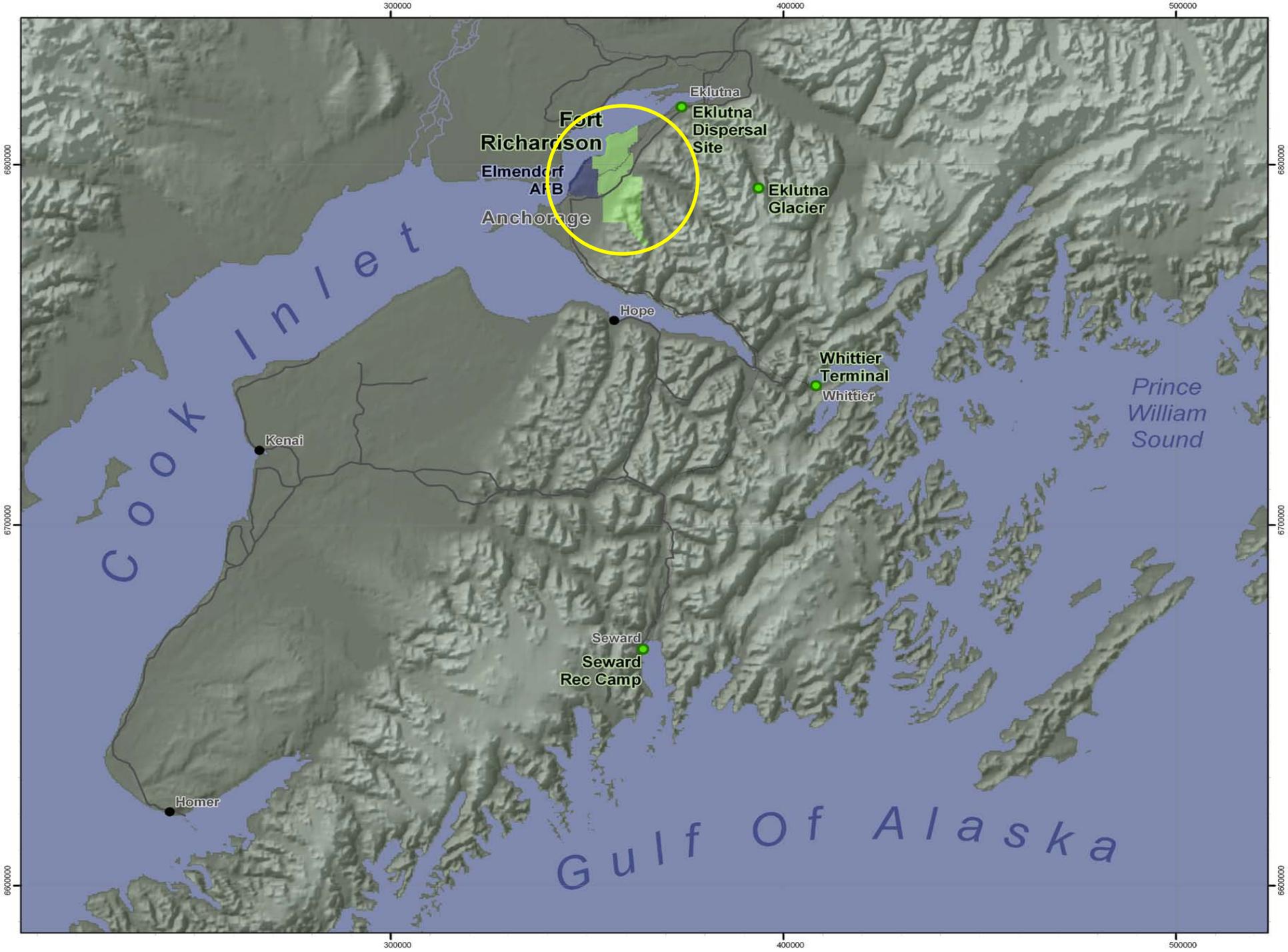


**COOK INLET BELUGA WHALE MONITORING EAGLE BAY,
FORT RICHARDSON, ALASKA 2008-2009**

Chris McKee and Christopher Garner

INTRODUCTION

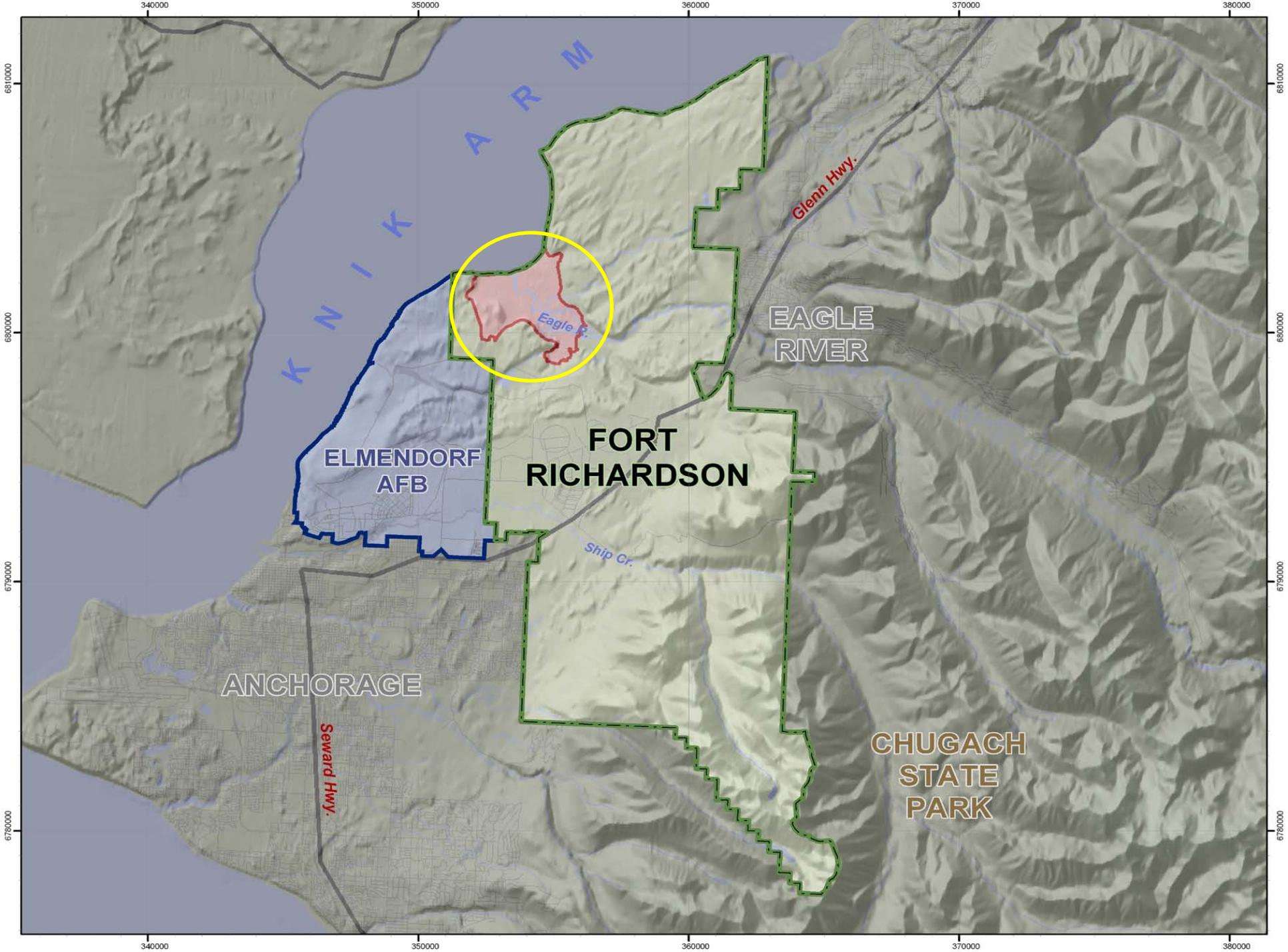
Eagle River Flats (ERF) is a 2,140 acre estuarine salt marsh located in Knik Arm at the mouth of Eagle River on Fort Richardson Army Post. ERF has been used as an impact area since at least WWII



INTRODUCTION

Glacially-fed Eagle River flows through the flats before discharging into Eagle Bay of Knik Arm in Upper Cook Inlet

Beluga whales gather in Eagle Bay and Eagle River between the months of May and November



K N I K
A R M

Glenn Hwy.

EAGLE
RIVER

FORT
RICHARDSON

ELMENDORF
AFB

Ship Cr.

ANCHORAGE

Seward Hwy.

CHUGACH
STATE
PARK

Eagle R.

INTRODUCTION

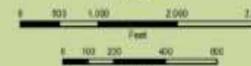
Whales were observed from multiple points but mostly at the mouth of Eagle River, affording a unique opportunity for enumeration and behavioral observations

USAG-AK conservation staff have been observing belugas in ERF since 2005

Eagle River Flats

▲ Observation Points

Distance:
OP Fagan - Mouth = 2,877m
Upper Cole - Mouth = 3,307m



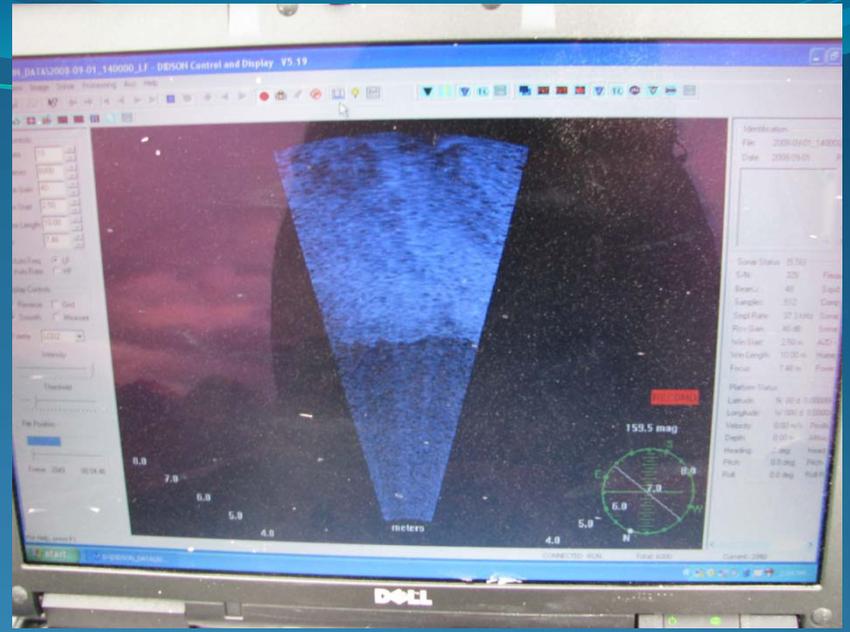
USAGAK GIS
Fort Richardson, Alaska



This data provided for reference use only.
For information on current USAGAK
data and maps, please contact
USAGAK GIS at 907-384-3058







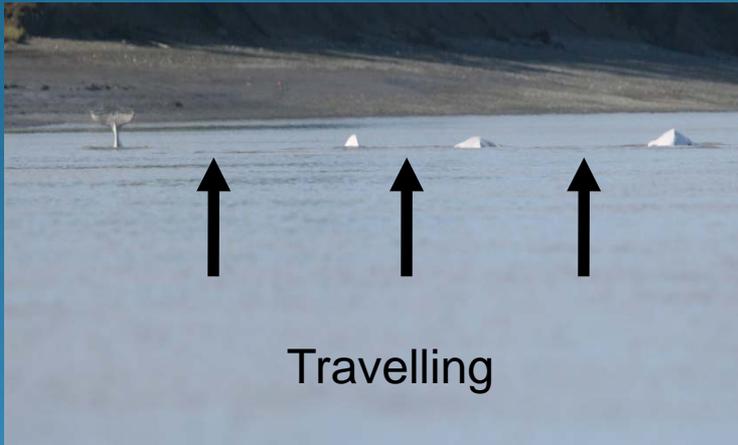
METHODS

- *ad libitum* (opportunistic) sampling used for behavioral observations during first years of observations (2005-2007)
 - No systematic restraints on data collection
 - Useful for refining data collection techniques
 - Not useful for statistical analysis of whale behaviors
- Further refinement of follow protocol and sampling method was needed to allow for analysis of frequencies, rates, and durations of behaviors and seasonal presence/absence information

METHODS

- Follow protocol: Group follow
- Sampling method: Focal-group
- Length of sampling round: 20 minutes
- Whale numbers estimated during each sampling round via instantaneous scans
- Whales classified as white, gray, or calf
- Group behavior was defined as what most (>50%) of a whale group was engaged in during the course of the sampling round
- All whale behaviors were strictly defined prior to sampling to eliminate ambiguities and minimize variation between observers
- Remote cameras set up near mouth of river to record whale presence/absence when observers weren't present

COMMON BEHAVIORS



Feeding Behavior











REMOTE CAMERA



Cook Inlet Beluga Observations – Eagle Bay and Eagle River, Alaska

Observer: Garner / Battle / McKee

Location: OP Vital / OP FAGAN / ER Mouth / Coast of EB

Date

Grid # Start/Finish	Sampling Round/Time Interval	White/Gray/Calf	Behavior	
			1°	2°
		W G C		

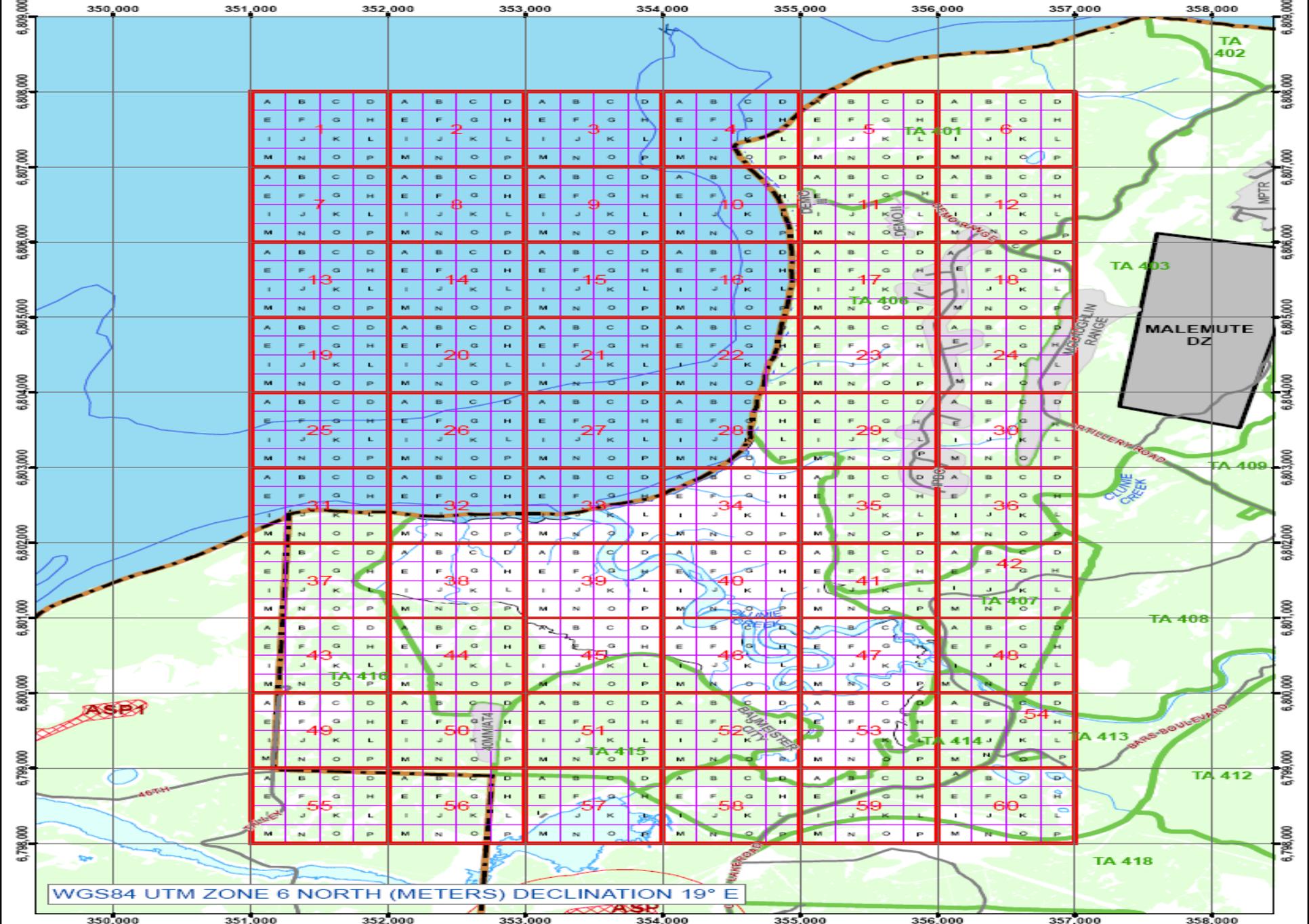
Survey Conditions					
Time	Beaufort Scale	Visibility	Tidal Stage	Precip	Overall
	0 1 2 3 4 5 6		Flood/Ebb	0 1 2 3	P F G E
	0 1 2 3 4 5 6		Flood/Ebb	0 1 2 3	P F G E

Time Start	Time End
Total Time	



Behavior Legend
Traveling (T)
Milling (M)
Prey Pursuit (PP)
Spy Hopping (SH)
Diving (D)
Feeding (F)
Other (O)
Observer Location: ⊗

Estimated Total Number of Whales:



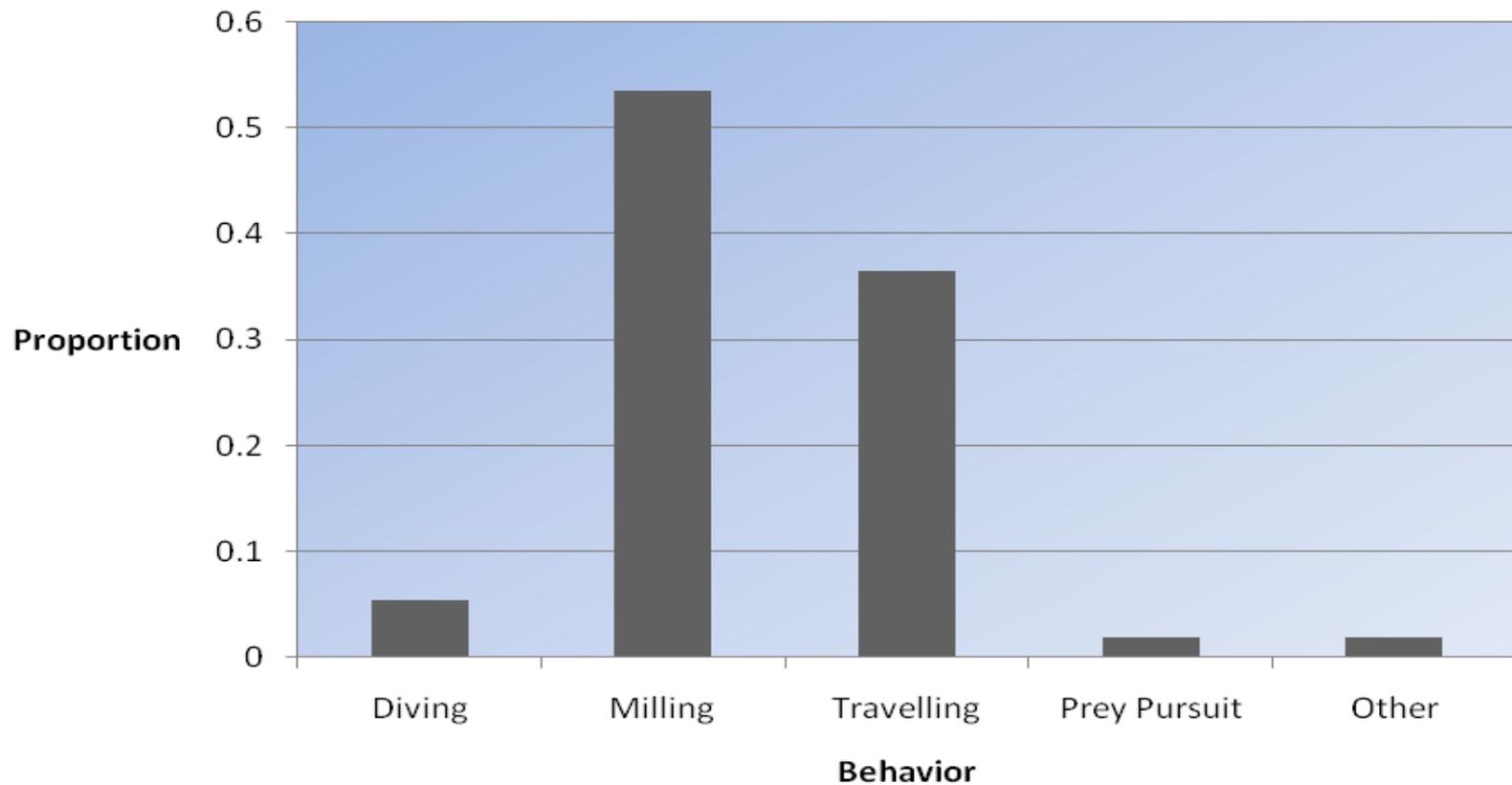
WGS84 UTM ZONE 6 NORTH (METERS) DECLINATION 19° E

RESULTS

- A total of 538 hours was spent on this observational effort in 2008 and 2009
- Whales were present for 97 hours (18%) of the total observation time for both years
- Mean number of whales observed in 2008 (15.4) and 2009 (8.8) was significantly different ($t = 2.04, p < .02$)
- There was no significant difference in the mean number of whales observed per month for the months in which whales were present ($F = 2.47, p = .09$), or for the mean number of whales observed over the course of the day ($F = .71, p = .49$).
- Group color composition between years significant for whites ($t = 3.01, p < .001$) and calves ($t = 1.90, p < .03$) but not for grays ($t = 1.01, p = .15$)

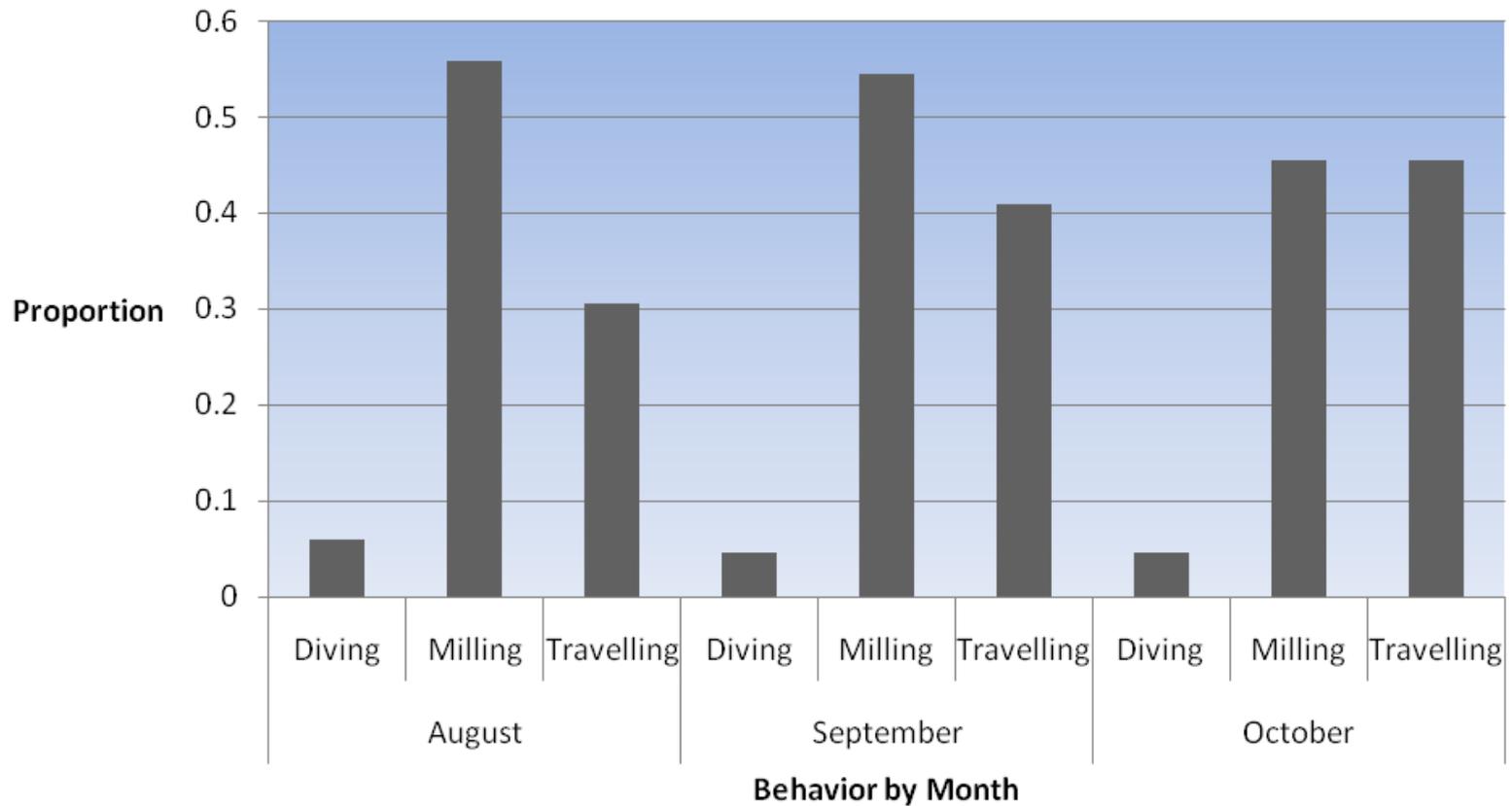
RESULTS

Total Proportion of Time Whales Spent in Behavioral Categories 2009



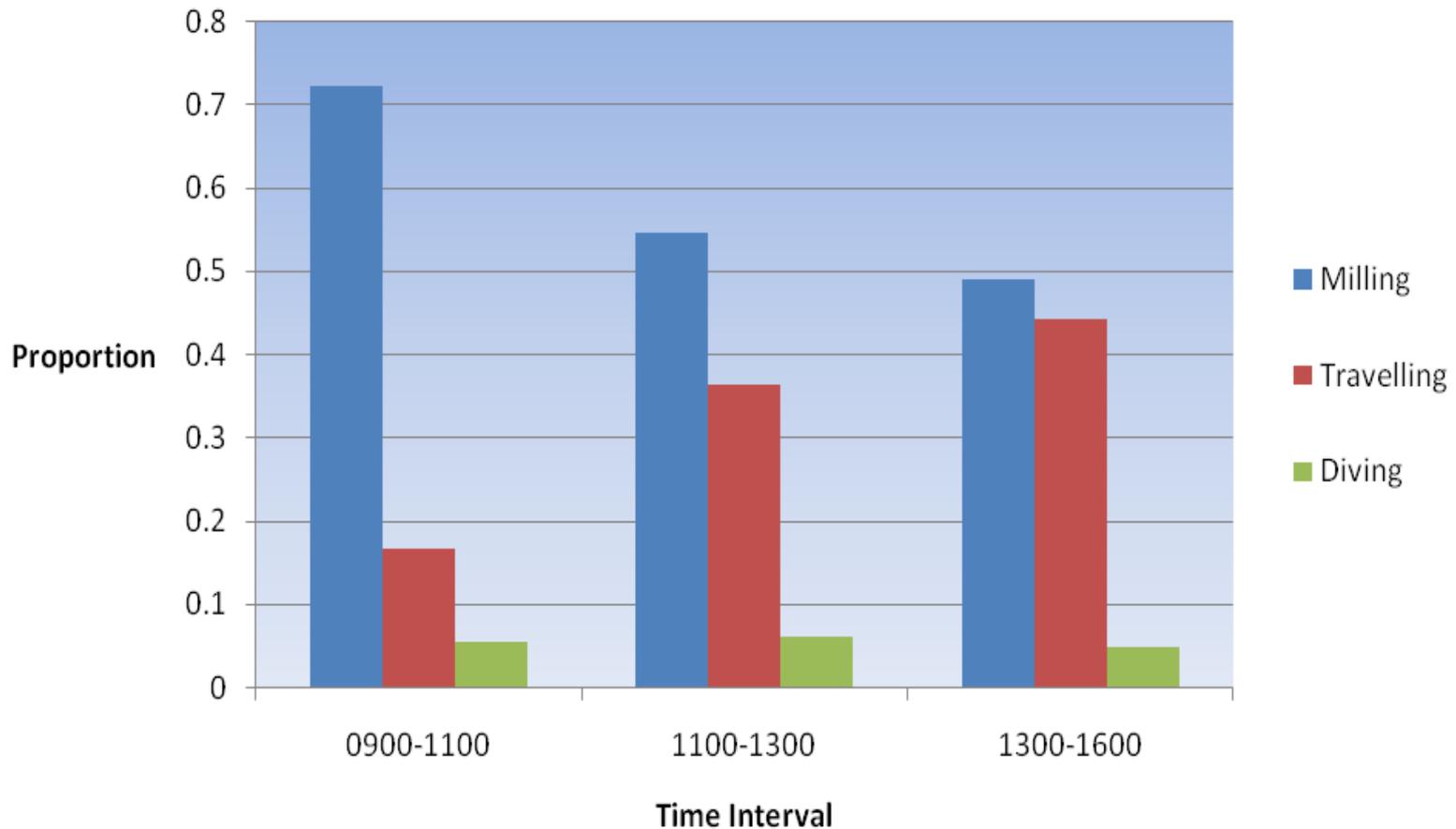
RESULTS

Proportion of Time Whales Spent in Behaviors by Month



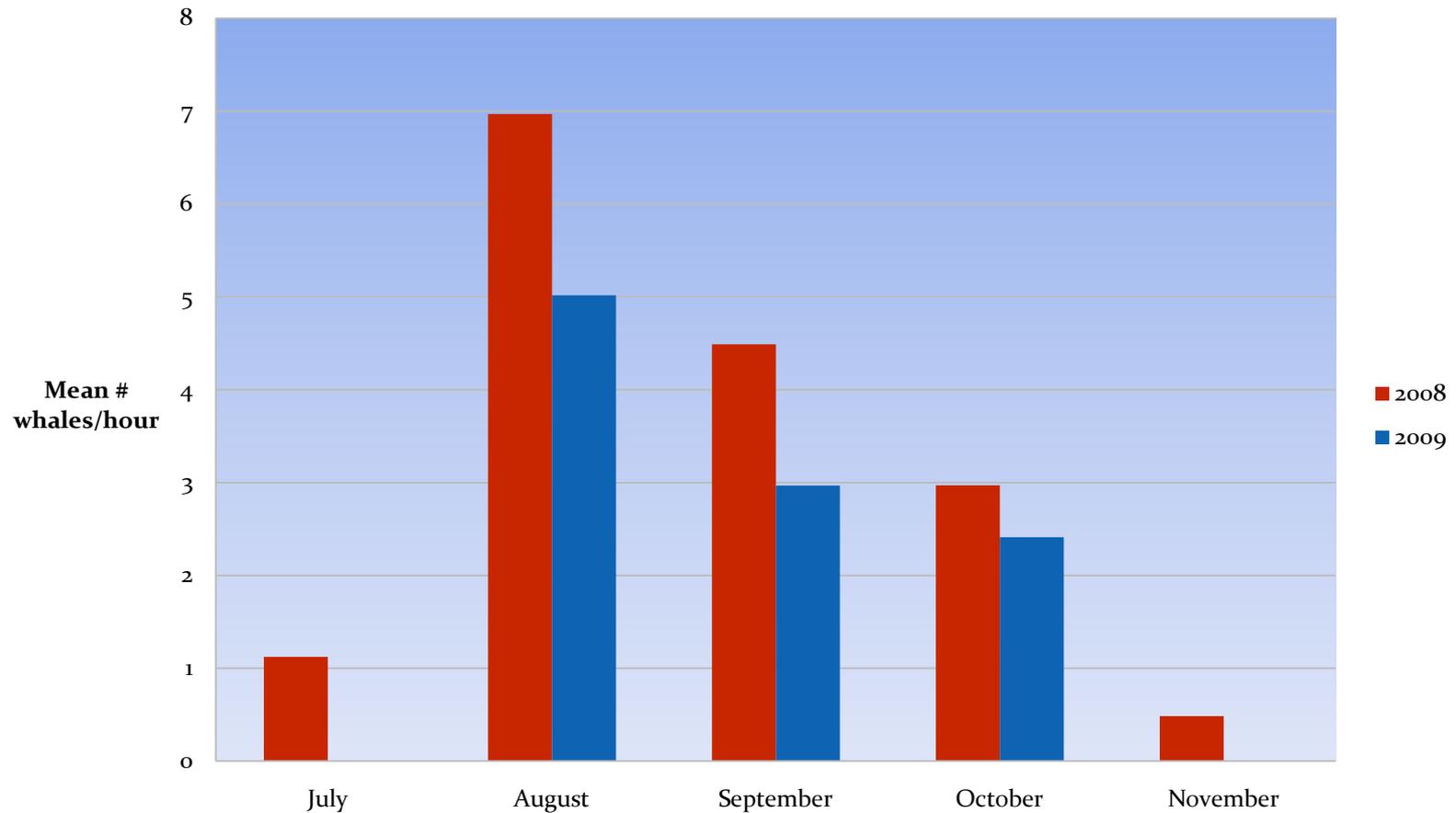
RESULTS

Proportion of Behaviors by Time of Day 2009



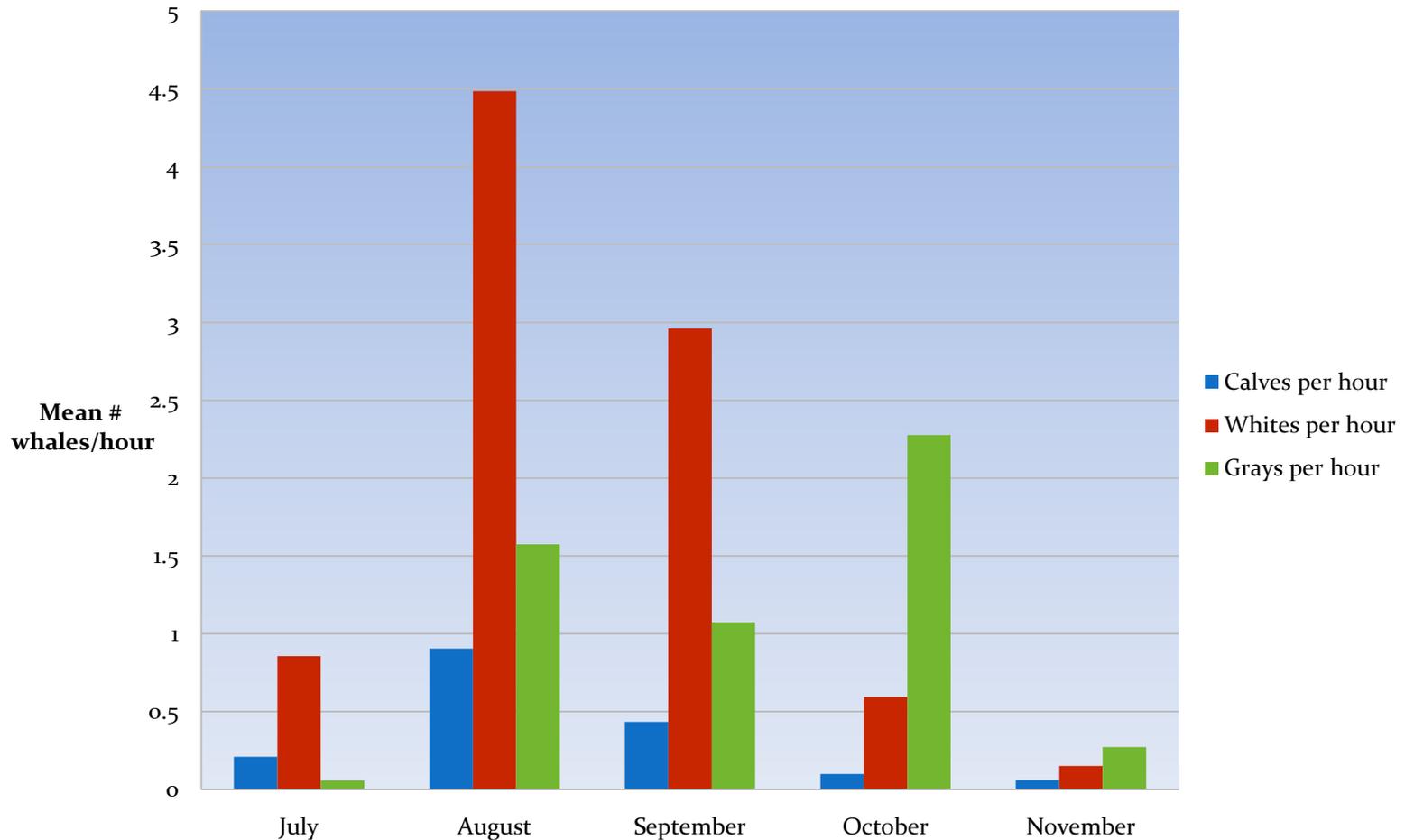
RESULTS

Observational rates (whales per hour) for all whale color classes by year



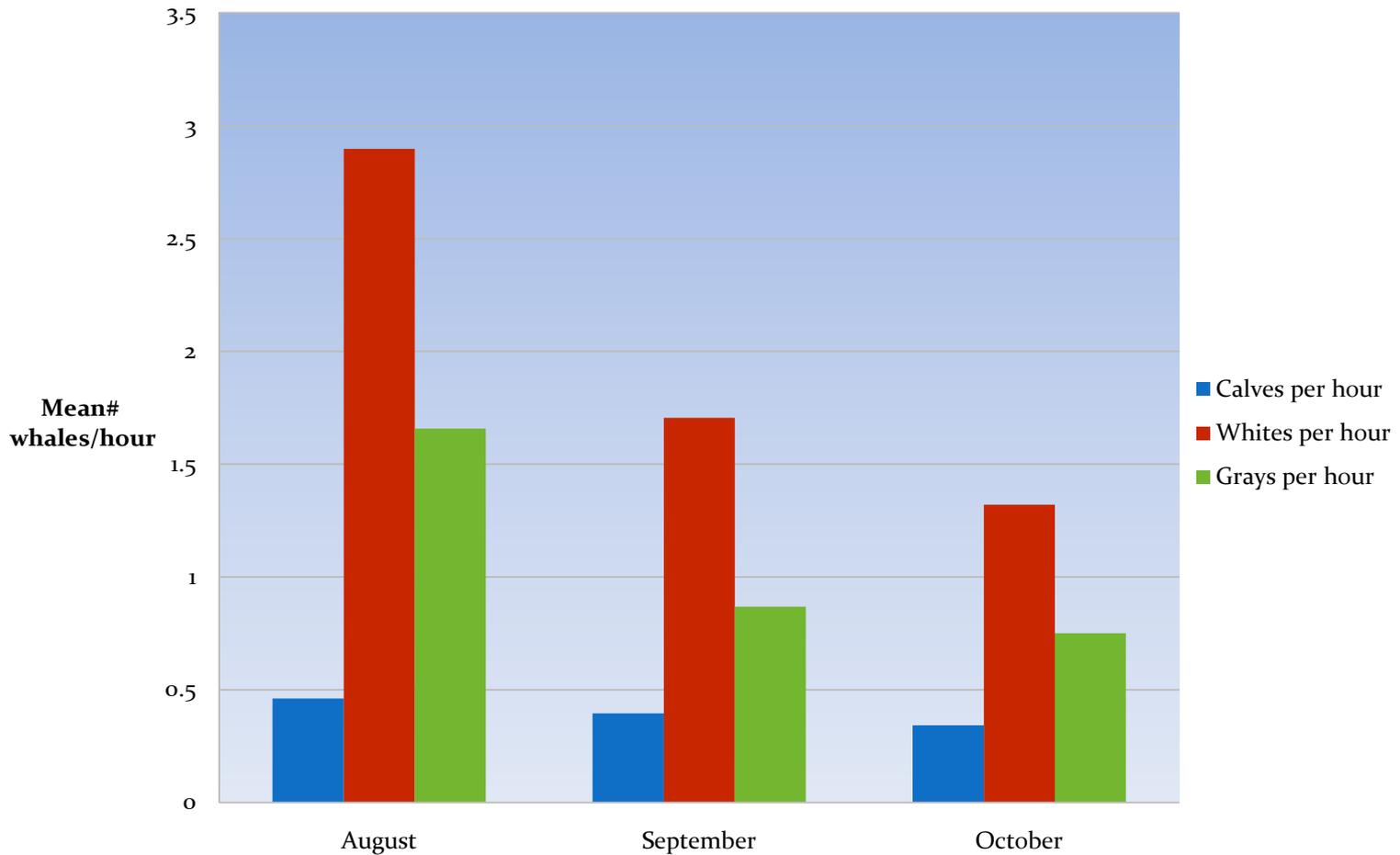
RESULTS

Observational rates for whale color classes 2008



RESULTS

Observational rates for whale color classes 2009



Future Directions

- Beluga monitoring ongoing in 2010 and is expected to continue into the foreseeable future
- Observational hours in 2010 exceed those from the previous three field seasons
- Access to study area continues to be main limiting factor to data collection
- Looking to combine visual observations with real-time acoustical monitoring to minimize missing beluga presence
- Will be utilizing a Forward Looking Infrared Radar (FLIR) camera for whale detection and close-up identification of individuals