THE LITTLENECK CLAM FARMING PROJECT

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LITTLENECK CLAM

Prototheca staminea

Harvest sizes
Farmed size 1.25 in (35+ mm)
Commercial size (38+ mm)

- Habitat
  - Sandy/gravel/organic composition
  - Pocket beaches
  - Tidal height +3.0 to -1.7 (+1.5 to -1.5)
  - Depth of substrate to 6”
- Water current preference
  - Faster moving water 30-40 inches/sec
- Age and growth
  - Appear to reach harvest size by 4th or 5th year
  - Reading circuli on the shell often over estimates age
  - Reach reproductive size at 1.5”
- Recruitment irregular

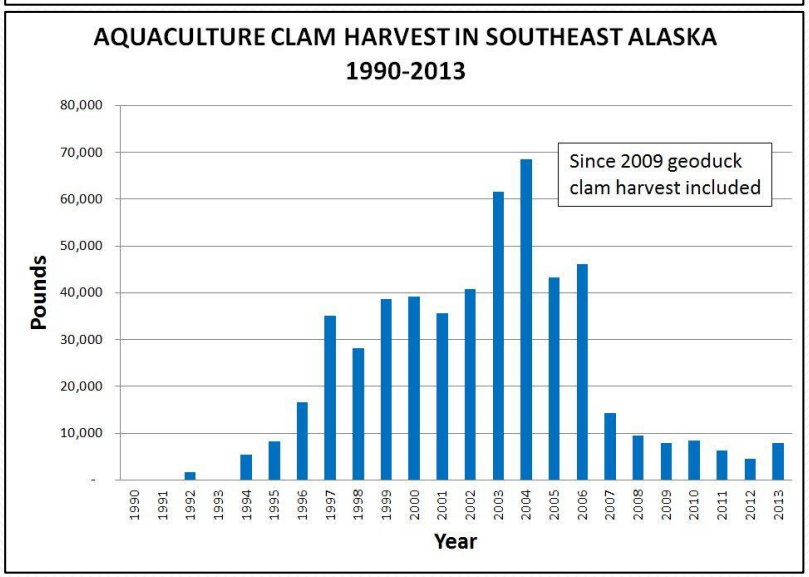
COMMERICAL AND AQUACULTURE HARVEST

- Kachemak Bay
  - General increasing harvests
  - Catch per effort shows a decline
  - Clam farming banned in 2001
  - Concern about population decline
- Southeastern Alaska
  - Aquaculture increases after 1996 and significant declines as 2004
    - Primarily due to natural recruitment
  - Commercial harvest stopped in 1997

LITTLENECK CLAM COMMERCIAL FISHERY HARVEST IN KACHEMAK BAY 1986 to 1995

Year	Harvest	Landings	Harvest/ landing
1986	17,303	18	961
1987	12,214	69	177
1988	14,449	32	452
1989	2,584	41	63
1990	35,744	62	577
1991	47,486	78	609
1992	54,631	117	467
1993	63,676	159	544
1994	44,291	104	426
1995	66,723	93	717

Note: No commercial fishery harvest since 2009



SOUTHCENTRAL STUDIES (Brooks 1995-2000)

- Tatitlek, Prince William Sound environmental is similar to S.E. Alaska
- Lesson learned about substrate stability
- Region of very poor recruitment and survival, density average 13.5 clams/ft^2
  - Only 7% survival to market
  - Extremely high predation
- Optimum stocking density (4 mm seed) at 100 seed/ft^2
- Growth to market size 4- 5 years

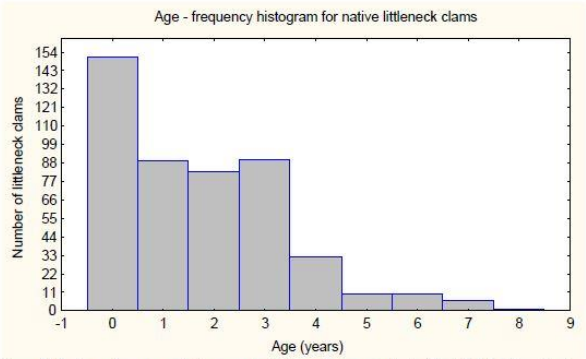


Figure 12. Age – frequency histogram for littleneck clams collected in 35, 0.1 m^2 quadrats at the Tatitlek Village on August 27, 1995.

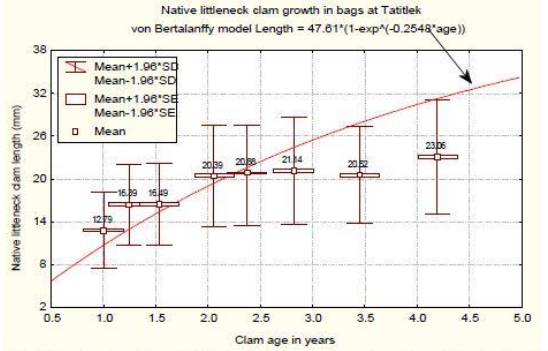


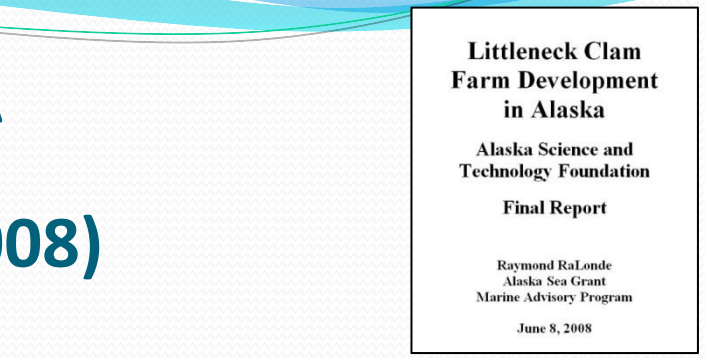
Figure 84. Mean lengths of native littleneck clam cohorts cultured at all tide heights in bags at Tatitlek between June 27, 1996 and September 9, 1999. Clams in bags were measured quarterly for the first two years during this study.

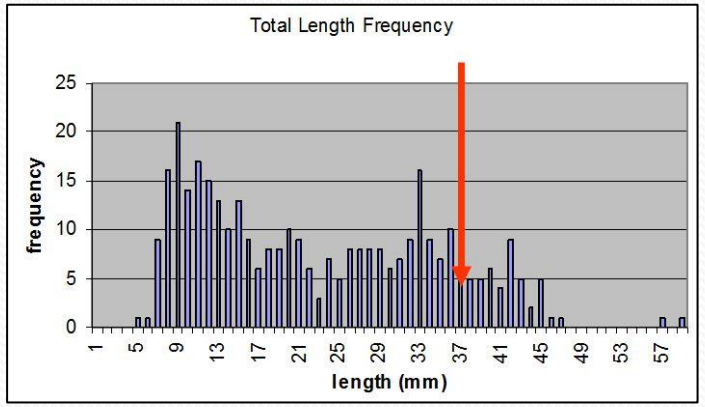
Final Report
Chugach Regional Resources Commission Bivalve Enhancement Program
Bivalve inventories and native littleneck clam (*Protothaca staminea*) culture studies
***Exxon Valdez* Oil Spill Trustee Council Project Number 95131**

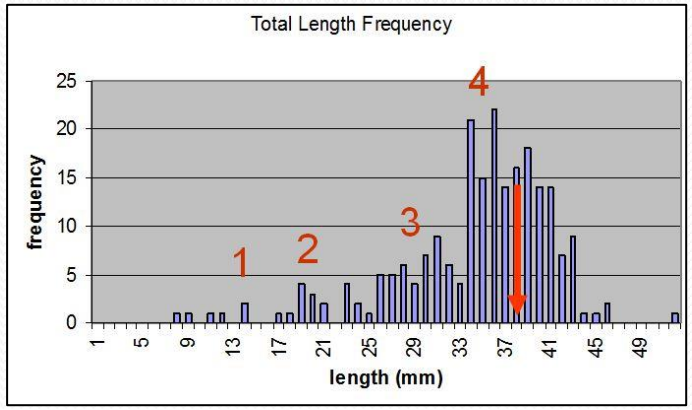
Brooks 2000

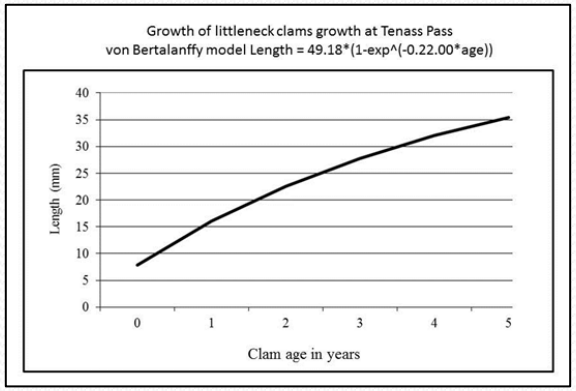
SOUTHEAST ALASKA STUDIES (RaLonde 1999–2008)

- Repeated (Brooks 2000)
  - Recruitment was variable
  - Density of clams at 69 clams/ft^2
  - Growth similar
- Additional studies
  - Recruitment distribution
  - Optimum stocking density









ADDITIONAL SOUTHEAST STUDIES

Recruitment distribution and contribution

Upper plot									
Plot number	**1-A**	**1-B**	**1-C**	**2-A**	**2-B**	**2-C**	**3-A**	**3-B**	**3-C**
Stocking number	90	30	60	30	90	60	90	60	30
Percent recruitment	91.38	60.00	57.89	92.59	60.71	17.50	30.19	33.33	23.33
Lower plot									
Plot number	**1-A**	**1-B**	**1-C**	**-2-A**	**2-B**	**2-C**	**3-A**	**3-B**	**3-C**
Stocking number	90	30	60	30	90	60	90	60	30
Percent recruitment	93.75	76.92	68.42	79.55	81.82	66.67	57.69	33.33	53.13

Determination of optimum seed stocking density

Stocking clams/ft^2	Recruitment		
	Low	Moderate	Heavy
30	S+ G+ $L	S+ G+ $L	S+ G+ $M
60	S+ G+ $M	S+ G+ $M	S+ G+ $H
90	S+ G+ $M	S+ G+ $H	S- G+ $L

S = Survival G = Growth $ = Income

Optimum yield Red Low Blue Medium Green High

LITTLENECK CLAM FARMING PRELIMINARY STUDY 2010

Joint effort between

- Alaska Department of Fish and Game Mariculture Division
- Alaska Sea Grant Marine Advisory Program
- Starr Fisheries LLC shellfish farm – Eric Wyatt
- Volunteers – Naukati Nursery, Eric Wyatt, John Sandi

Additional questions

1. What is the harvestable clam density after 4 years when stocking at 60 clams/ft^2?
2. What is the effect of predator exclusion netting on clam survival?
3. When can predator exclusion netting be removed?
4. Validate growth with other studies.

A LITTLENECK CLAM FARM PRODUCTION PLAN

- Determine clam distribution on the beach.
- Inventory the population for density
- Measure clams and develop a length frequency distribution.
- Interpret the length frequency for clam size distribution and abundance
- Calculate seed stocking plan based on existing density
- Prepare the farm plot –
  - Leveling the substrate, deploy predator exclusion, seeding
- Develop a post planting management plan –
  - Net maintenance, reseeding?, fouling control, monitoring growth/survival, and harvest

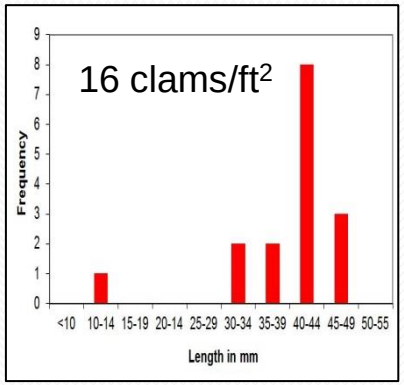
THE FARMING PROCESS

Site selection

Nursery grown seed

Clam inventory

Count and measure



Results

Plot preparation

Completed prep

Seeding @ 46/ft^2

METHODOLOGY - redux

- 3 Sites in Tokeen Bay
- 2009 Sampling
- Treatments applied at each site
  - Plot 1 - Seed and net
  - Plot 2 - Net only
  - Plot 3 - Control
- Sampled again in 2010, 2011, and 2013
- Clam density and length — Treatment, Time

ANALYSES

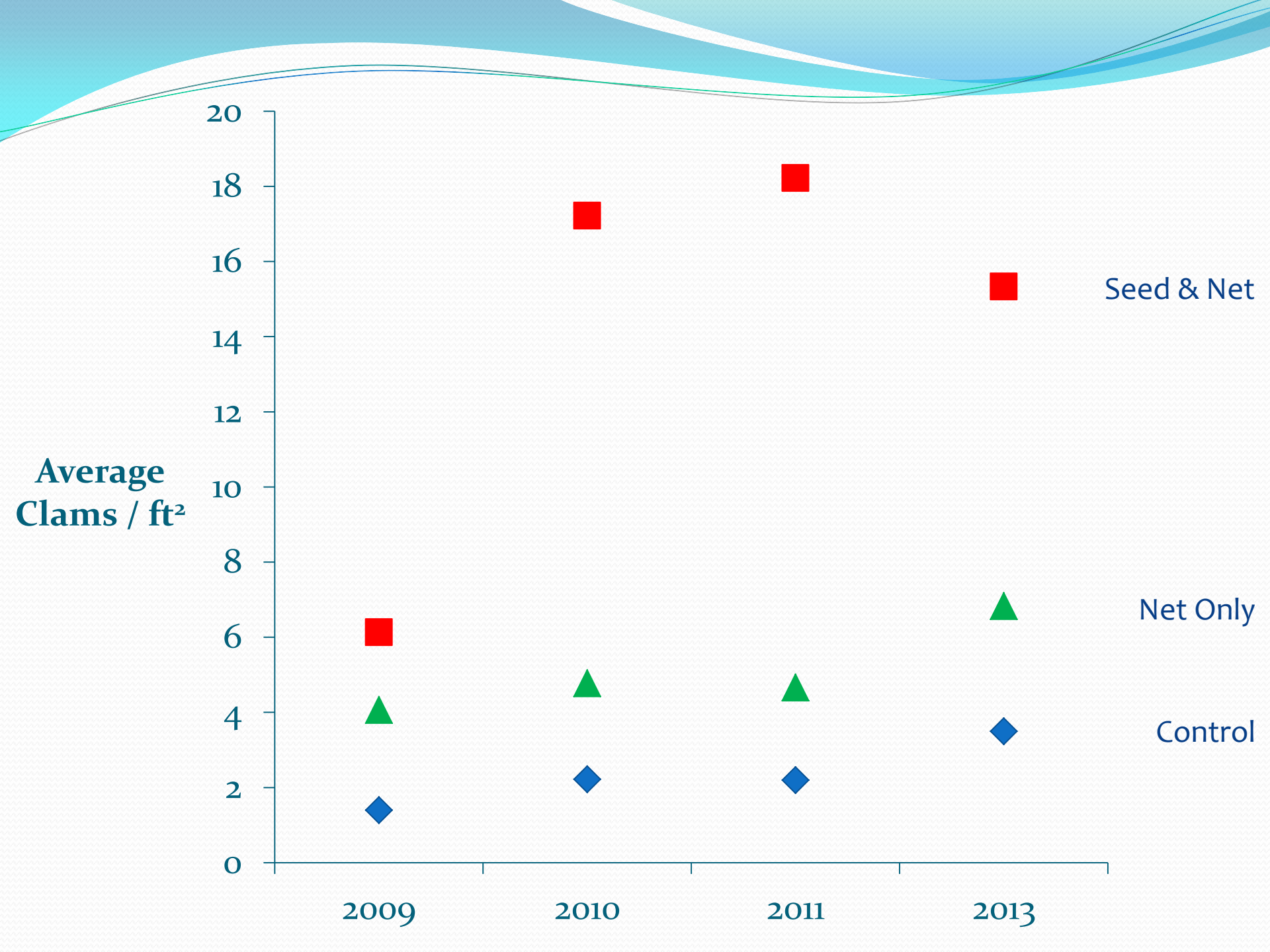
Determine whether….

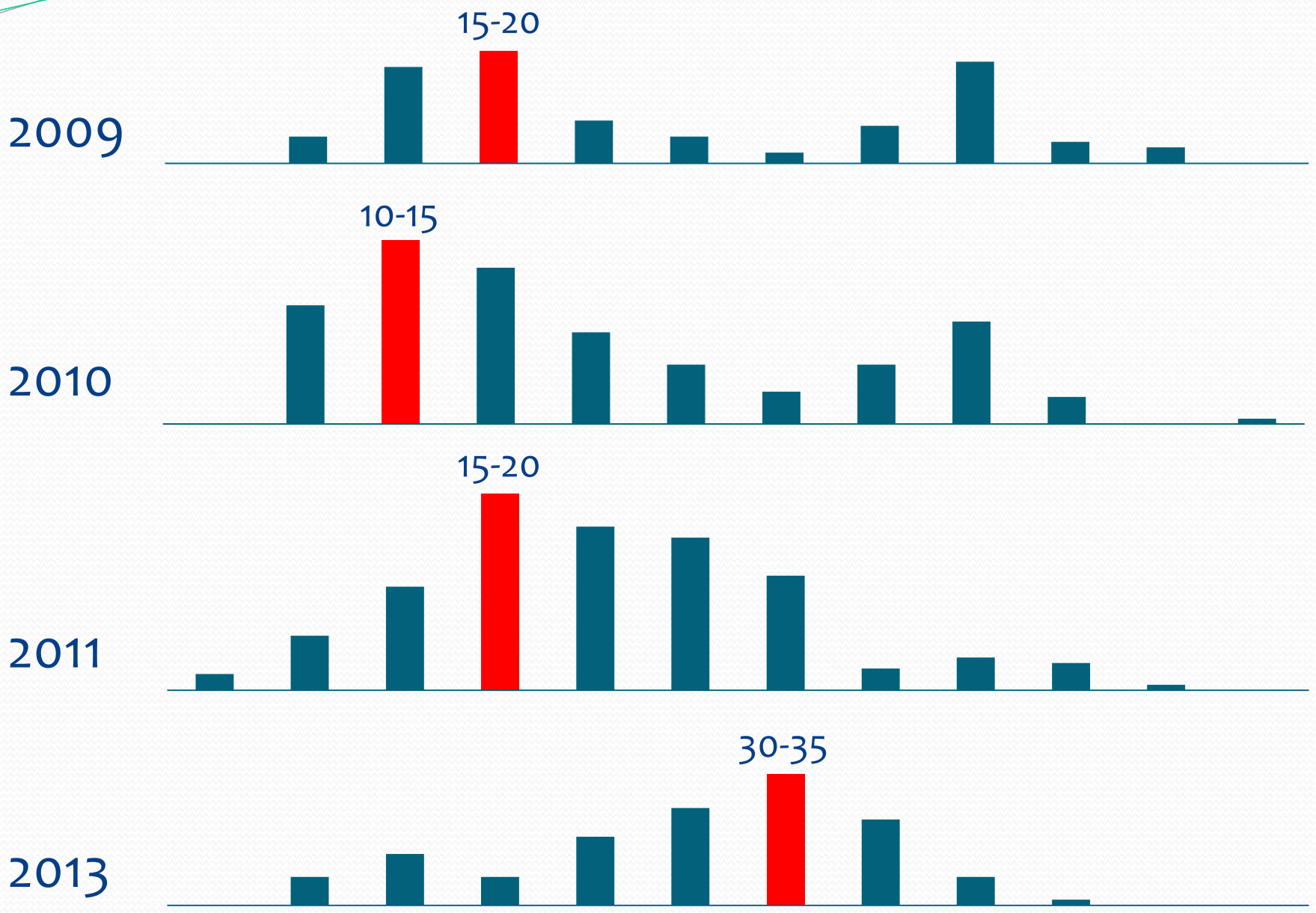
Predator exclusion netting

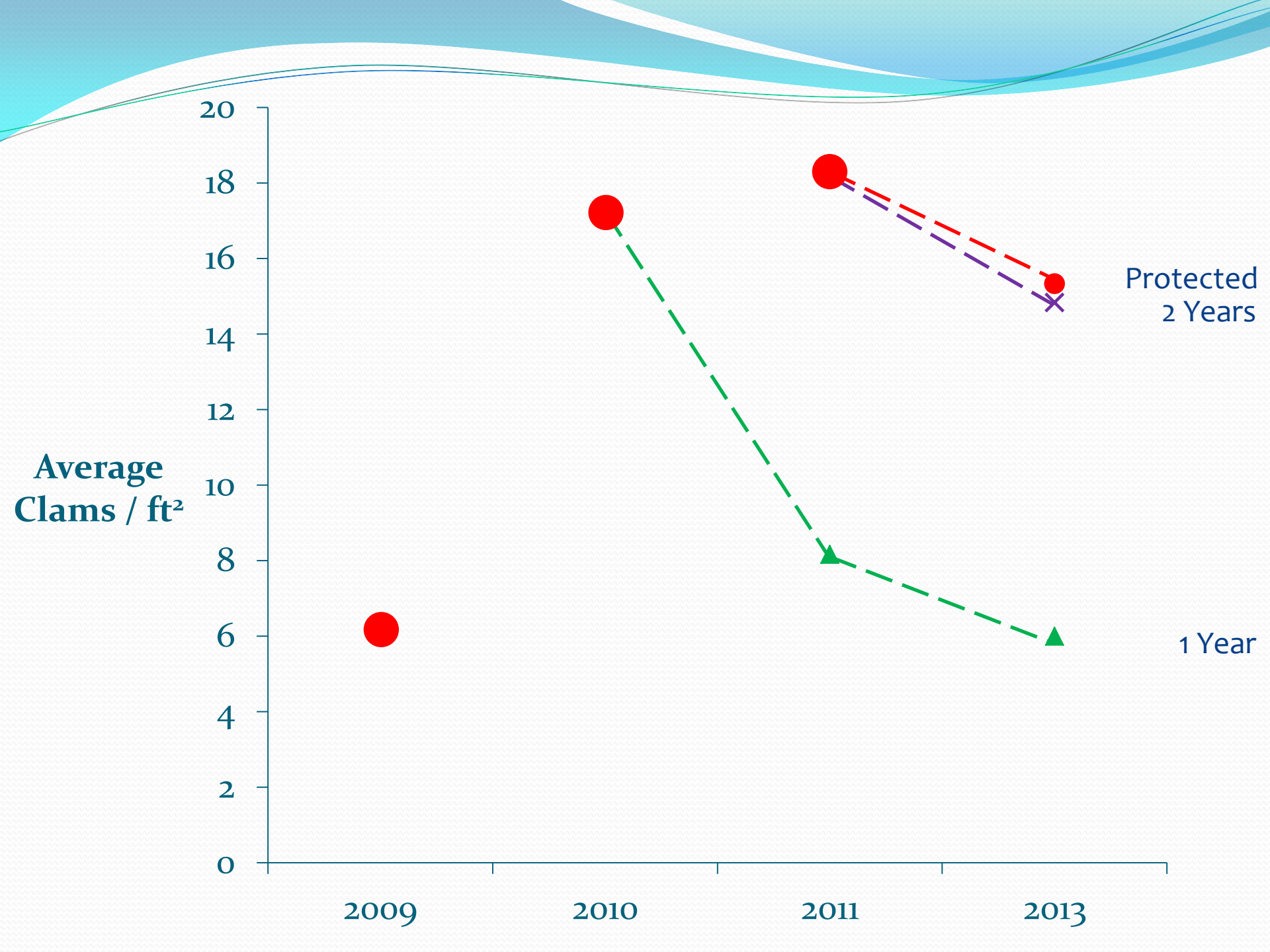
1) Maintain clam population

2) Promote growth clam

How long must the netting be installed?


Average Clams / ft²
20
18
16
14
12
10
8
6
4
2
0
2009
2010
2011
2013
Seed & Net
Net Only
Control


15-20
2009
10-15
2010
15-20
2011
30-35
2013


Average Clams / ft²
20
18
16
14
12
10
8
6
4
2
0
2009
2010
2011
2013
Protected 2 Years
1 Year

CONCLUSIONS

To optimize littleneck clam production

- Seed and predator netting
- Netting in place for at least 2 years

Growth to market size 4 years in SE Alaska

Full report available soon!

THANK YOU

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