

Animal Communication & Behavior



MYSTIC
AQUARIUM

PROTECT OUR
OCEANS

Communication is Key to Social Interactions

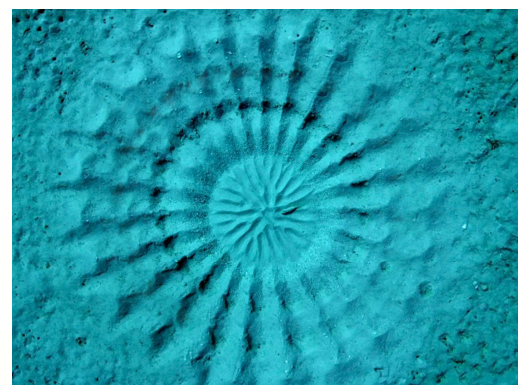
- What is communication?
- How are signals created?
- What are possible modes of communication?



Animal Communication – What is it?

Bradbury & Vehrencamp (1998)

“Communication involves the provision of information (via a signal) by a sender to a receiver, and subsequent use of this information by the receiver in deciding how or whether to respond.”



Getting the Message Out
How do animals communicate?

Modes of Communication

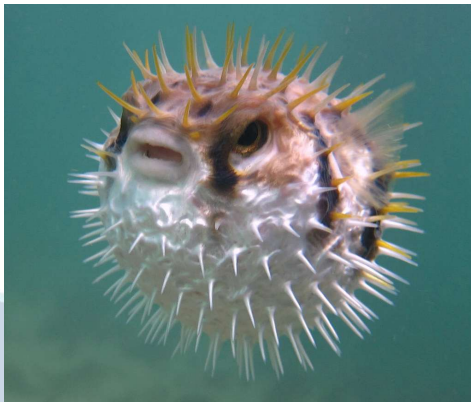
- Visual
- Chemical
- Acoustic
- Tactile
- Electrical

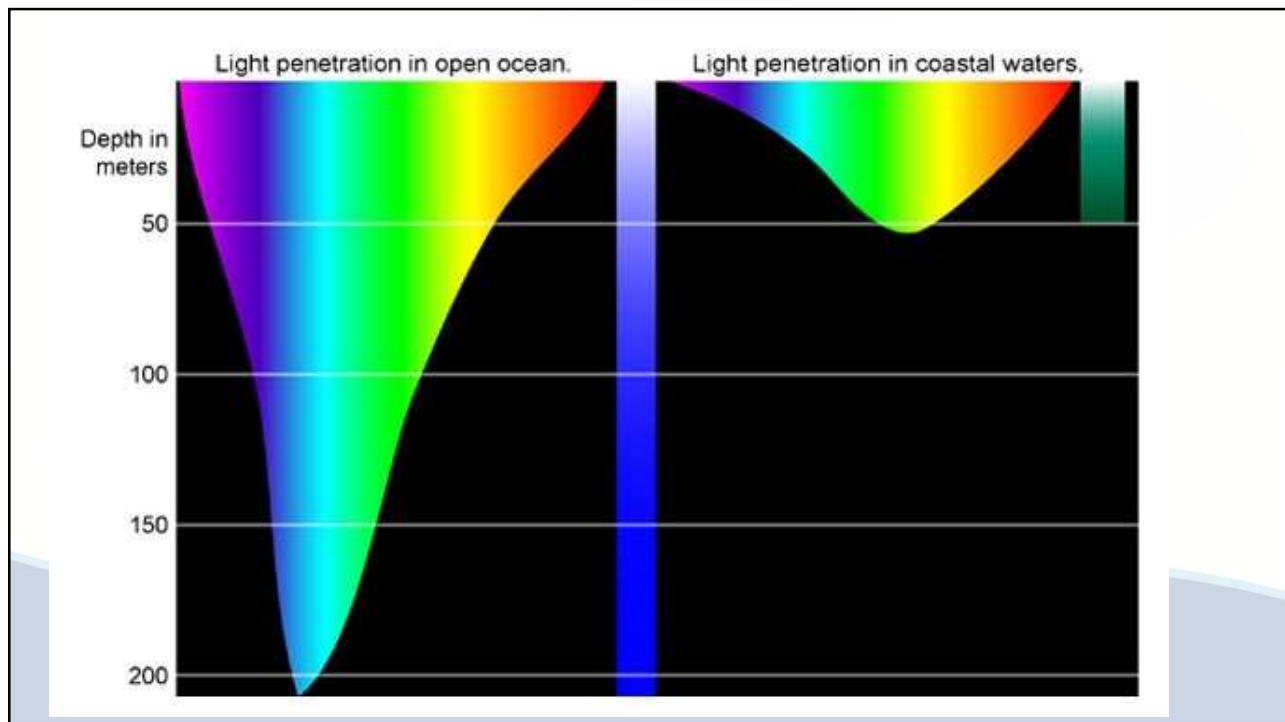


Visual Communication

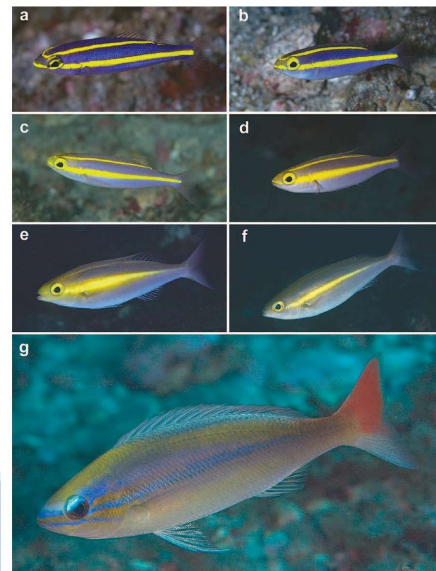
Simple – sexually dimorphic traits, postures, color patterns

Complex – elaborate behavioral sequences





Visual Cues



False Signals - Mimicry



Pinniped Postures



E. Guth



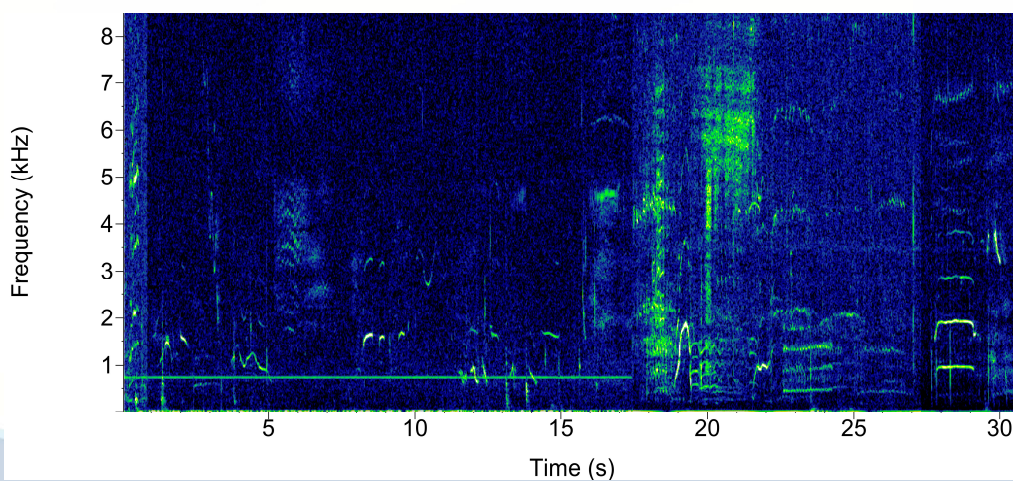
N. Wu

Acoustic Communication - Fish

- Sounds produced are relatively low frequency
- Most commonly involves:
 - prey startle or release calls
 - Reproductive behavior
 - agonistic interactions with competitors for mates and resources
 - attraction of shoal mates



Acoustic Communication – Toothed Whales



Acoustic Communication Pinnipeds



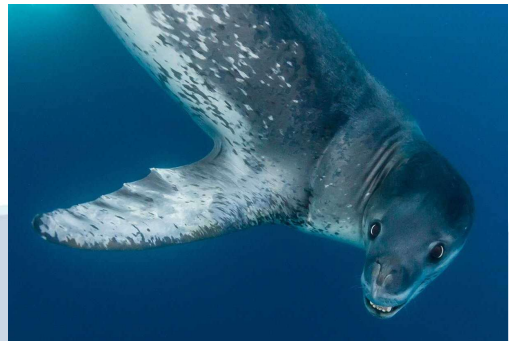
Weddell Seals

- Colonies up to 100 mothers w/ pups
- Males have underwater territories
- Polygynous, w/ female choice



Leopard Seals

- Polygynous, but solitary
- Males have short-term underwater territories
- Geographic variation to calls

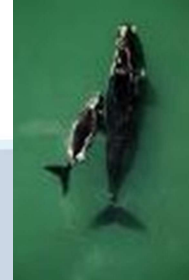


Tactile Communication - Fish

- Close range communication
- Accurate information on size and strength for some interactions
- May involve specialized morphological features like barbles, rays, and other structures (e.g. nuptial tubercles)
- Includes biting during combat, courtship or copulation



Tactile Communication

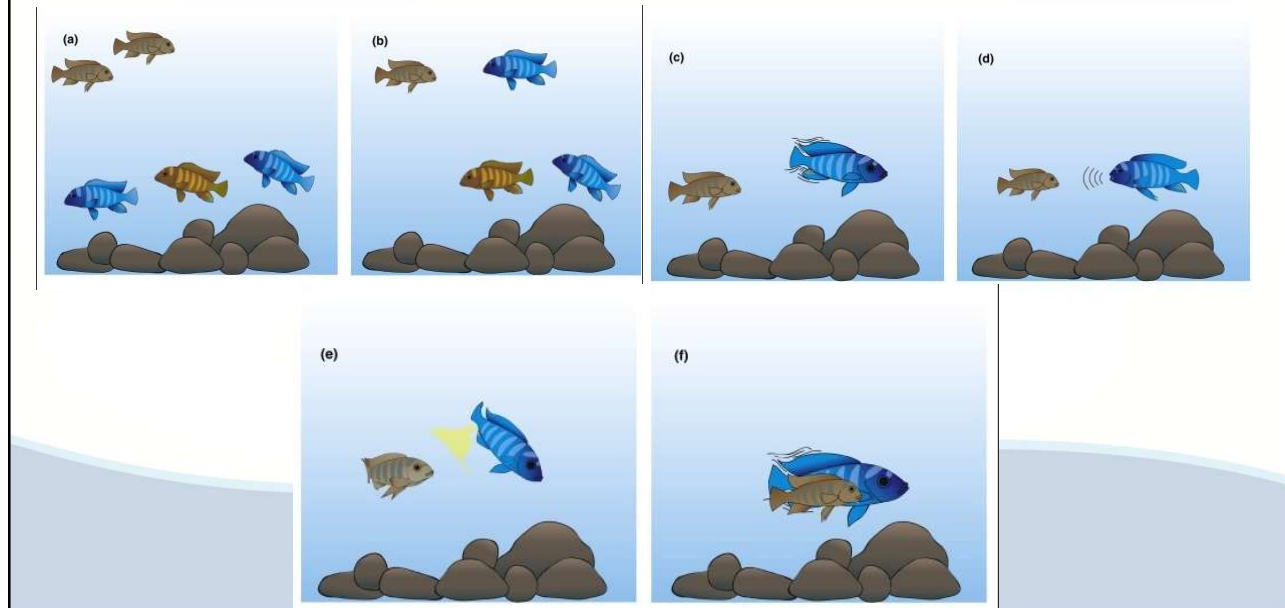


Chemical Communication

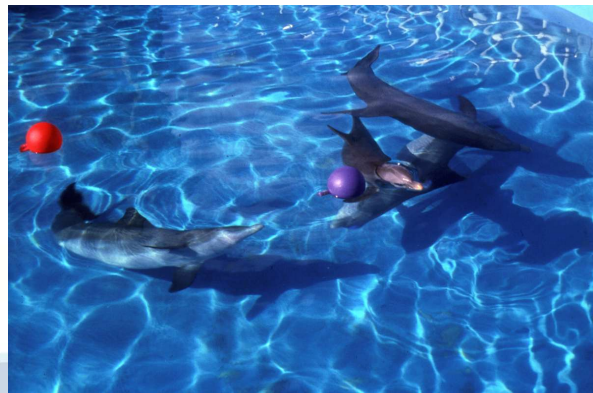
- Primarily related to pheromones
- Either gustation or olfaction
- Key component of foraging, parental care, migration, species & individual recognition, etc.



Communication is Frequently Multimodal

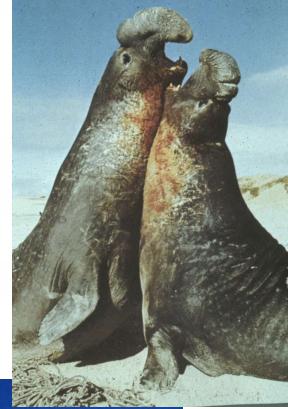


Studying Animal Behavior



Ethology

- Systematic study of behavior of animals in natural or semi-natural environments
- Conduct systematic observations via scientific method once unit of measure determined
- Make observations, ask questions, form hypothesis, collect data, discuss results
- ... ask more questions

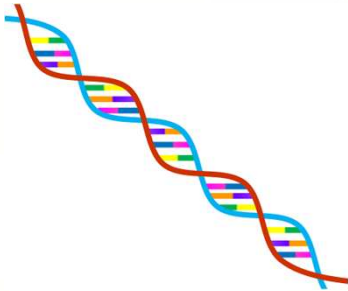


Types of Social Interactions

- Aggregations (Groups)
- Agonistic – behavioral hierarchies, territoriality, home ranges
- Interspecific relationships (symbiosis)
- Reproduction



What is the basis for behavior?



Behavioral Catalogue

- Behaviors must be
 - mutually exclusive, and
 - objective
- Catalogue may be descriptions of:
 - Motor patterns (structural), or
 - Consequences



Experimental design

Observation Rules – who to watch & what you're looking for

- Entire group, subgroup, or individuals?
- Event Sampling, Interval Sampling, or Sequence sampling

Sampling Rules – how data is collected

- Continuous
- Discontinuous
 - Instantaneous
 - One-Zero

Behavior	1	2	3	4	5	6	7	8	9	10
Climb bamboo	x	x	x							
Cover themselves				x		x		x	x	
Lay down				x	x		x			
Bleat		x							x	
Roll on floor					x	x				
Groom themselves							x			
Play					x					
Eat								x	x	
Sit up right						x				x
Sticks his/her tongue out	x				x		x	x		

Species: Mus musculus		Observers: Brooks and Yasukawa		
Date: 15 October 1997		Time: 14:00–15:00		
Conditions: natural light, 20 gallon aquarium		Comments: adult male ID# 21		
		Category of Behavior		
	Time	Walking	Sleeping	Eating
	14:02	x		
	14:04	x		
	14:06		x	
	14:08		x	
	14:10		x	
	14:12		x	
	14:14			x
	14:16			x
	14:18	x		
	14:20	x		

What role does behavior play in conservation of a species?

