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**The Place of Indigenous Hunting Systems in Marine
Mammal Management Regimes: The Case of Harbor
Seals and Steller Sea Lions in Alaska**

by

Robert J. Wolfe

1993

Alaska Department of Fish and Game

Division of Subsistence



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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly-accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H_A
gram	g			base of natural logarithm	e
hectare	ha			catch per unit effort	CPUE
kilogram	kg	all commonly-accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	coefficient of variation	CV
kilometer	km			confidence interval	CI
liter	L	at	@	correlation coefficient (multiple)	R
meter	m	compass directions:		correlation coefficient (simple)	r
milliliter	mL	east	E	covariance	cov
millimeter	mm	north	N	degree (angular)	$^\circ$
		south	S	degrees of freedom	df
Weights and measures (English)		west	W	expected value	E
cubic feet per second	ft ³ /s	copyright	©	greater than	>
foot	ft	corporate suffixes:		greater than or equal to	≥
gallon	gal	Company	Co.	harvest per unit effort	HPUE
inch	in	Corporation	Corp.	less than	<
mile	mi	Incorporated	Inc.	less than or equal to	≤
nautical mile	nmi	Limited	Ltd.	logarithm (natural)	ln
ounce	oz	District of Columbia	D.C.	logarithm (base 10)	log
pound	lb	et alii (and others)	et al.	logarithm (specify base)	log ₂ , etc.
quart	qt	et cetera (and so forth)	etc.	minute (angular)	'
yard	yd	exempli gratia (for example)	e.g.	not significant	NS
		Federal Information Code	FIC	null hypothesis	H_0
Time and temperature		id est (that is)	i.e.	percent	%
day	d	latitude or longitude	lat. or long.	probability	P
degrees Celsius	°C	monetary symbols (U.S.)	\$, ¢	probability of a type I error (rejection of the null hypothesis when true)	α
degrees Fahrenheit	°F	months (tables and figures)	first three letters (Jan.,...,Dec)	probability of a type II error (acceptance of the null hypothesis when false)	β
degrees kelvin	K	registered trademark	®	second (angular)	"
hour	h	trademark	™	standard deviation	SD
minute	min	United States (adjective)	U.S.	standard error	SE
second	s	United States of America (noun)	USA	variance	
		U.S.C.	United States Code	population	Var
Physics and chemistry		U.S. state	two-letter abbreviations (e.g., AK, WA)	sample	var
<i>all atomic symbols</i>					
alternating current	AC	Measures (fisheries)			
ampere	A	fork length	FL		
calorie	cal	mideye-to-fork	MEF		
direct current	DC	mideye-to-tail-fork	METF		
hertz	Hz	standard length	SL		
horsepower	hp	total length	TL		
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

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MAMMAL MANAGEMENT REGIMES: THE CASE OF HARBOR SEALS
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by

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Alaska Department of Fish and Game, Division of Subsistence, Juneau

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The Place of Indigenous Hunting Systems In Marine Mammal Management Regimes: The Case of Harbor Seals and Steller Sea Lions in Alaska

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Because of the Native exemption of the Marine Mammal Protection Act, federal law allows for the local regulation of subsistence seal hunting and sea lion hunting, as it has been for generations within Alaska Native villages. Without federal regulations, local indigenous hunting traditions are free to work, establishing the basic parameters of the subsistence hunt, including harvest methods, harvest seasons, harvest levels, and the disposition of the take. To date, allowing local indigenous systems to regulate the subsistence take of seal and sea lion in Native villages has created few problems for either the natural resource or Native groups who rely upon it. Unlike commercial hunting, which historically has required tight federal monitoring and control, subsistence hunting of marine mammals, guided by local traditions and customs, has been associated with sustainable cultural patterns of use.

This paper describes the subsistence hunting patterns for seals and sea lions which have emerged under local, indigenous management systems in Alaska, looking at data from the 1992 hunt. The data presented will show that under traditional management systems:

1. Only a small number of potential hunters actually hunt seals and sea lions;
2. Harvest levels are intentionally limited, substantially below production potentials;
3. Many hunters choose not to hunt sea lion at all;
4. Hunters intentionally select for adult seals and adolescent sea lions, and choose to protect pups and pregnant females; and
5. Hunter-seal interactions result in the selection of males over females.

All these practices may have positive conservation effects. They indicate that indigenous management systems play important local roles in marine mammal management regimes.

Source of Information

Information on the 1992 subsistence take of harbor seals and sea lions comes from an ongoing, cooperative study involving Native hunters in 65 Alaska communities and the Division of Subsistence (Wolfe and Mishler 1993). This study was the first systematic attempt to document the subsistence use of harbor seal and sea lion in Alaska. In 1993, users of marine mammals in 2,105 households were interviewed, as well as marine mammal experts in each community. Information was collected by thirty researchers from the Division of Subsistence, and 63 local research assistants from the 65 communities. I would like to acknowledge the support from Native hunters, Native leaders, and regional and village Native organizations. The project was done in consultation with the Indigenous People's Council for Marine Mammals and the Rural Alaska Community Action Program. Funding derived from the National Marine Fisheries Service and the State of Alaska.

Groups Using Sea Lions and Harbor Seals

Sea lions and harbor seals range throughout most of the Pacific coastal waters of Alaska, including southeast Alaska, Prince William Sound, Kodiak Island, the Alaska Peninsula, the Aleutian-Pribilof islands, and Bristol Bay (Fig. 1). Traditionally, sea lions and harbor seals have been hunted by Aleut, Alutiiq, Haida, Tlingit, and Yup'ik groups within the range of the two species. During the recent decade, sea lions and harbor seal populations appear to be in decline from about Prince William Sound westward, probably due to reduced forage. Populations appear to be high and stable in southeast Alaska.

Species Selectivity

For generations, the use of harbor seal and sea lions by Alaska Native groups has been guided by complex, local systems of knowledge, beliefs, and customary practice. These indigenous hunting systems function to inform and regulate the behavior of Native hunters.

Local indigenous hunting systems guide hunters in their choices of which species to hunt. As shown in Fig. 2, under local indigenous management, many Native hunters chose not to hunt sea lion at all in 1992. Harbor seal was the preferred species by Tlingit and Haida hunters in southeast Alaska, where over half (58 percent) the statewide take occurred. By contrast, sea lions were harvested primarily by Aleut hunters in the southwest region, where over three-quarters (79 percent) of the statewide sea take of sea lions occurred. Tlingit seal hunters took only 6 sea lions in 1992.

Why did Aleut hunters harvest sea lions and harbor seals, while Tlingit hunters almost exclusively harvested harbor seals? This simple question has many, complex, local, cultural explanations, which cannot be covered by this paper. Aleut hunters reported sea lion meat and fat were excellent foods. Tlingit hunters stated that they chose not to hunt sea lions in 1992 -- "we leave them alone" -- except occasionally when taken for specialty items, such as whiskers for dance regalia, flippers, and rawhide.

Fig. 2
Harbor Seal and
Sea Lion Takes, 1992
by Alaska Natives

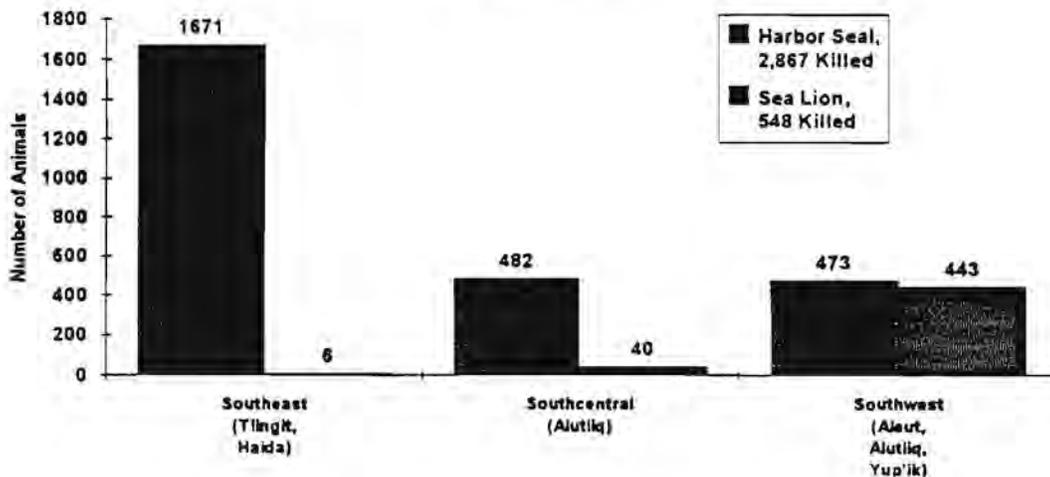
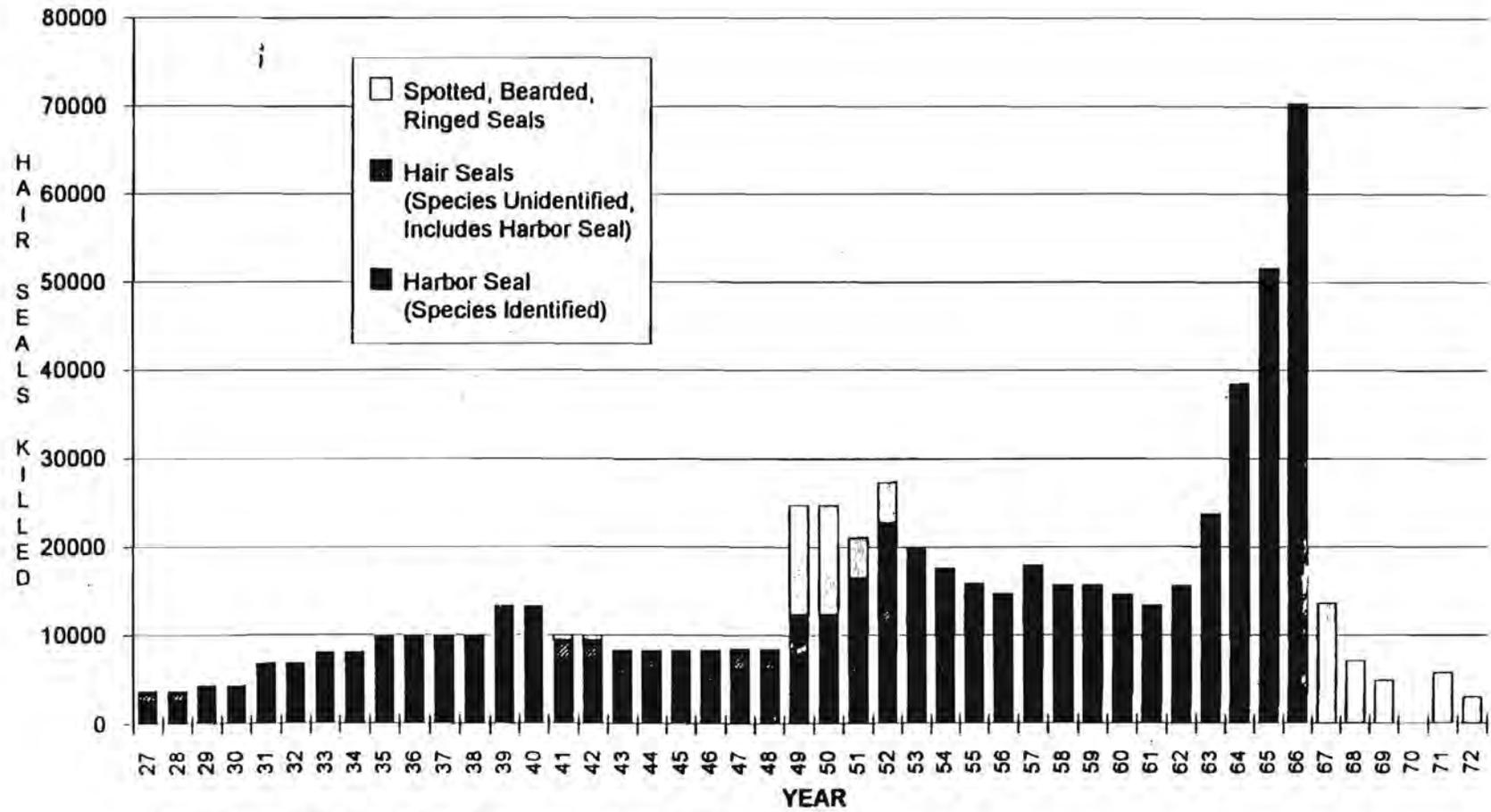


Fig. 3.
Hair Seals Killed in Alaska, 1927-1972,
Under Bounty and Pedator Control Programs
(Programs Ended After 1972)



Source: Division of Subsistence, Alaska Department of Fish and Game

Under local indigenous management systems, subsistence hunters chose to limit their take of animals to levels substantially below hunting potentials. In 1992, Alaska Natives took a total of 2,867 harbor seals and 548 sea lions for subsistence uses. As a general assessment, the 1992 subsistence harvest represented about 1.5 percent of the 1992 estimated Alaska harbor seal population (185,000 seals), and 1.4 percent of the estimated 1992 Alaska sea lion population (39,396 sea lions) (National Marine Fisheries Service 1992); however, the accuracy and trends in these populations estimates are currently under assessment.

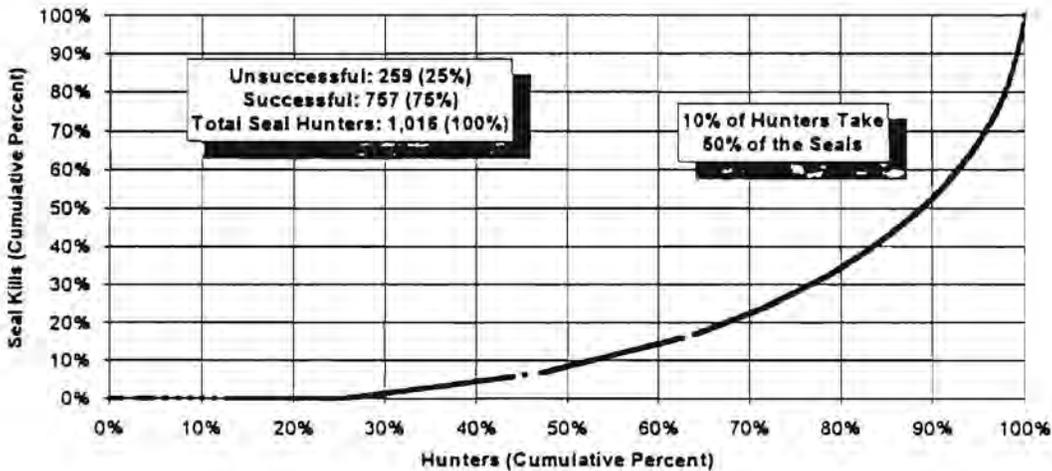
Harvest Limits

In 1992, the harvest was substantially below harvest potentials for either species (Fig. 3). To illustrate this point, from 1927 to 1967, when the government considered seals to be unwanted predators of commercial salmon and paid a bounty for harbor seal snouts, and both Natives and non-Natives could harvest marine mammals, between 10,000-70,000 hair seals, primarily harbor seals, were killed annually in Alaska waters (Wolfe and Mishler 1993:86-88, Addendum to Appendix B). At the peak of the bounty years, between 1964-66, 40,000-60,000 hair seals, mostly pups, were harvested by bounty hunters (Hoover 1988:138). Compared with these historic takes, the 1992 subsistence harvest of 2,867 seals is substantially less than what could have been taken, because subsistence hunters chose to limit their take.

Hunter Specialization for Seals

Under local indigenous management systems, only a select number of people chose to hunt marine mammals in 1992. Seal hunting was a relatively specialized activity. We estimate that there were 1,016 seal hunters in 1992, in a regional Native population of 37,678, and of these, a quarter took no animals in 1992. Further, about 10 percent of the seal hunters took 50 percent of the seals in 1992 (Fig. 4). This group of highly productive hunters, taking an average of about 15 seals each, were harvesting in order to distribute seal products to other, non-hunting families in their communities.

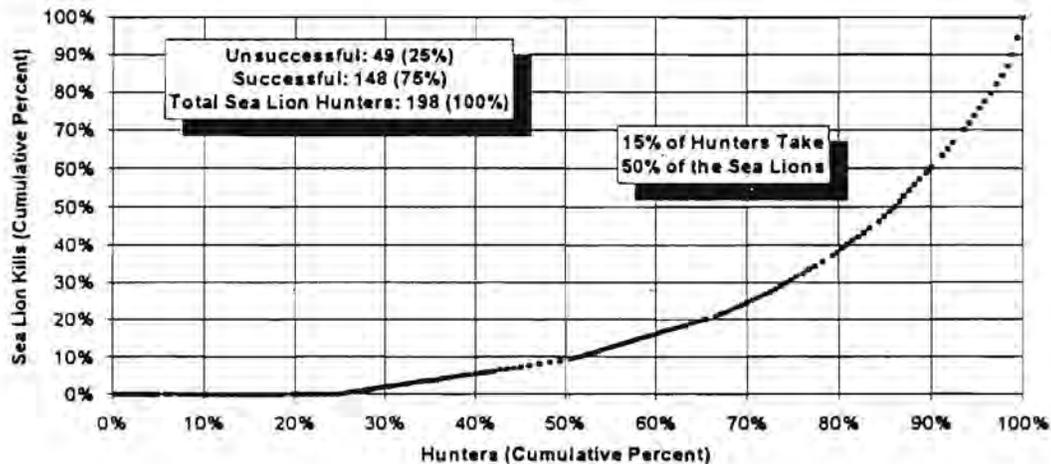
Fig. 4
Seal Hunting Specialization:
Percent of Hunters By
Percent of Harbor Seals Killed,
Alaska, 1992



Hunter Specialization for Sea Lions

Sea lion hunting was also a specialized activity. There were 198 sea lion hunters in 1992; 25 percent were unsuccessful; and about 15 percent took 50 percent of the sea lions -- about 10 sea lions each (Fig. 5). Therefore, although everyone was free to hunt, in practice seal hunting and sea lion hunting was a specialized activity of a small segment of the Native community.

Fig. 5
Sea Lion Hunting Specialization:
Percent of Hunters By
Percent of Harbor Sea Lions Killed,
Alaska, 1992



Age Class Selectivity

Under local indigenous management, hunters selected for particular age and sex classes. For harbor seals, hunters harvested primarily adults, about 5:1 over juveniles (which are yearling seals) (Fig. 6). For sea lions, hunters harvested juveniles (which are immature males) over adults about 2:1. In general, hunters did not take pups of either species. What accounts for this particular age composition? Many hunters stated that they intentionally selected for these age classes. Except when hunting for a few specialty items, hunters stated they tried to avoid killing pups.

Sex Class Selectivity

In 1992, the subsistence harvests also selected for males over females. Hunters could not recall the sex of a portion of their kill. Of the known take, hunters reported harvesting twice as many male harbor seals than female harbor seals, and three times as many male sea lions than female sea lions in 1992 (Fig. 7).

Like avoidance of pups, taking more males probably has good conservation effects. Harbor seals probably are promiscuous breeders, and sea lions are harem breeders. In a reproductive sense, there are excess males in the population which can be taken with less effect on future population production than if females are taken.

Fig. 6
Age Composition of
Harbor Seal and
Sea Lion Takes, 1992
by Alaska Natives

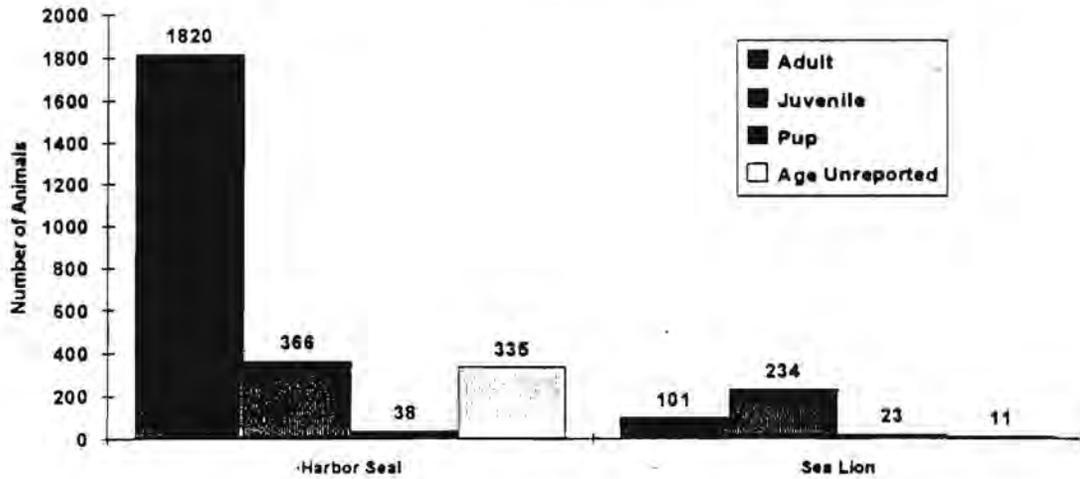
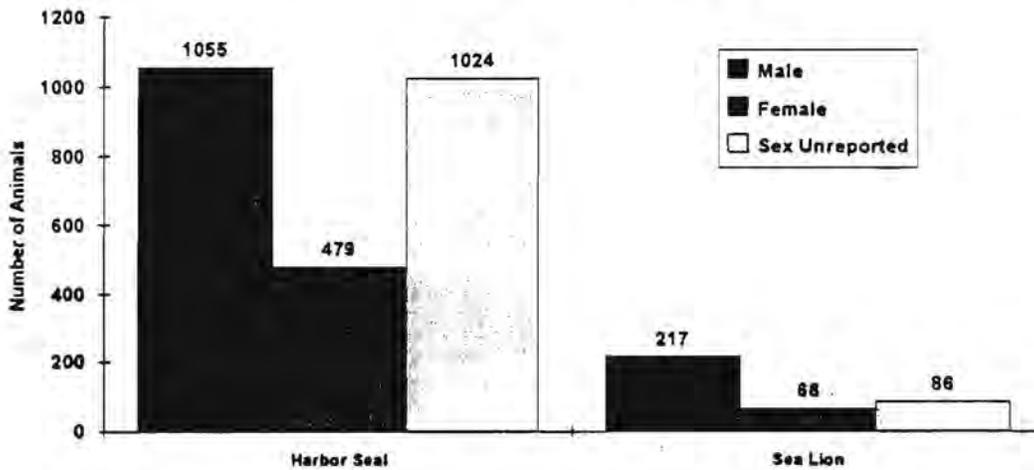


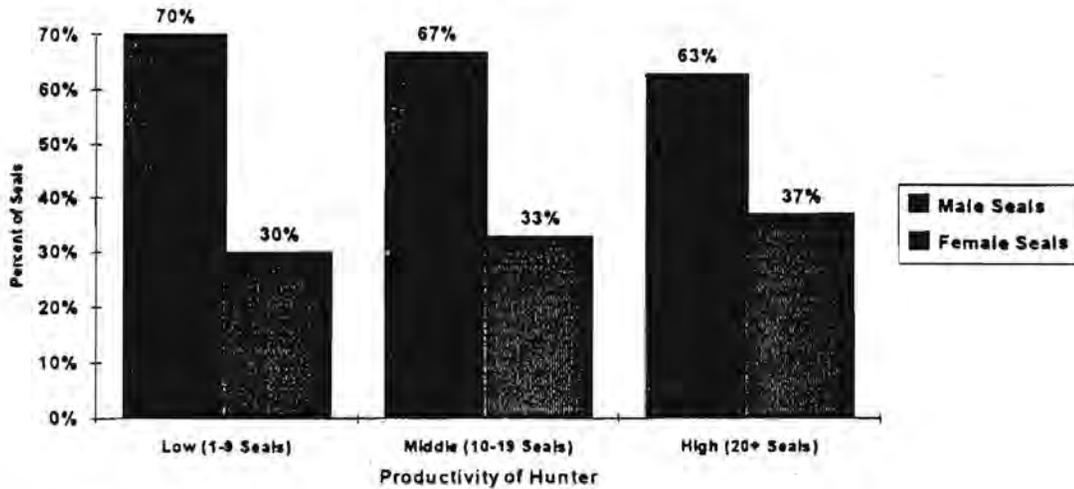
Fig. 7
Sex Composition of
Harbor Seal and
Sea Lion Takes, 1992
by Alaska Natives



Sex Ratio by Hunter Productivity

The two to one, male to female sex ratio is consistent across productivity of the hunter – low productive hunters (1-9 seals), moderate productive hunters (10-19 seals), and high productive hunters (20 or more seals) (Fig. 8).

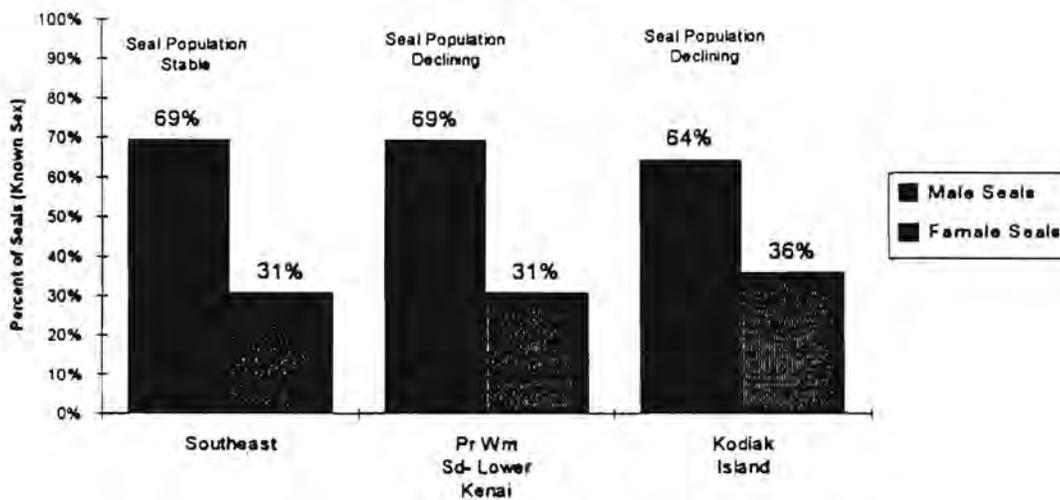
Fig. 8
Sex Ratio of
Harbor Seal Harvest
by Hunter Productivity,
Alaska, 1992



Sex Ratio by Area

The two to one, male to female sex ratio is also consistent across geographic area – comparing southeast Alaska (where the seal population is stable), and Prince William Sound-Lower Kenai Peninsula and Kodiak Island (where seal populations are declining and low in certain locales) (Fig. 9).

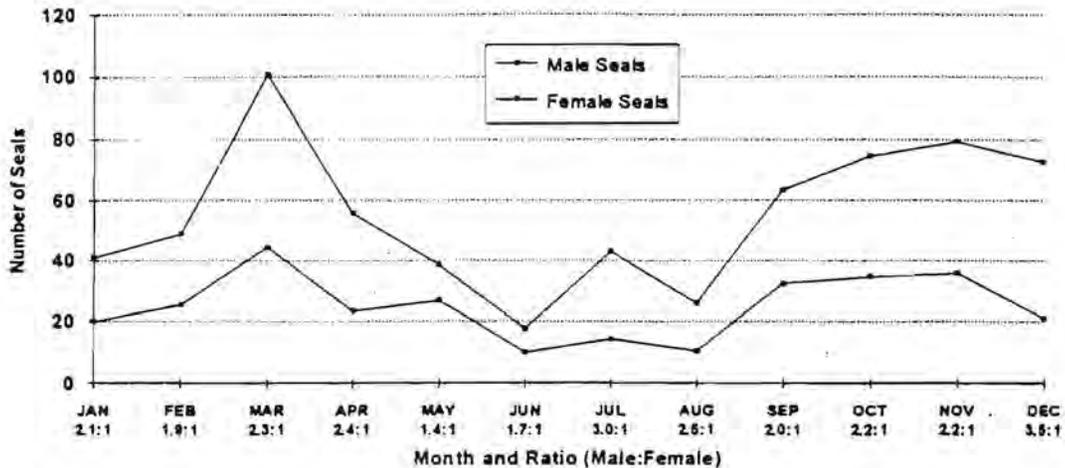
Fig. 9
Sex Ratio of
Harbor Seal Harvest
By Alaska Area, 1992



Sex Ratio by Month

The two to one, male to female sex ratio is also consistent across monthly harvest period in southeast Alaska (Fig. 10).

Fig. 10
Sex Composition of
Harbor Seals Harvested,
By Month,
Southeast Alaska, 1992



The sex ratio is an interesting feature of the harbor seal take. How does it come about? If by intent, then how do hunters distinguish males from females when harbor seals show little sexual dimorphism and aggregate in mixed sex groups?

Many hunters stated that they, by choice, avoided killing females, especially females accompanied by pups or females carrying near-term fetuses. For example:

A Tlingit hunter from Kake stated, "We try not to shoot the small seals less than a year old, or females with pups."

Another Kake hunter stated, "I tell my sons, in June or July, don't harvest seals that are floating with backs out of the water. That's a female carrying pups. I teach my sons not to hunt females, especially during those months."

A Haida hunter stated, "From September to late November, and early December you can shoot all the seals you want, after which we don't shoot the females. Generally, we don't shoot the females anyway."

A Tlingit hunter from Juneau stated, "[Historically], no one went out to look for mothers with pups. My father was an avid seal hunter. He would be able to tell that it was a female with a little one. He wouldn't shoot it."

Distinguishing Sex

There are a number of ways that hunters say they can distinguish males from females, including the following.

Size. Older bulls are larger than females; however, young males may be confused with older females.

Swimming behavior. Pregnant females carrying near-term pups are more buoyant and swim higher out of the water. This principal apparently is widely known, and was mentioned by hunters in Saxman, Kake, Klawock, Juneau, Haines, and Yakutat.

Presence of pups. Pups are associated with females.

Body proportions. Animals with smaller heads are females or young males. Pregnant females' necks are wider than males'.

Segregation of groups. At times of the year, females with pups segregate from older males.

Locations of sexes in seal groups. Dominant bulls hold higher positions on haulouts. Male guards swim at the periphery of a group.

Behavior of sexes in seal groups. Male seals are more curious, bolder, and in some cases, easier to call in a group of seals reacting to the presence of a hunter in a boat or on land.

Although in aggregate, more males than females are taken, selectivity of animals is a complex issue, with considerable variation among hunters. Some hunters stated that they could not distinguish males from females, and some hunters stated they preferred females over males, or had no preference.

A number of other factors were mentioned by hunters in selecting seals. Many hunters stated they preferred medium sized animals, about 1-2 years old, because the meat was tender, the hides less scarred, or because seal communities needed to retain their older leaders. Some hunters stated they selected for larger animals, which provided more meat and oil. Some hunters stated they targeted on skin color, particularly lighter colored animals, which may select for younger adults if the pelage of harbor seals darkens with age. A combination of selection factors are evident in the following discourse from a Tlingit hunter from Pelican:

Seals seldom are hunted during pupping time in spring, except when unborn seal are hunted for their hides, which are favored for making moccasins – light, white, soft, and wooly. Unborn seals can be harvested in March and April. Baby seals are born in April and May and nurse through June. I don't hunt them again until late June or July. Sometimes I try to target males, which tend to be longer or thinner than females, but often I cannot tell the difference. I also avoid old seals because their meat is usually tougher and their hides are scarred from battles. Young seals have the best skins – juvenile or unborn pups – and I used to target them for my mother, who used the skins for beadwork.

Teaching Local, Customary Rules

Indigenous hunting systems consist of collective, customary patterns of behavior, following knowledge, beliefs, and proscriptions learned by men and women socialized into the local group. The customary patterns are primarily taught within kinship groups. They take the form of customary practice, oral traditions, experiential lessons, and normative rules. While there are some cultural taboos with severe consequences in local management systems, customary principles are most commonly guidelines for proper conduct, and hunters have substantial individual freedom of choice.

A male Yup'ik hunter explained how hunters learned customary rules in Togiak:

An elder hunter in the household counsels their sons on techniques of hunting on sea and land. Every child (*mikelnguq*) who is counseled (*qalarucimalrit* – "ones who are counseled") know the rules of hunting. The ones who are not counseled (*qalarucimanrenguq*) are careless and not respectful to their fellow hunters and harvest, and are a danger to themselves and fellow hunters. The ones that are observant (*murilketalret*) and the ones that accompany the hunters (*maligrutetulet*) learn and know the rules of hunting.

Transcribed by Molly Chythlook, ADF&G Division of Subsistence

In a similar fashion, women are taught the customary rules regarding the processing and distribution of seals and sea lions, as described to us by a woman Yup'ik elder in Togiak:

What game is brought home are cared for with respect by a wife, mother, mother-in-law, or sister. Mothers or the responsible woman parent or guardian would train a daughter her responsibility to her husband's harvests before they were old enough for marriage... When a wife of a hunter does not care for his harvests, and lets them go to waste by rotting, or if she discards usable or edible parts due to laziness, then the husband's harvesting of game will be affected through his wife's carelessness and laziness... To be stingy has the same results as one who does not respect one's harvests, the harvester will gradually lose his harvesting ability. Shared foods *cimirtuq* ("are unexpectedly replaced") if shared willfully... All women are not alike, some freely share and others do not... I cannot to this day leave or discard any harvested game or fish. I still practice what I was taught by my mother to date.

Transcribed by Molly Chythlook, ADF&G Division of Subsistence

Here we see three ways a person learns the customary rules of the indigenous system. A person is counseled by elders, fathers, mothers, and guardians. A person is observant, and watches what others do. And a person learns by practice, accompanying and working with others.

According to these elders, some people are more educated than others. There are those who are instructed, and there are those who are not. Statistically, as indicated above, marine mammal hunting tends to be a specialized practice in Native communities, perhaps reflecting the status distinctions of exclusive instruction. We also see that if customary rules are not followed, there are negative consequences, such as a hunter losing his hunting ability. According to the two respondents, there are some hunters and processors who disregard customary rules, at the risk of themselves and others. Untutored persons may hunt, but they may be more careless, disrespectful to wild animals, and dangerous to themselves and others.

The Place of Indigenous Hunting Systems

This brief profile of the 1992 subsistence take of harbor seal and sea lion strongly shows the influence of indigenous cultural systems in guiding hunting activity. Federal or state regulations are not responsible for the limited size of the harvest, the seasonal cycle, and the selection of species, age, and sex classes. These features result from complex sets of local factors, many of them cultural in nature.

Local, indigenous management systems play important roles in marine mammal management regimes. They guide the proper conduct of local subsistence hunters across a diverse geographic and cultural landscape. As shown by the 1992 data, under local, indigenous management, we find that only a small number of potential hunters actually hunted seals and sea lions; that harvest levels were intentionally limited, substantially below production potentials; that many hunters chose not to hunt sea lion at all; that many hunters intentionally selected for adult seals and adolescent sea lions, and chose to protect pups and pregnant females; and that hunter-seal interactions resulted in the selection of males over females. All these practices may have good conservation effects.

The importance of indigenous management systems in resource management is gaining recognition in the recent scientific literature (Berkes, George, and Preston 1991; Case 1991; Caulfield 1992; Feeny et al. 1990; Huntington 1992; Wolfe 1993). The term "comanagement" is being used to describe a spectrum of new management arrangements, which brings together western and indigenous management systems. Indigenous, traditional knowledge, expertise, and practice are formally linked with western scientific knowledge, expertise, and practice. The result is resource management that is better informed, and better structured to achieve important, beneficial goals.

With harbor seal and sea lion, formal comanagement arrangements have yet to be developed. Native hunters of sea lions and harbor seals and their local management systems are not formally integrated with the federal or state system (Fig. 11). For sea lion or harbor seal, there are not even organizations representing Native hunters, such as the Eskimo Whaling Commission, the Eskimo Walrus Commission, the Alaska and Inuvialuit Beluga Whale Committee, or the Sea Otter Commission.

Under the Native exemption of the Marine Mammal Protection Act, local indigenous management systems have had the freedom to work to guide the local subsistence takes of Native hunters. This regulatory arrangement has existed during a period when sea and sea lion populations have been stable. However, will this continue when seal and sea lion populations are in a period of decline? With sea lion and harbor seal populations falling rapidly, it is possible that state, federal, and international management bodies will rush to develop and implement recovery plans for sea lions and harbor seals without the involvement of Native hunters, indigenous knowledge, or local management systems. If so, these efforts will be handicapped, because structurally, they do not draw upon local marine mammal systems. They are less likely to be successful in achieving their goals. Local, indigenous management systems historically have played important roles in guiding local hunting. During this period when marine mammal populations are facing ecological problems, the important roles of local, indigenous management systems should be recognized and be secured a place in marine mammal management regimes.

**Local Indigenous Hunting Systems,
Customary, Local Regulation
Aleut, Alutiiq, Haida, Tlingit, Yup'ik)**

↓
**Mediating Organizations
(Eg., Eskimo Whaling Commission;
Alaska and Inuvialuit Beluga Committee;
No organizations for seal or sea lion)**

↓
**State-Federal-International
Management Regimes
(MMPA, Native Exemption)**

George, and Richard J. Preston
Management, The Evolution in Theory and Practice of the Joint
Resources. *Alternatives* 18(2):12-18.

Self-Determination. Can Alaska Natives Have a More "Effective
Digest 1:26-39 (Revised and updated from 1989 University of
50(4):1009-1035).

Subsistence Management Regimes. *Polar Record* 28(164):23-32.

Arkes, Bonnie J. McCay, and James M. Acheson
Tragedy of the Commons: Twenty-Two Years Later. *Human Ecology*

Seal — *Phoca Vitulina*. In Jack W. Lentfer, ed. *Selected Marine
Species Accounts with Research and Management Recommendations*.
Commission, Washington, D.C., p. 125-157.

Alaska Eskimo Whaling Commission and Other Cooperative Marine
Organizations in Northern Alaska. *Polar Record* 28(165):119-126.

Marine Service
*and Regime to Govern Interactions Between Marine Mammals and
Operations*. Legislative Proposal, U.S. Department of Commerce,
Atmospheric Administration, National Marine Fisheries Service,

Trade and Politics in Alaska. In Alexander B. Dolitsky (ed.) *Politics and
Alaska-Siberia* Research Center, Publication No. 5, Juneau, Alaska, p.

Craig Mishler
Subsistence Harvest of Harbor Seal and Sea Lion by Alaska Natives in 1992.
1992, Parts 1 and 2. Division of Subsistence, Alaska Department of Fish
and Game, Alaska.

References

- Berkes, Fikret, Peter George, and Richard J. Preston
1991 Co-Management, The Evolution in Theory and Practice of the Joint Administration of Living Resources. *Alternatives* 18(2):12-18.
- Case, David S.
1991 Subsistence and Self-Determination. Can Alaska Natives Have a More "Effective Voice?" *Arctic Issues Digest* 1:26-39 (Revised and updated from 1989 University of Colorado Law Review, 60(4):1009-1035).
- Caulfield, Richard A.
1992 Alaska's Subsistence Management Regimes. *Polar Record* 28(164):23-32.
- Feeny, David, Fikret Berkes, Bonnie J. McCay, and James M. Acheson
1990 The Tragedy of the Commons: Twenty-Two Years Later. *Human Ecology* 18(1):1-19.
- Hoover, A. Anne
1988 Harbor Seal — *Phoca Vitulina*. In Jack W. Lentfer, ed. *Selected Marine Mammals of Alaska: Species Accounts with Research and Management Recommendations*. Marine Mammal Commission, Washington, D.C., p. 125-157.
- Huntington, Henry P.
1992 The Alaska Eskimo Whaling Commission and Other Cooperative Marine Mammal Management Organizations in Northern Alaska. *Polar Record* 28(165):119-126.
- National Marine Fisheries Service
1992 *Proposed Regime to Govern Interactions Between Marine Mammals and Commercial Fishing Operations*. Legislative Proposal, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, November.
- Wolfe, Robert
1993 Subsistence and Politics in Alaska. In Alexander B. Dolitsky (ed.) *Politics and Environment in Alaska*, Alaska-Siberia Research Center, Publication No. 5, Juneau, Alaska, p. 13-28.
- Wolfe, Robert J. and Craig Mishler
1993 *The Subsistence Harvest of Harbor Seal and Sea Lion by Alaska Natives in 1992*. Technical Paper No. 229, Parts 1 and 2. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Alaska.