How will climate change affect our coasts?

Linwood Pendleton

UCLA,

National Ocean Economics Program

How will climate change affect our coasts?

Sea level rise
Storms
Coastal Erosion
Wetland Loss
Sea Surface Temp

What's at risk? (vulnerability)

Value of Total Ecosystem Goods and Services at Risk: Globally

$2 trillion annually (Martinez et al. 2007)

ZOOM IN

Economic Activities in US Coastal Counties (National Ocean Economics Program and BLS)

3 million business establishments

45 million jobs

$4.2 trillion in output

1) But what's at risk on the MY coast?

2) What does that mean to me?

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ZOOM IN
(again)

What's At Risk in California?

The Coastal Economy

Tourism

Beach Going

The California Coastal Economy

(National Ocean Economics Program and BLS)

762,000 business establishments
9.7 million jobs
$945 billion in output

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$945 billion in output

Tourism and Hospitality =
56,000 business establishments
1 million jobs
$39.4 billion in output

National Survey On Recreation and the Environment (2000)		
Recreational Activity	**Number of Participants**	**Number of Days**
Visit Beaches	12.6 million	151 million
Rec Fishing	2.7 million	20 million
Scuba Diving	288 thousand	1.4 million
Surfing	1.1 million	22.6 million
Bird and Wildlife Watching	2.5 million	65.8 million
Snorkeling	707 thousand	3.8 million

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Pendleton and Restore America's Estuaries	
Recreational Activity	**Annual Economic Value**
Visit Beaches	$1.5-$7.5 billion
Rec Fishing	$0.5 -$2 billion
Scuba Diving	$21 - $69 million
Bird and Wildlife Watching	$0.7 - $7 billion
Surfing, snorkeling, boating,	?????

ZOOM IN
(one last time)

Get local.

What's at stake in Santa Monica Bay?

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Get local.

What's at stake in Elkhorn Slough?

We usually don't collect local data so we don't know what's at stake.


(c) 2004 Kenneth and Gabrielle Adelman

How many homes?

How many beach goers?

How many bird watchers?

How many kayakers?

How many anglers?

How many divers?

Who are these people?

What do they contribute to the local economy?

What businesses do they support?

What is the value of these activities?

What affects these activities?

How will climate change affect these activities?

How will restoration affect these activities?

How will marine protection affect these activities?

How will T.M.D.L.s affect these activities?

How resilient are local communities?

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Economic Indicators for Local Coastal Activities

- Collected regularly (time series)
- Collected easily
- Collected rigorously
- Unambiguous Interpretation

Sample Economic Indicators: Off the Shelf

ACTIVITIES

Commercial fishing

Commercial Passenger Fishing Vessels

Beach visitation

Camping Park Visitation

Oyster production

Housing

Sample Economic Indicators: Off the Shelf

ACTIVITIES	INDICATORS
Commercial fishing	Landings, revenue, # of vessels (per yr)
Commercial Passenger Fishing Vessels	# of trips, # of vessels (per yr)
Beach visitation	# visitors/year
Camping Park Visitation	# of visits/year
Oyster production	Annual output (volume, $)
Housing	Permits, property tax, MLS

Sample Economic Indicators: Elusive Activities

ACTIVITIES

Private Recreational Fishing

Recreational Boating

Kayaking

Coastal visits

Diving

Surfing

Reuven Walder, Marine Photobak

Sample Economic Indicators: Elusive Activities

ACTIVITIES	INDICATORS
Private Recreational Fishing	Bait sales
Recreational Boating	Marine Fuel
Kayaking	# of rentals, # of tours, revenue/year
Coastal visits	Parking data
Diving	Charters, tank fills
Surfing	Wax sales


Reuven Walder, Marine Photobak

Sample Economic Indicators: Elusive Activities

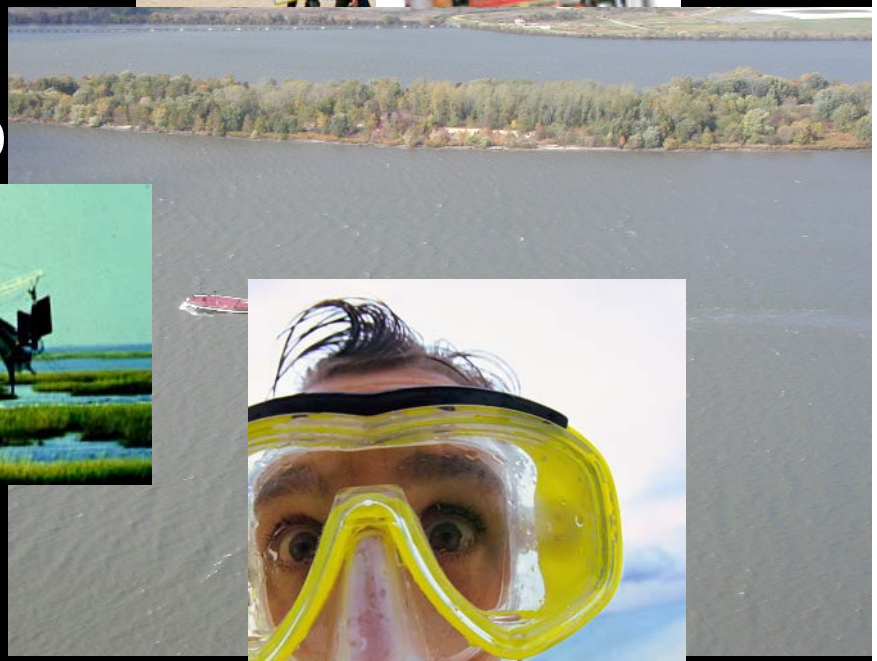
ACTIVITIES	INDICATORS
Private Recreational Fishing	Bait sales
Recreational Boating	Marine Fuel
Kayaking	# of rentals, # of trips, revenue/year
Coastal Hiking	Hiking Gear
Diving	Diving Gear sales
Surfing	Wax sales

EVEN BETTER – REGIONAL PHONE SURVEYS OF COASTAL USERS (underway in Santa Monica Bay, Monterey Bay)


Reuven Walder, Marine Photobak

ocal Eco ?

- uents
- Understand relative impo uses



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Why Collect Local Economic Info ?

- Make the links to climate change personal:
- My house?
- My livelihood?
- My past time?

Why Collect Local Economic Info ?

- More than climate change –
- Understand beneficiaries of management, marine protection, and restoration
- Understand value of local coastal uses
- How do these compare to the costs of management?

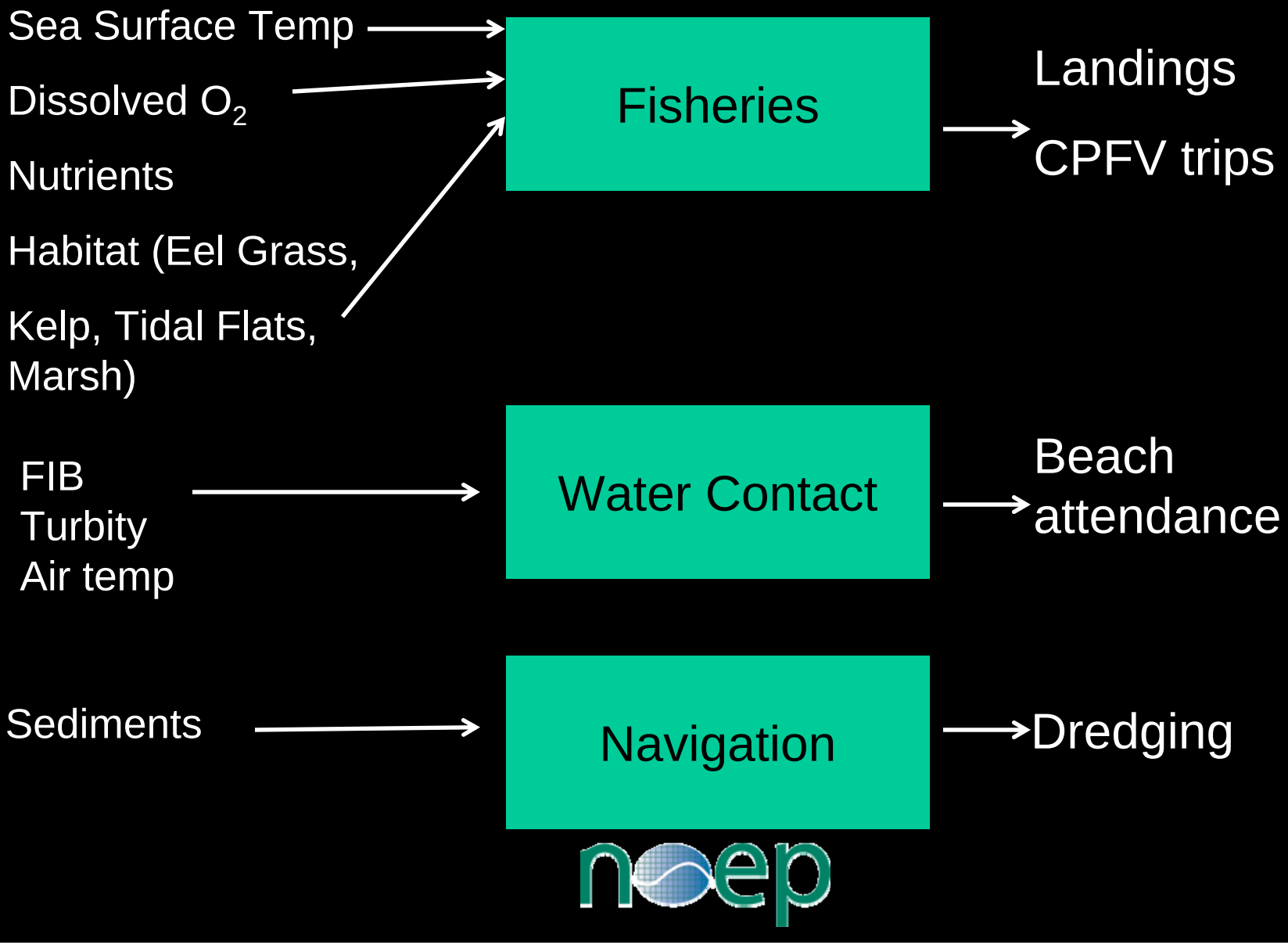
Why Collect Economic Indicators?

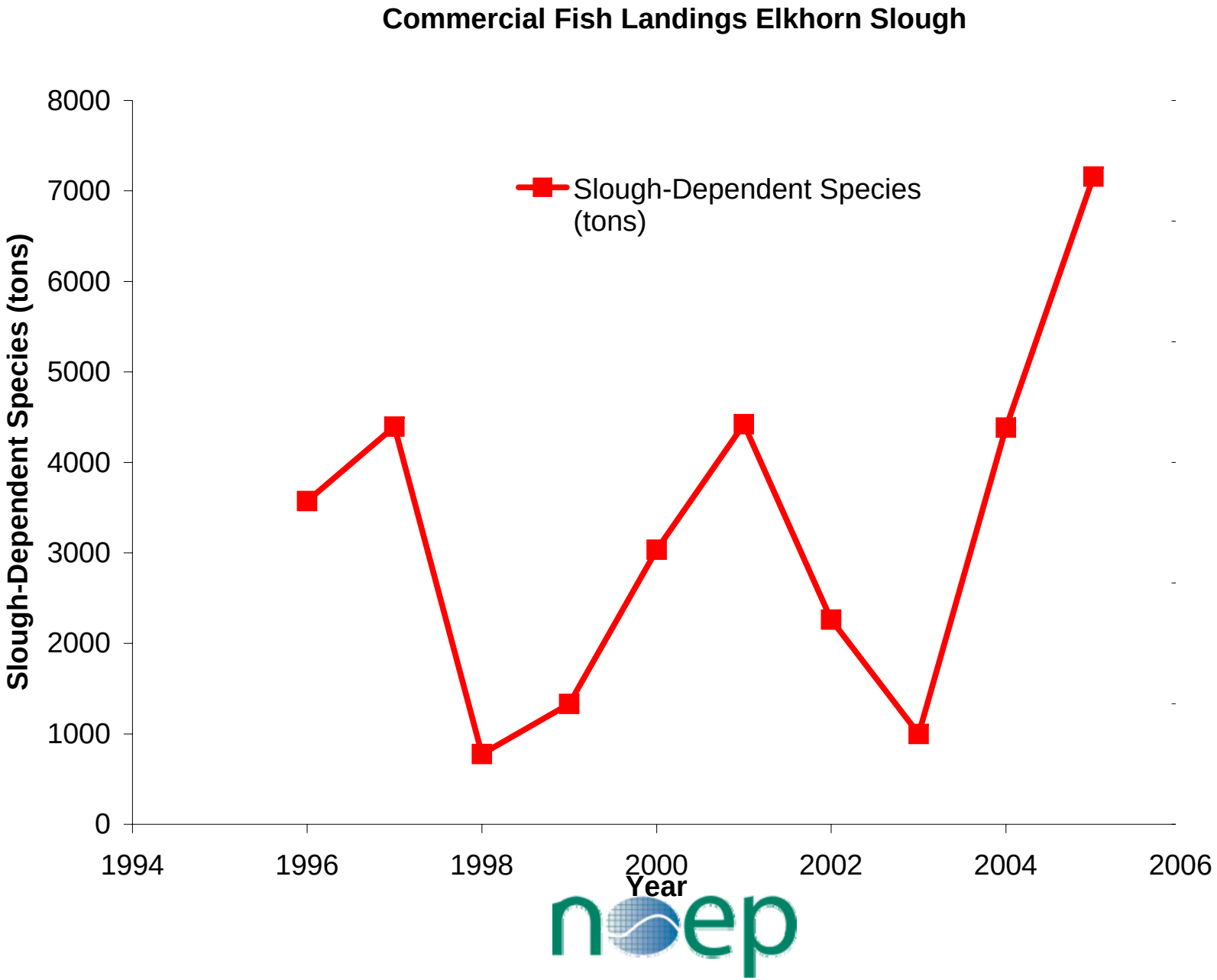
- Changing constituencies
- Changing mix of uses and users

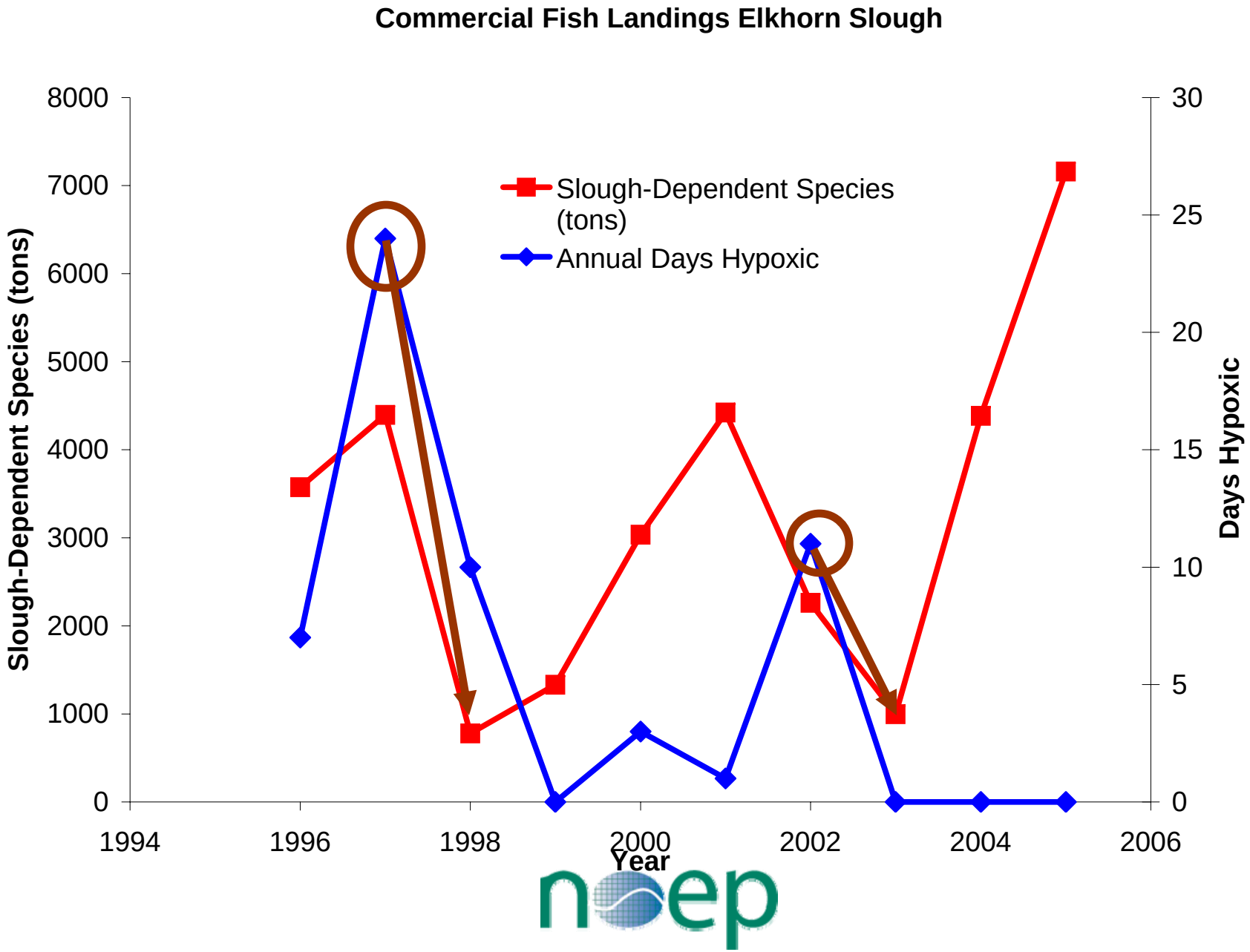
Why Collect Economic Indicators?

- Demonstrate impacts of environmental change (e.g. climate change)
- Demonstrate the outcomes of management and restoration (economic performance measures)

Linking Environmental Change to People




Commercial Fish Landings Elkhorn Slough
Slough-Dependent Species (tons)
Slough-Dependent Species (tons)
8000
7000
6000
5000
4000
3000
2000
1000
0
1994
1996
1998
2000
2002
2004
2006
Year


Commercial Fish Landings Elkhorn Slough
Slough-Dependent Species (tons)
Annual Days Hypoxic
Slough-Dependent Species (tons)
Days Hypoxic
Year
8000
7000
6000
5000
4000
3000
2000
1000
0
30
25
20
15
10
5
0
1994
1996
1998
2000
2002
2004
2006
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Other Explanatory Data

- Multiple ecological and environmental variables
- Weather
- Demographic Information
- Economic Data

Other Explanatory Data

- Multiple ecological and environmental variables
- Weather
- Demographic Information
- Economic Data
- REGULATION, RESTORATION, CLIMATE CHANGE

Other Explanatory Data

- Multiple ecological and environmental variables (monitoring plans)
- Weather (NWS, IOOS)
- Demographic Information (US Census)
- Economic Data (BLS, US Census, NOEP)
- REGULATION, RESTORATION, CLIMATE CHANGE

Multivariate Analysis: Requires data over time and space

- STANDARD ECONOMIC INDICATORS
- APPLIED ACROSS THE U.S.
- NO NEED FOR CONTROL SITES or BACI Design
- STATISTICALLY VALID COMPARISONS
- MULTIVARIATE METHODS CONTROL FOR NON-POLICY FACTORS


I HAVE A DREAM
ECONOMIC INDICATORS for
COASTAL MONITORING PLANS,
on par with
ECOLOGICAL INDICATORS

Coastal Ocean Values Expedition: 2008

- 20+ ports of call
- NERRS, NEPS, MARINE SANCTUARIES
- Workshops
  - Economic Tools
  - How to Collect Economic Indicators
  - Public Lectures
- Month-long site visits
  - Economic indicator plans

Partners

- The Ocean Foundation
- NOAA's Coastal Services Center
- National Ocean Economics Program
- Waterkeeper Alliance
- Surfrider Foundation

Please make economic data collection part of your annual monitoring plan!

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or

www. OceanEconomics.org

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