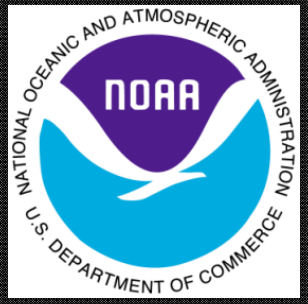
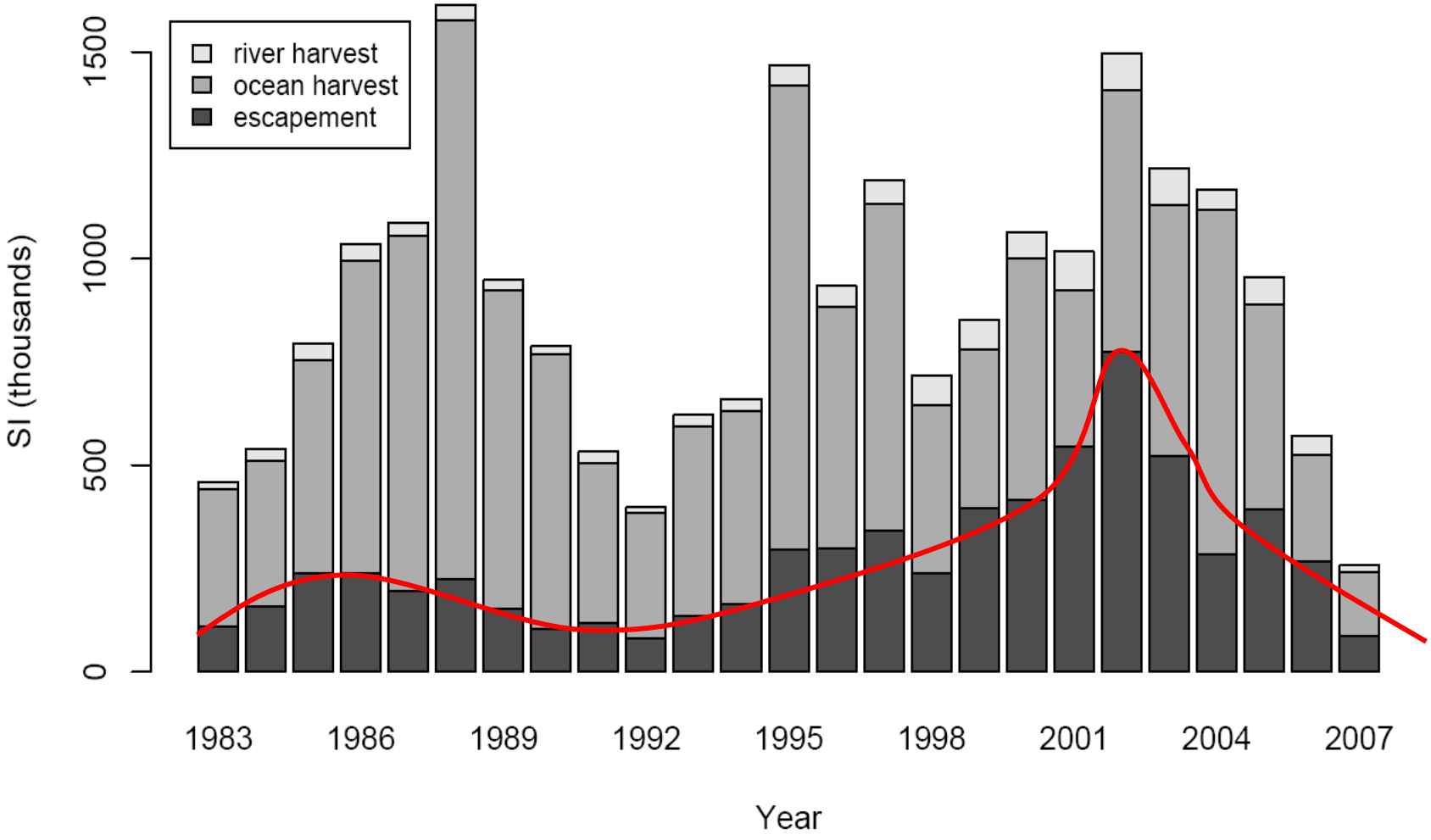
WRONG PLACE, WRONG TIME: RECENT MISMATCHES IN FOOD AVAILABILITY TO SALMON AND SEABIRDS IN CALIFORNIA

William J. Sydeman and Steven J. Bograd



BACKGROUND

CHINOOK SALMON POPULATION



O'Farrell et al. 2008

RETURNS (NO. FISH)

2002 – 800,000

…

2007 – 90,000

2008 - 60,000

2009 - ? (better)

2010 - ?

SIMILAR PATTERNS ACROSS SALMON POPULATIONS, AND WITH SEABIRDS…

…SUGGEST LARGE-SCALE (CLIMATE-OCEAN) FACTORS AT PLAY

Black-footed Albatross

(GIVEN LONG-STANDING RIVER DEGRADATION, DECREASE IN STOCK RESILIENCY)

TACKLING CLIMATE CHANGE AND ECOLOGICAL COMPLEXITY (OPC ENV-07)

WJ Sydeman and SJ Bograd - Principle Investigators

JA Santora, ID Schroeder – Post-Doctoral Research Associates (Farallon Inst. and NOAA-ERD)

JD Dorman (Z Powell, prof) – PhD Trainee (UCB)

KL Mills, SA Thompson – Staff Biologists (Farallon)

B Black and RM Suryan – Collaborators (OSU)

JC Field, S Ralston – Collaborators (NMFS)

WHAT HAVE WE LEARNED?

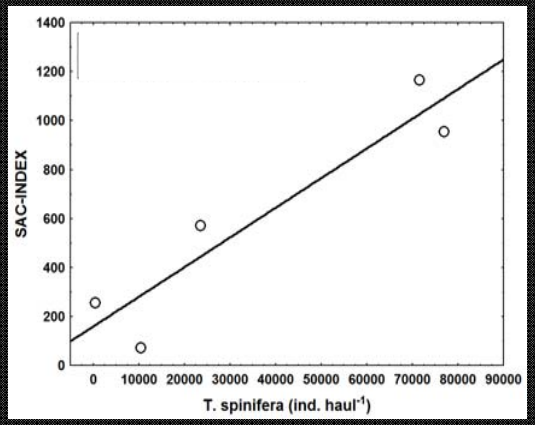
PREDATORS NEED FOOD AT THE RIGHT PLACE AND TIME TO THRIVE AND SURVIVE

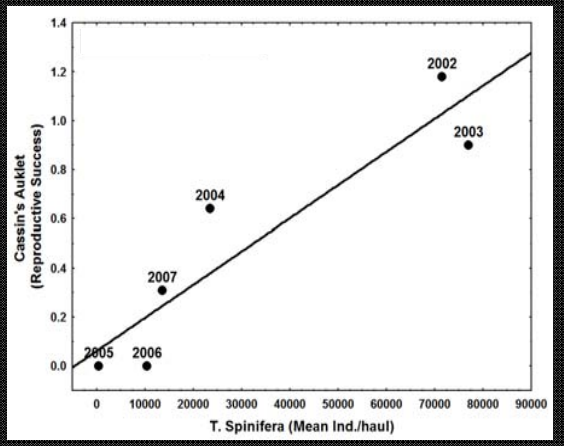
BLUE WHALE/KRILL

KRILL - RIGHT PLACE AND RIGHT TIME= BETTER SURVIVAL AND REPRODUCTIVE SUCCESS..

Chinook Salmon

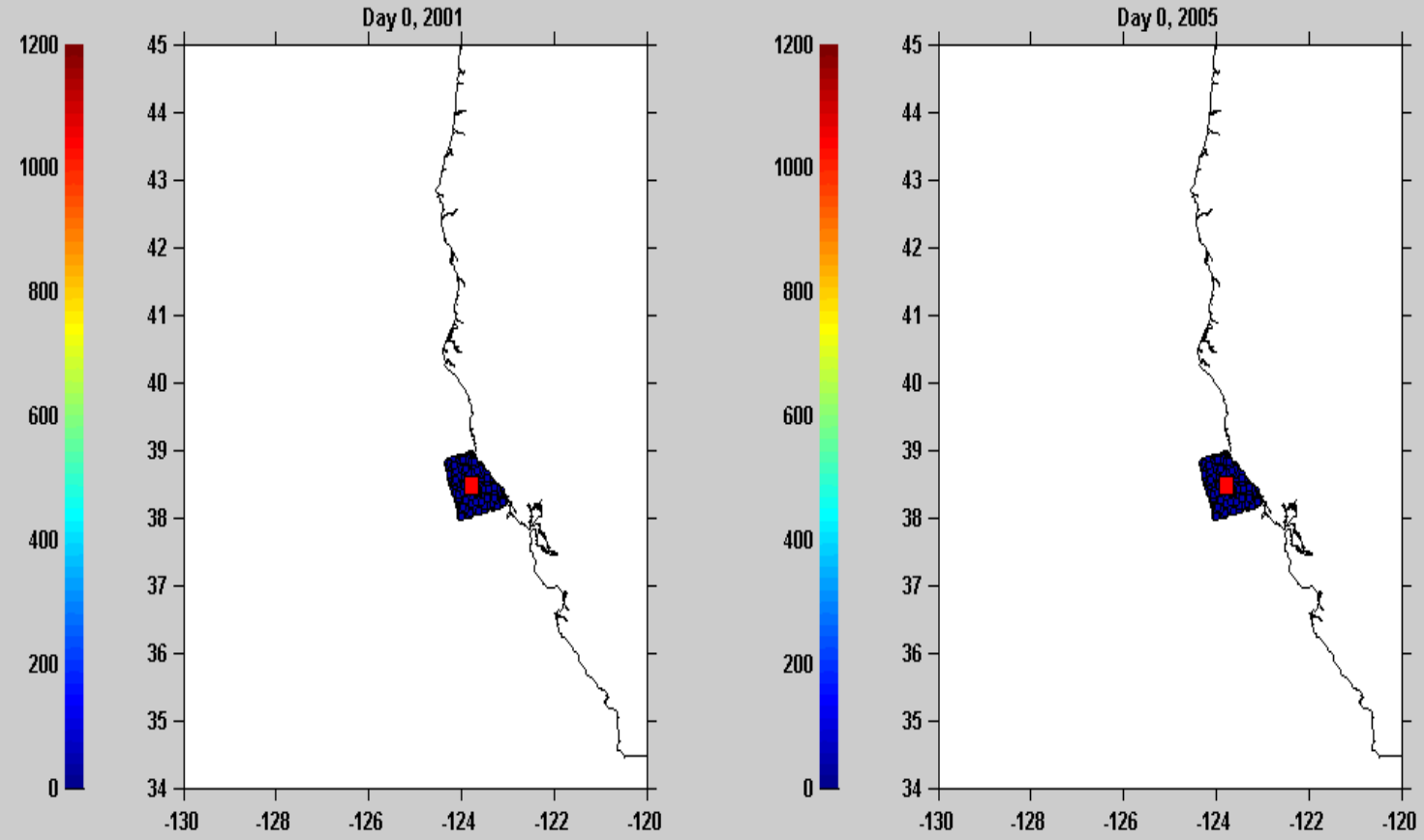
Cassin's Auklet





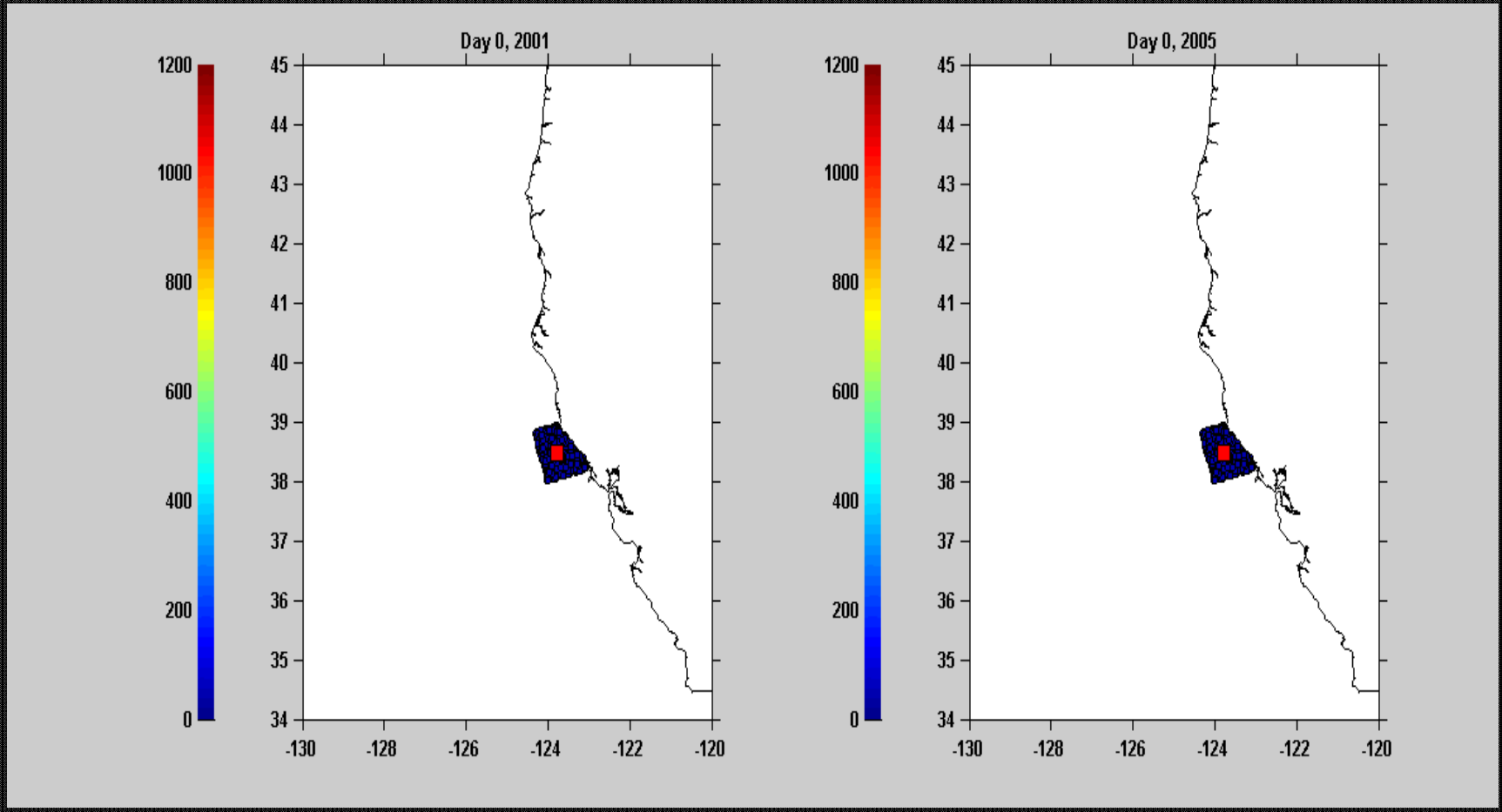
WHAT HAVE WE LEARNED? THE CLIMATE CONNECTION

CLIMATE IMPACTS VIA CURRENTS?



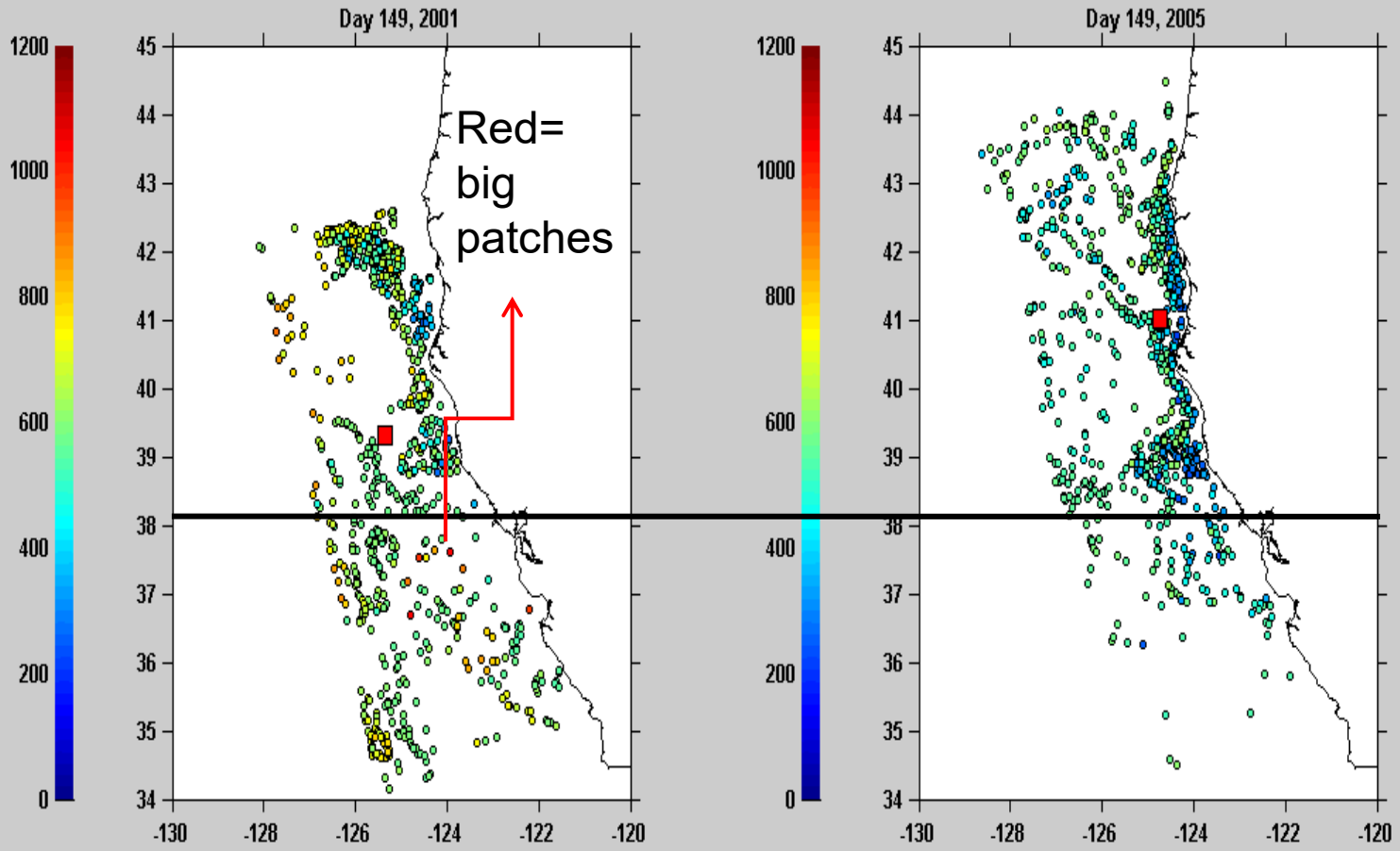
Jeff Dorman et al. unpublished

HOW? COUPLE REGIONAL OCEAN MODEL WITH KRILL POPULATION MODEL (WINDS – CIRCULATION – PRIMARY PRODUCTIVITY – KRILL DIST'N)



Jeff Dorman et al. unpublished

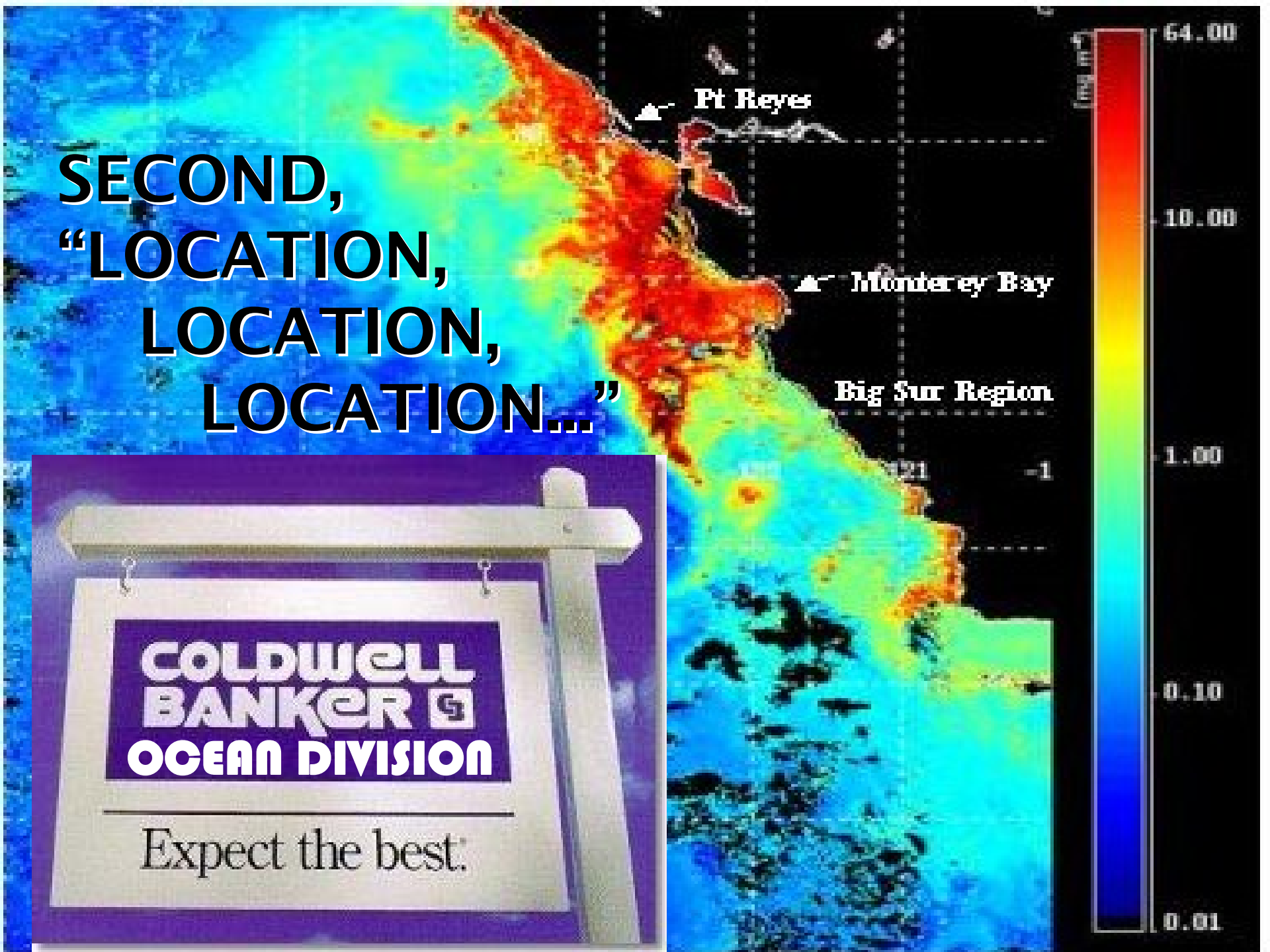
MODEL RESULTS: GOOD VS. BAD YEAR...



Jeff Dorman et al. unpublished

CONCLUSIONS

First, a small fish story…

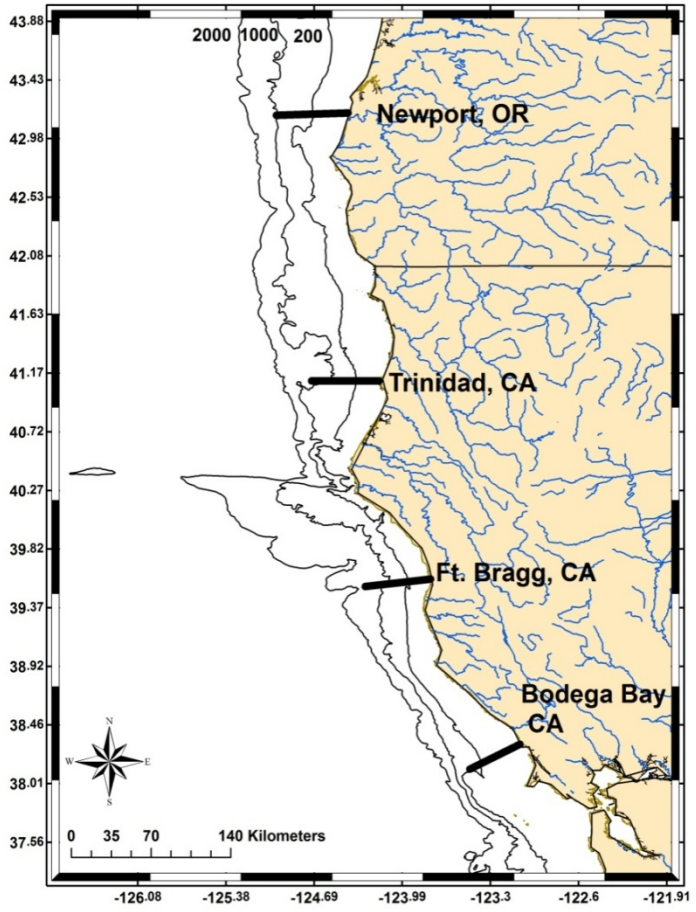

Pt Reyes
Monterey Bay
Big Sur Region
64.00
10.00
1.00
0.10
0.01
SECOND,
"LOCATION,
LOCATION,
LOCATION..."
COLDWELL
BANKER
OCEAN DIVISION
Expect the best.

THIRD, MANAGEMENT/POLICY IMPLICATIONS

- OCEAN CLIMATE IMPACTS HERE AND NOW
- FOOD (RIGHT PLACE, RIGHT TIME) IMPORTANT TO JUVENILE SALMON SURVIVAL = RUN HEALTH YEARS LATER
- ~30M SMOLTS PRODUCED IN CALIFORNIA'S HATCHERIES…
- CAN WE RELEASE AT DIFFERENT TIMES OF YEAR TO INCREASE RESILIENCY?

INTEGRATED OCEAN OBSERVING (PHYSICS AND BIOLOGY)

North Coast Program - Plankton



WEST COAST SURFACE CURRENTS MAPPING PROGRAM (COCMP)

100 mi
200 km

THANK YOU!


Sea Grant
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CALIFORNIA OCEAN
PROTECTION COUNCIL