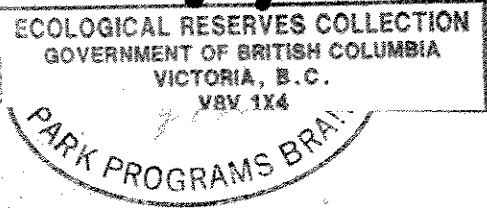


Baeria Rocks

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Ecological Reserves Program
Parks & Outdoor Recreation Division
Victoria, B.C. V8V 1X4

Field Study on the Harbor
Seal (Phoca vitulina)

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Marine Mammals '81

for: K.S. Norris

Introduction

Naturalistic behavior studies are expensive timewise and tend to yield relatively small amounts of scientifically "pure" data - those which are easily measured and repeatable, when compared to other methods of study.

At least partially due to this phenomenon there appears to be a paucity of data published on seals studied in their natural environment. It is not the intent of this study to bridge the gap in our scientific knowledge but, to introduce to the researcher the actual dimensions of a behavioral project and some of the problems inherent to the best of them.

Methods & Materials

The subject of this study was the harbor seal (Phoca vitulina) carried out on Baeria rocks ($48^{\circ} 57' 13''$ N and $125^{\circ} 9' 6''$ W), an ecological reserve area found in the Imperial Eagle Channel of Barkley Sound where the seals are known to frequent (for a map showing the position of Baeria Rocks and the reserve area see Figure 1 in the appendix).

The Baeria rocks are oriented lengthwise on an east-west plane (making the north end "lee") and measure approximately 300 yards in length, 100 yards in width and ^{having} a maximum elevation of 40 feet at low tide. For a contour map of the study area refer to Figure 2 in the appendix.

The study ran from August 2, 1981 to August 22, 1981; a period of 20 days encompassing five separate observation periods yielding 17 hours and 40 minutes of direct study. The times of day in which observations were taken (August 2 ~ 9⁰⁰ AM - 12⁴⁰ AM; August 4 ~ 6¹⁰ AM - 9¹⁰ AM; August 6 ~ 7⁰⁰ AM - 10³⁰ AM; August 14 ~ 6¹⁵ AM - 9⁴⁵ AM; and August 22 ~ 7⁴⁵ AM - 11⁴⁵ AM) reflect the availability of free study time, preferred attention to haul-out behavior occurring at low tides and basic difficulty in travel to and from the area due to usually high winds blowing up in the early afternoon. For the relation of

study times to the tidal action. Figures 3-7 in the appendix show the overlaps. It should be noted that no cross check at high tide for haul-out behavior was initiated due to time and weather allowances.

The "still" observation time at Baria Rocks was more or less equally divided between two fixed sites (refer to Figure 2). The first one was on the rocks 10 feet above the water and 100 feet across the bay from the main haul-out rocks for the seals (ie. where they have always been congregated upon initial wide sweeps of the island). The boat for these periods was moored in an inlet on the east side of

the rocks, also shown in Figure 2. The other point of observation was 150 feet southwest of the haul-out area where the 13' 4" whale was anchored. Tours around the entire island were also used to survey possible adaptive behavior by the seals and at the termination of each study session a pass around a neighboring island, Swiss Bay, was completed to see any possible fluctuations in the resident numbers.

Observations were all recorded by the chief (and only) experimenter immediately upon sighting. Unfortunately few time-tags or repetition rates were, or could be applied. Behaviors observed in ind-

individuals or groups were carefully recorded,
behavior being classed as such if it
appeared as an obviously discreet action
was repeated over time.

results

The results derived from this study were
primarily not empirical but nor were they
expected to be. The most empirically
"pure" results were the population estimates.

The largest number of seals seen on the
surface at any one point during a session
appeared the best way to census without
exaggeration seeing as how individual
identification was very limited. For
August 2nd 24 individuals was the initial
estimate on the first run in with the

als on Baeria with 3 more ^{being} seen on
Swiss Boy Island. On August 4th 15
were seen up at once with 4 being
sighted on Swiss Boy. August 14th showed
2 up at Baeria and 5 up at Swiss
Boy. Finally August 22nd showed
up at Baeria and 9 up at Swiss
Boy.

For the behaviors seen through the
study it should be noticed that all
of them appeared to be partially con-
trolled by acclimation. That is that
the behaviors got stronger or weaker,
faster or slower as our time in the
area was extended.

A primary behavior most frustrating

to this study was the seals hauling
off the rocks. On the wide sweeps
around the rocks before approach the
seals were seen hauled out and we
were far enough out that none were
seen to haul off on our pass. How-
ever, if we got close enough to anchor
the boat or even moor it around the other
end of the rocks and walk silently
towards our observation region (being
out of sight all the way) the seals
would be off the rocks before we
arrived.

Sitting at either site we also had seals
moving inside or just outside the bay
area paying very much attention to us

at first and then that degrading until they were doing much other action and only glancing at us occasionally near the end of the study. This was accompanied by a similar reduction in the numbers of seals ranging into the area. An example of this is shown by the August 4th population count of 15. This number was made by looking forward into the bay and counting 7 seals then glancing behind us to the south of the rocks and seeing 8 more - all up and all watching us. On the other hand by the 4th and 5th study sessions no seals were seen on the south of the rocks (windward) where it was roughest

and the population census had to be achieved by paddling the boat around the north side of the rocks and counting the number of seals that had moved out and hauled out there (this action most likely depressed the counts markedly since all the seals weren't seen to haul up and stay at once). One point of interest to note on this re-haul-out action was the placement of the new "beaches". Do best follow refer to Figure 2. If the observation of the main "beach" was done from the boat and we travelled around the island by paddling the seals were seen to be hauled out on the secondary "beach"

in the northeast corner of the rocks, furthest away from us (2 cases). If, however, the observations of the main "beach" were from shore and we had the boat parked in the eastern inlet and we then circled the island the seals were seen to haul out in the northernmost secondary "beach", or midway and most distant from both the observers and the boat (1 case).

Other behaviors observed included 2 types of submersions, being called the "slip under" and the "twist + splash".

The "slip under" was primarily seen in lone seals visible around us. The seal would look around and then tilt his

head back (nose straight up) and slide underwater with hardly a ripple. The "twist & splash" was generally seen when more than one seal was present or when the observer would focus his face directly on a nearby seal or if he moved quickly. This maneuver consisted of driving the head backwards until the back of the head was usually underwater and then twisting to one side and giving a massive push which brought the hind flippers out of the water or at least to the surface and led to a fast, deep orientation dive with a loud slapping splash.

Another behavior noted very commonly

was the "crane + sniff" which was usually directed towards the observers but was twice seen directed at the glaucous gull (Larus hyperboreus) residents of the rocks. This behavior involved a craning of the neck of the seal into the air bringing up to 18 inches out of the water while looking directly towards the object of study (generally us) and flaring their nostrils in and out (as a horse or dog smells) approximately 5-6 times before slipping underwater. In the case of the gulls they (the gulls) have an interesting behavior pattern of what sounds like one gull initiating a specific sound pattern that stimulates all

the other resident gulls to cease their diverse vocalizations and for 10-15 seconds partake in a synchronous sound pattern that is much louder than their usual sounds and definitely attention getting.

Twice when seals were scanning at the surface and this "symphony" occurred they were seen to look in a southeasterly direction towards the apex of the rocks where the largest numbers of gulls congregate and "crane + sniff" in that direction.

A play behavior definitely being the commonest one seen is surge play. Up to 6 seals were seen at once riding the ever moving surge in the powerful surge channel of the rocks northwest corner.

This behavior would go on almost indefinitely by the 5th study period as long as the surge was reasonably strong, and individuals would go from the surge channel to another activity and back to the surge channel if they weren't replaced by another individual.

It should be noted that this behavior was non-existent on the first study day.

"Social play" as defined by Weller (1961) [in Schusterman (1968)] "occurs when two or more animals indulge in vigorous manipulation of each other's body parts." These types of behavior were seen primarily in one subadult "couple" that were identified and recognized on

3 separate study days and who were very helpful to this study due to their sustained "play" activity held directly in front of us in the bay. Their actions included mock fighting (apparently), nipping at each other, fencing (Schusterman, 1968) (done with neck action), somersaults, and the two following anecdotes. In the first instance one seal turned away from a nuzzling session and started to swim across the bay. The second seal quickly caught up and attempted to climb on the first seal's neck, as is seen by young pups to mothers. The first seal let this go on for about 2 seconds upon which he turned and nipped seriously

at shortly at the "riders" neck at which
time the two separated and swam away
only to join approximately 15 seconds
later at the initial point of nuzzling
to start nuzzling again. Another ex-

ample classed as social play in the
same seal pair involved phonation.

The two were nose to nose and nuzzling
for at least 2 minutes when one backed
up 2 inches and barked 5 times in
approximately 10 seconds directly into
the face of the other (the "bark" sounded
like a racoon's sneeze and very similar
to some sea lion barks). The seals
then turned on their heels and each
swam directly away and 10 seconds

later they returned to the same spot and started nuzzling again.

Another action seen occurred as our only mother-young interaction. At the close of a study session upon passing Swiss Bay Island a mother (assumedly) with a pup on it's back and another adult beside were seen 10 feet off the rocks. We headed over in the boat and the mother twisted, grabbed the pup between her teeth by the back of the neck and dove simultaneously with the other adult. A little while later (we were idling 30 feet off the rocks) a lone adult pops up 20 feet off our port bow (approx-

imately), looks at us and dives. About

5-10 seconds later another lone seal popped

up facing our direction approximately

20 feet off our starboard bow and

then he dove. This action went on

for three separate surfacings before

we thought about it, backed up and

travelled 40 feet down the coast to

see the mother with pup on her back

out of sight behind a rock mass.

At this point we gave up the hunt but

not until we realized that we were

seeing the single free adult of the trio

doing the surfacing.

The last behavior ^{to be} described here is

one that was seen from shore observation

only and at no time observed from the anchored boat. Again it is noted that the behavior wasn't seen on the initial observation day but it became more and more frequent. Lone seals would be seen between 50 and 150 yards off the west end of the rocks and they would look around for about 5 seconds, dive down in what looked to be a deep orientation, stay underwater for at least over one minute, surface in the same area and dive again to repeat the cycle. This behavior was generally continued for approximately 15 minute stretches by individuals upon which they would dive down and

surface either in the bay region or in places denoting a travelling movement around the rocks out of sight.

Discussion

The results show in virtually all the examples described an incremental (or decremental) alteration in the behavior rates over successive visits but it should be realized that to some extent this may have been caused by the observer's initial inexperience in recognizing the behavior.

It is definitely felt, though that the behaviors seen were real, and based on this premise certain of the behaviors shall be considered and hypotheses presented.

The haul-off behavior seen when the

observers were visibly in range of the seals demonstrates that they were aware of us using vision (since we were not always upwind of them and were drifting silently up to 150 yards away). This is not saying, however, that their vision allows them to focus at this distance since at one point a log was observed to float within 50 yards of a group of seals visible on the surface and all evacuated the area, thus suggesting that all they have to do is recognize an unknown moving form to be caused to react (this not requiring great visual acuity). The fact that the seals were always off the "beach" even if we moored quietly at the

other end of the rocks and walked around
may be understood by the "crane + sniff"
response seen directed towards the gulls.
Upon approaching any point of the rocks
the gulls would fly up and respond
orally to our presence, and if the seals
maintain an awareness of the gulls chang-
ing action this would easily give sufficient
warning of intruders. This warning
system won't be attributed to the cases
when we were in sight of the seals
because in one instance we had been
anchored for observation and the gulls
were used to us being in the area
so when we paddled around the rocks
very little change in vocalizations occurred

and those which did were in very small, localized regions considered to be not enough to alert the seals.

The haul out behavior seen on the secondary "beaches" seems a good example of the seals adaptation to unwanted company. The apparently increasing number of individuals seen on Swiss Boy Island may reflect this same response action but the degree of allowable extrapolation is questionable.

The "twist + splash" method of submersion is hypothesized to have some group warning function since a "wave" of response based on distance between individuals was noticed. This thought, however, is

definitely on the verge of being overly presumptuous so it won't be speculated on further.

The play behavior seen is easily understood. Spatially compact societies don't generally exist without interactions and while large scale interactions appear limited to haul-out behavior some grouping behavior should naturally occur with play being a regular form.

The example of phonation shall remain as a predominantly unexplained anecdote but there has been reason given to suspect that this type of phonation will only be heard in very young seals (Jim Darling, personal communication, 1981).

The anecdote of the mother, pup and "companion" adult seal seems to strengthen the idea of a social organization where at least some epimeletic behavior can be seen. While it is not hypothesized how the second adult fits into the trio it does appear clear that he (or she) was diverting our attention away from the mother and pup pair, probably at no little "personal discomfort" since he (or she) was within 20 feet of our idling craft for a period longer than seen during previous moving encounters.

The behavior of the lone seals diving off the west end of the rocks is hypothesized to represent feeding behavior.

Although no apparent foodstuffs were seen (potentially because the seals were too far off or feed totally underwater) the behavior itself appeared to be designed towards a specific goal as it wasn't a randomly carried out action pattern.

As seen before though no proof was found in support of this suggestion so it won't be pursued further.

As seen now throughout these discussions, some of the behaviors noted in this study have led to several hypotheses and much conjecture by the author. Due to the nature and aim of this study, however, it is strongly recommended that neither the utmost faith nor an overly

critical review should be implemented in response to this paper. Instead an open minded reflection of the possibilities and potential extensions of the study would appear to be most productive. Potential methods proposed by the author to expand and/or aid in this study might include observation from a secure blind on the rocks (the value of this initial idea of the author was severely questioned by the end of the study), study from the neighboring islands with the use of a telescope, and perhaps the implantation of a hydrophone in the bay region so rich in activity.

Acknowledgements

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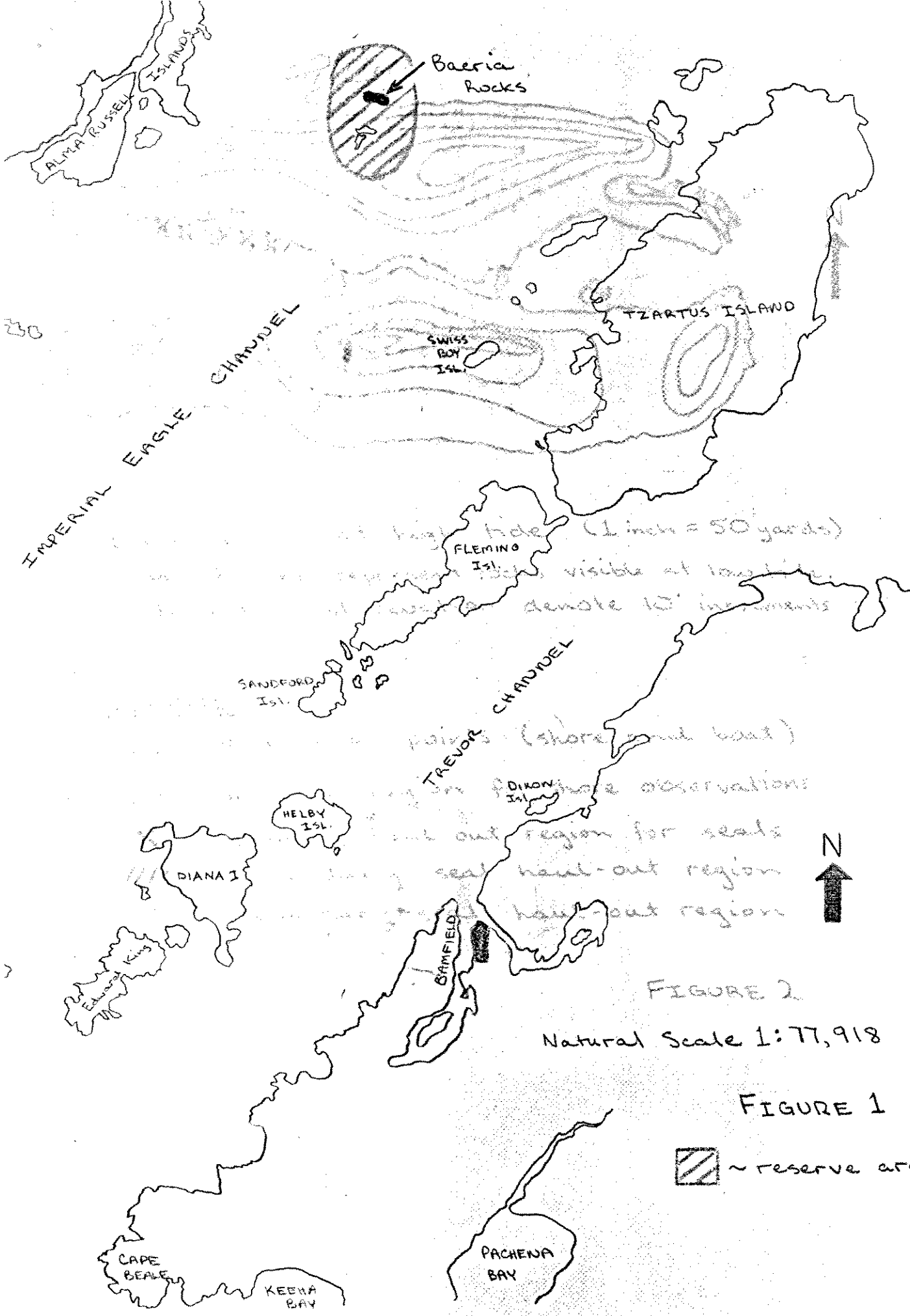
Special thanks go to Dr. Kenneth S.
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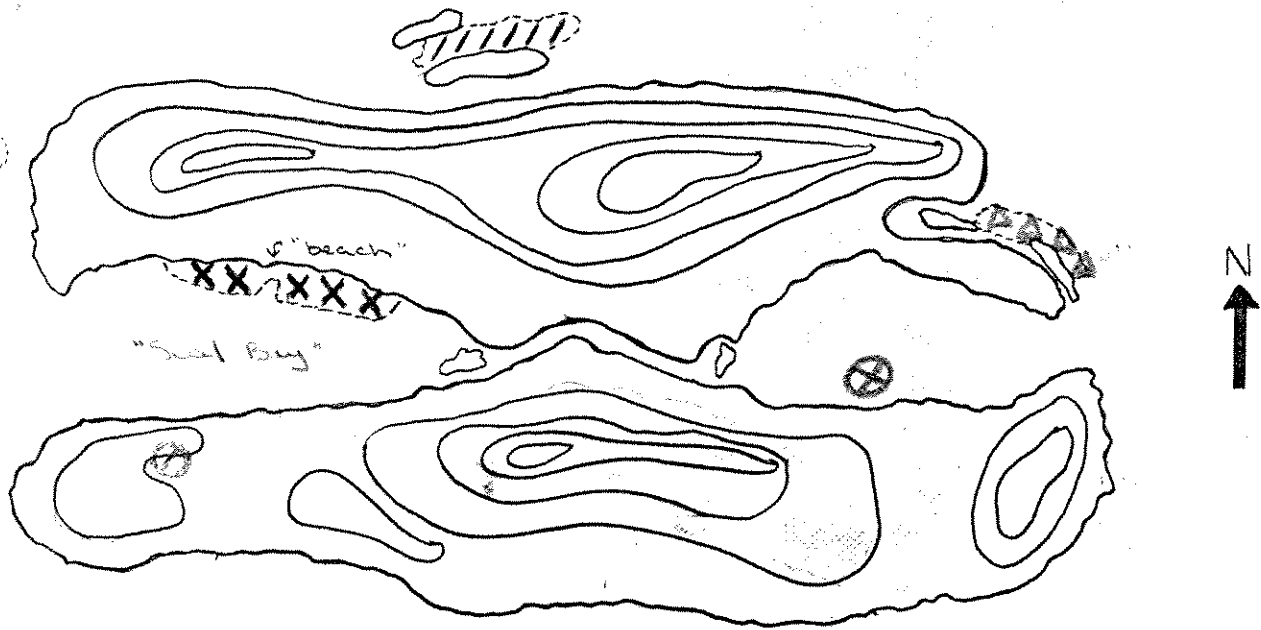
References

Harrison, R.J., R.C. Hubbard, R.S. Peterson,
C.E. Rice, and R.J. Schusterman (Editors).
1968. The Behavior and Physiology of
Pinnipeds. Appleton-Century-Crofts,
New York. Schusterman, R.J.: pp. 128-152.

Appendix

- Figure 1 - Map of north-eastern Barkley Sound showing location of the study area.
- Figure 2 - Contour map of Baeria Rocks with legend of features salient to the study.
- Figure 3 - Graphed tidal heights on study day periods with observer presence superimposed over the time scale (day 1)
- Figures 4-7 - Same information graphed as in Figure 3 for subsequent study days. 2, 3, 4, + 5.



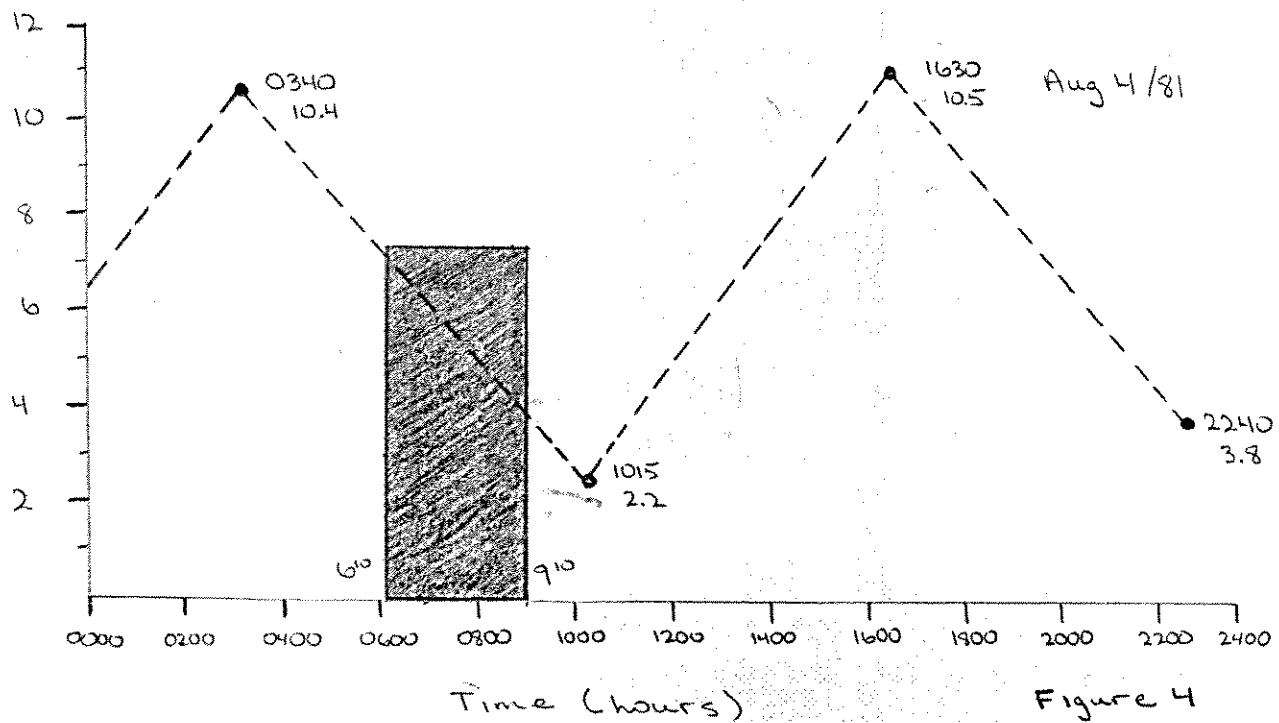
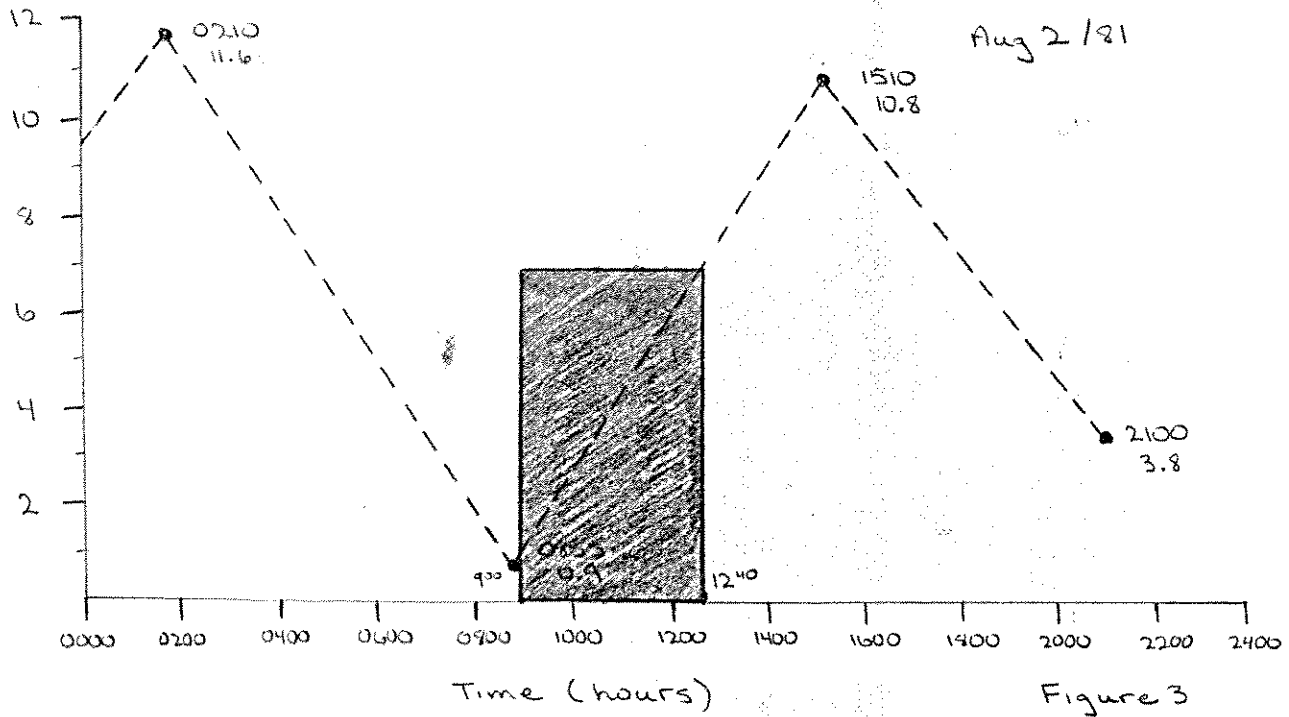


Baeria rocks at high tide (1 inch = 50 yards)
 Dotted lines represent rocks visible at low tide.
 Inner lines of elevation denote 10' increments.

LEGEND

- ⊙ ~ observation points (shore and boat)
- ⊗ ~ mooring region for shore observations
- X ~ primary haul out region for seals
- //// ~ secondary seal haul-out region
- △ ~ secondary seal haul-out region

FIGURE 2



Daily periods of study in relation to tidal action.
 Shaded area represents periods of observer presence.

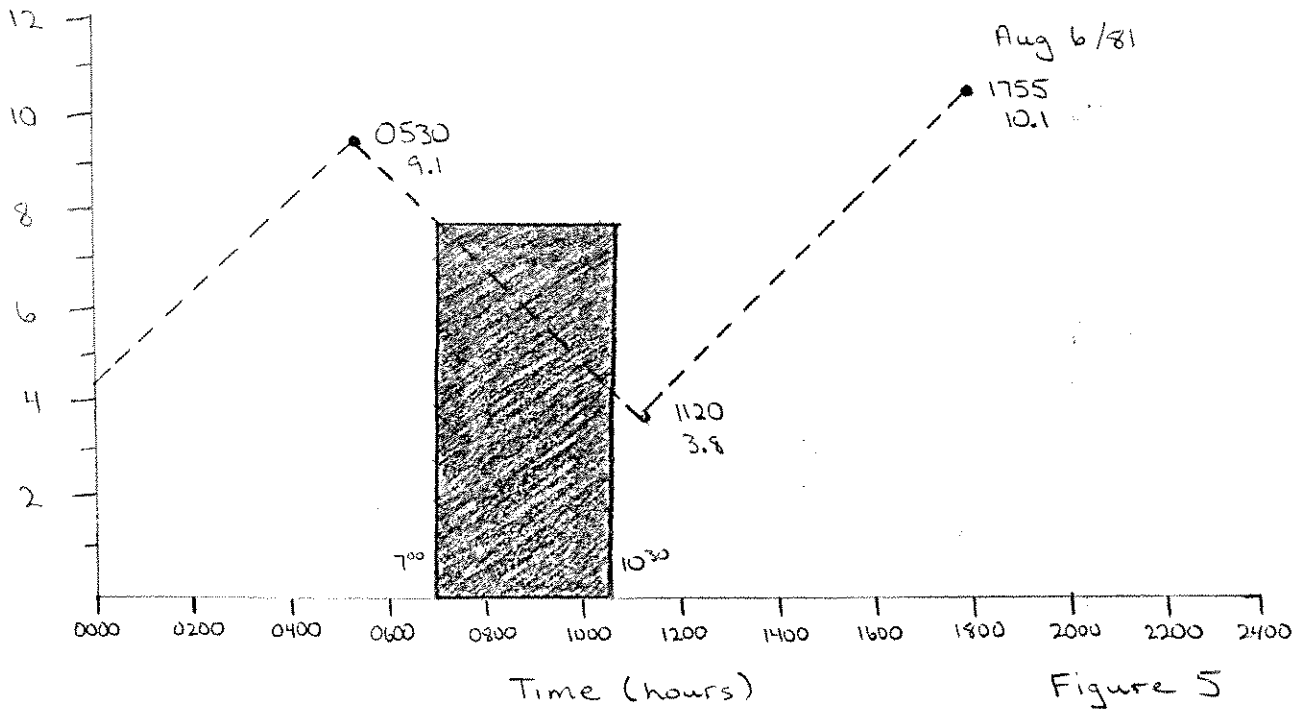


Figure 5

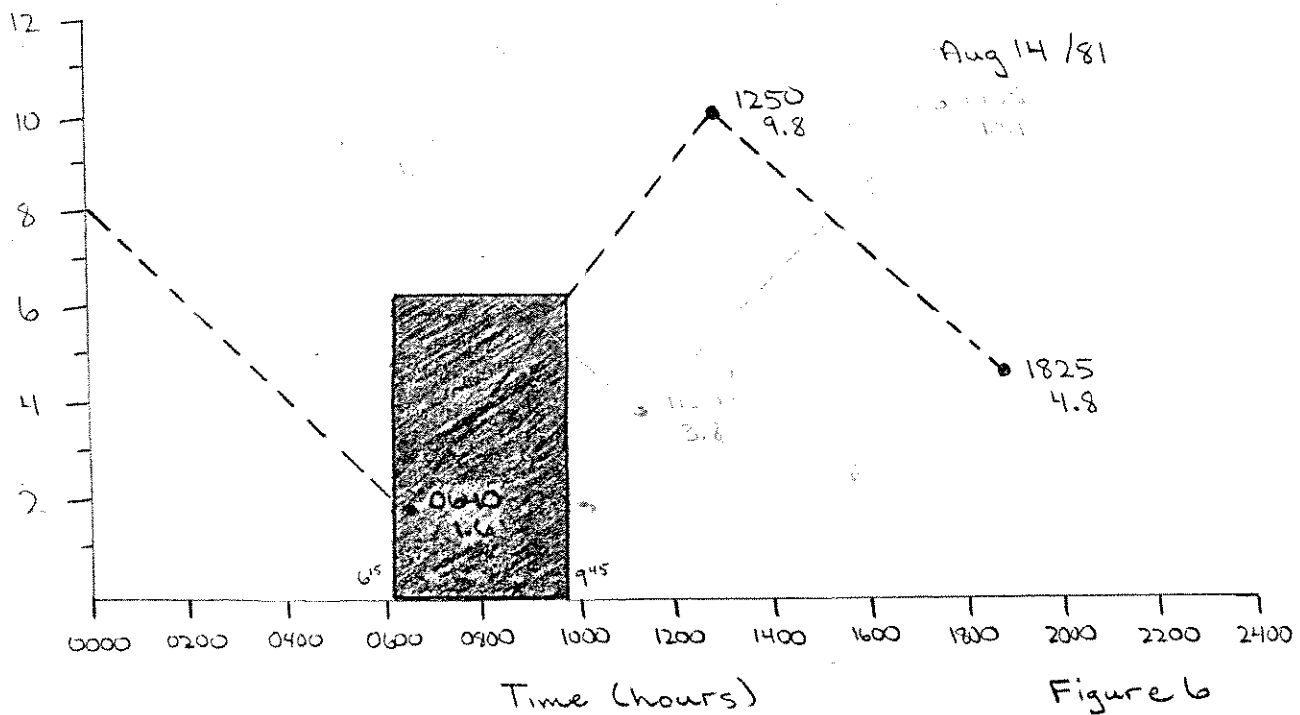
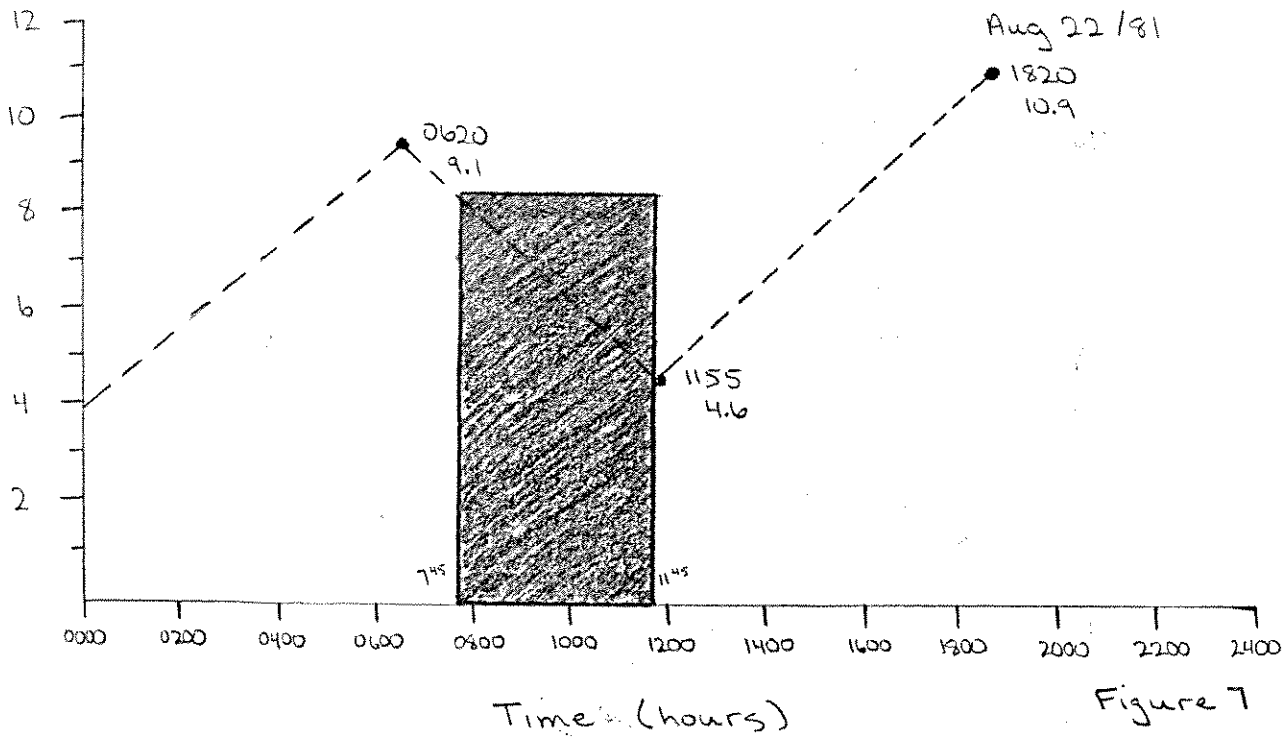


Figure 6

Daily periods of study in relation to tidal action.
 Shaded area represents periods of observer presence.



Daily periods of study in relation to tidal action.
 Shaded area represents periods of observer presence.