### Persistent Pelagic Habitat Etnoyer P., D. Canny, B. Mate, L. Morgan. 2003.





#### Baja California to Bering Sea Marine Conservation Initiative (B2B)



The Baja California Sur to Bering Sea region has been subdivided into 10 degree blocks and projected into Lambert Azimuthal 90W Equal Area (long-100, lat 45) as advised by the USGS Hydro 1k projection for North America. The cellblocks are numbered numerically in the vertical and alphabetically in the horizontal, with a lower right corner at (-90, 12). All global raster datasets (eg ETOPO2, AVHRR SST) should be subset according to these parameters. Labeled cells represent those we seek to populate with data.

#### Data Driven Analysis for Priority Conservation Areas



## North American Marine Protected Area Network Criteria

Benthic and pelagic

Continentally significant

Protects Marine Species of Common Conservation Concern

Considers ENSO variability





**Priority Conservation Areas** 



### What's a hotspot?

Strong signal High rate of change Geophysical feature Upwelling Endemism under the threat of habitat loss Richness Abundance



## Fisheries and Conservation

Commercial and recreational fisheries use satellite services to identify targets

Marine conservation community must become more technologically sophisticated







# **Protecting Species**



171 Sharks and Rays (85 Endemic) 139 Fish (18) 105 Sea and Shorebirds 85 Mammals (23)





# Highly Migratory Species



Map Created by the Sea Turtle Survival League

50 100

0

## What's our problem?

Highly endangered species Dynamic environment Static protected area paradigm

### What's our answer?

Identify persistent pelagic habitat for endangered species in order to inform protected area strategies



# SST Fronts and Species associations





## Temperature Fronts across scales

18km to 2km



MCSST (18 km)





AVHRR (9 km)





#### Coastwatch

(2km)





### **Finding SST Fronts**





#### **Calculating Frontal Density**





Double Thresholds yield monthly binary values

1 = high density cell, 0 = not

months are added for annual persistence values of

1-12



### Persistence between years





### Persistence between years





### Persistence between years





### **Results**?

Less than of the 1% NEPac exhibits a high density of fronts nine months or more

The majority of high density cells occur in three discreet locationsthe North Pacific Transition Zone, off Baja California Sur, and the Channel Islands.

These sites recur within and between years.

The largest, most persistent system is the Baja California Frontal System

Frontal systems are habitat for blue whales, striped marlin, and swordfish



### Creatures and features

FEZ and Blue whales

#### NPTZ and Loggerheads



Source: Marine Conservation Biology Institute B2B CD-ROM, NASA Jet Propulsion Laboratory, Bruce Mate and Tom Follett at Hatfield Marine Science Institute

### Creatures and features



## Red crabs, of course





#### Striped Marlin CPUE 1965-1975



Figure 2. Rank values for hooking rates (CPUE) by Japanese longliners. Numbers represent the sum of mean monthly rank values for CPUE, 1965-1975.



#### Swordfish CPUE 1955-1985





### **B2B** Priority Conservation Areas

Important Oceanographic Features:

Haeda Eddie

**Ensenada Front** 

The BCFS



## Thank you!

PICES MCBI Packard CEC NASA NRL

