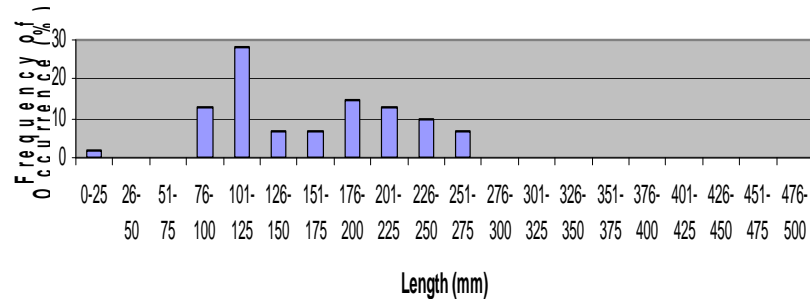
- Flat fish
  - Y-fin
  - Sand sole
  - Starry flounder
  - Ak. plaice
  - Halibut
- Gadids
  - Pacific cod
  - Saffron cod
- Other
  - Snake prickleback
  - Poachers (2 spp.)
  - Sculpin (5 spp.)
  - Whitespotted greenling
  - Snail fish

# Seasonal CPUE for Demersal Fish Species

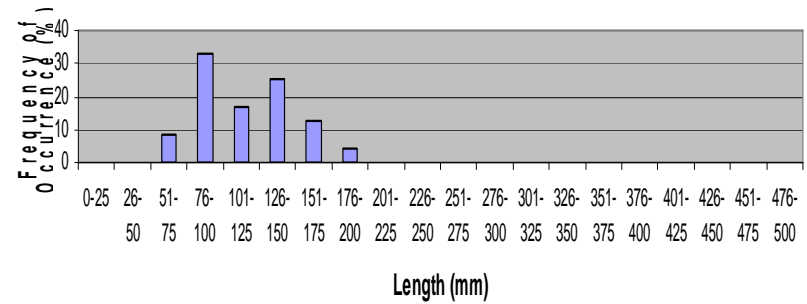


# Yellowfin Sole L/F

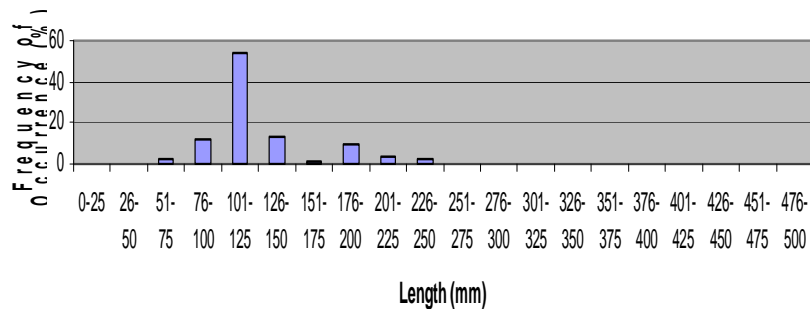
May 2005  
n=6



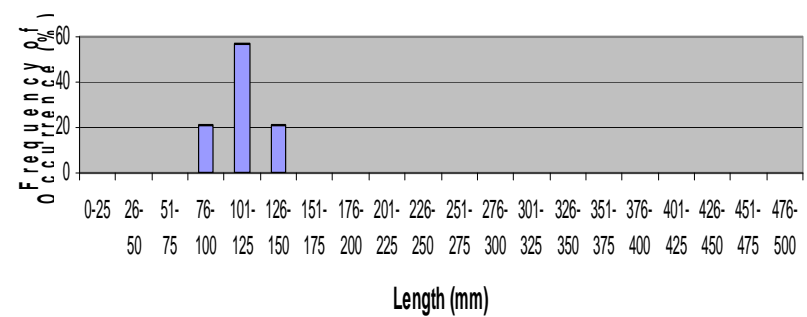
July 2005  
n=22



June 2005  
n=16

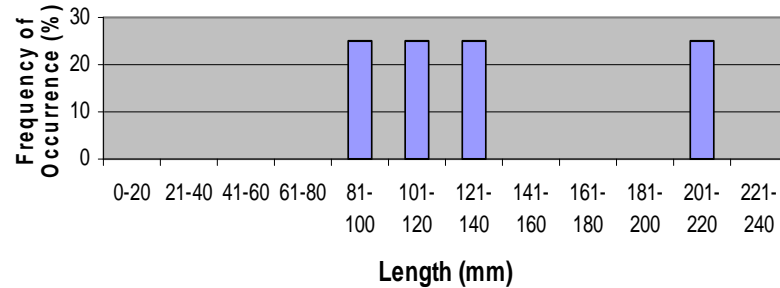


August 2005  
n=5

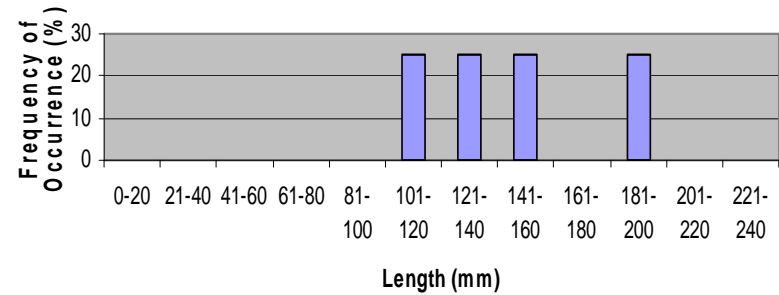


# Juvenile Halibut L/F

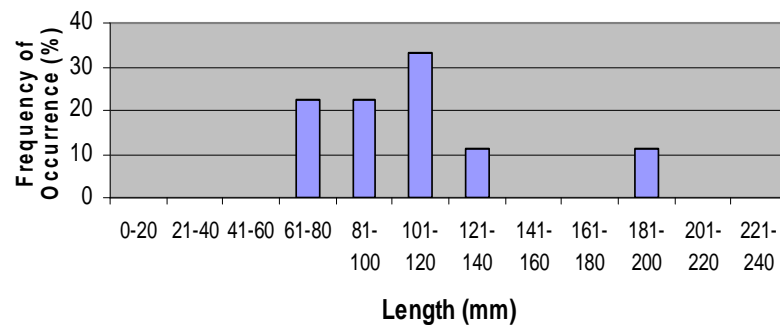
May 2005  
n=4



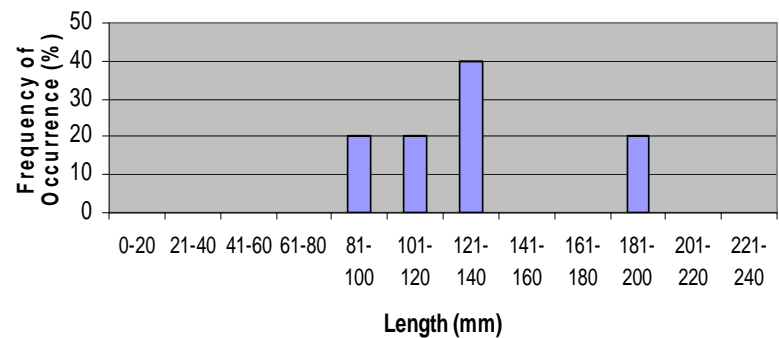
July 2005  
n=4



June 2005  
n=9



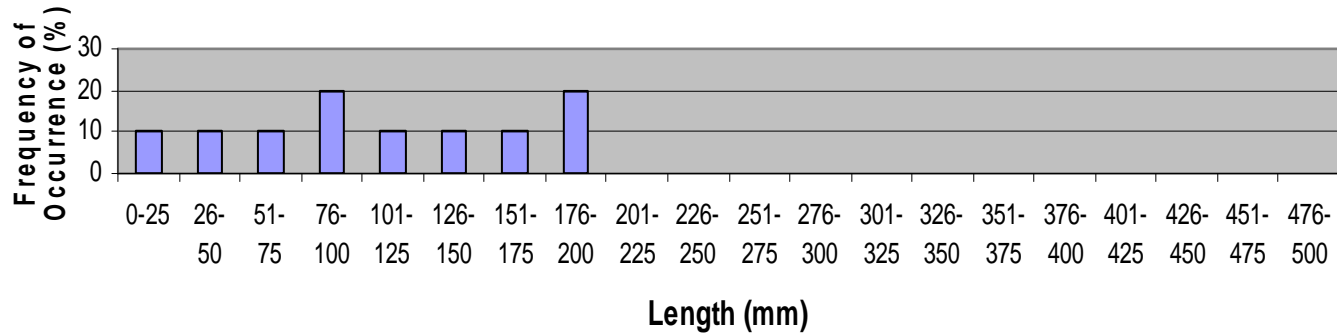
August 2005  
n=5



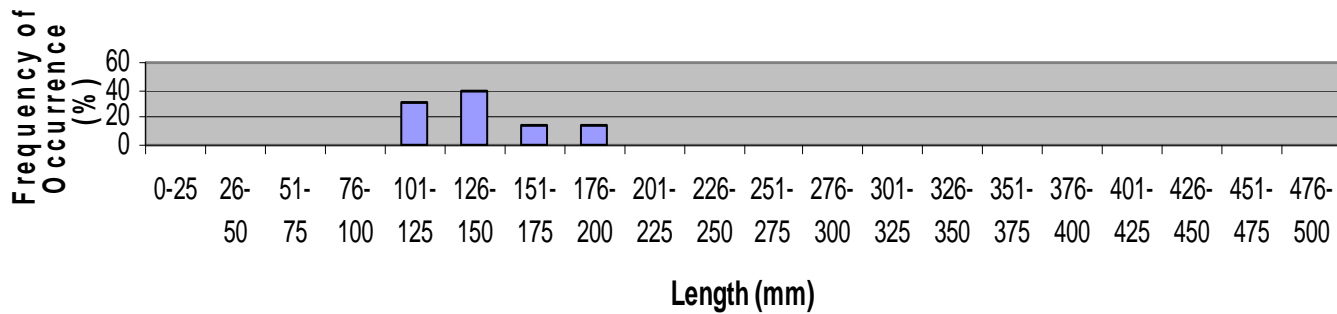


# Juvenile Pollock L/F

May 2005  
n=10



June 2005  
n=13



# Subtidal Inverts (Trawl)

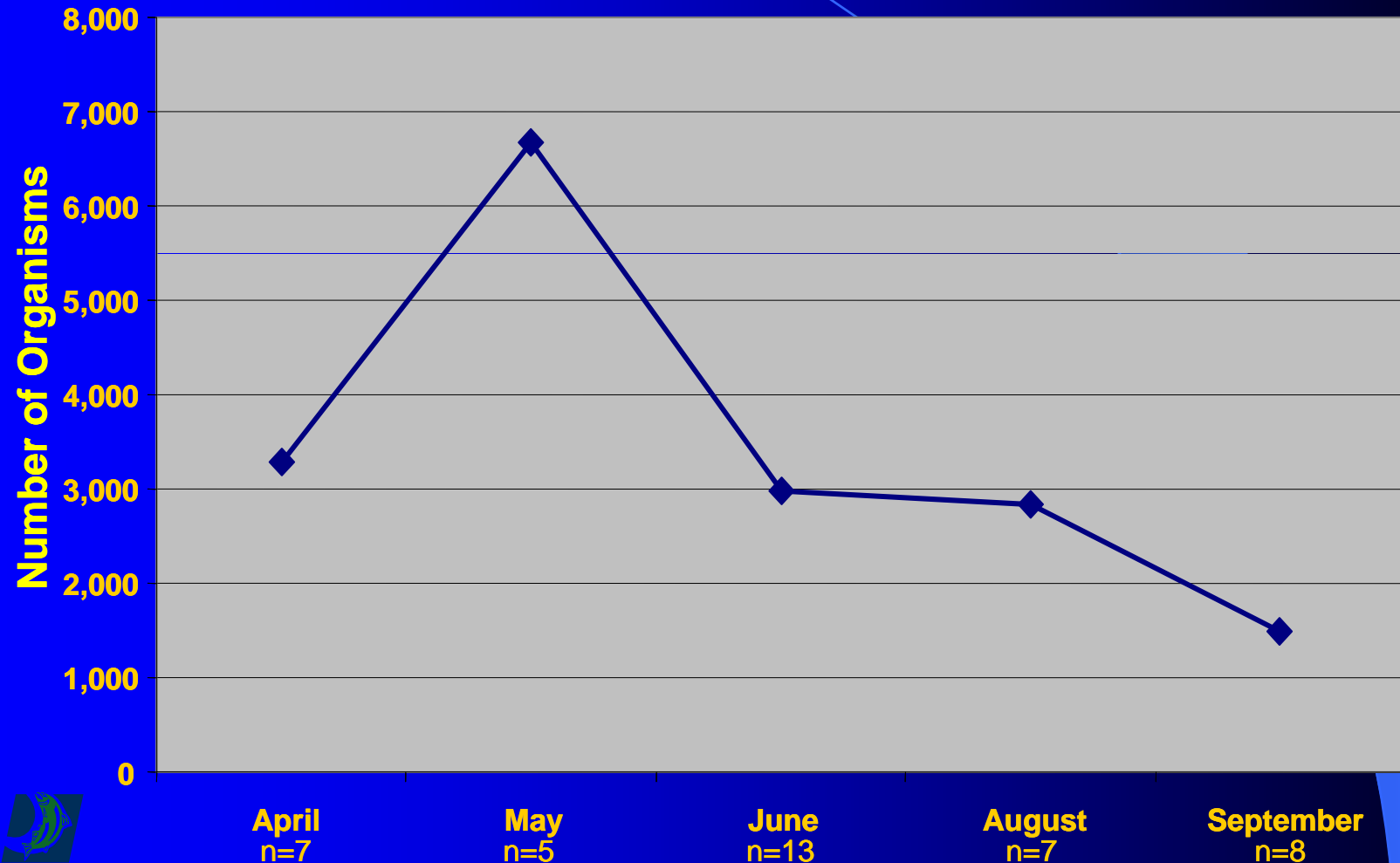


- Crustaceans
  - Crangon (abund. on mud flats)
  - Pandalids
  - Hermits

- Sponges
- Hydroids
- Bryozoans



# Seasonal CPUE for Demersal Invertebrates



# Dominant Invertebrates in Trawl Catches

Taxon	Month:	Rank				
		April	May	June	August	September
<i>Crangon</i> spp.		1	2	3	2	1
<i>Pandalus</i> spp.		2	1	2	1	2
<i>Neomysis</i> sp.		3	4	*	*	4
<i>Heptacarpus</i> spp.		4	3	1	3	3



# Tanner Crabs

(*Chionoecetes bairdi*)

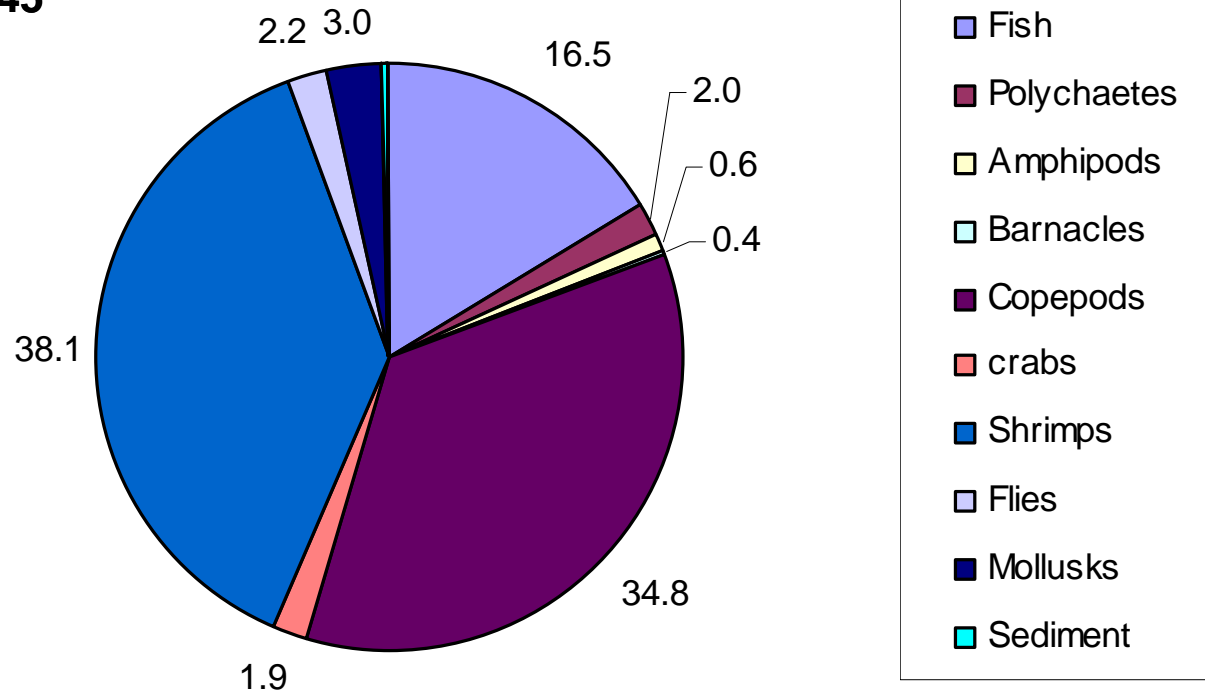
- Commercially important species
- Present in trawls in Sept '06, Sept '07, and Oct '07
- Possible overwinter refuge for juveniles



# Dietary Composition of Juvenile Chum

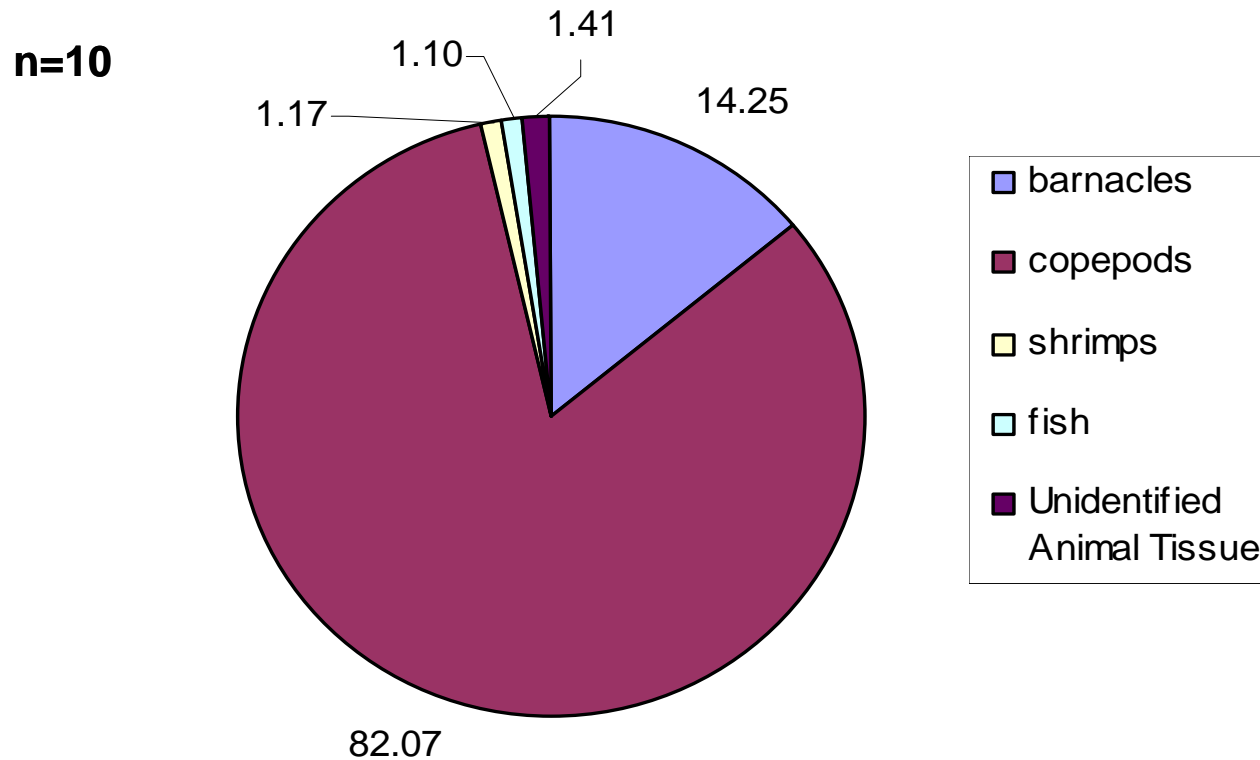
Chum Salmon: %IRI of dominant prey

n=45

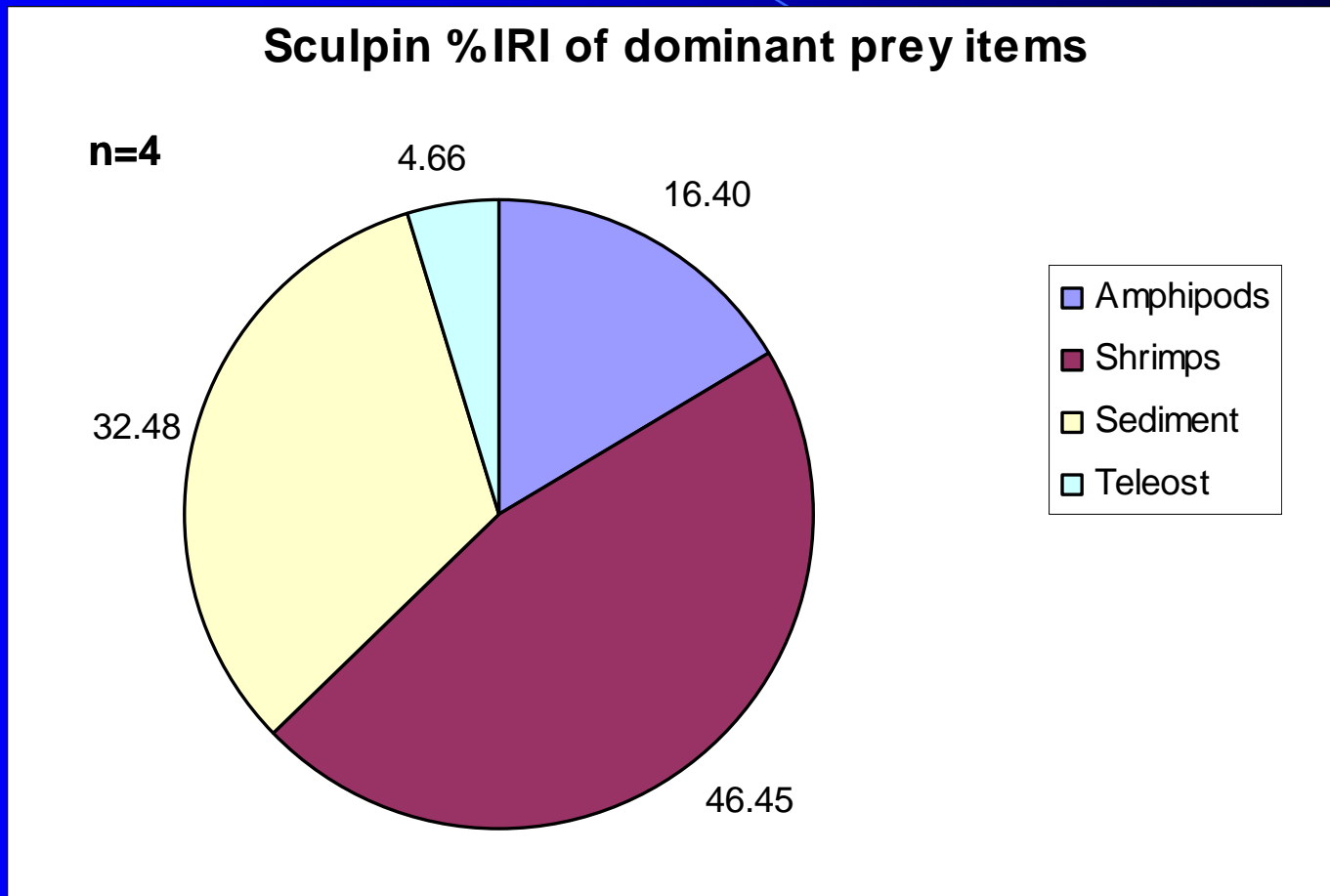


# Dietary Composition of Surf Smelt

Surf smelt: % IRI of dominant prey items



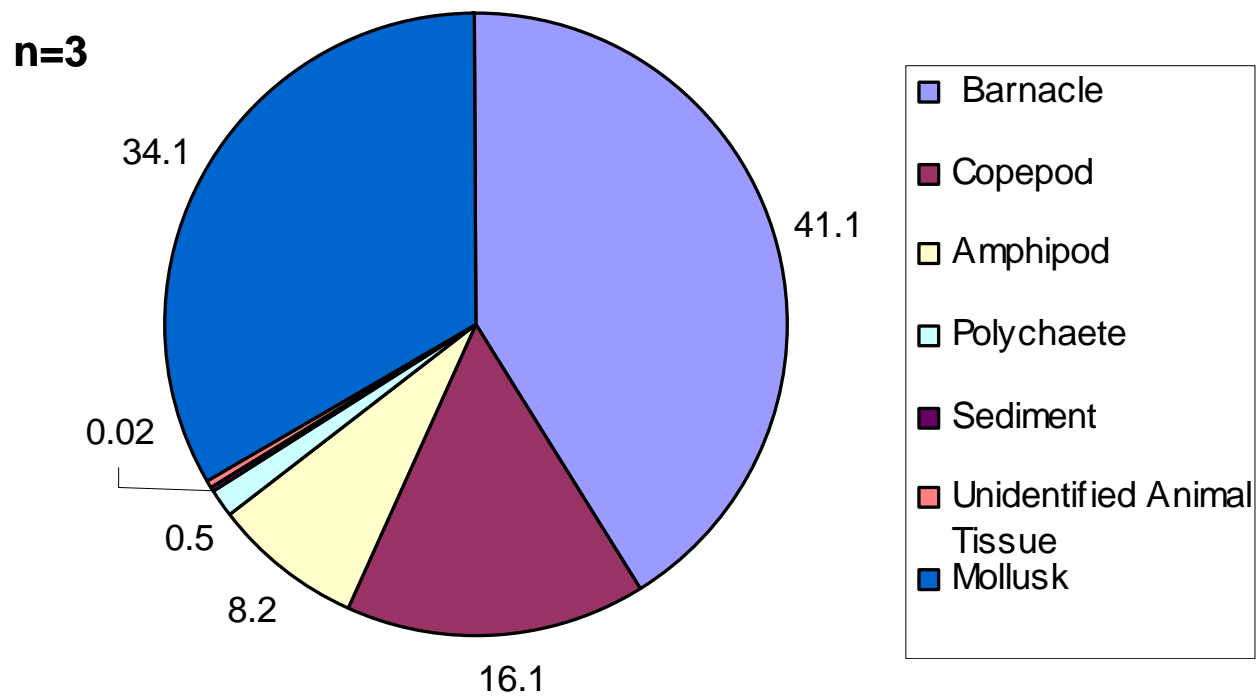
# Dietary Composition of Staghorn Sculpin





# Dietary Composition of Yellowfin Sole

Yellowfin Sole % IRI of dominant prey items



# Nearshore Fish Summary

- **Diverse habitats**
- **Moderate stress environment**
- **Highly seasonal use**
- **Variable fish densities**
- **Probable importance to adjacent Kamishak ecosystem**
  - **Herring spawning?**
  - **Nursery for salmon, FF, flatfish, and crab**

A photograph taken from inside a boat, looking out at a turbulent sea under a dark, stormy sky. The view is through a window covered in raindrops and streaks. A dark metal railing is visible in the lower foreground. The water is dark and choppy, with white foam from the boat's wake visible in the lower right. The sky is filled with heavy, grey clouds.

Questions?

[jon@pentecenv.com](mailto:jon@pentecenv.com)