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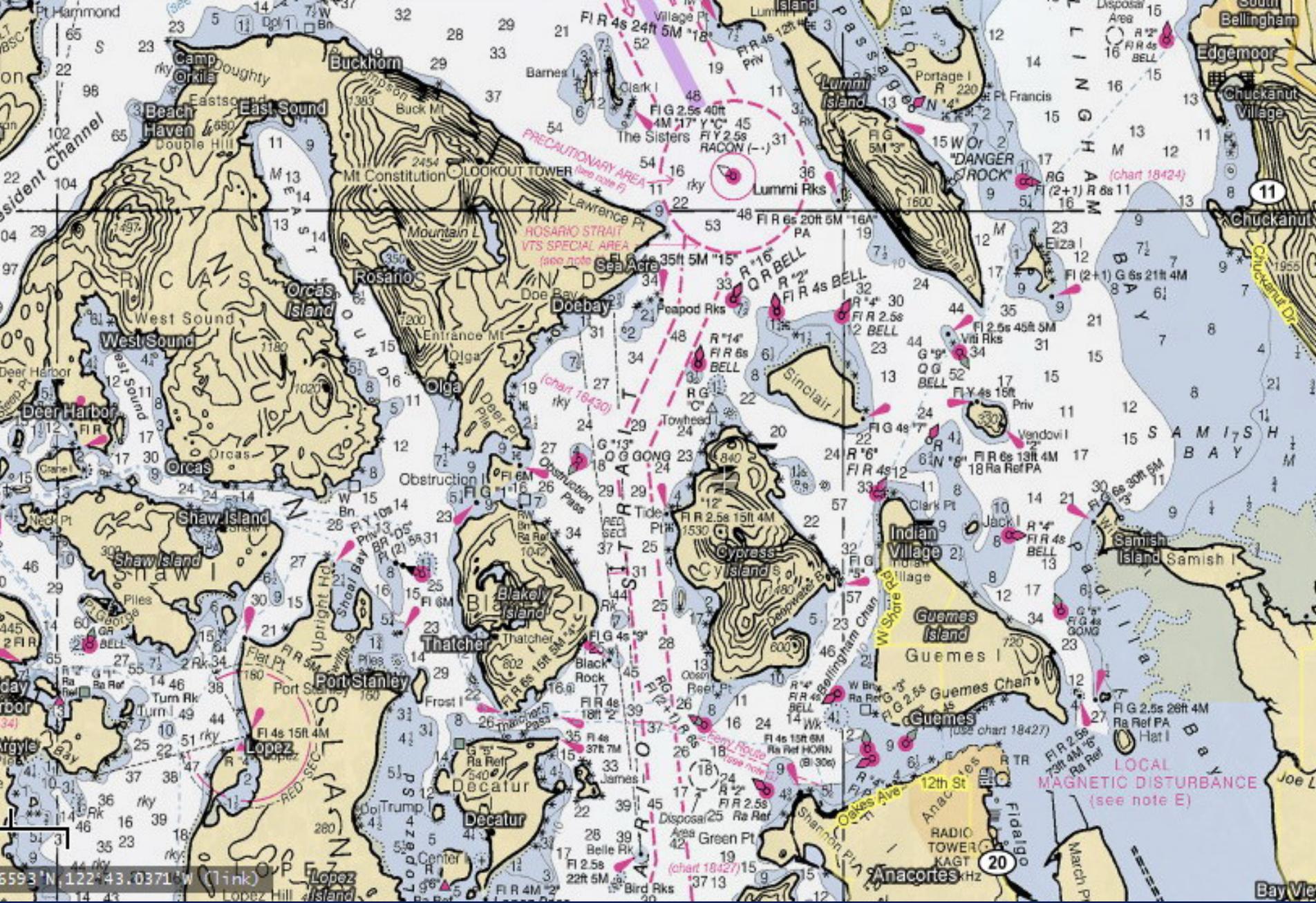
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Pamela Taylor

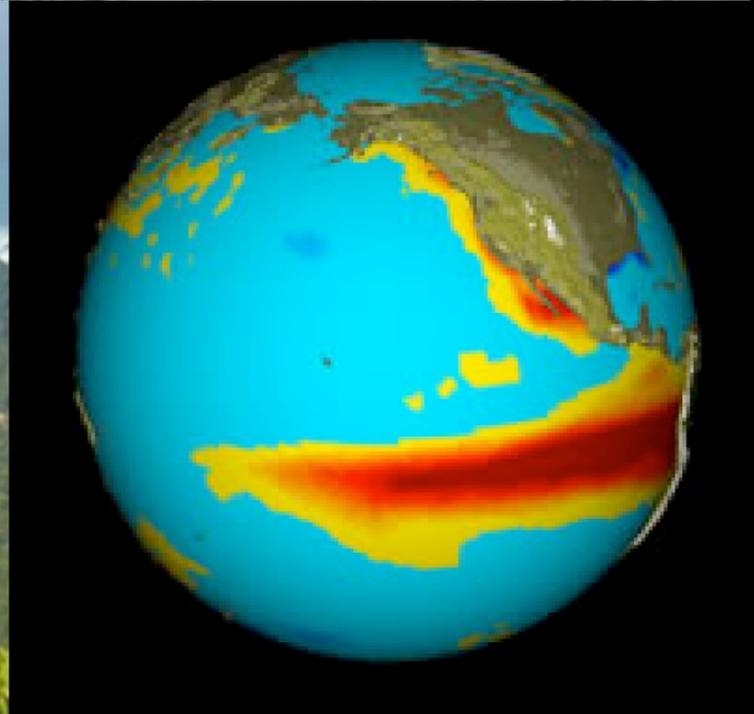
Leadership & Corporate Services
William Broglio







Sumatra tsunami hitting Koh Pu, Thailand





New Carissa, 1999



Whatcom Creek, 1999

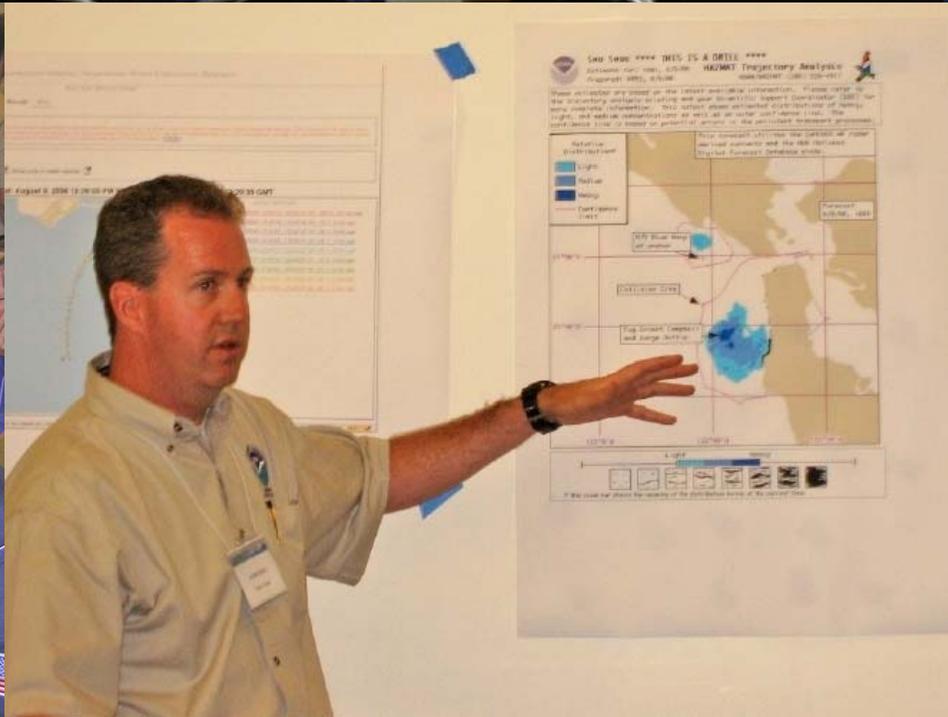


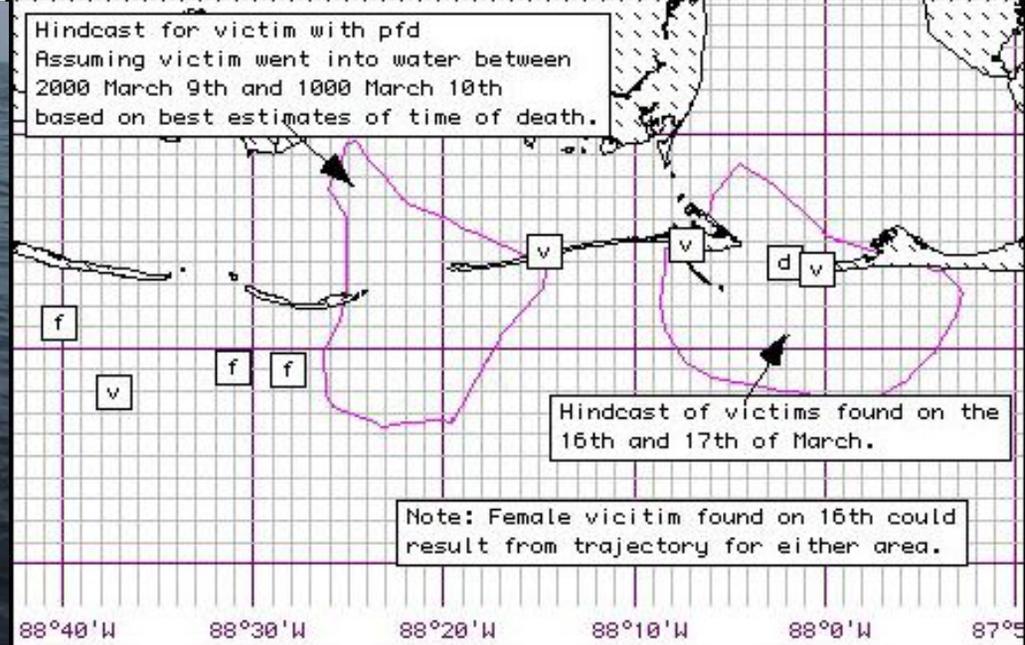
Bayou Perot, 2007

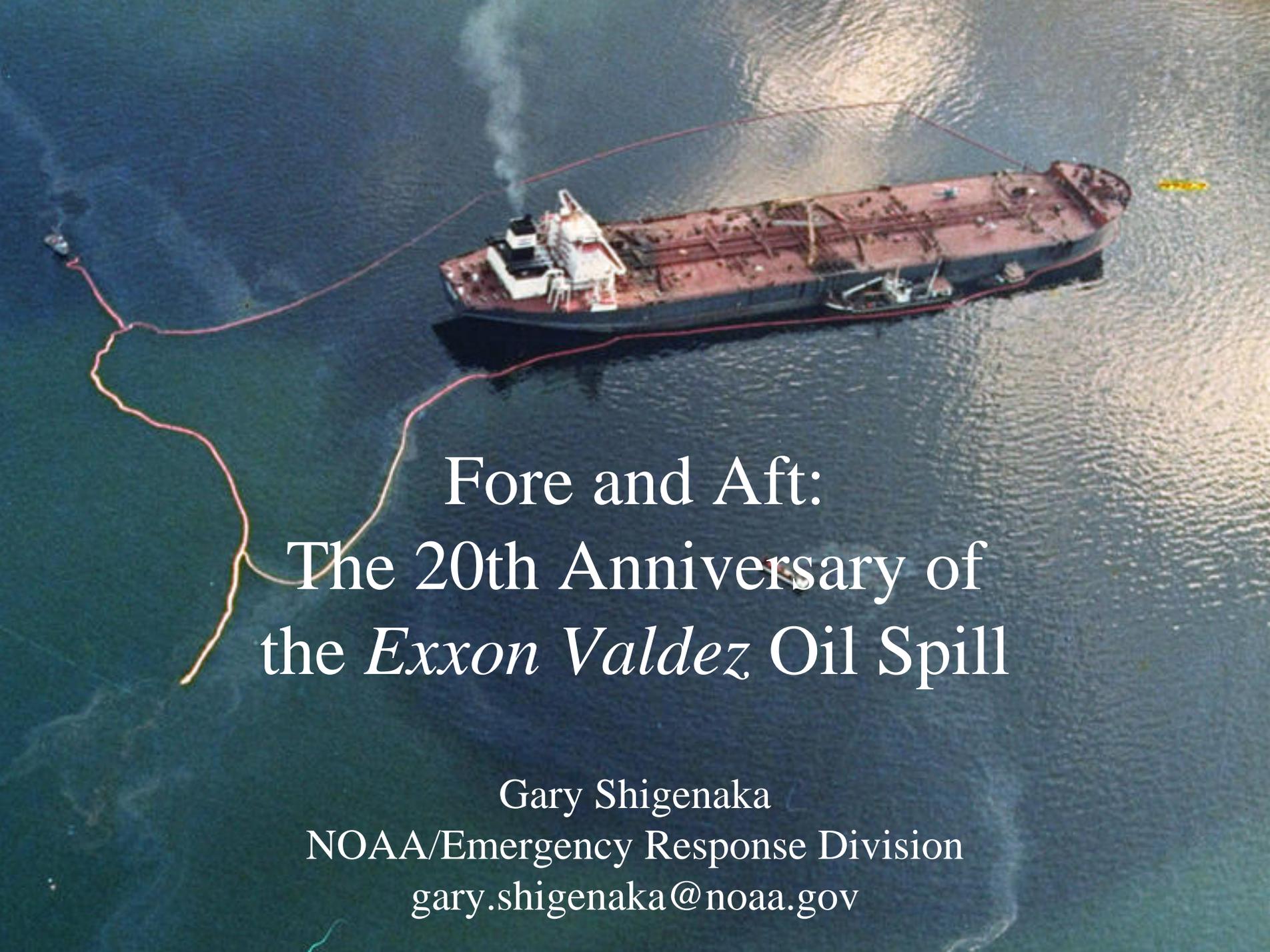
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Selendang Ayu, 2004





An aerial photograph of the Exxon Valdez oil tanker at sea. The ship is a large, dark-hulled vessel with a white superstructure. It is surrounded by several long, orange containment booms that form a large rectangular enclosure around the ship. The water is dark blue, and the sky is a pale, hazy blue. The ship is moving towards the right of the frame, as indicated by the wake and the position of the booms.

Fore and Aft:
The 20th Anniversary of
the *Exxon Valdez* Oil Spill

Gary Shigenaka
NOAA/Emergency Response Division
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Timeline for *Exxon Valdez* (the ship) *noaa*

- 1986 *Built at National Steel & Shipbuilding Co., San Diego*
- 1989 *Exxon Valdez oil spill*
- 1990 *Returned to service after repairs, renamed Exxon Mediterranean*
- 1993 *Renamed SeaRiver Mediterranean, S/R Mediterranean, Mediterranean*
- 2002 *Removed from service; US 9th Circuit Court affirms banning ship from Prince William Sound service*
- 2005 *Reflagged to Marshall Islands*
- 2008 *Sold to Hong Kong Bloom Shipping Ltd, converted to ore carrier, renamed Dong Fang Ocean*

Exxon Valdez as a source of Irony... *noaa*

i · ro · ny (ahy-ruh-nee)

- 1. the use of words to convey a meaning that is the opposite of its literal meaning.*
- 2. In literature, a technique of indicating, as through character or plot development, an intention or attitude opposite to that which is actually or ostensibly stated.*
- 3. In contemporary writing, a manner of organizing a work so as to give full expression to contradictory or complementary impulses, attitudes, etc., esp. as a means of indicating detachment from a subject, theme, or emotion.*

Oil Spill Irony (Part 1a)

DISCHARGE OF OIL PROHIBITED

THE FEDERAL WATER POLLUTION CONTROL ACT PROHIBITS THE DISCHARGE OF OIL OR OILY WASTE INTO OR UPON THE NAVIGABLE WATERS OF THE UNITED STATES OR THE WATERS OF THE CONTIGUOUS ZONE IF SUCH DISCHARGE CAUSES A FILM OR SHEEN UPON OR A DISCOLORATION OF THE SURFACE OF THE WATER OR CAUSES A SLUDGE OR EMULSION BENEATH THE SURFACE OF THE WATER. VIOLATORS ARE SUBJECT TO A PENALTY OF \$5,000.

Oil Spill Irony (Part 1b)

TAKE TIME TO BE CAREFUL – NOW



EXXON VALDEZ
 Length - 987' Beam - 166' Draft - 64.5'
 1,485 kBbls. Crude Oil Service

March 1989

EXXON SHIPPING COMPANY

SUNDAY MONDAY TUESDAY WEDNESDAY THURSDAY FRIDAY SATURDAY

<p>FEBRUARY</p> <p>S M T W T F S</p> <p>1 2 3 4</p> <p>5 6 7 8 9 10 11</p>		<p>APRIL</p> <p>S M T W T F S</p> <p>1</p> <p>2 3 4 5 6 7 8</p>		<p>1</p>	<p>2</p>	<p>3</p>	<p>4</p>
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20 Years After the *Exxon Valdez*:

(“Tell ‘em what you’re going to tell ‘em...”)

- *Is there still oil in Prince William Sound?*
- *Has Prince William Sound recovered?*
- *Is all that nasty litigation finally over?*
- *Where do we go from here?*

20 Years After the *Exxon Valdez*:

- *Is there still oil in Prince William Sound?*
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Photo by Erik Hill, © Anchorage Daily

Bob Hallinen, Anchorage Daily News



Exxon Valdez Trustee Council



Bob Hallinen, Anchorage Daily News

20 Years After the *Exxon Valdez*:

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Yes.

Eleanor Island, February 7, 2009

Eleanor Island, February 7, 2009



Lingering Oil: The Big Picture...

- *There's still some oil out there*
- *It's not a lot*
- *It's more than we expected*
- *...So what?*

Lingering Oil:

(For people obsessed with the details)

- *In 2003, an estimated 21,000 gals/79,500 liters of oil remained (~0.2% of originally spilled volume)*
- *Rate of decrease 0 - 4% per year*
- *=> Decades to centuries persistence*
- *...So what?*

Exxon Valdez 20th Anniversary:

- *Is there still oil in Prince William Sound?*
- *Has Prince William Sound recovered?*
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Recovery: Point - Counterpoint *noaa*

“...The ecosystem in Prince William Sound today is healthy, robust and thriving... based on the studies of many scientists who have worked extensively in Prince William Sound, there has been no long term damage caused by the spilled oil.”

ExxonMobil statement on corporate website

“The spill was recent, the impact to the spill-area ecosystem was profound, and adverse effects of the oil on biological resources were readily apparent...20 years after the spill, there are two species that continue to be listed as ‘not recovered,’ ten species and four services listed as ‘recovering’...”

Exxon Valdez Oil Spill Trustee Council website

What is “Recovery”? How to measure it?

Some everyday definitions & metrics:

- *Economy*

- *Recovery: a period in a business cycle following a recession, during which the GDP rises*
 - *Jobless rate, industrial output, durable goods, retail inventories, job classifieds*

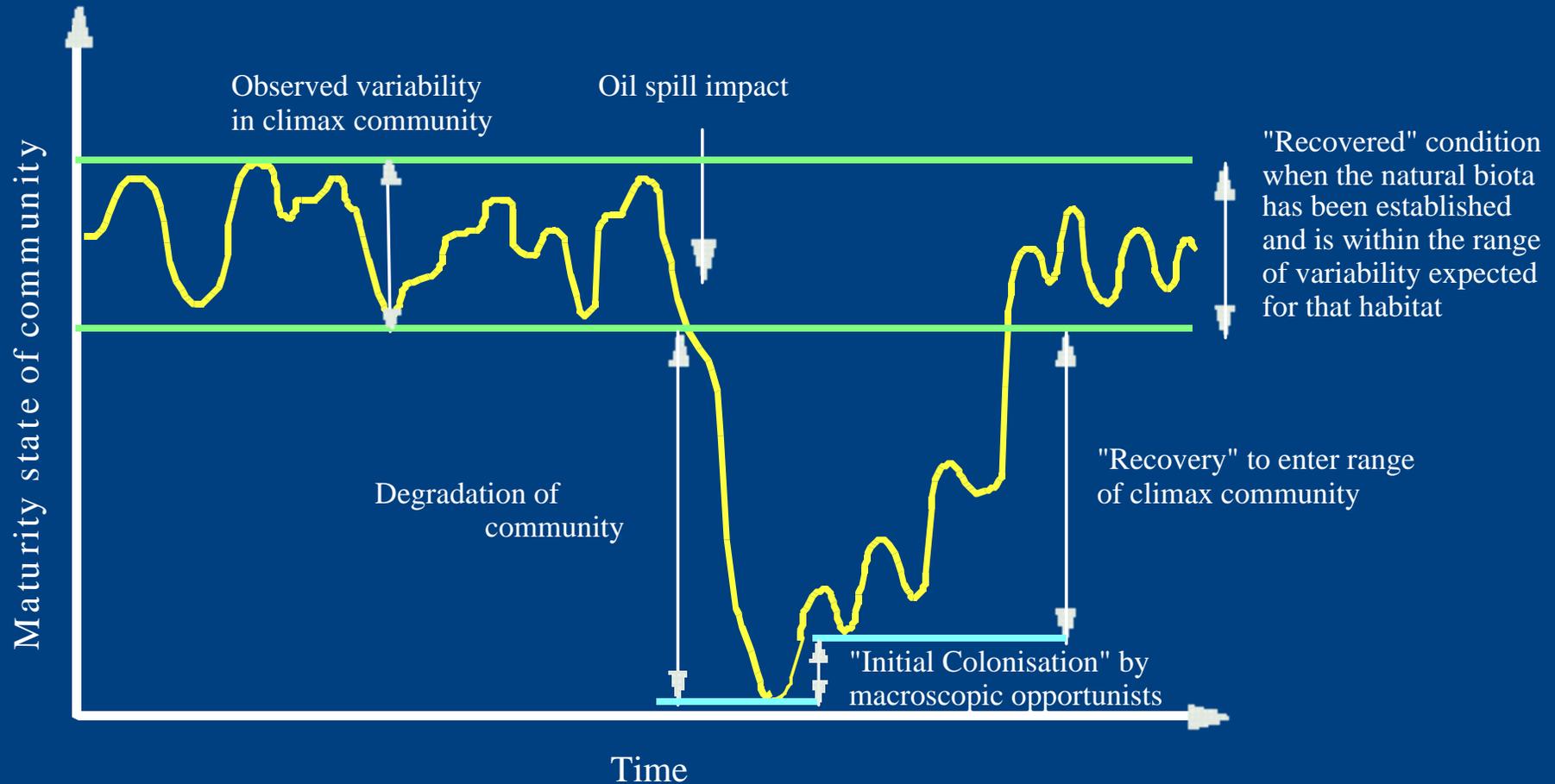
- *Personal health*

- *Recovery: “when I don’t feel like crap”*
 - *Body temperature, coughing, runny nose, appetite, energy level*

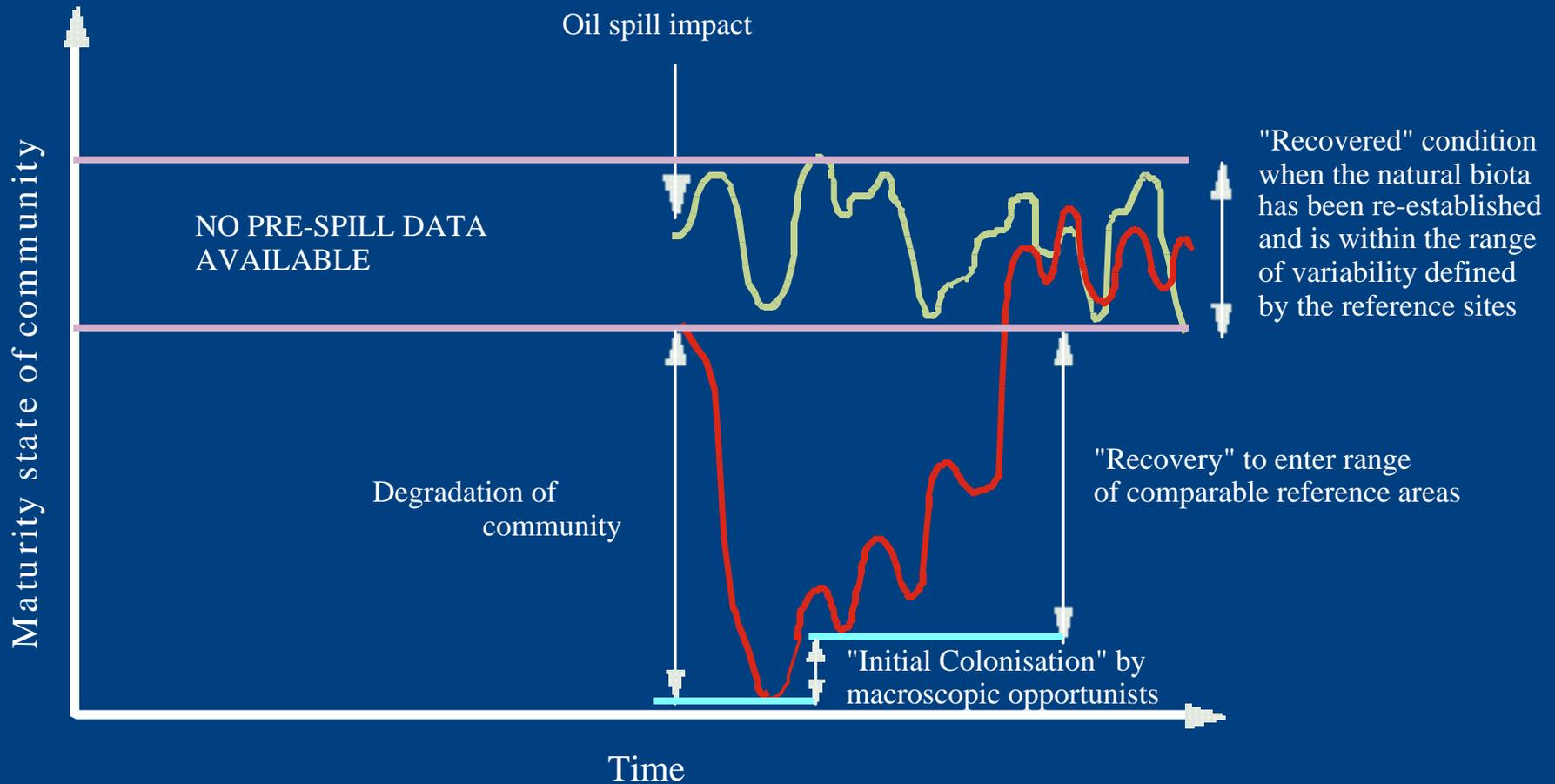
- *Sports*

- *Recovery: “...the answer to this question is not always easy because each athlete and each injury is unique...”*
 - *Baseball pitcher: pitch speed, location, endurance, ERA*

Idealized Recovery from Spills



Idealized Recovery: No Pre-Spill



How does
your garden
grow...?



Sidebar...

Mary, Mary, quite contrary,
How does your garden grow?
With silver bells, and cockle shells,
And pretty maids all in a row

... a religious allegory of Catholicism, with bells representing the sanctus bells, cockleshells the badges of the pilgrims to the shrine of Saint James in Spain (Santiago de Compostela) and pretty maids are nuns.

...alludes to Mary I of Scotland, with "how does your garden grow" referring to her reign, "silver bells" referring to Catholic cathedral bells, "cockle shells" insinuating that her husband cheated on her, and "pretty maids all in a row" referring to her ladies-in-waiting.

... identified with Mary I of England for roughly the same reasons as with her Scottish counterpart. The "How does your garden grow?" may make mocking reference to her inability to produce heirs, or to the common idea that England had become a Catholic vassal or "branch" of Spain and the Habsburgs. "Quite contrary" could be a reference to her unsuccessful attempt to reverse ecclesiastical changes effected by her father Henry VIII and her brother Edward VI. The "pretty maids all in a row" could be a reference to miscarriages as with the other Mary or her execution of Lady Jane Grey after coming to the throne. "Rows" may refer to her infamous burnings and executions of Protestants. Alternatively, capitalizing on the Queen's portrayal by Whig historians as "Bloody Mary", the "silver bells and cockle shells" referred to in the nursery rhyme could be colloquialisms for instruments of torture.

Definitions of Recovery in PWS



- Population return to prespill levels: Bald eagles, black oystercatcher, common loons, common murrelets, cormorants, harlequin ducks, sea otters
- Populations/productivity return to levels that would have prevailed in absence of oil spill, based on comparisons of oiled and unoiled sites: Clams
- Growth rates within oiled areas similar to those for unoiled areas, taking into account geographic differences: Cutthroat trout, dolly varden
- Population stable or increasing: Harbor seals, killer whales, marbled murrelets, pigeon guillemots
- Community composition on oiled shorelines similar to that which would have prevailed in absence of the spill: Intertidal communities
- Community composition in oiled areas similar to unoiled areas: Subtidal communities
- Concentrations of oil in mussels and in sediments below beds reach background, do not contaminate predators, and do not affect subsistence uses: Mussels
- The next highly successful year class is recruited into the fishery and when other indicators of population health are sustained within normal bounds: Pacific herring
- Population indicators (e.g., growth & survival) within normal bounds and no statistically significant differences in egg mortalities in oiled and unoiled streams for two years each of odd and even year runs: Pink salmon
- Adults returns per spawner and other indicators or [sic] productivity are within normal bounds: Sockeye salmon
- Biochemical indices of hydrocarbon exposure or other stresses and indices of habitat use are similar between oiled and unoiled areas after taking into account any geographical differences: River otters

Source: Exxon Valdez Oil Spill Trustee Council

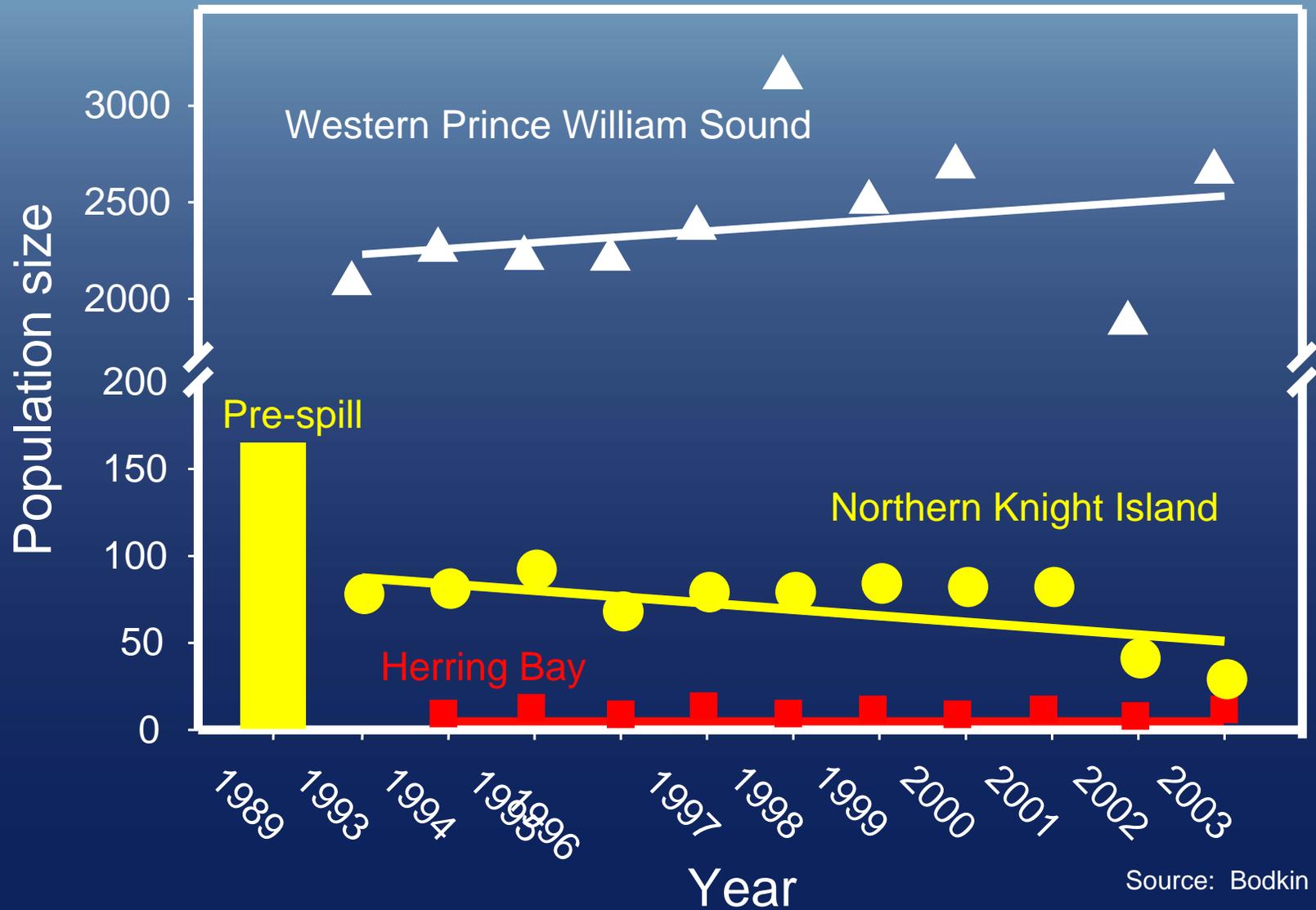
Two Examples of Impaired Recovery from *Exxon Valdez*:

- *Sea otters* (*Enhydra lutra*)
- *Orcas* (*Orcinus orca*)



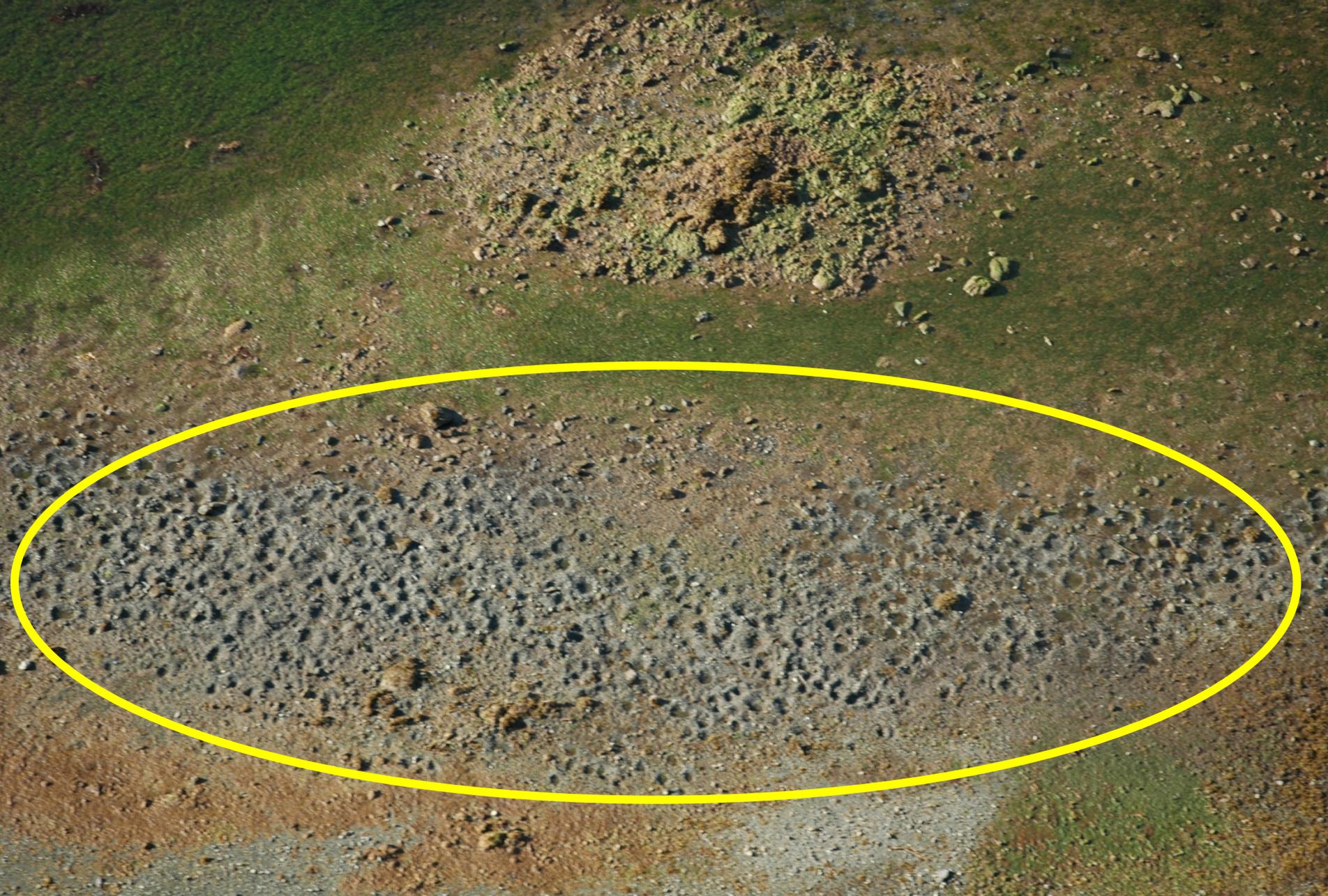
PWS Otter Recovery Status

noaa



Source: Bodkin et al.
2003







Differences in Aromatic Hydrocarbon Metabolism

Krahn (1998)

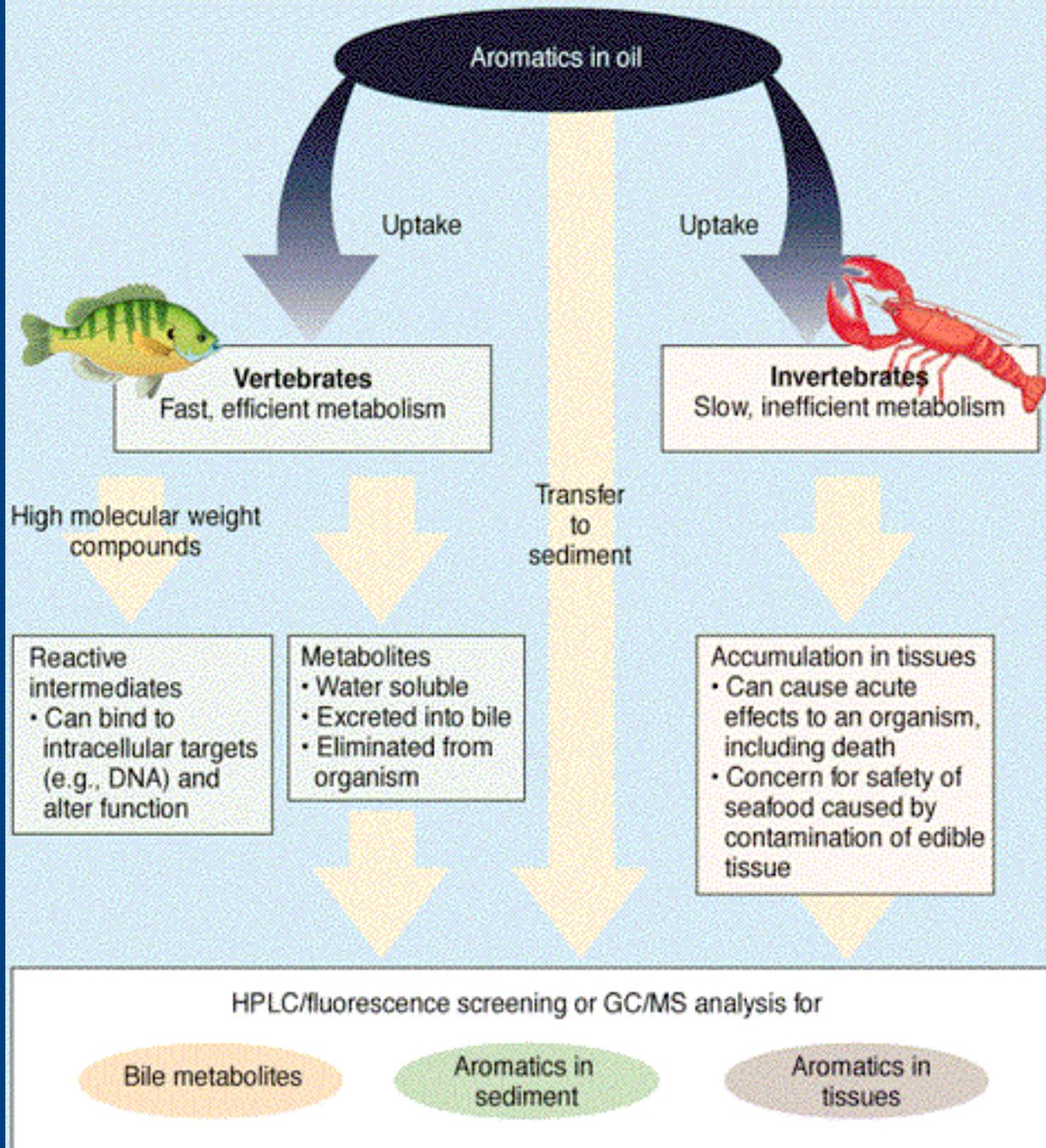




Photo Use by Permission © Copyright Craig Matkin, North Gulf Oceanic Society

Orca Vulnerability to Spills

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“On the whole, it is quite improbable that a species or population of cetaceans will be disabled by a spill at sea, whatever the likelihood that one or a few animals might be affected or even killed.”

J.R. Geraci, in *Sea Mammals and Oil: Confronting the Risks*

“An assessment of the toxicological literature and of the available empirical data on EVOS leads to the conclusion that direct, long-term sublethal toxic effects on wildlife appear to be very unlikely.”

R. Hartung, in *Exxon Valdez Oil Spill: Fate and Effects in Alaskan Waters*



Photo: Chuck Monet, Craig Matkin



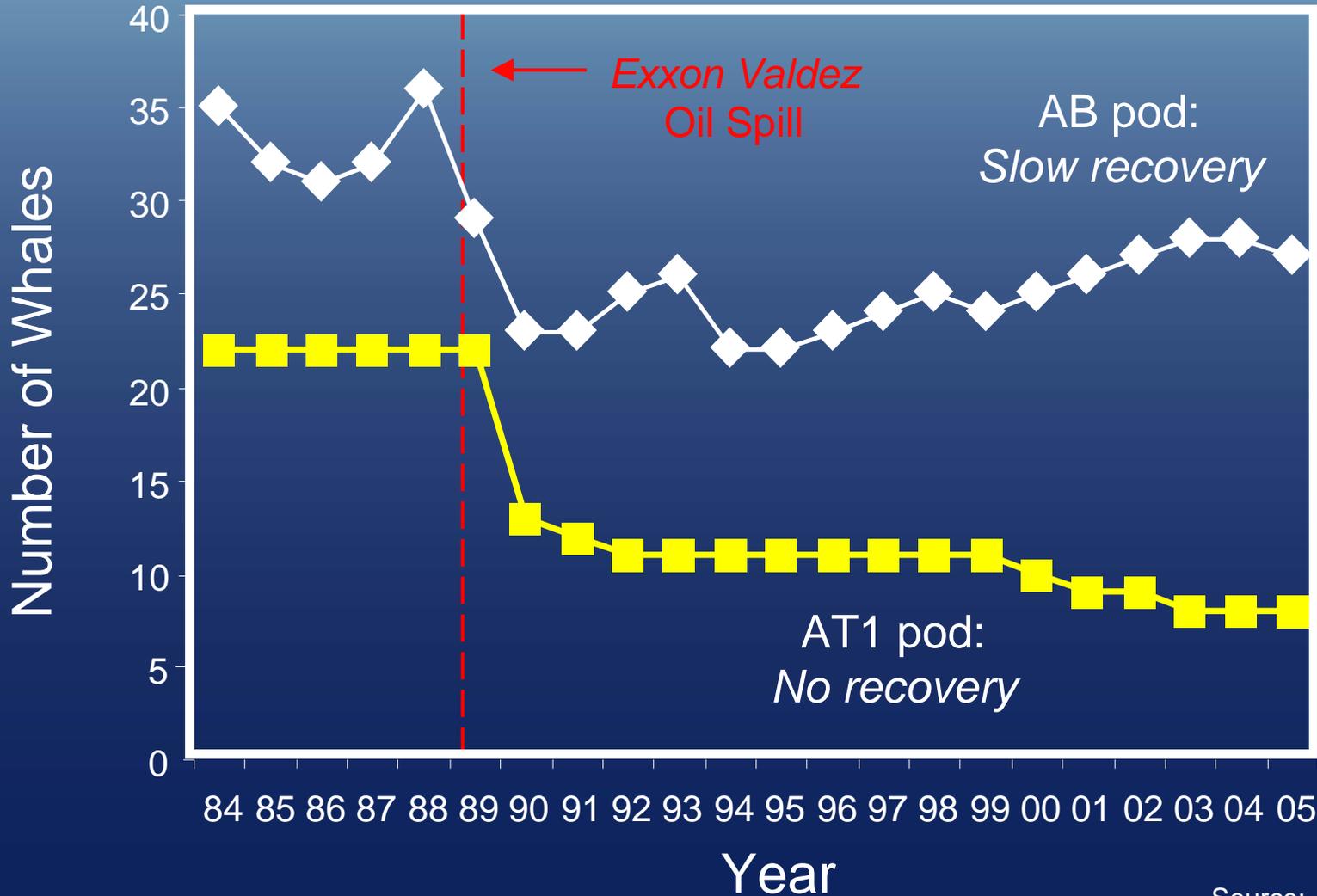
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EXXON VALDEZ
WILMINGTON DEL.

PWS Orca Recovery Status

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Source: Matkin 2006



Photo: Erich
Gundlach





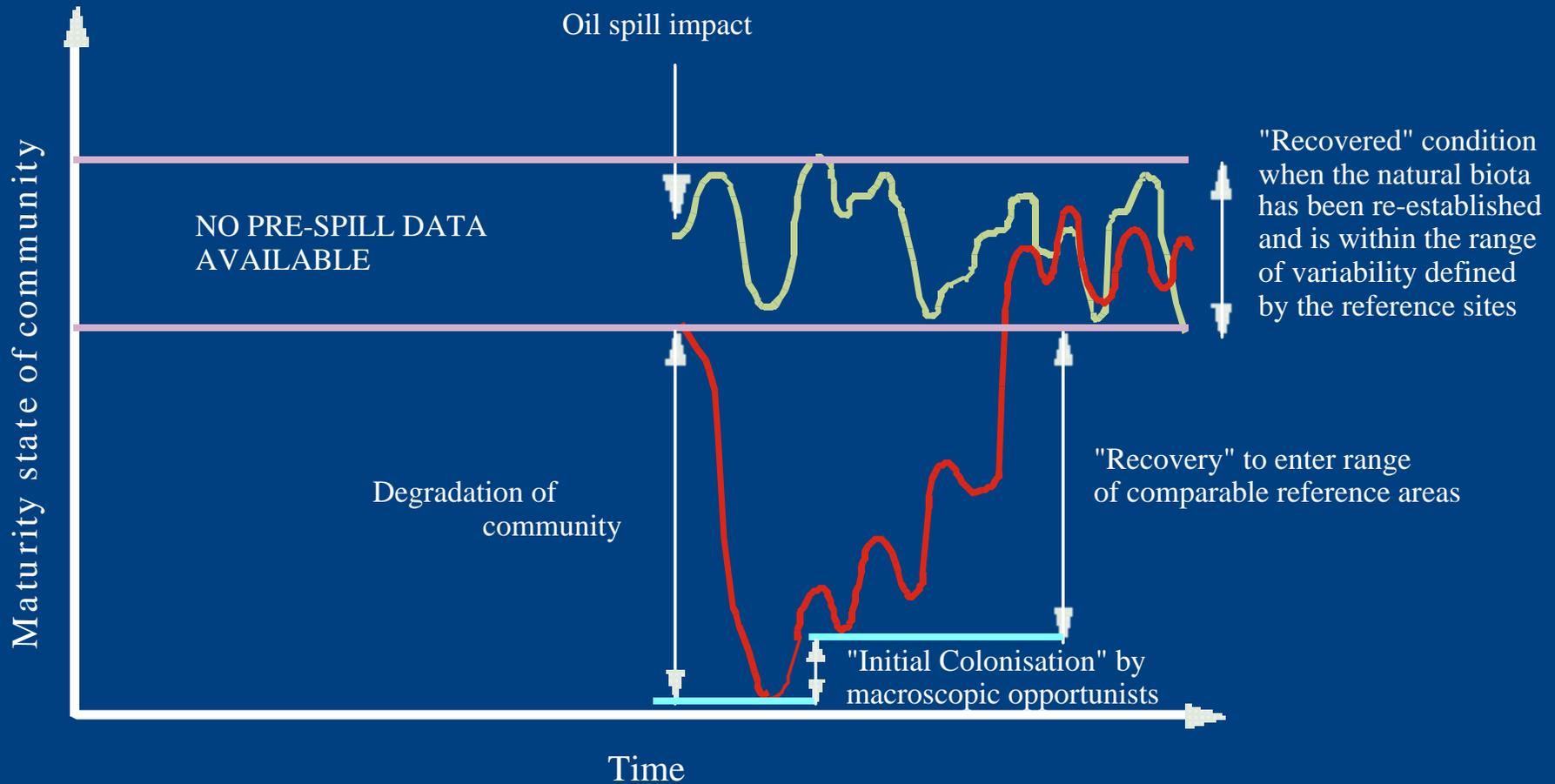


Exxon Valdez: Recovery from Cleanup



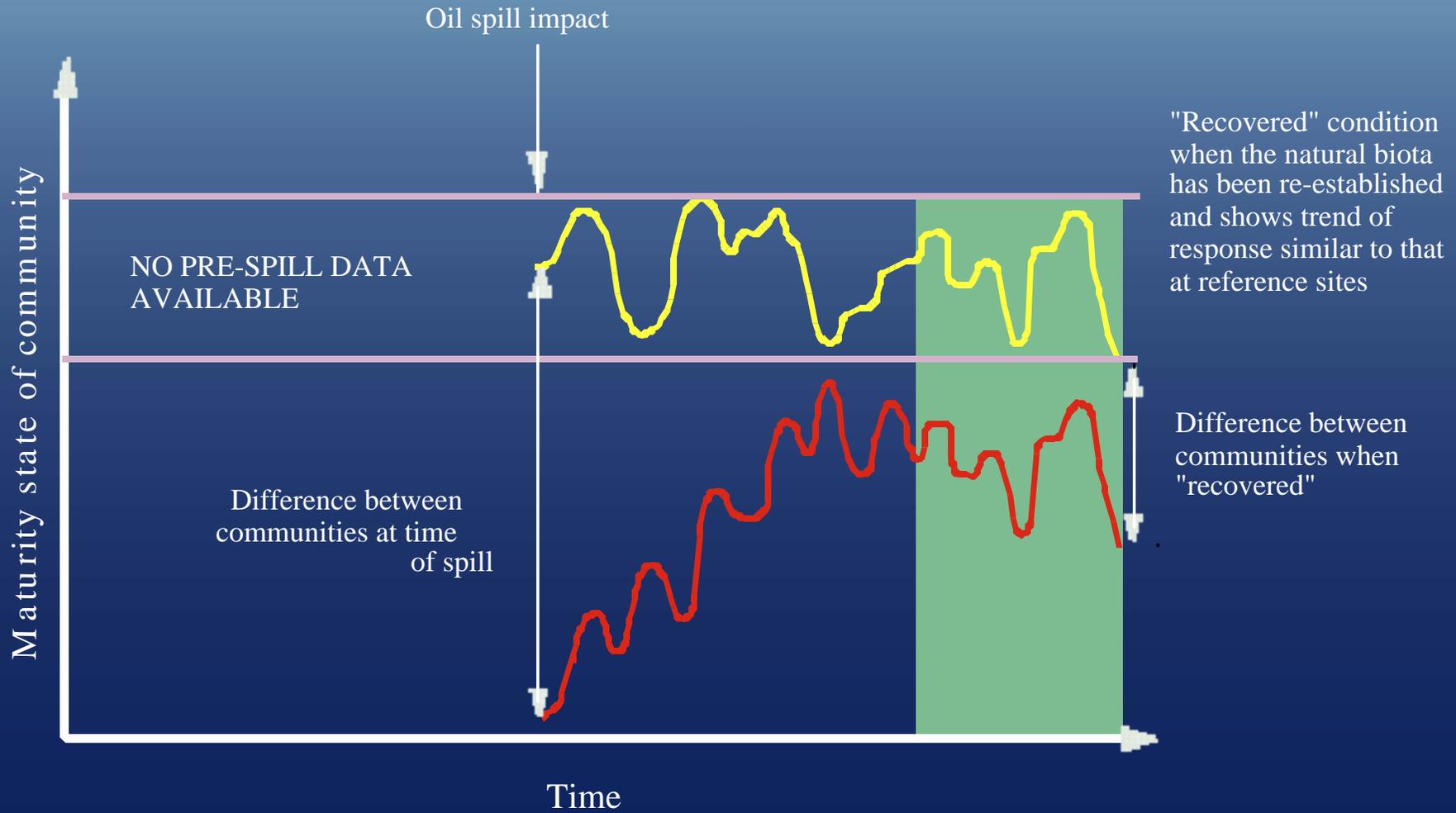
Initially, a greater degree of recovery was necessary at washed sites, but little difference could be discerned between washed & unwashed sites after around three years.

Idealized Recovery: No Pre-Spill



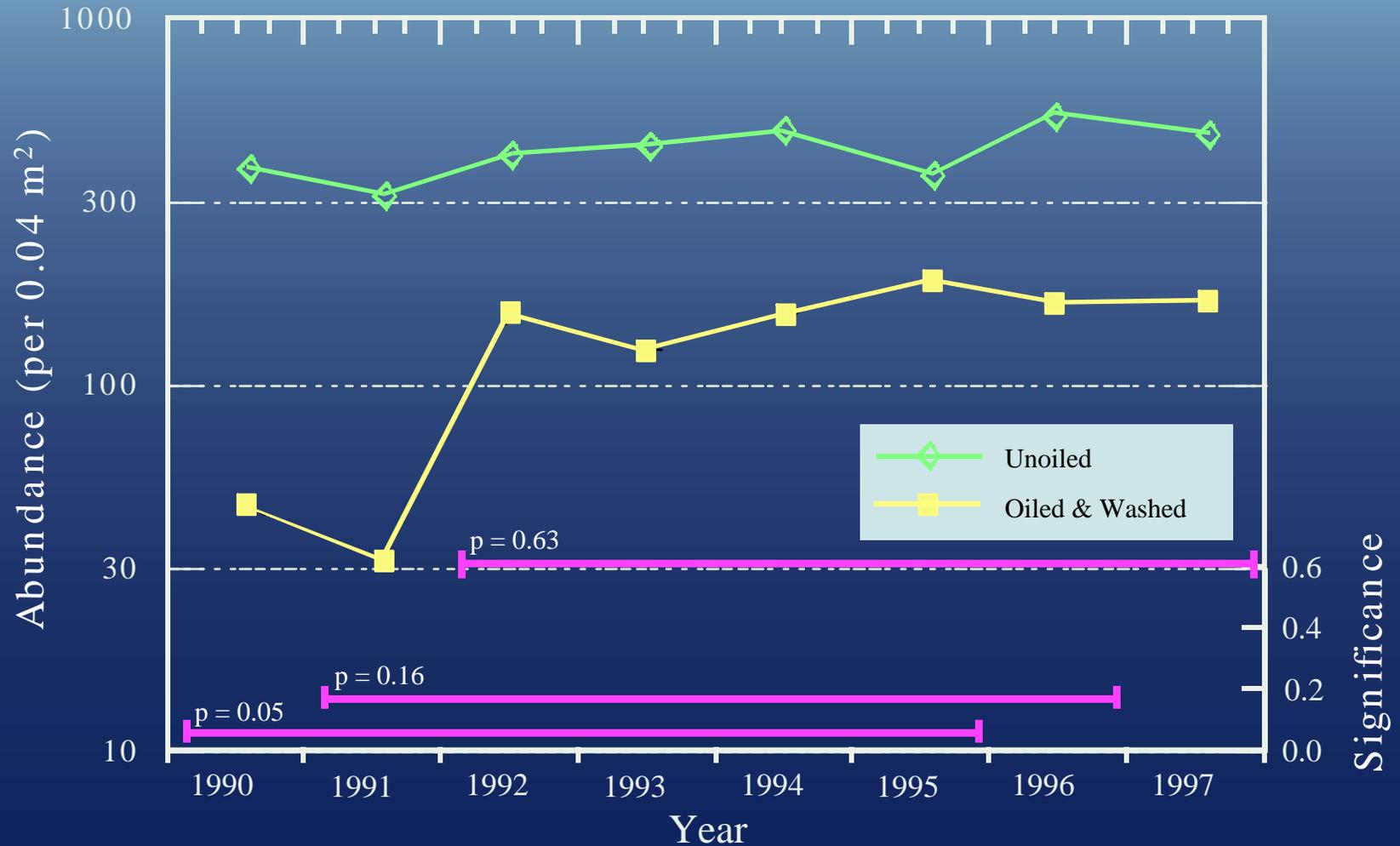
Recovery: "Parallelism" Approach

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Parallelism Application to Infauna

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Source: Coats et al. (1999)





Photo: Allan K. Fukuyama





Kasitsna Bay *Fucus* Study

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Before, 1999



2000



2002



After, 1999



2001



July, 1989





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Exxon Valdez: Litigation, Part 1 *noaa*

- *Criminal Plea Agreement*
 - *Exxon fined \$150 million, the largest fine ever imposed for an environmental crime.*
 - *\$125 million forgiven; \$12 million to the North American Wetlands Conservation Fund and \$13 million to the National Victims of Crime Fund.*
- *Criminal Restitution*
 - *For injuries to the fish, wildlife, and lands of the spill region, Exxon paid \$100 million.*
 - *Divided evenly between the federal and state governments.*
- *Civil Settlement*
 - *Exxon paid \$900 million in annual payments over 10 years (final payment received in September 2001).*

Exxon Valdez: Litigation, Part 2



- *Third Party Claims*

- *1994: class action jury trial awards \$5 billion in punitive damages to plaintiffs. (32,000 fishermen, Alaska natives, landowners and others).*
- *2001: 9th Circuit Court of Appeals rules the original \$5 billion verdict was excessive.*
- *2002: U.S. District Court reinstates award at \$4 billion.*
- *2003: 9th Circuit again directs District Court to reconsider punitive damages award under United States Supreme Court guidelines.*
- *2004: District Court decides no change in the court's earlier analysis; finds that damages of \$4.5 billion plus \$2.25 billion in interest is in accordance with Supreme Court authority.*
- *2006: Exxon asks the court of appeals to reduce the \$4.5 billion punitive damage award to \$25 million.*
- *2006: 9th Circuit Court of Appeals sets punitive damages award at \$2.5 billion; Exxon seeks review by U.S. Supreme Court.*
- *2008: U.S. Supreme Court allows assessment of punitive damages in spills under maritime law. However, also holds that Exxon Valdez award was excessive and limits to \$507.5 million, equal to the trial court's calculation of appropriate compensatory damages.*

- *Reopener Claim*

- *Civil settlement contained a "reopener clause" in which the governments could make a claim for up to an additional \$100 million to address injuries from the spill that were not known or foreseeable from information available or reasonably available at the time of the settlement in 1991.*
- *On June 1, 2006, the United States and the State of Alaska notified Exxon they were invoking provision at an estimated \$92 million to address the continued presence of oil in the spill area.*

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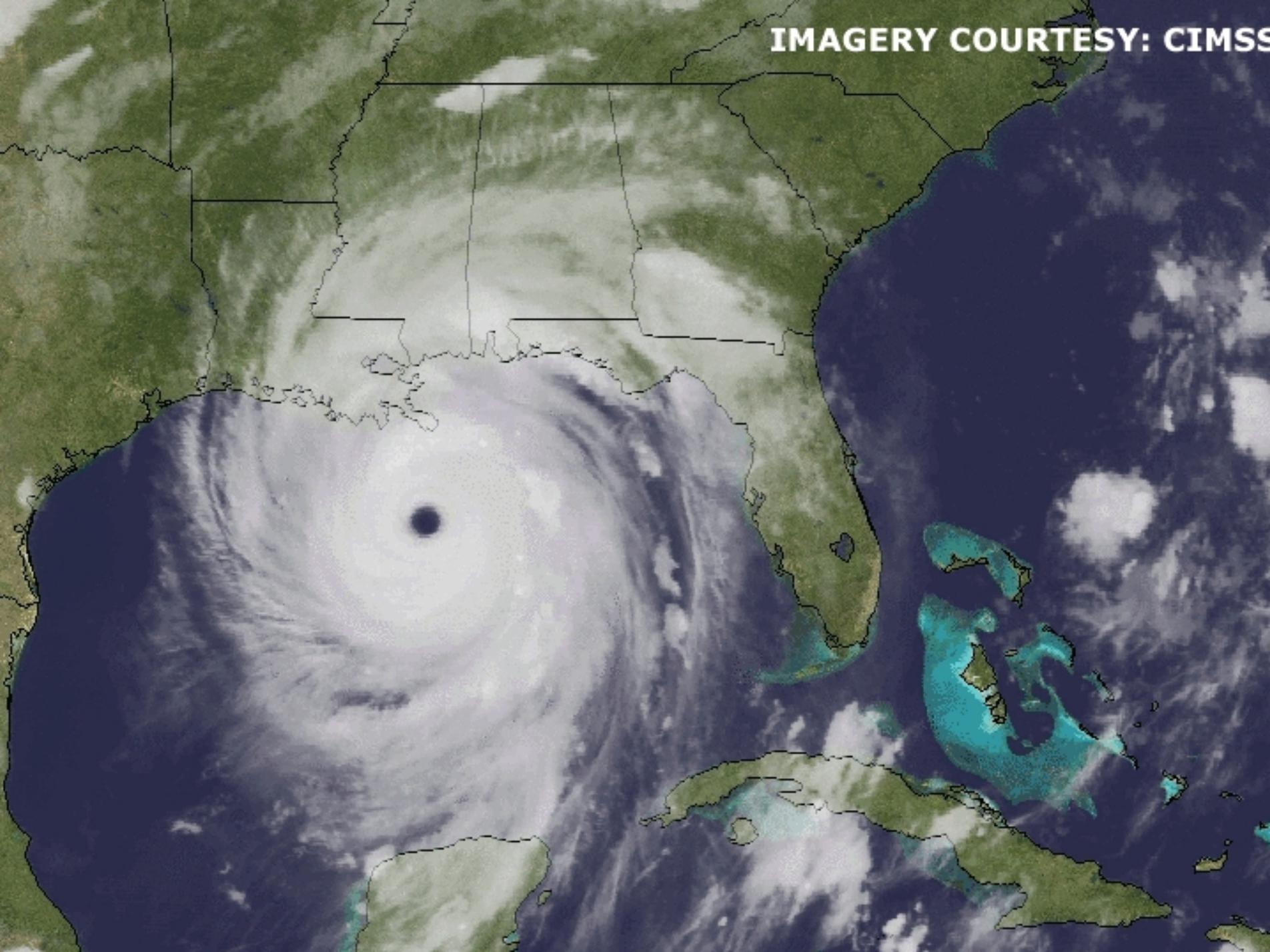


New Orleans, 2008

Wabamun Lake, 2005



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Hurricanes as a source of irony...





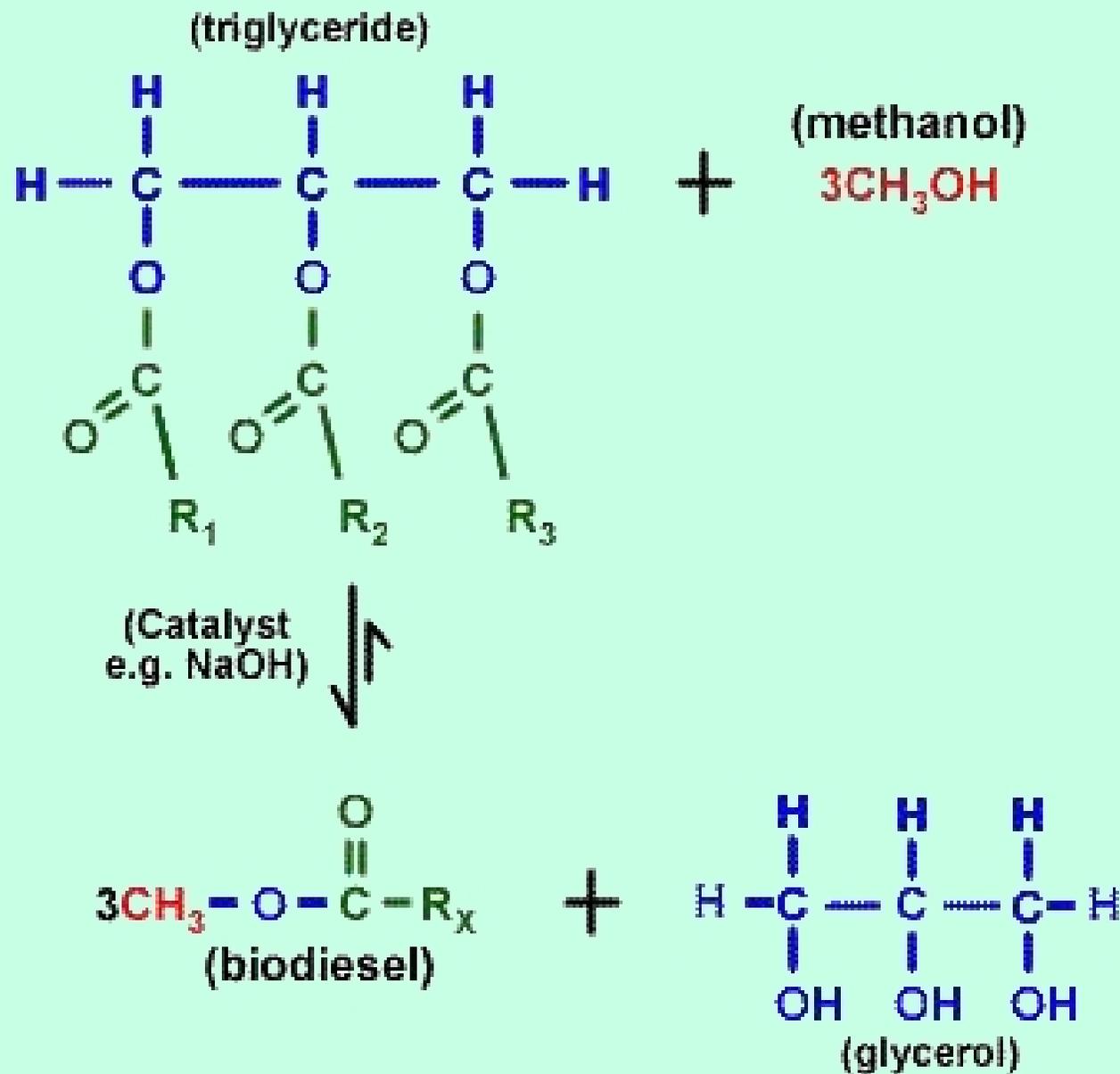
NEAR FORT MCMURRAY, AB

Seattle Biodiesel

July 2007

620 gal/2347 liters





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Questions...

