

Preliminary Approaches to Modeling Effects of No-Action and Action Alternatives on Fall Chinook Fisheries

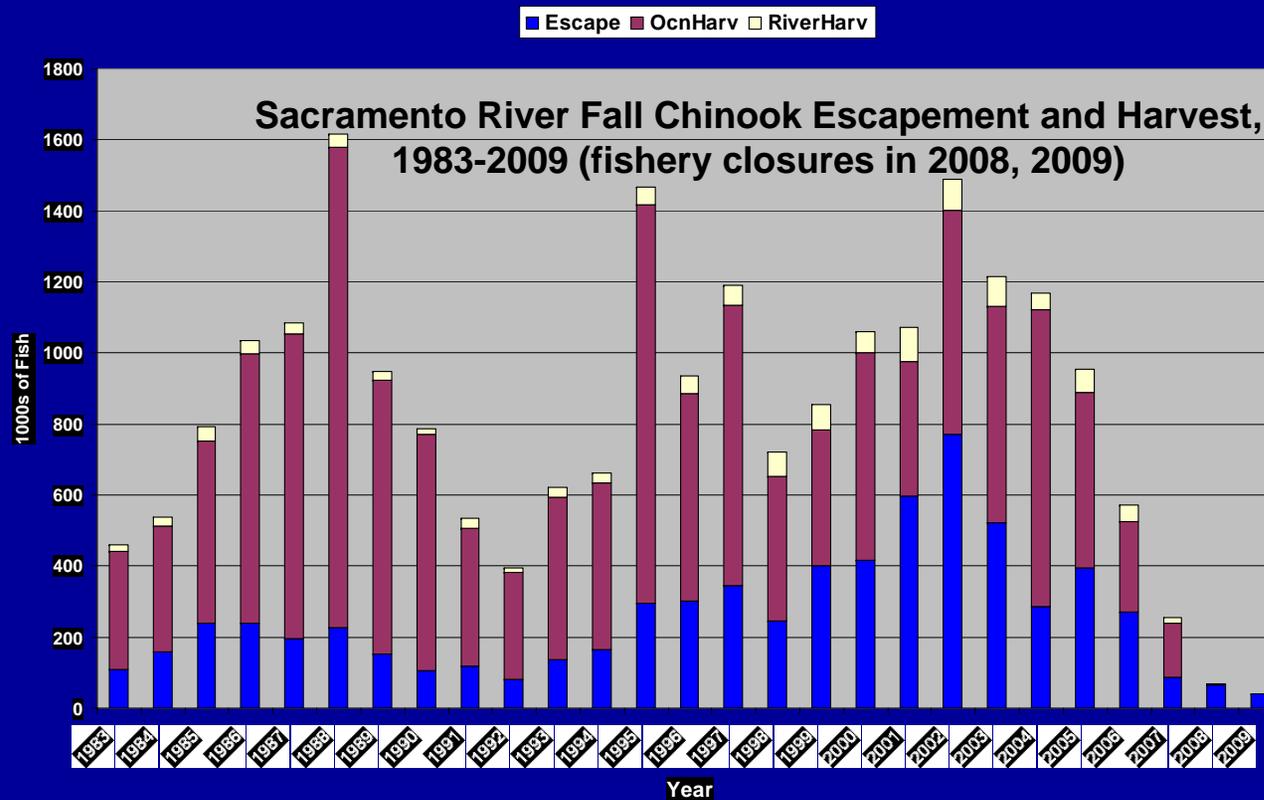
Cindy Thomson (NMFS)

**Economics Subteam: Ben Simon (Co-Chair, DOI),
Paula Engel (BOR), Pete Grigelis (DOI), Dave Harpman (BOR),
Ted Maillet (FWS), Aaron Mamula (NMFS), Jon Platt (BOR),
Becky Redhorse (BOR), Cameron Speir (NMFS)**

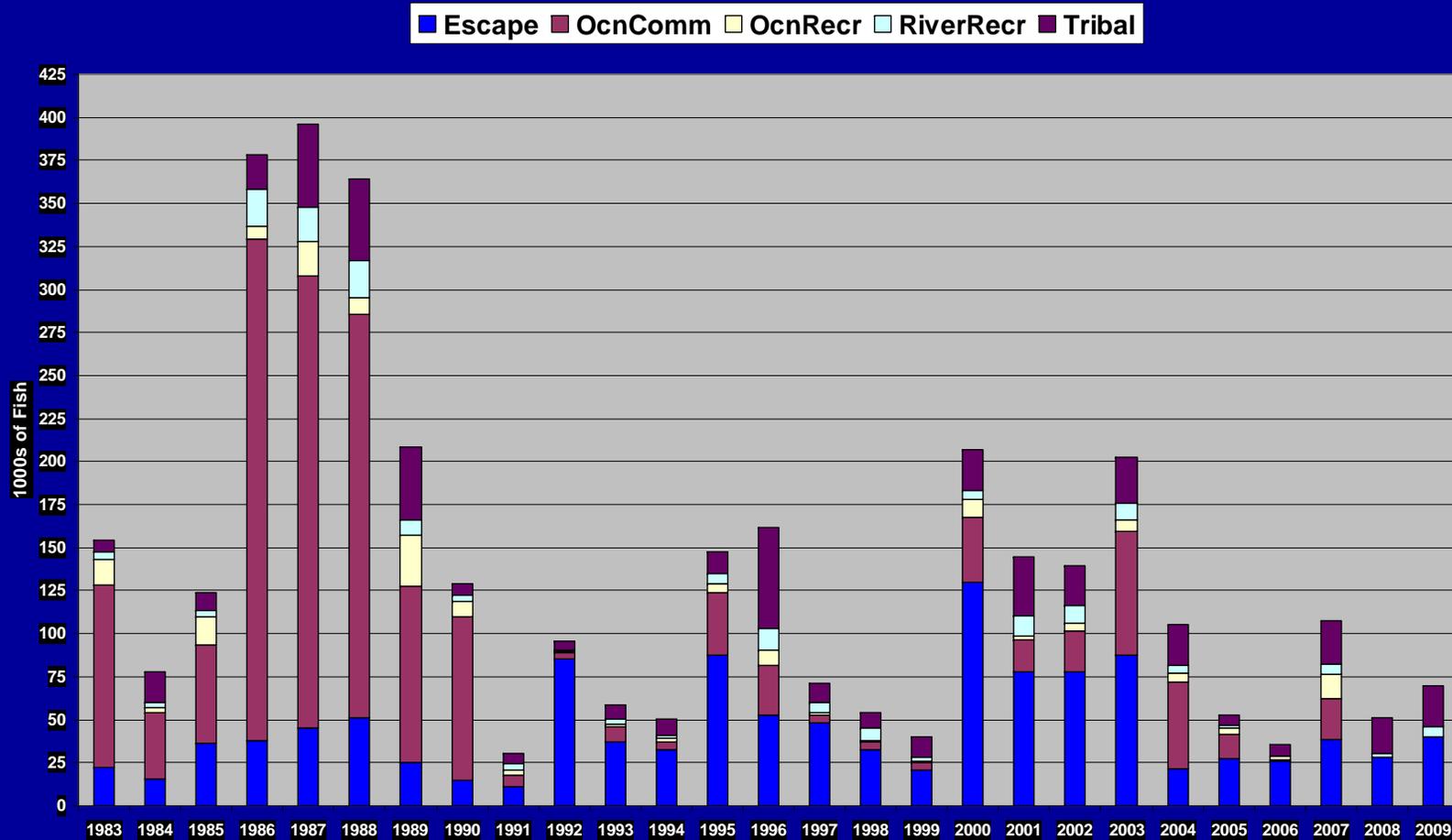
**TCC meeting
Klamath Falls, OR
6 Oct 2010**

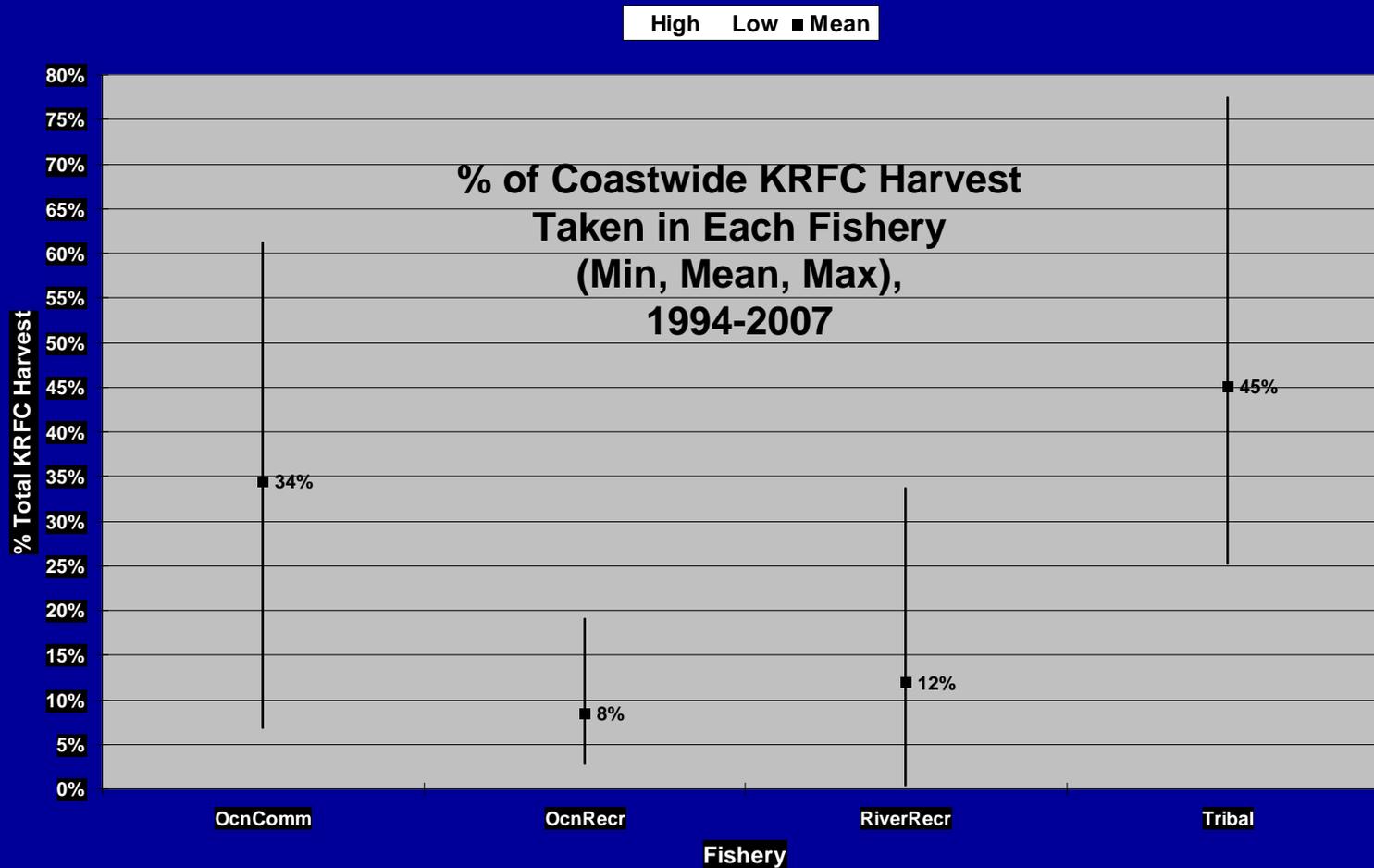
Some Factors to Consider in Evaluating Fishery Effects

- Shift to more conservative management beginning in 1990s
- 50% Tribal allocation (1993)
- Importance of grilse as well as adult harvest in inriver recreational fishery
- Historical coho as well as Chinook harvest
- Mixed stock nature of ocean fisheries (e.g., influence of SRFC)



Klamath River Fall Chinook Adult Escapement and Harvest 1983-2009



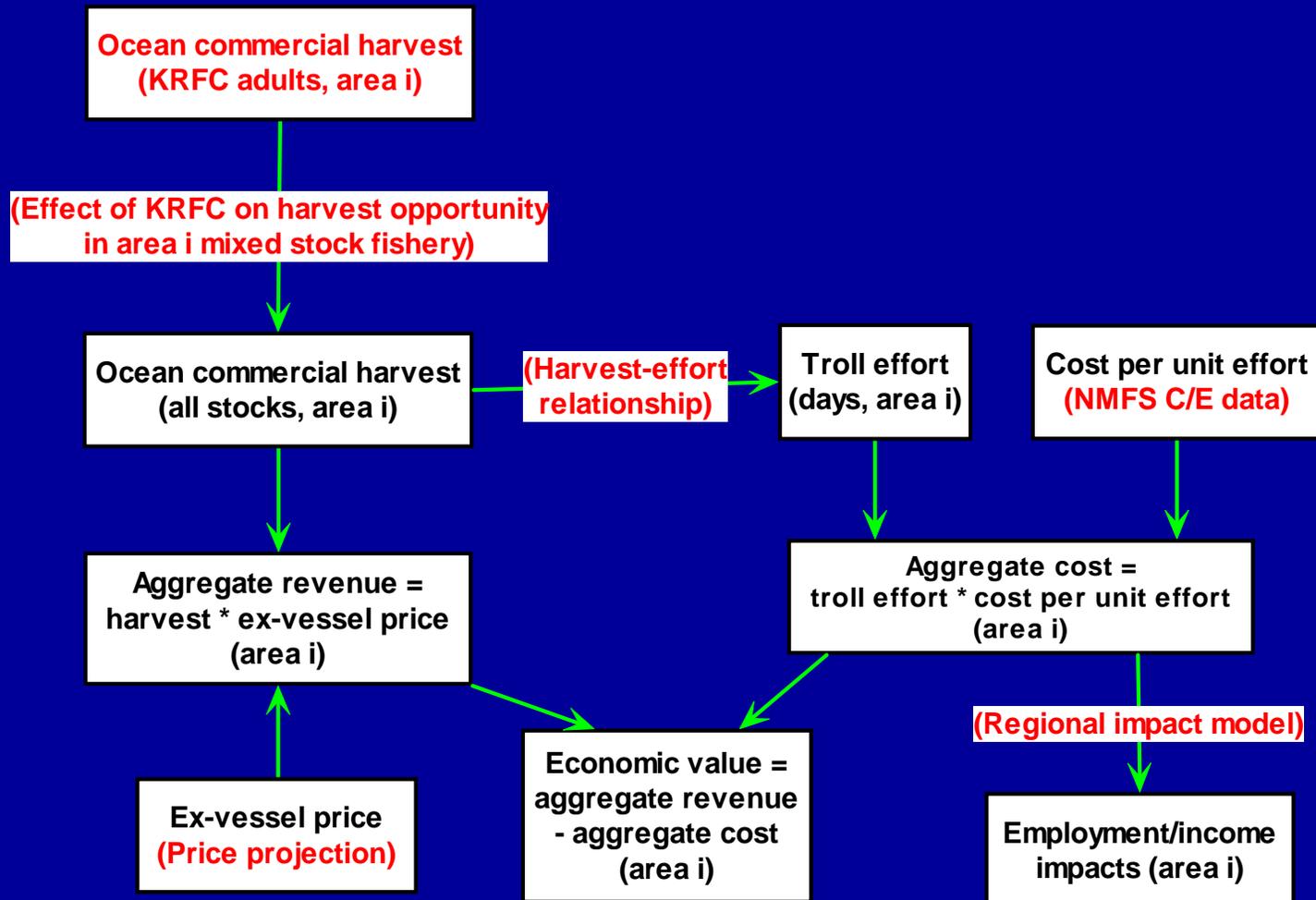


	OcnComm	OcnRecr	RivrRecr	Tribal
1994-2007 Avg Actual (Scaled)	34% (32%)	8% (7%)	12% (11%)	45% (50%)
2008-2009 Avg	0%	0%	12%	88%

Evaluating Tribal Effects

- **Importance of spatial distribution – Tribes distributed throughout Basin**
- **Effects on subsistence and commercial fisheries and ceremonial use**
 - > **Implications for practice/transmittal of cultural values**
 - > **Social implications (including health)**
- **Tribal effects not amenable to monetization**

Evaluating Economic Value and Economic Impacts for Fall Chinook Ocean Commercial Fishery



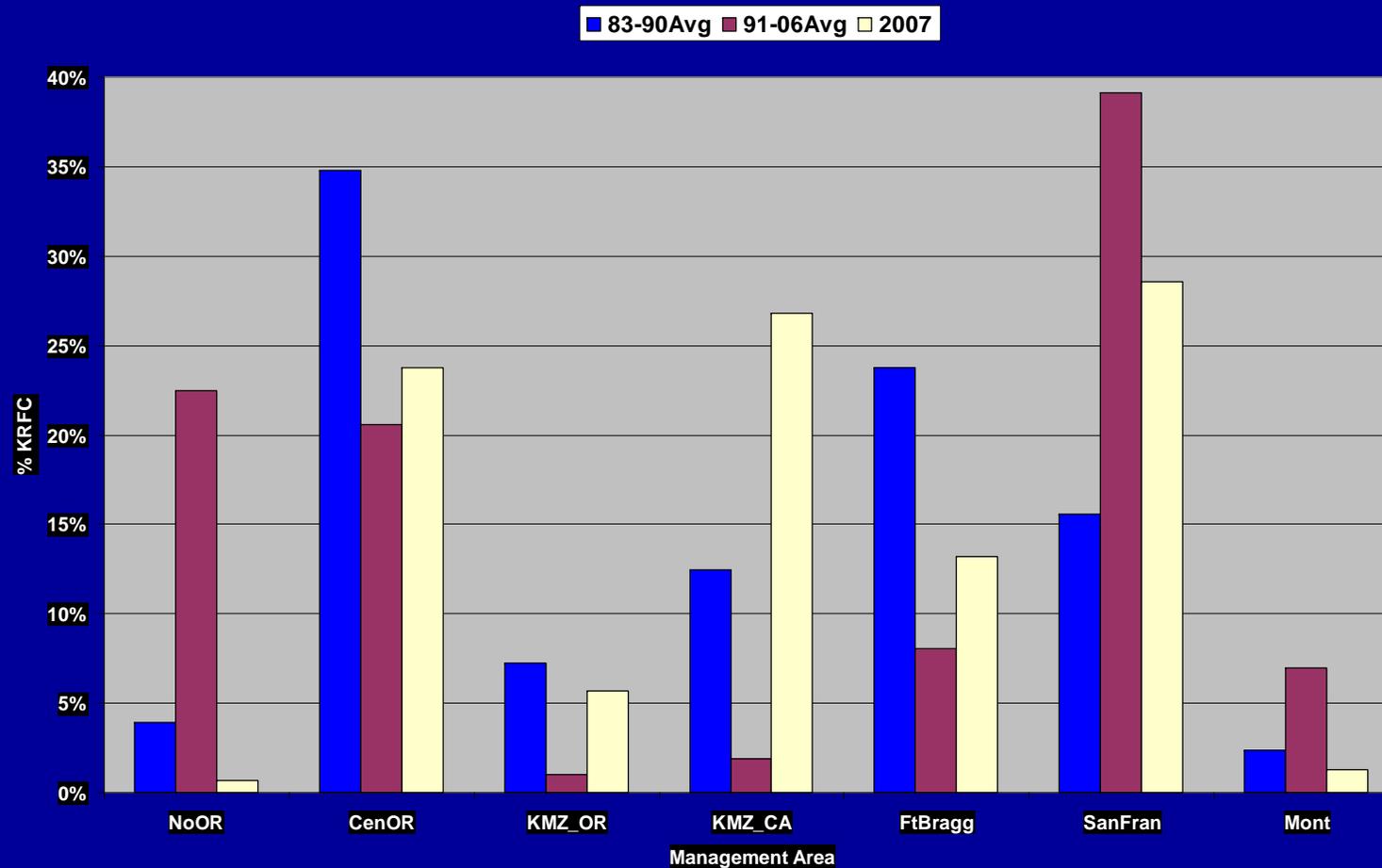


Data Sources: USDA/NRCS & USGS - watershed boundary; ODFG & ODFG - rivers; ESRI & Google Earth - cities, counties, lakes; USGS - dams. Proj: Geographic, NAD83.

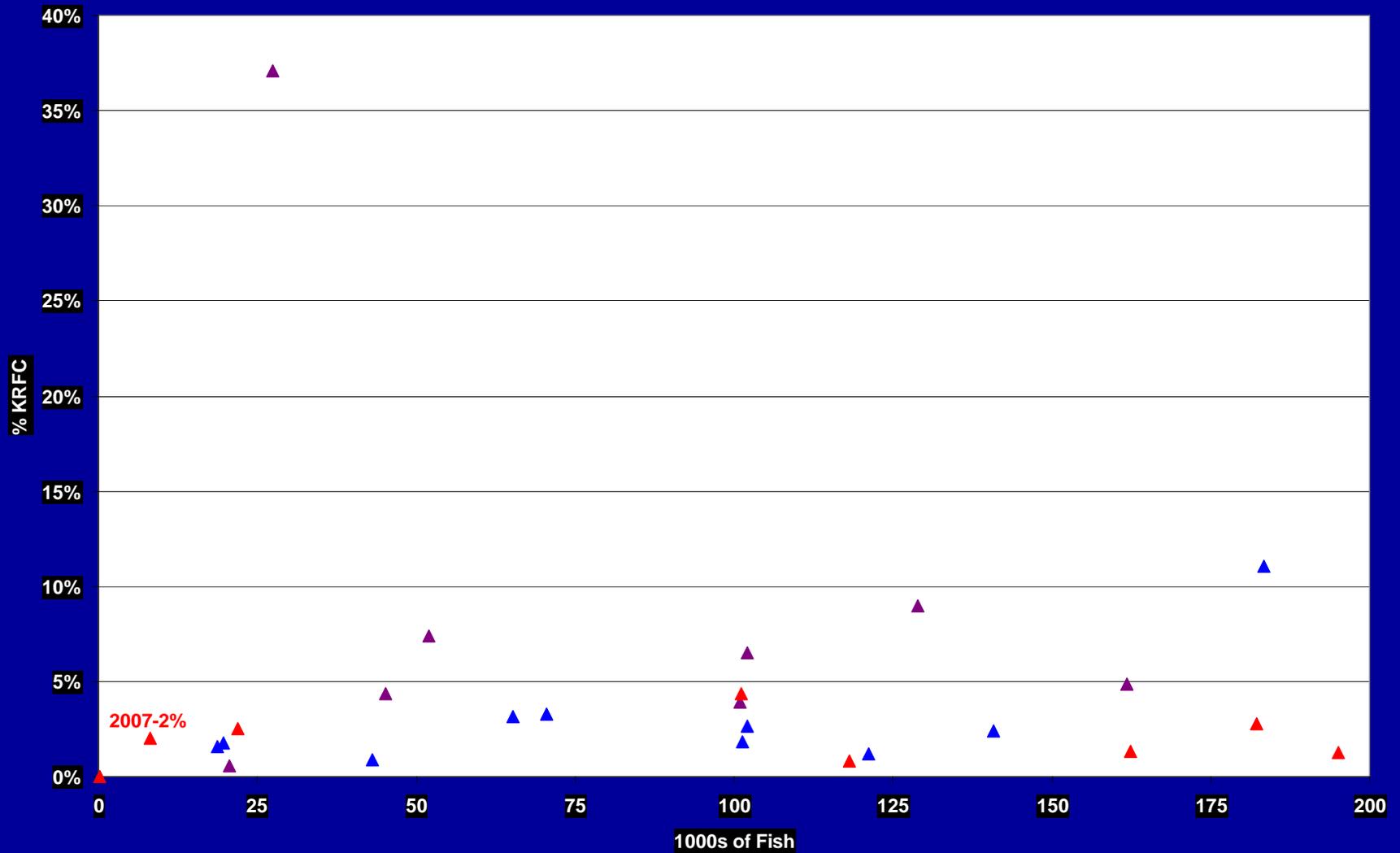
Ocean Salmon Fishery Management

- Ocean fisheries are “mixed stock” fisheries
- Stocks originating south of Cape Falcon tend to stay south of Falcon
- Prevailing policy: “weak stock management”
- Areas most constrained by management objectives for Klamath fall Chinook
 - > KMZ – OR
 - > KMZ – CA
 - > Fort Bragg

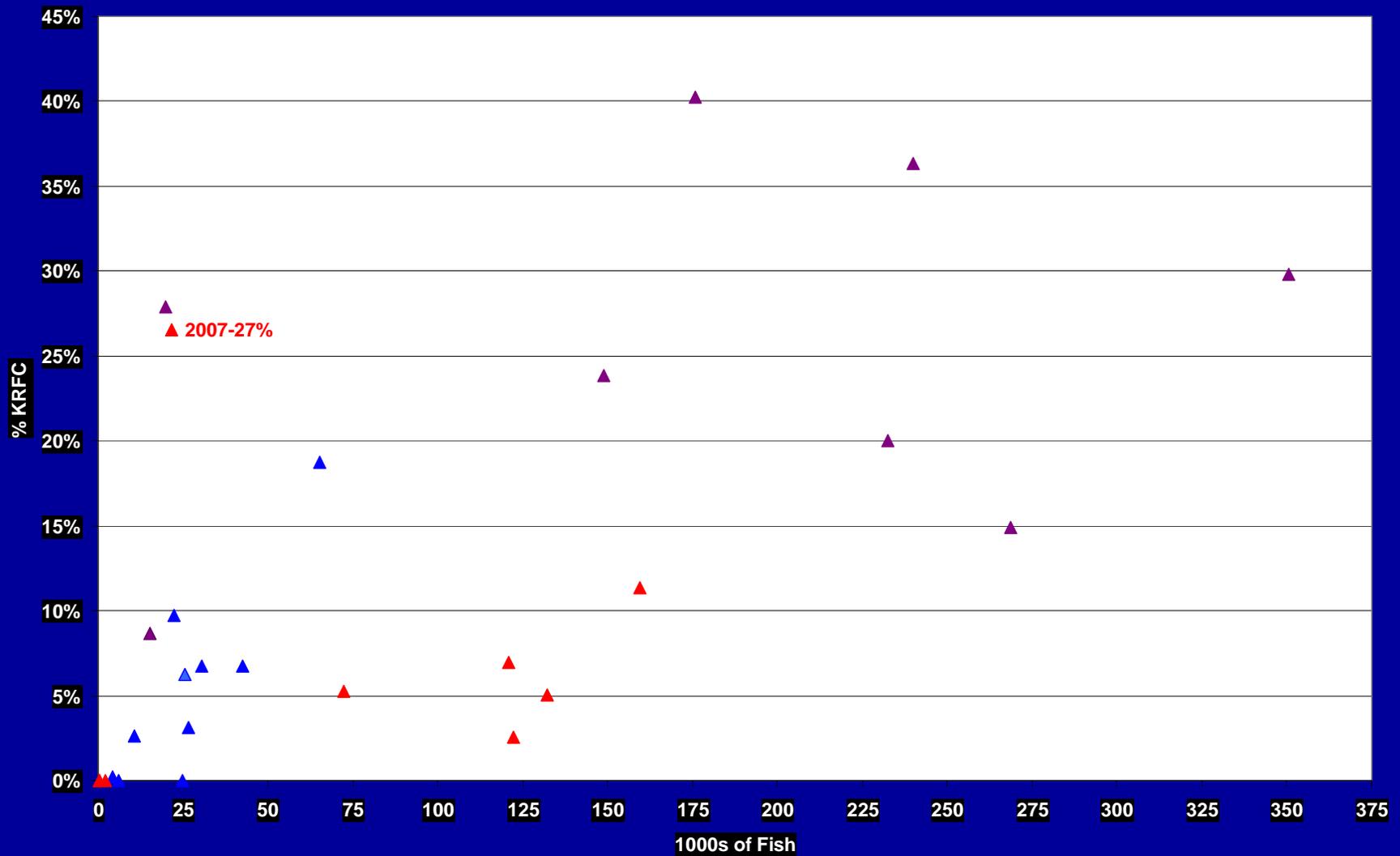
Distribution of Ocean Commercial KRFC Harvest Among Management Areas, 1983-1990 Avg, 1991-2006 Avg, 2007



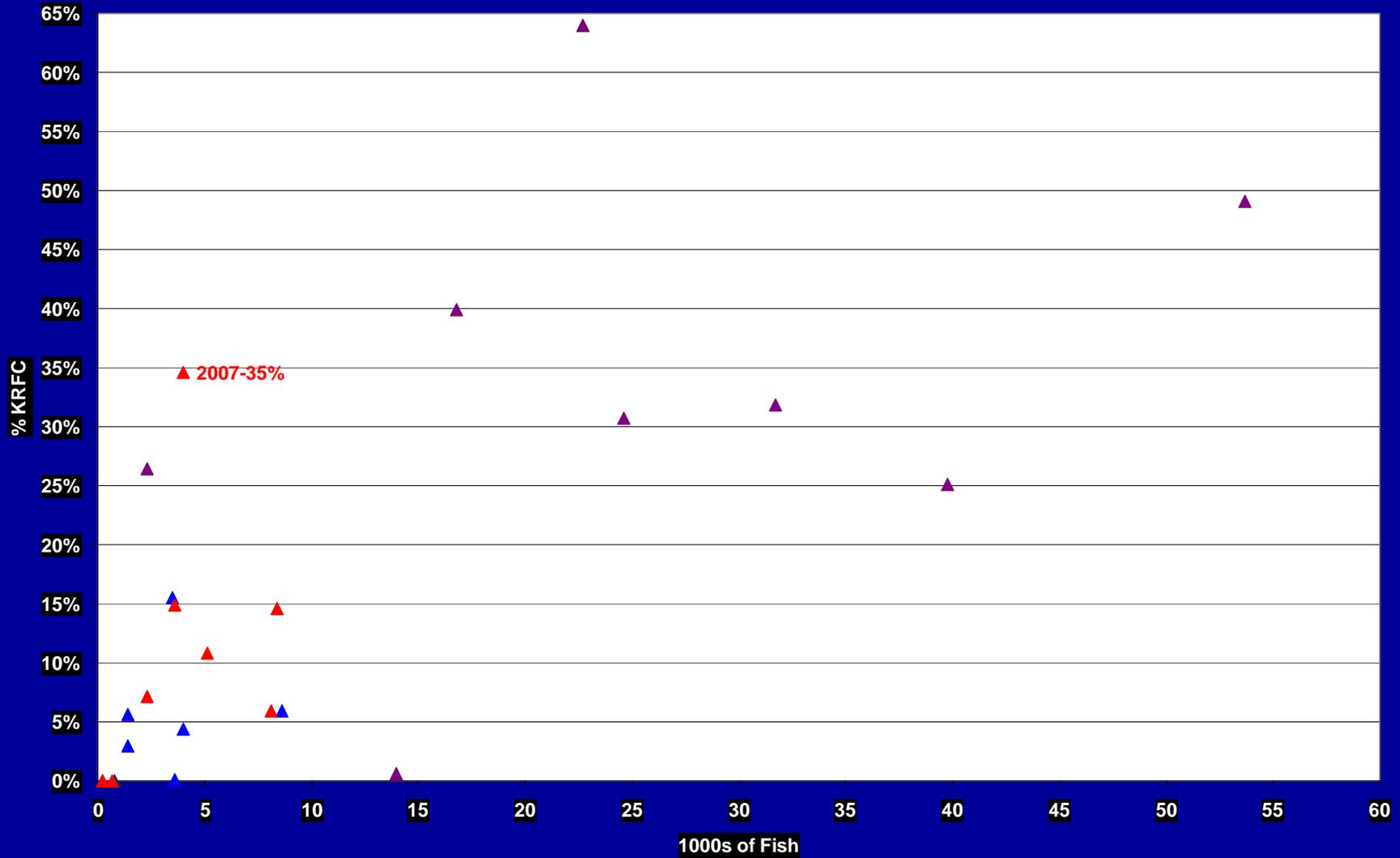
KRFC Share of Total Ocean Commercial Harvest Northern Oregon Management Area (purple 1981-1990, blue 1991-2000, red 2001-2007)



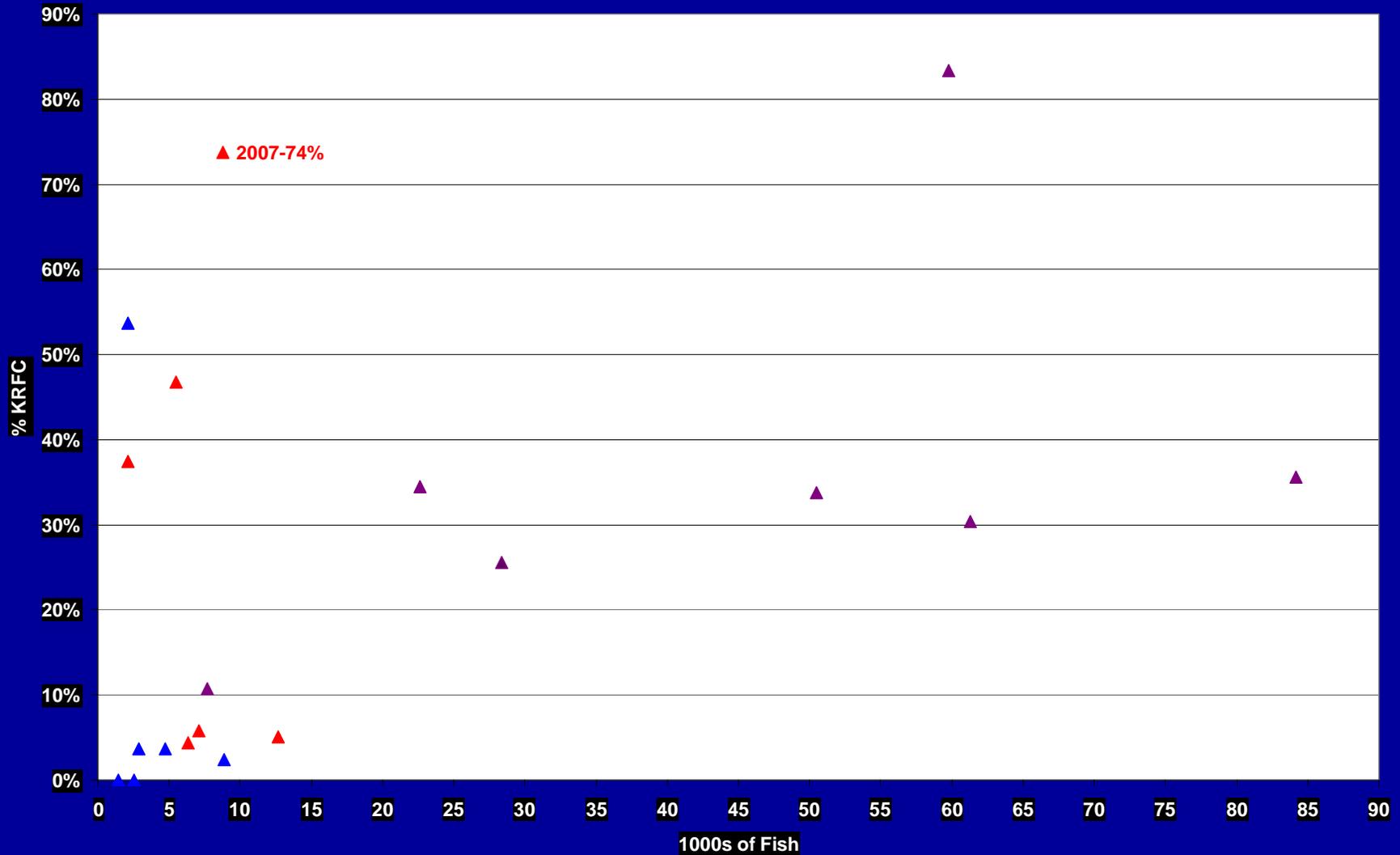
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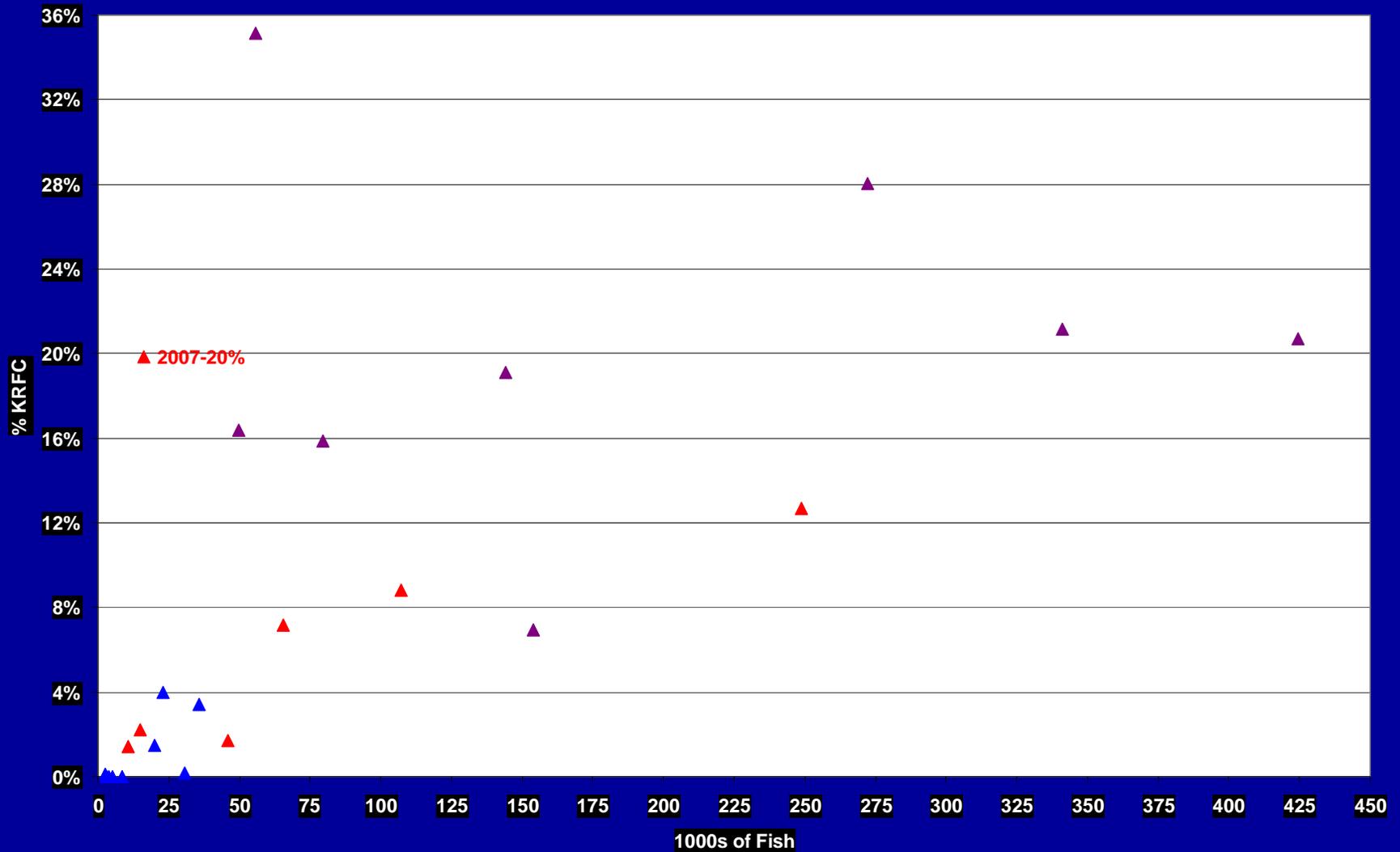
KRFC Share of Total Ocean Commercial Harvest KMZ Oregon Management Area (purple 1981-1990, blue 1991-2000, red 2001-2007)



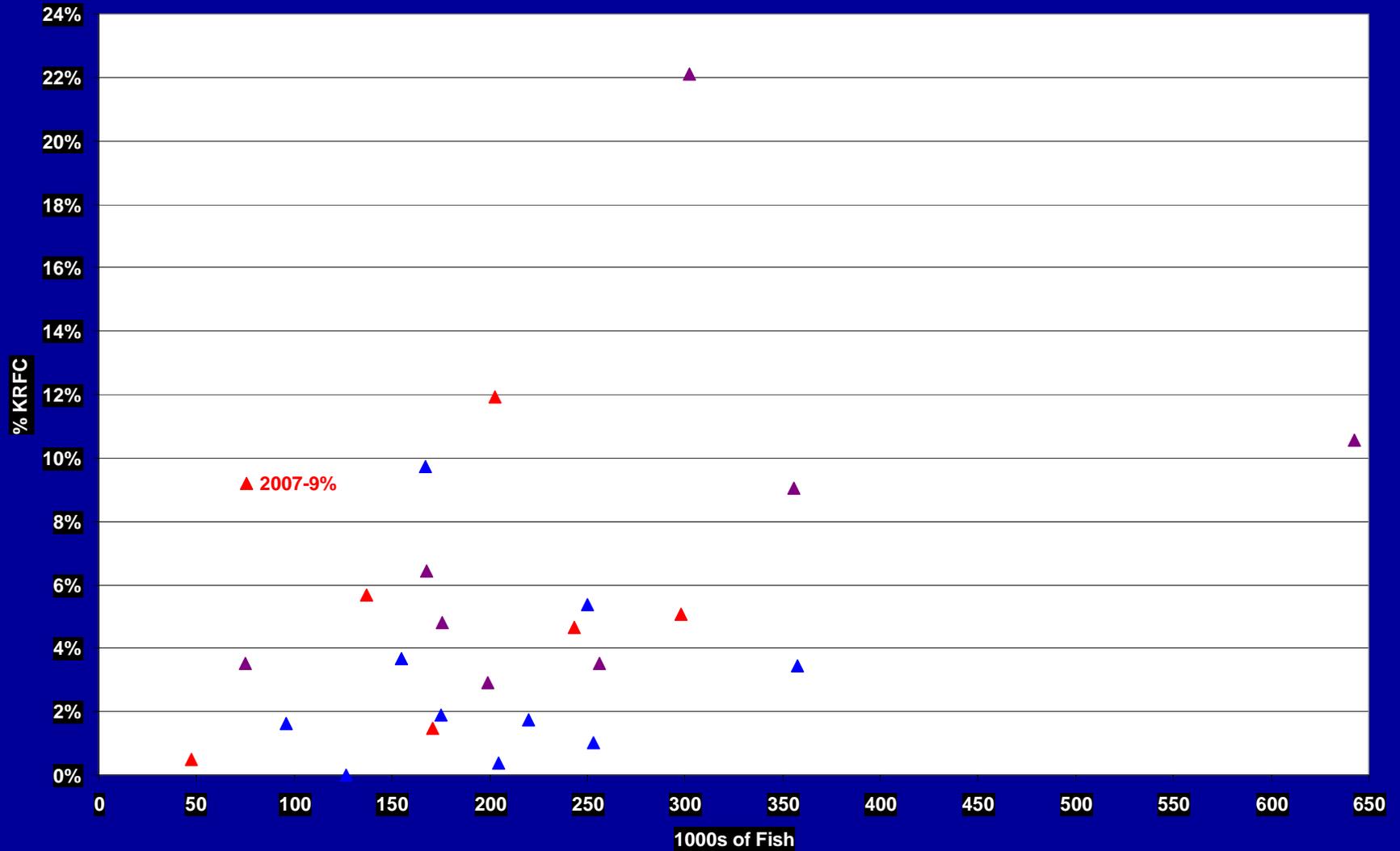
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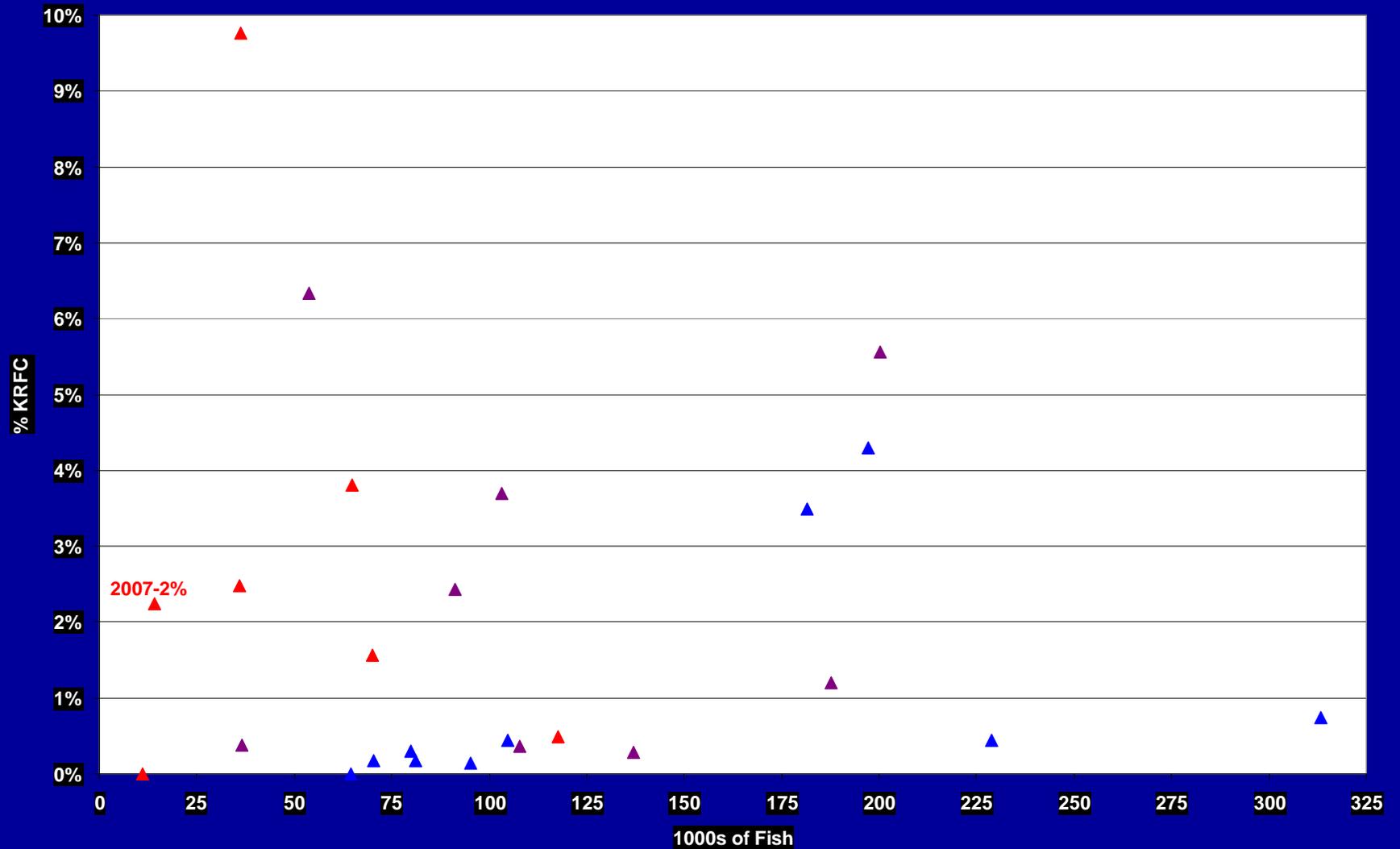
KRFC Share of Total Ocean Commercial Harvest Fort Bragg Management Area (purple 1981-1990, blue 1991-2000, red 2001-2007)



KRFC Share of Total Ocean Commercial Harvest San Francisco Management Area (purple 1981-1990, blue 1991-2000, red 2001-2007)

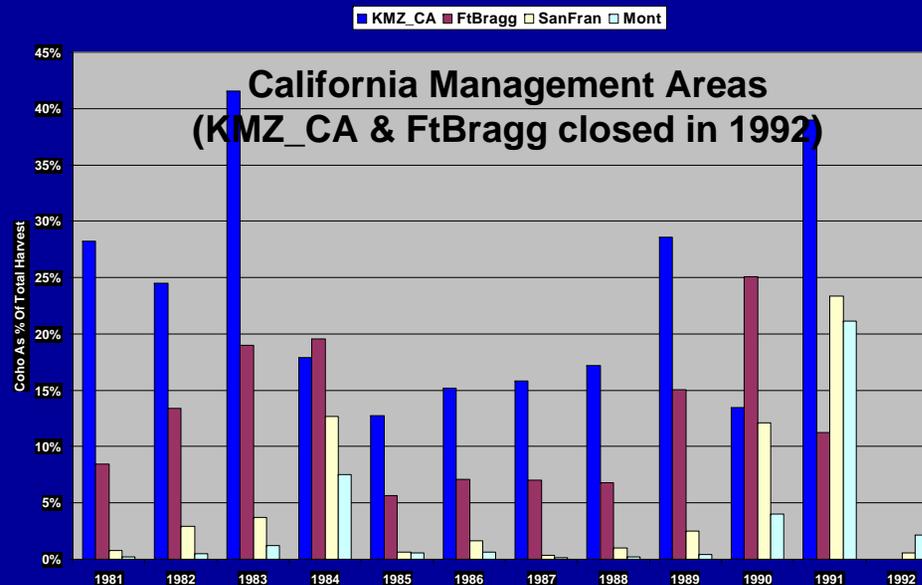
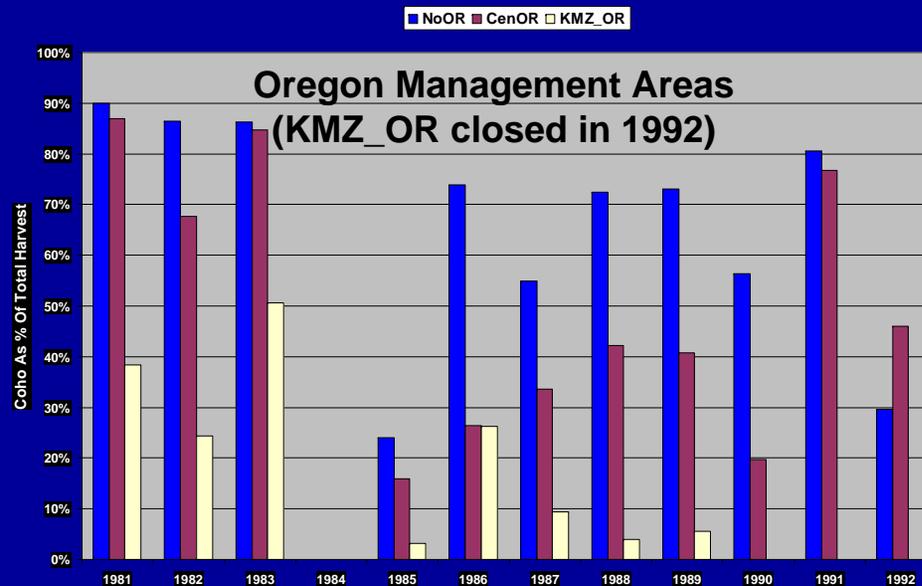


KRFC Share of Total Ocean Commercial Harvest Monterey Management Area (purple 1981-1990, blue 1991-2000, red 2001-2007)



Coho as % of Total Harvest in Ocean Commercial Fishery, by Management Area, 1981-1992

- Coho historically an important component of harvest
- Coho retention in commercial fishery prohibited after 1992
- Harvest-effort relationships should reflect availability of coho as well as Chinook

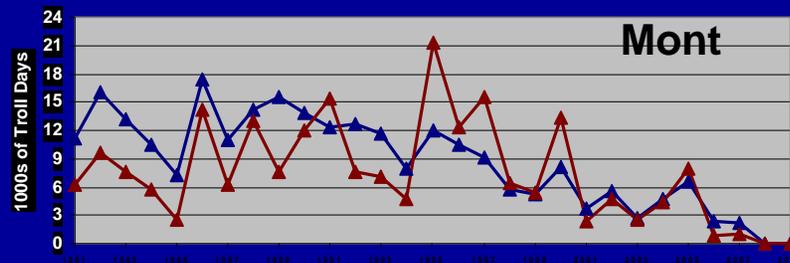
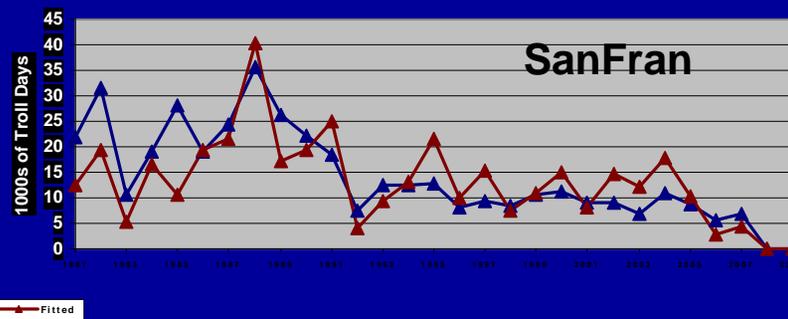
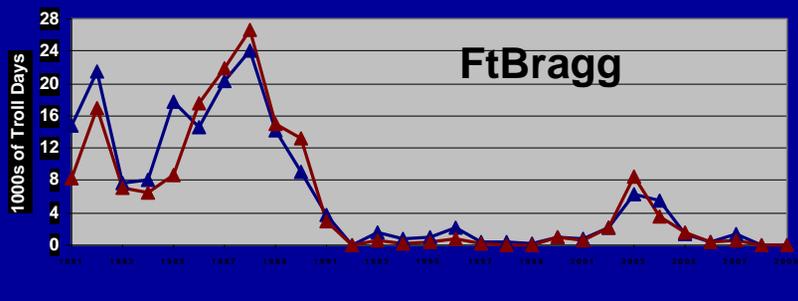
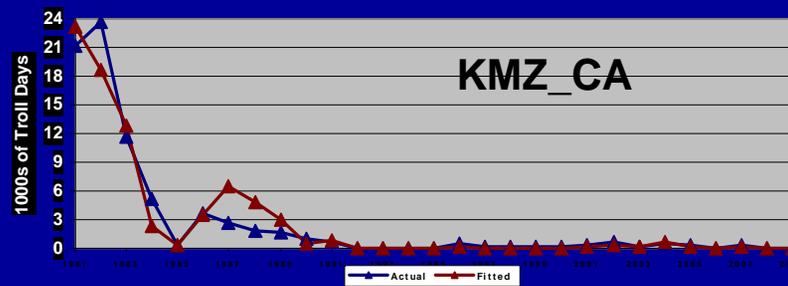
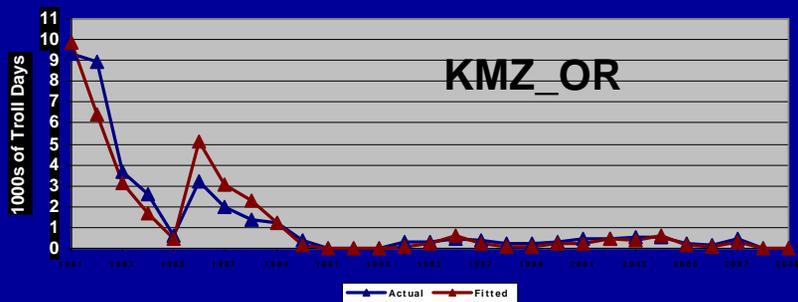
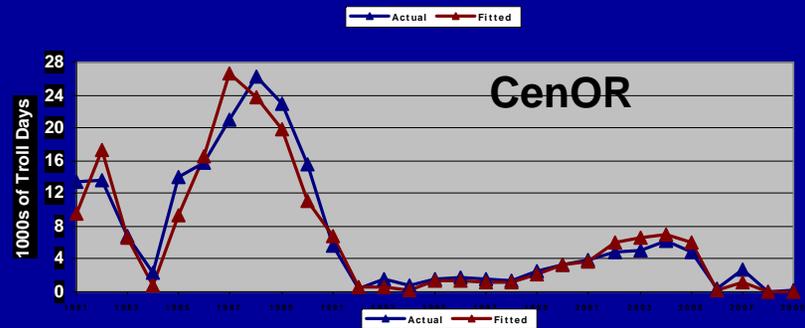
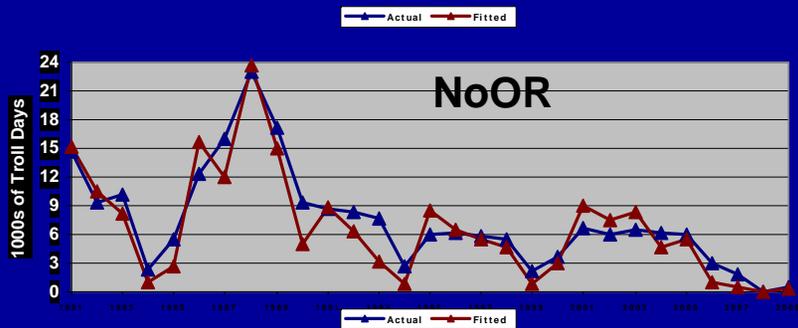


**Ocean Commercial
Fishery:
Harvest-Effort
Relationship by
Management Area**

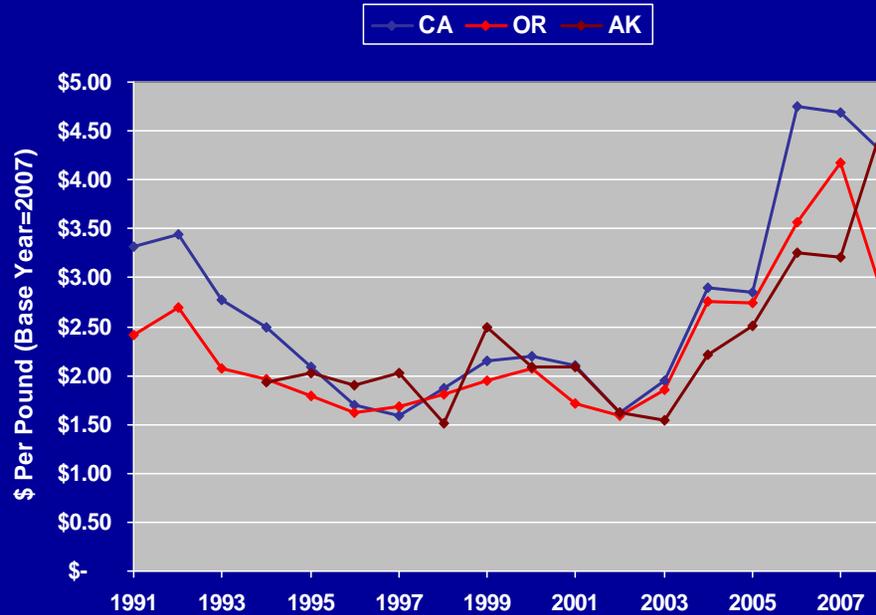
Linear regression of
annual commercial
effort (# troll days) on
annual Chinook and
coho harvest
(# fish), 1981-2009

Management Area	Adj r ²	Coeff Estimates SE in Parentheses	
		Chinook	Coho
NoOR	0.943	0.046* (0.004)	0.038* (0.003)
CenOR	0.951	0.050* (0.005)	0.052* (0.007)
KMZ_OR	0.920	0.069* (0.010)	0.073* (0.024)
KMZ_CA	0.941	0.022*** (0.019)	0.270* (0.053)
FtBragg	0.920	0.034* (0.007)	0.394* (0.075)
SanFran	0.862	0.060* (0.005)	0.270** (0.103)
Mont	0.821	0.068* (0.007)	0.466** (0.197)
Significance level: 0.99=*; 0.95=**; 0.70=***.			

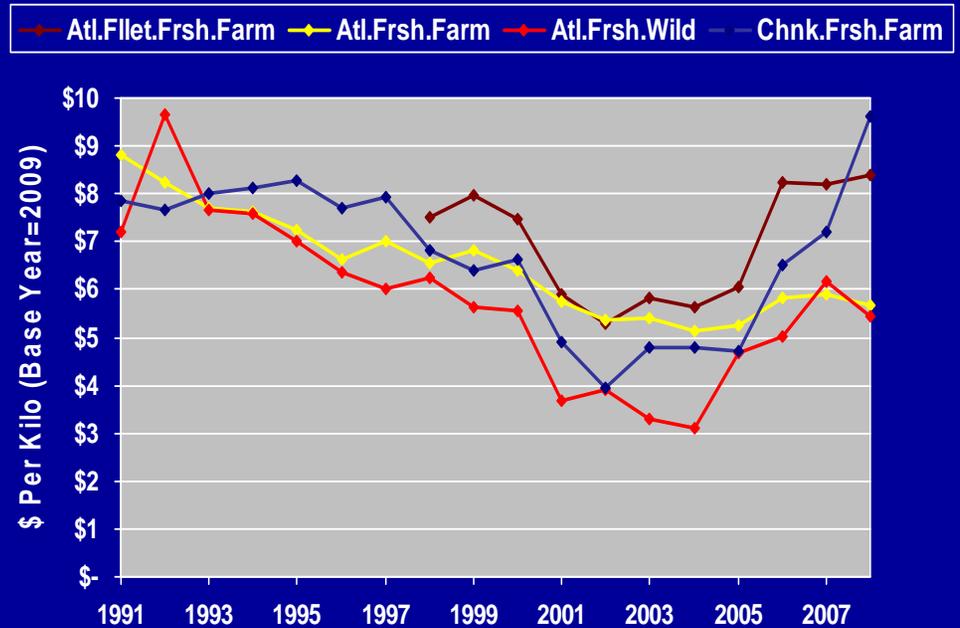
Ocean Commercial Troll Days: Actual and Fitted Values by Management Area, 1981-2009



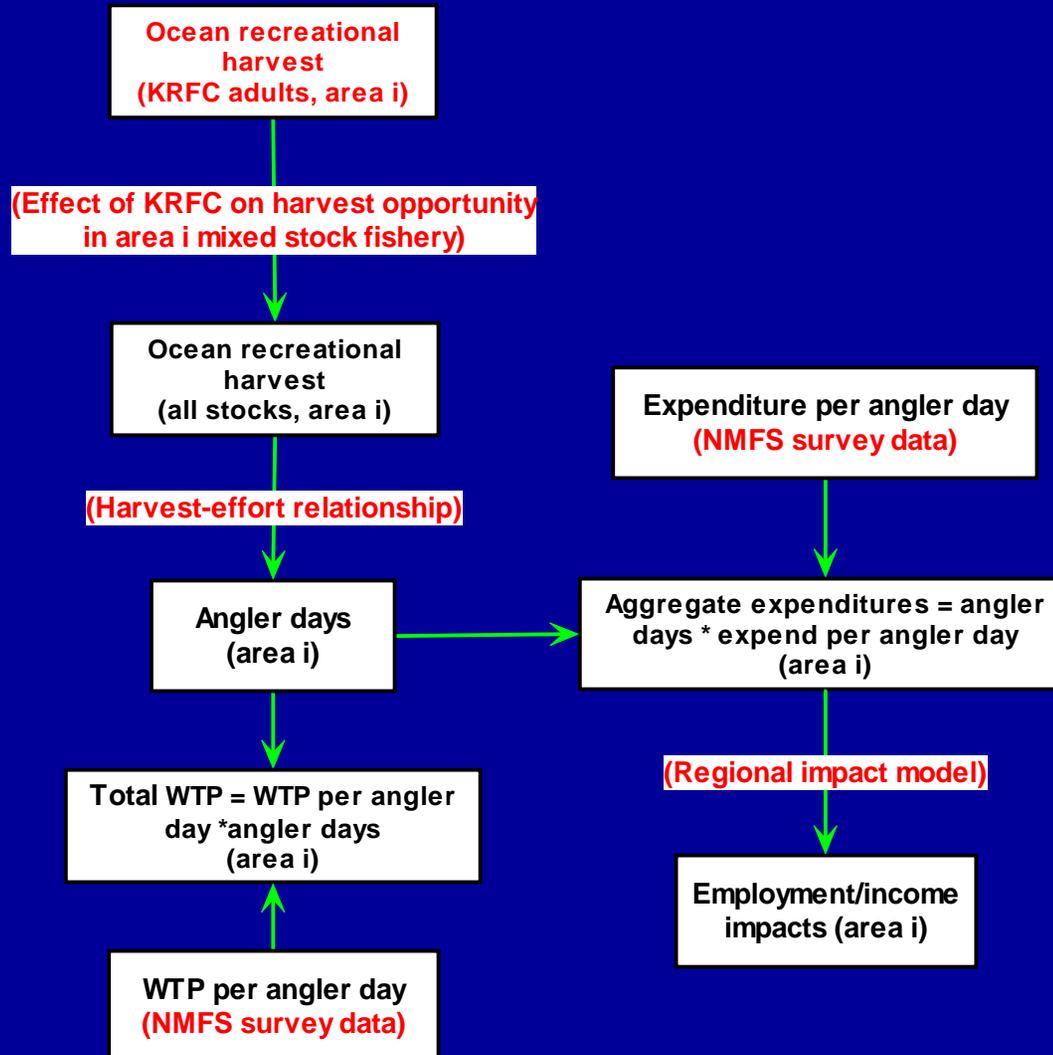
Ex-Vessel Chinook Prices CA, OR, AK 1991-2008



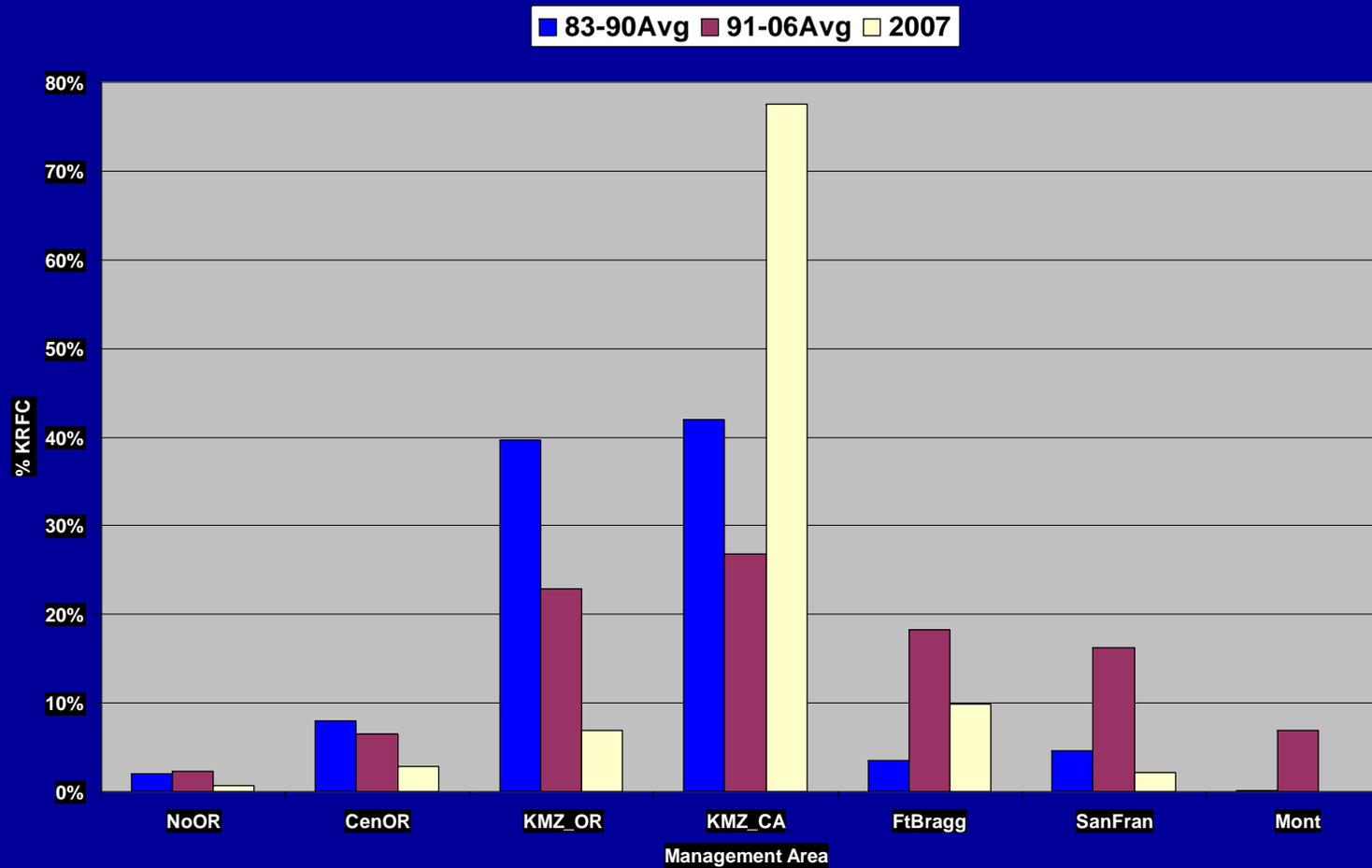
Prices of Selected U.S. Salmon Imports by Product Type, 1991-2008



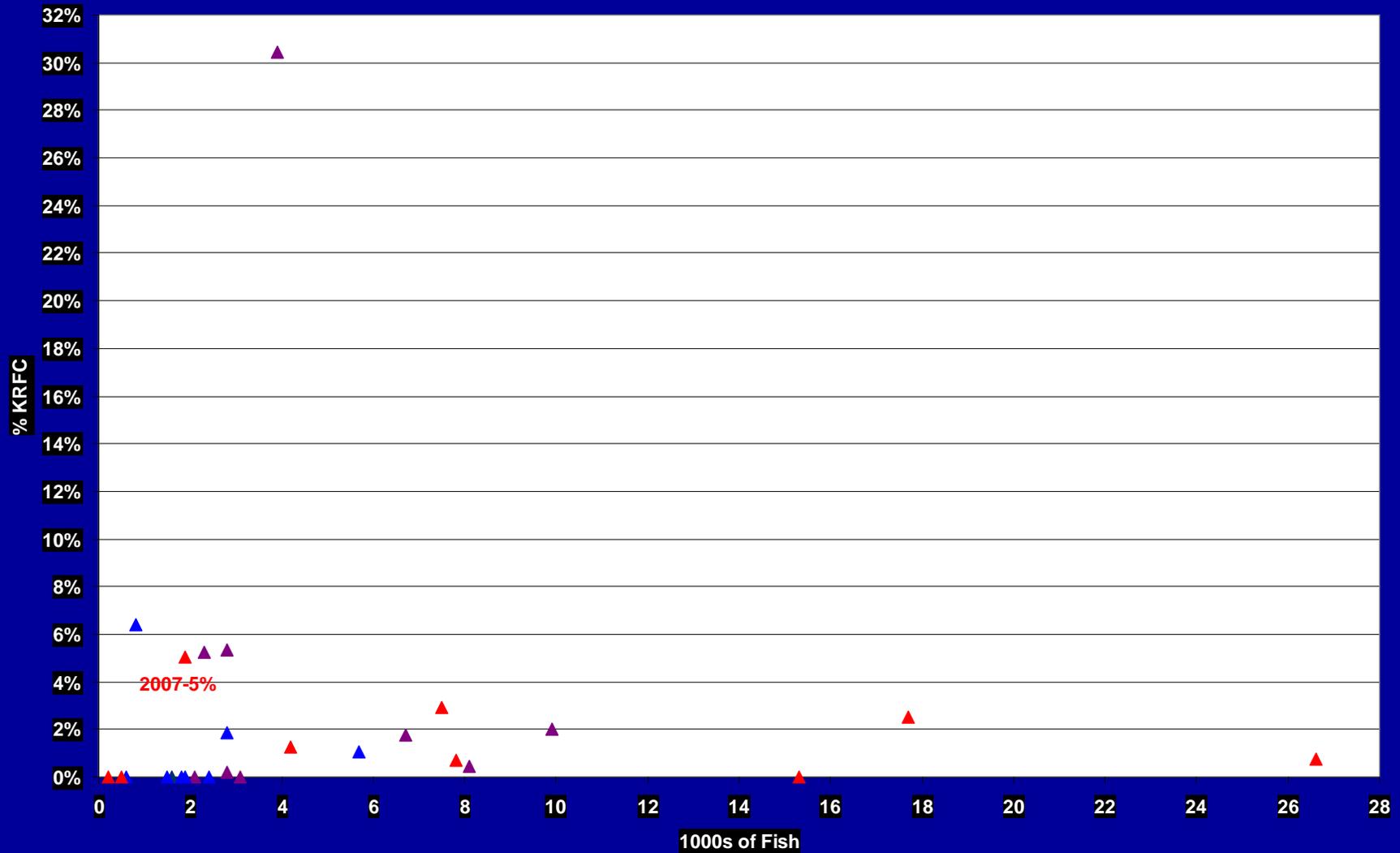
Evaluating Economic Value and Economic Impacts for Fall Chinook Ocean Recreational Fishery



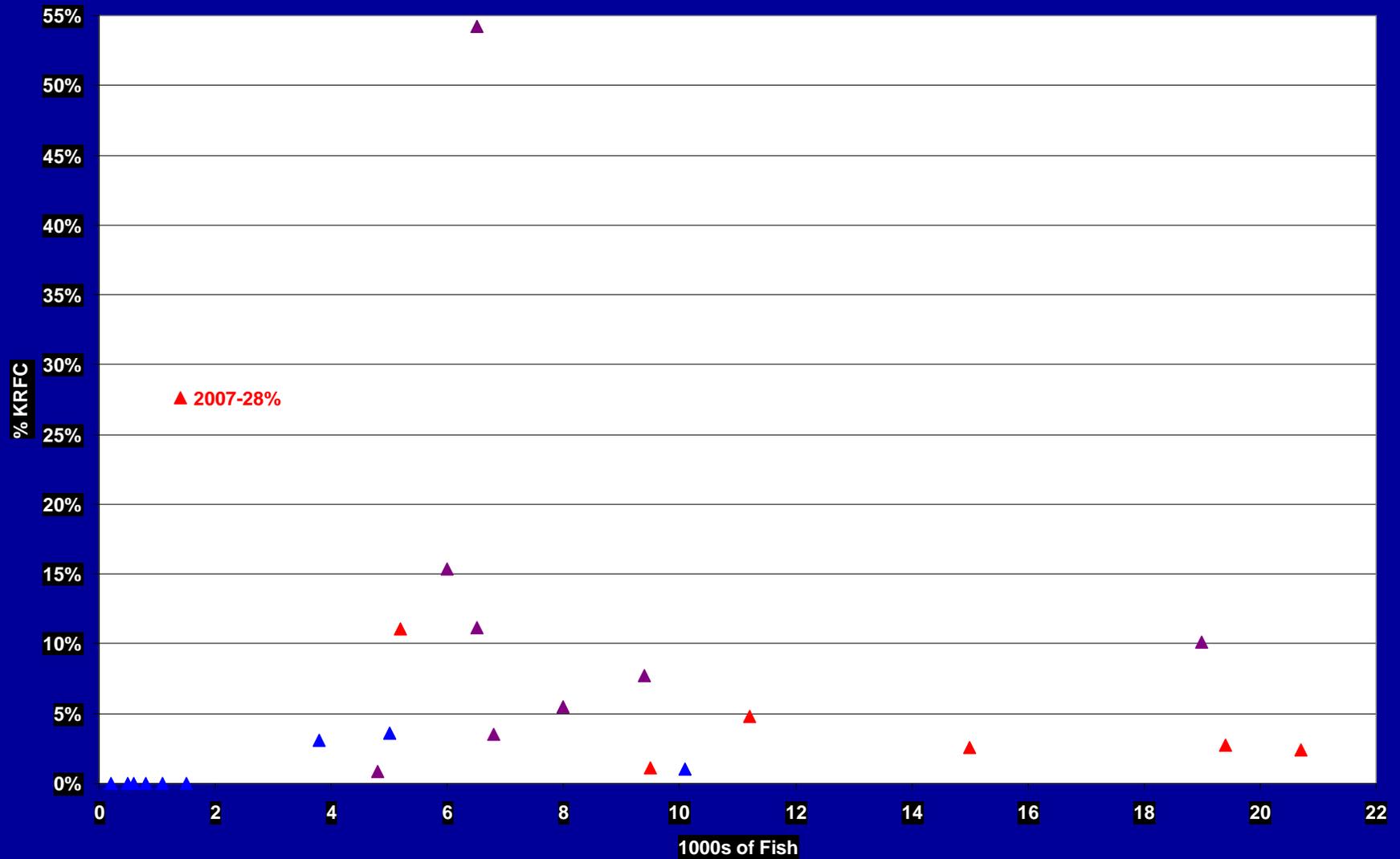
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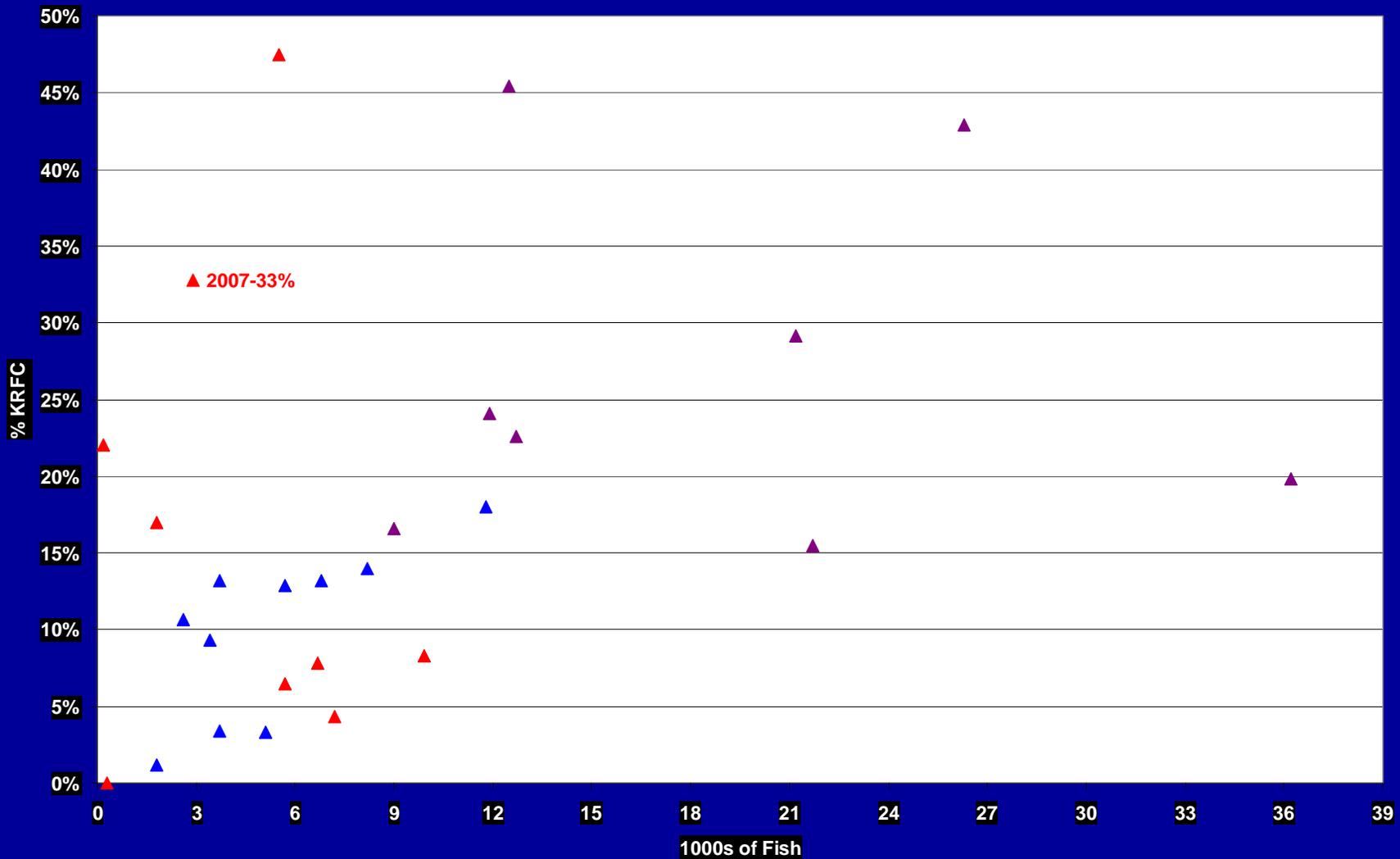
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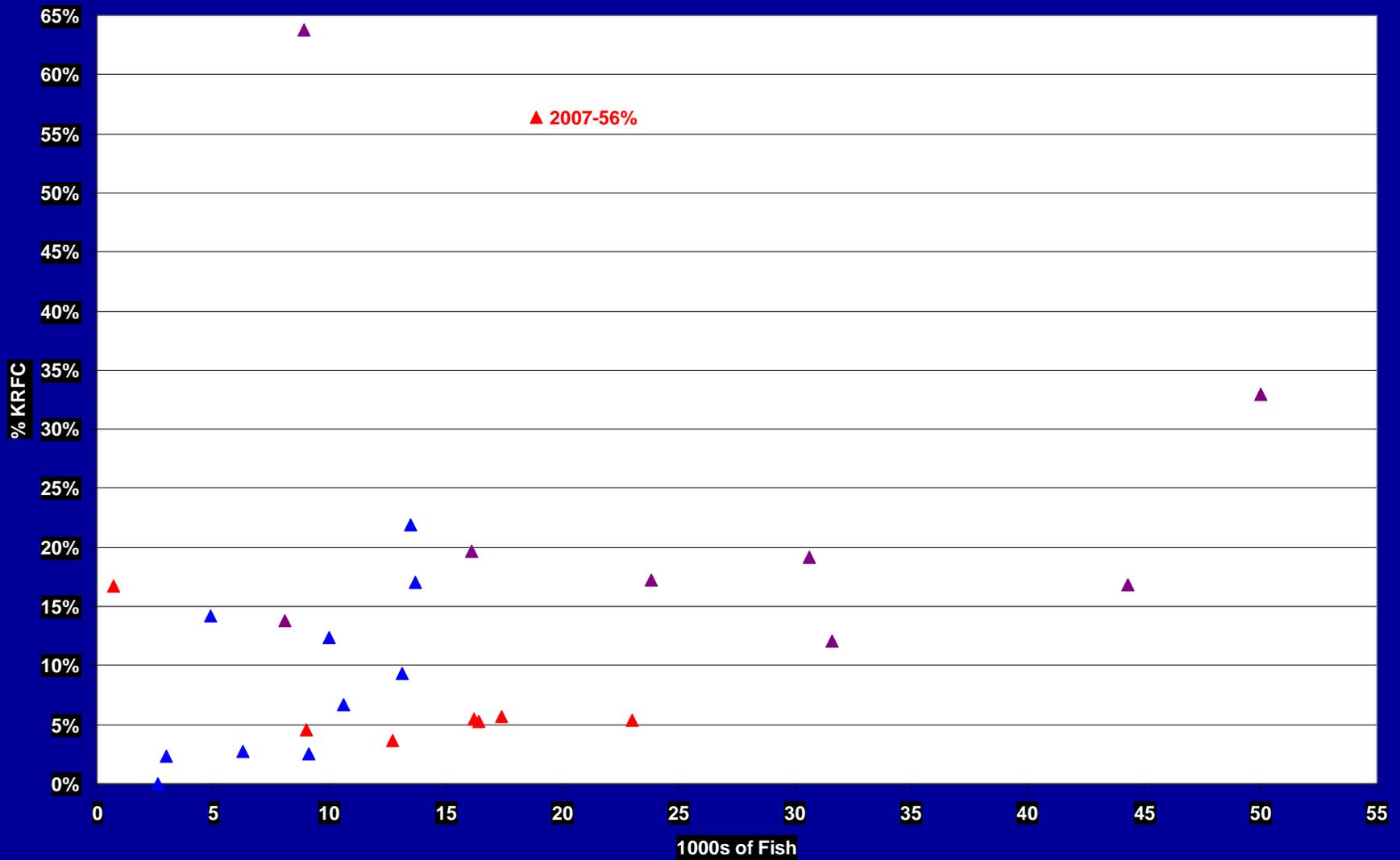
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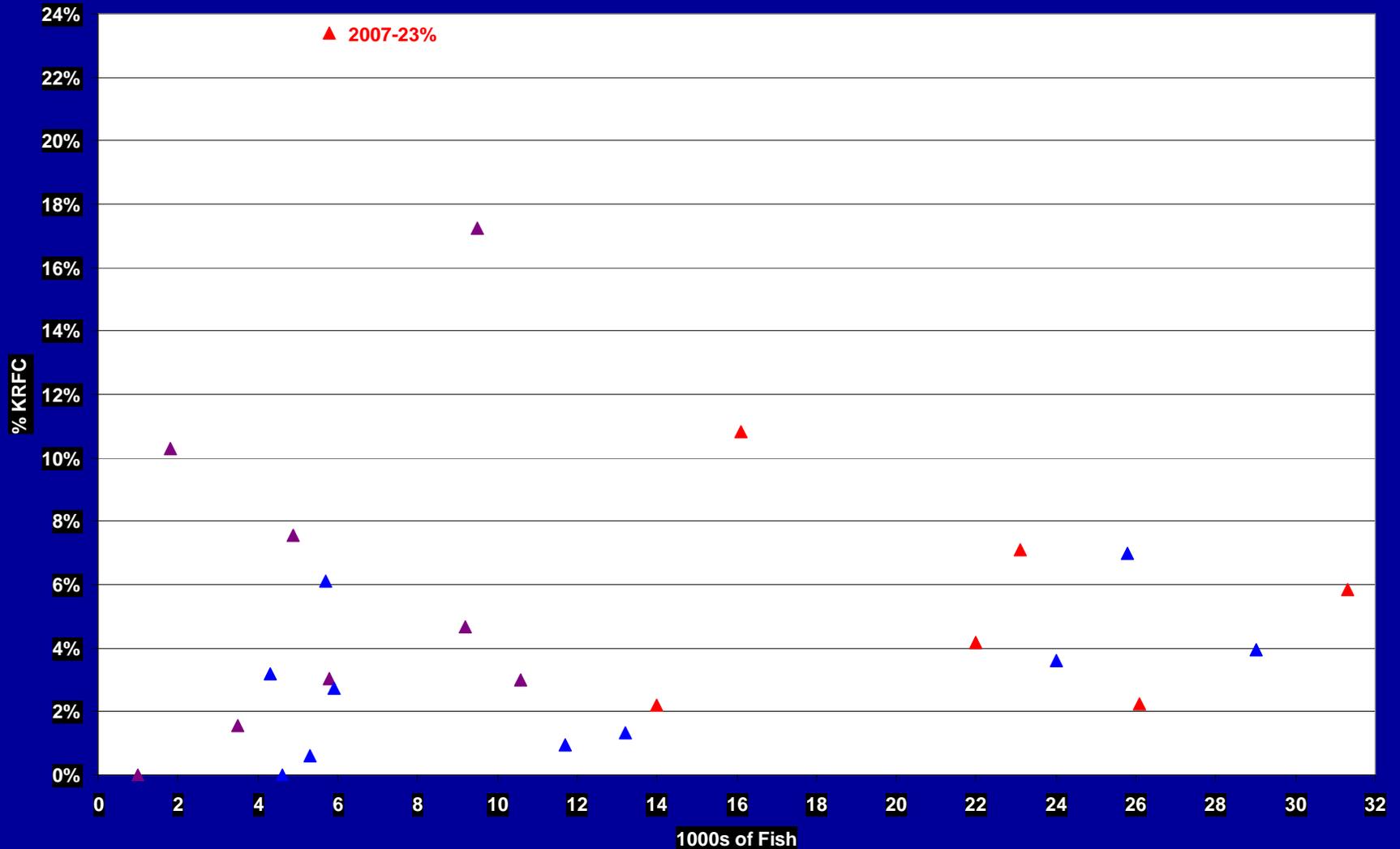
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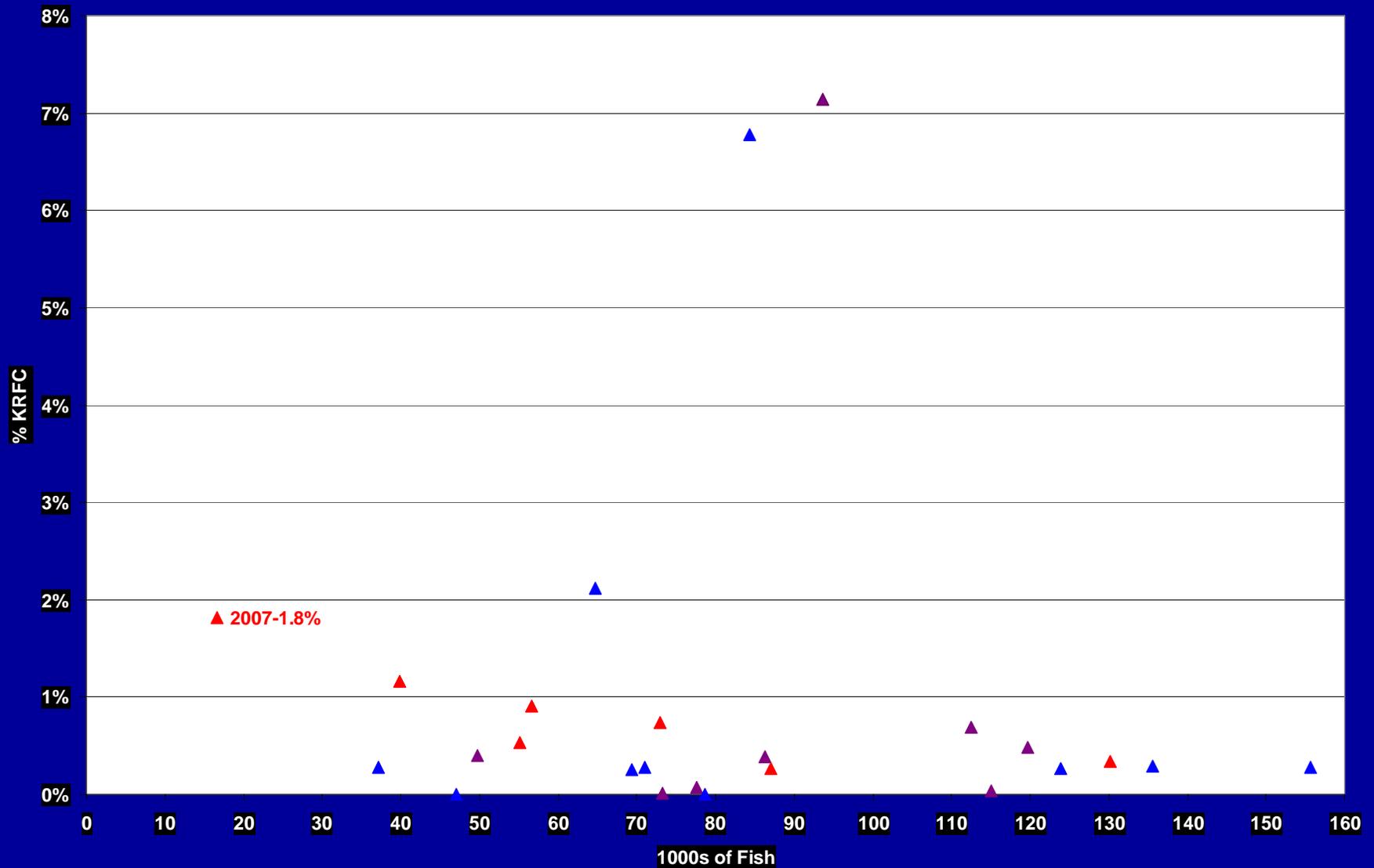
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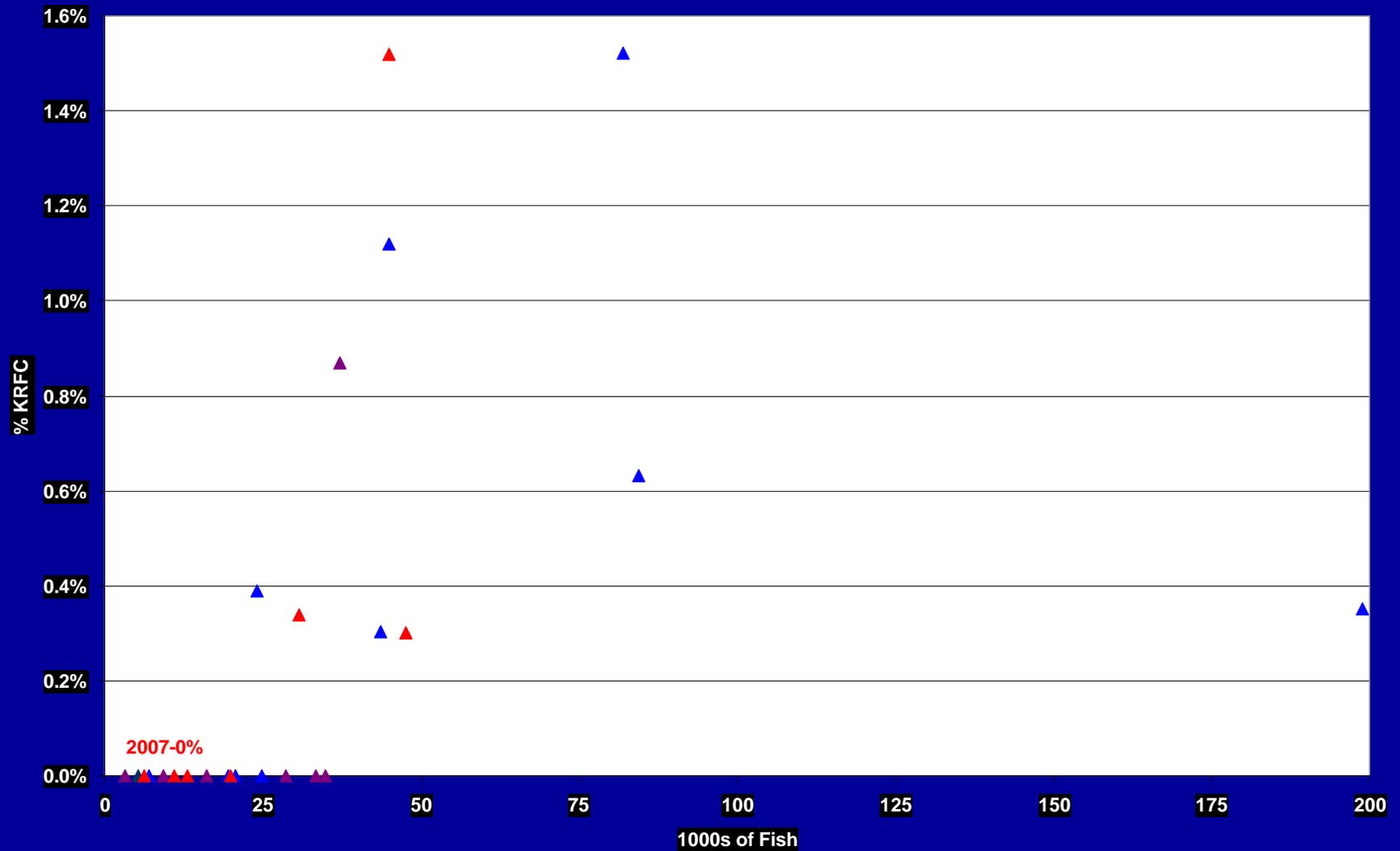
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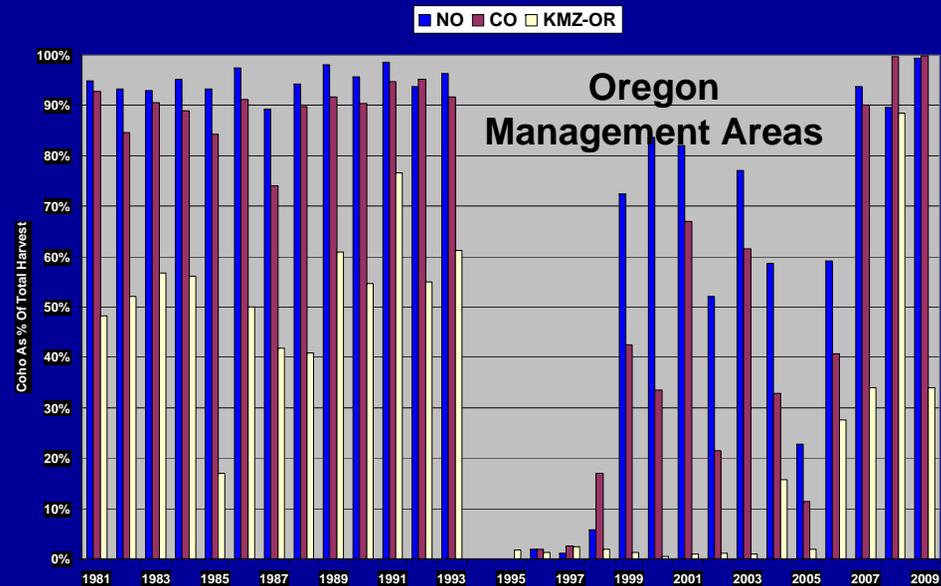


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Coho as % of Total Harvest in Ocean Recreational Fishery, by Management Area, 1981-2009

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- Coho retention severely constrained after 1993 in CA, until late 1990s in OR (mark-selective fishery thereafter)
- Harvest-effort relationships should reflect availability of coho as well as Chinook

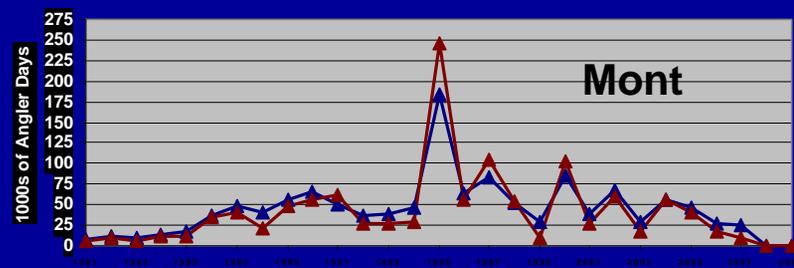
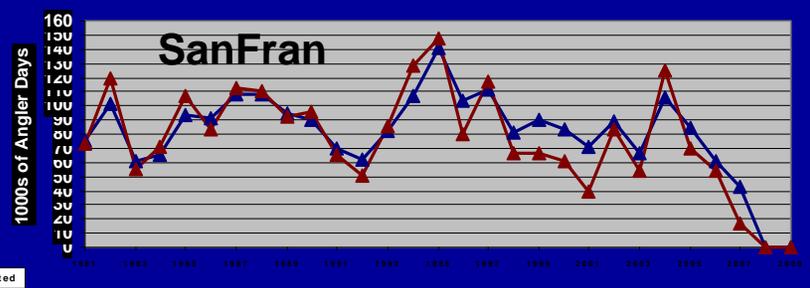
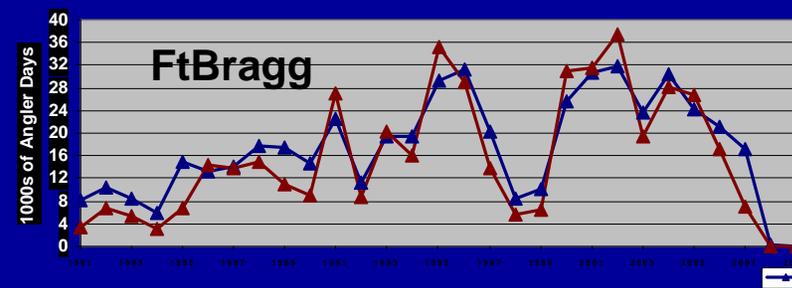
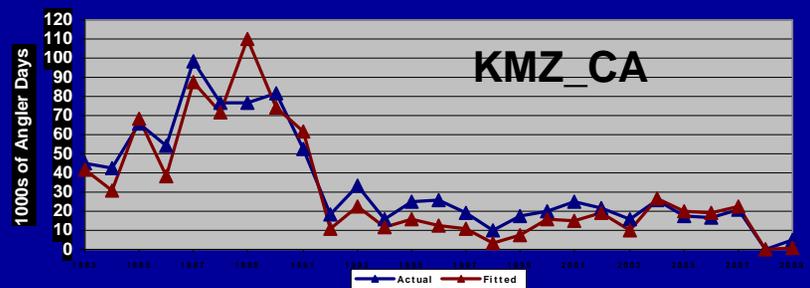
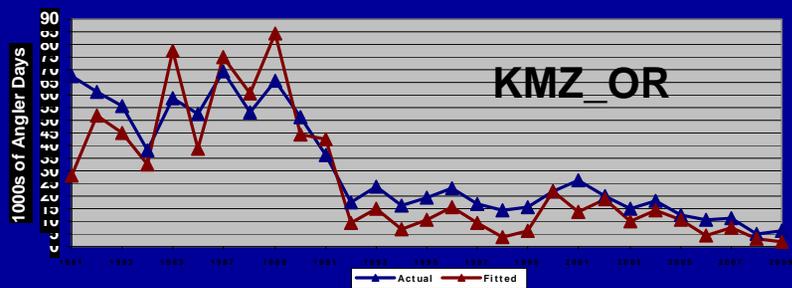
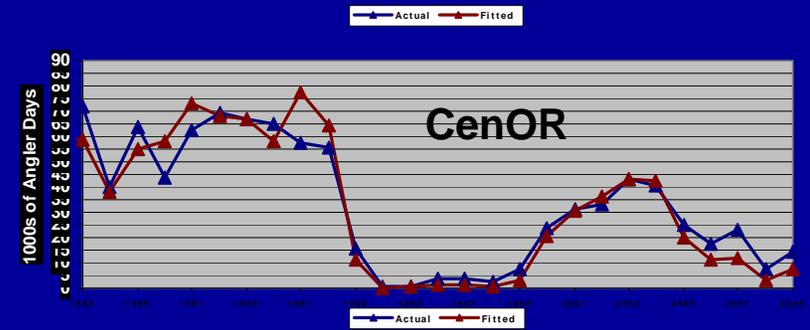
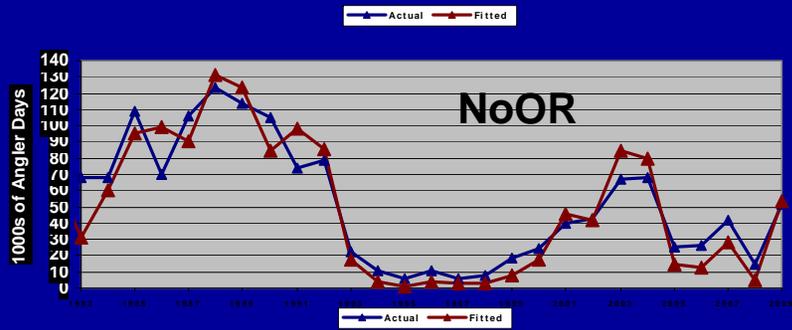


**Ocean Recreational
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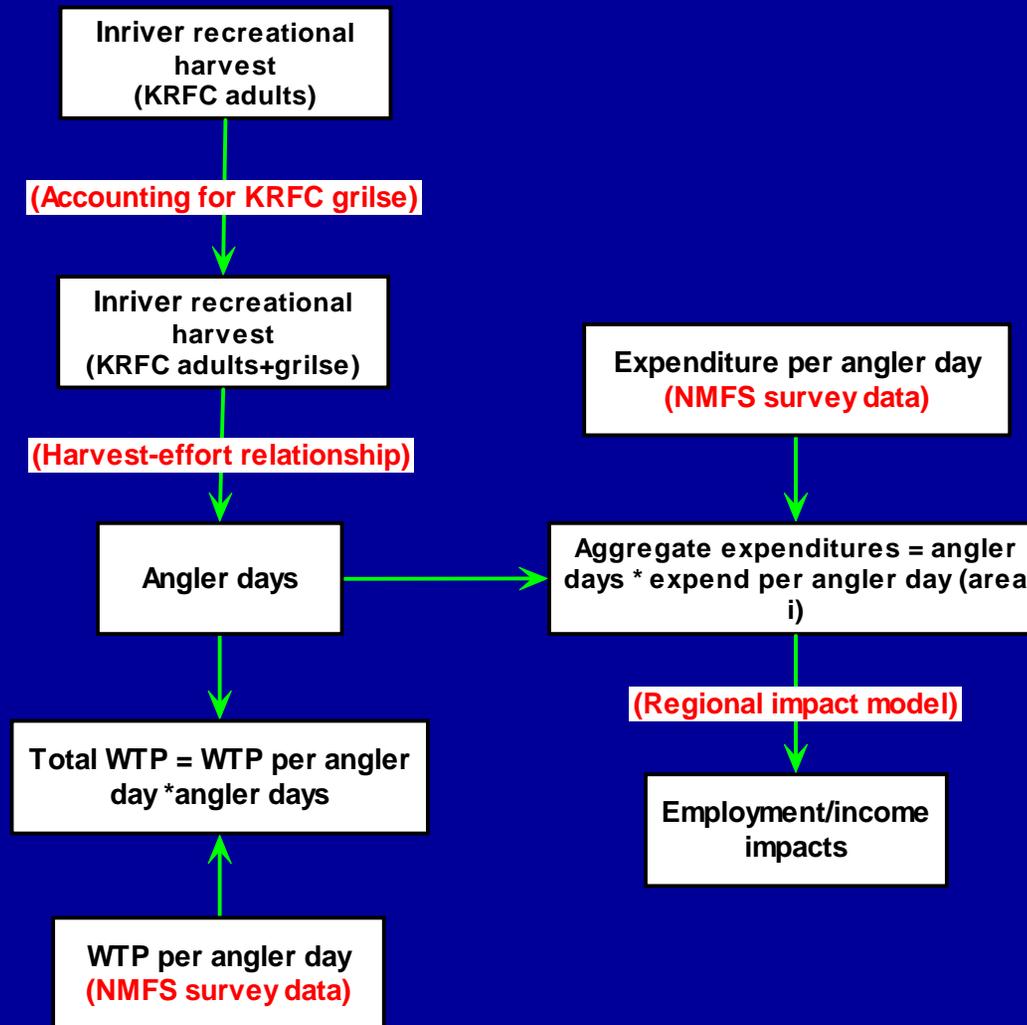
Linear regression of
annual recreational
effort (# angler days)
on annual Chinook
and coho harvest
(# fish), 1981-2009

Management Area	Adj r ²	Coeff Estimates SE in Parentheses (All coeffs significant at 0.99 level)	
		Chinook	Coho
NoOR	0.944	1.730 (0.449)	0.897 (0.056)
CenOR	0.952	1.665 (0.263)	7.620 (0.055)
KMZ_OR	0.901	1.865 (0.275)	1.352 (0.313)
KMZ_CA	0.941	1.151 (0.152)	1.710 (0.152)
FtBragg	0.945	1.197 (0.061)	1.074 (0.198)
SanFran	0.971	0.943 (0.035)	3.899 (1.485)
Mont	0.943	1.237 (0.064)	10.720 (3.480)

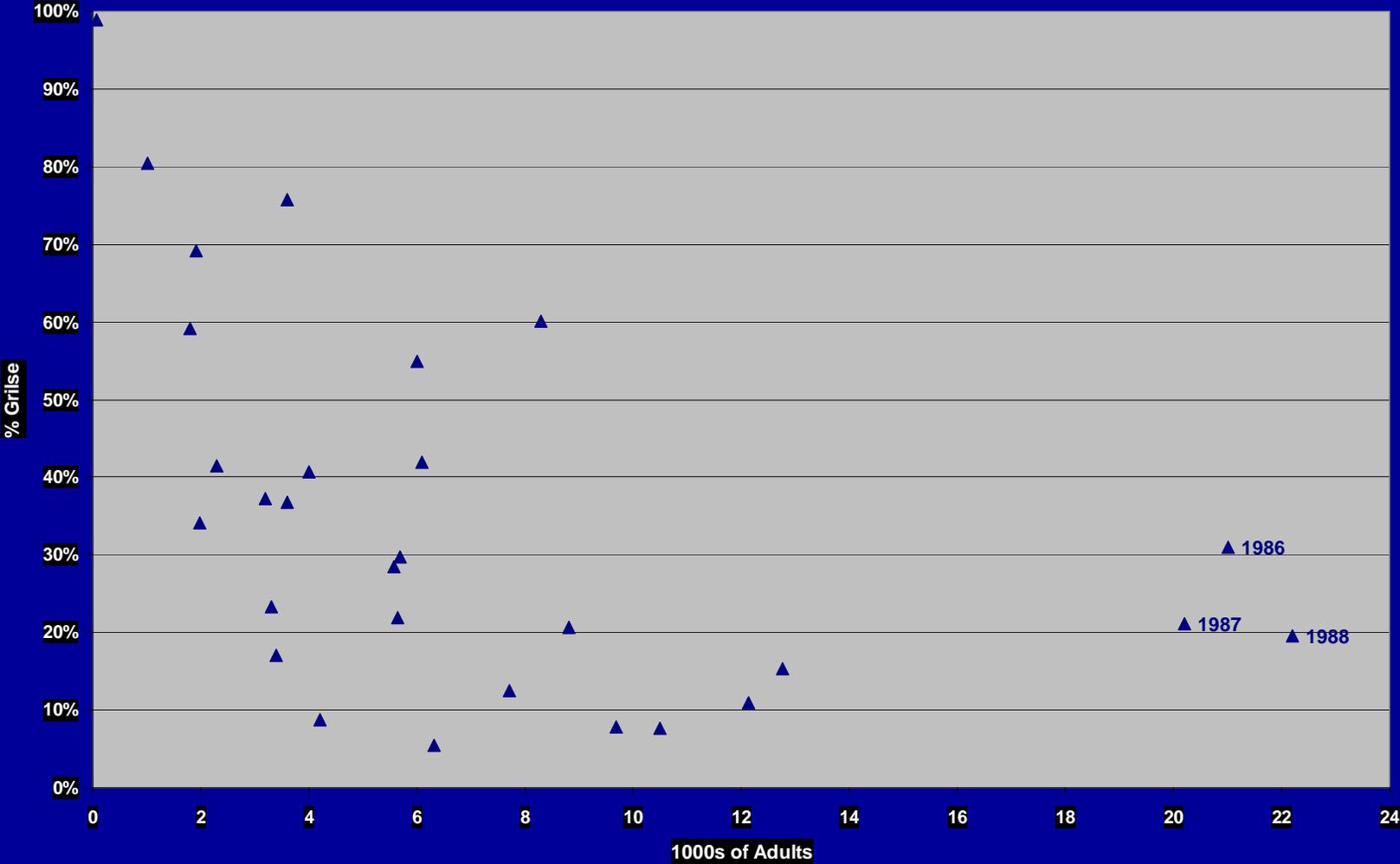
Ocean Recreational Angler Days: Actual and Fitted Values by Management Area, 1981-2009



Evaluating Economic Value and Economic Impacts for Fall Chinook Inriver Recreational Fishery



Is Contribution of Grilse to Total Harvest Related to Number of Adults Harvested? (Chart based on 1984-2008 CDFG creel data)

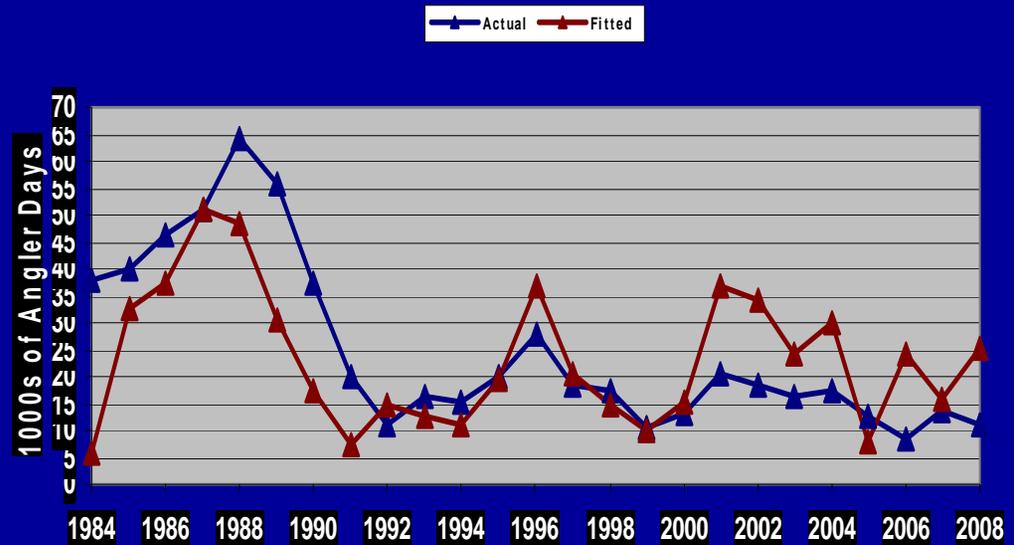


Fall Chinook Inriver Recreational Fishery: Harvest-Effort Relationship

Adj r ²	Coefficient Estimates SE in parentheses	
	Chinook Adult	Chinook Grilse
0.798	4.221 (0.801)	5.382 (1.630)

Linear regression of annual inriver recreational effort (# angler days) on annual Chinook adult and grilse harvest (# fish), areas 1&2 combined, 1984-2008

Actual and fitted values
from regression,
1984-2008



Major Species and Fisheries Potentially Affected by Klamath Dam Removal (red=ESA listed)

<i>Species</i>	<i>Historical/Current User Group(s)</i>					
	<i>Ocean Comm</i>	<i>Ocean Recr</i>	<i>River Recr</i>	<i>Tribal Subsist</i>	<i>Tribal Comm</i>	<i>Reservoir Recr</i>
Fall Chinook	X	X	X	X	X	
Spring Chinook	X	X	X	X	X	
Coho	X	X	X	X	X	
Steelhead			X	X		
Resident Trout			X	X		
Pacific Lamprey				X		
Lost River & Shortnose Suckers				X		
Yellow Perch & Largemouth Bass						X

Implications of Population Viability for Fishing Communities

- **Spatial distribution of fishing opportunities**
 - > Tribes distributed throughout Basin
 - > County-level impacts
- **Temporal distribution of fishing opportunities**
 - > Importance of 'seasonal round' to address Tribal subsistence needs
 - > Expansion of season likely to provide greater commercial/recreational fishing opportunity than enhancement of fishing within current season
 - > Timing of salmon availability may affect commercial ex-vessel prices
- **Viability enhances population resilience**
 - > Also makes fishing communities more resilient

