

Assessing the potential costs and benefits of electronic monitoring for the longline fishery in the Eastern Pacific Ocean

Anthony Rogers

Sea Change Economics, LLC

Study outline

- Collaborators:
 - Dr. Josh Graff Zivin, UC San Diego
 - Dr. Dale Squires, NOAA
- Cost-benefit analysis
- Eastern Pacific Ocean
 - Tuna longline fishery
- Central question:
“How likely are positive economic benefits if an electronic monitoring program is implemented for the longline tuna fishery in the Eastern Pacific Ocean?”

**Assessing the potential costs and benefits of
electronic monitoring for the longline fishery in
the Eastern Pacific Ocean**

Anthony Rogers, *Sea Change Economics, LLC*
Dr. Dale Squires, *National Oceanic and Atmospheric Administration
and University of California, San Diego*
Dr. Joshua Graff Zivin, *University of California, San Diego*

Approach

- Cost-benefit analysis
 - Net benefits = Benefits – Costs
- 10 year time horizon
- Different scenarios explored
 - 5/10/20% observer coverage
 - On board observers = 5% baseline
- Potential challenges:
 - Single (“point”) estimates
 - Uncertain future costs

Table 11. Parameter Values Used in the Base Economic Model.

Component	Value (low)	Value (high)	Value (median)	Value (mean)	unit
EPO					
Total EPO annual catch	780,561	856,404	836,817	825,154.80	mt
Longline (LL) catch - total EPO	104,466	159,660	144,379	139,318	mt
Longline vessels in fleet	1,113	1,253		1,183	#
Sets per year - LL whole EPO	111,827.92	254,795.43	186,928.49	187,913.16	sets/year
Total observers in EPO per year	272	302	282	285	#
Cost of IATTC observer program	2,642,531	2,743,292	2,705,041	2,699,664	\$/year
Observer Costs					
Video reviewer wages	30	97	64	64	\$/day
Video reviewer - sets per day	2	9	5	5	days/year
Video reviewers - # employed	-	-	-	36	days/year
Video reviewer - # of days worked per year	95	197	160	155	days/year
Onboard observer wages	48	380	65	148	\$/day
Onboard observer - sets per day	1	2	1	1	#/day
Onboard observer - average days at sea per year	95	197	160	155	days/year
Onboard observers - # employed	-	-	-	61	#
Onboard training	29	127	97	83	\$/observer
Onboard observer - supplies & equipment	56	109	79	82	\$/observer
Onboard observer - travel	357	497	449	434	\$/observer
Onboard observer - insurance & benefits	707	1,301	1004	1,004	\$/observer
Administrative staff	1,004	1,004	1,004	1,004	\$/observer

Sample result

- 20% observer coverage
 - 5% onboard observers
 - 15% EM
- Total costs & benefits (discounted) over 10 years

category	costs		benefits		net benefits
		% of total		% of total	
observers - on board	\$14,842,174	19.26%	\$0	0.00%	-\$14,842,174
observers - EM	\$4,781,093	6.20%	\$0	0.00%	-\$4,781,093
vessel hardware	\$56,257,168	72.99%	\$0	0.00%	-\$56,257,168
other management costs	\$1,199,532	1.56%	\$0	0.00%	-\$1,199,532
price premium - EM	\$0	0.00%	\$43,339,332	16.40%	\$43,339,332
scientific data value	\$0	0.00%	\$14,384,343	5.44%	\$14,384,343
bycatch reduction	\$0	0.00%	\$93,433,716	35.35%	\$93,433,716
IUU reduction	\$0	0.00%	\$113,135,759	42.81%	\$113,135,759
Total	\$77,079,966		\$264,293,149		\$187,213,182

Sample result

- 20% observer coverage
 - 20% onboard observers
 - No EM

category	costs		benefits		net benefits
		% of total		% of total	
observers - on board	\$59,368,695	100.00%	\$0	0.00%	-\$59,368,695
observers - EM	\$0	0.00%	\$0	0.00%	\$0
vessel hardware	\$0	0.00%	\$0	0.00%	\$0
other management costs	\$0	0.00%	\$0	0.00%	\$0
price premium - EM	\$0	0.00%	\$0	0.00%	\$0
scientific data value	\$0	0.00%	\$14,384,343	100.00%	\$14,384,343
bycatch reduction	\$0	0.00%	\$0	0.00%	\$0
IUU reduction	\$0	0.00%	\$0	0.00%	\$0
Total	\$59,368,695		\$14,384,343		-\$44,984,352

Sample result

- 10% observer coverage
 - 5% onboard observers
 - 5% EM

category	costs		benefits		net benefits
		% of total		% of total	
observers - on board	\$14,842,174	20.09%	\$0	0.00%	-\$14,842,174
observers - EM	\$1,593,698	2.16%	\$0	0.00%	-\$1,593,698
vessel hardware	\$56,257,168	76.13%	\$0	0.00%	-\$56,257,168
other management costs	\$1,199,532	1.62%	\$0	0.00%	-\$1,199,532
price premium - EM	\$0	0.00%	\$43,339,332	17.02%	\$43,339,332
scientific data value	\$0	0.00%	\$4,794,781	1.88%	\$4,794,781
bycatch reduction	\$0	0.00%	\$93,433,716	36.68%	\$93,433,716
IUU reduction	\$0	0.00%	\$113,135,759	44.42%	\$113,135,759
Total	\$73,892,571		\$254,703,587		\$180,811,016

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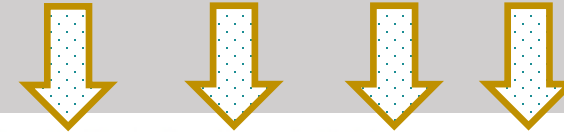
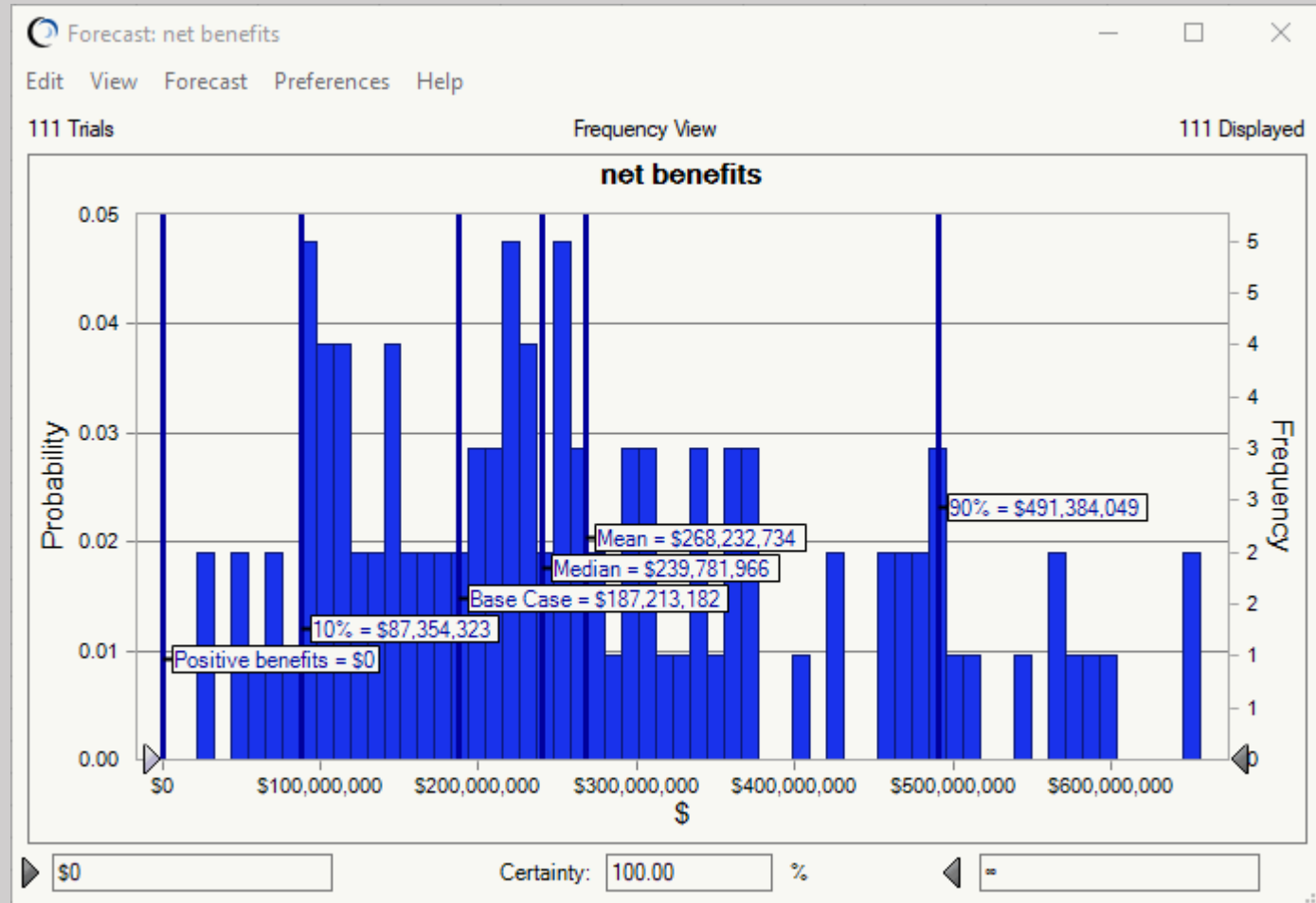


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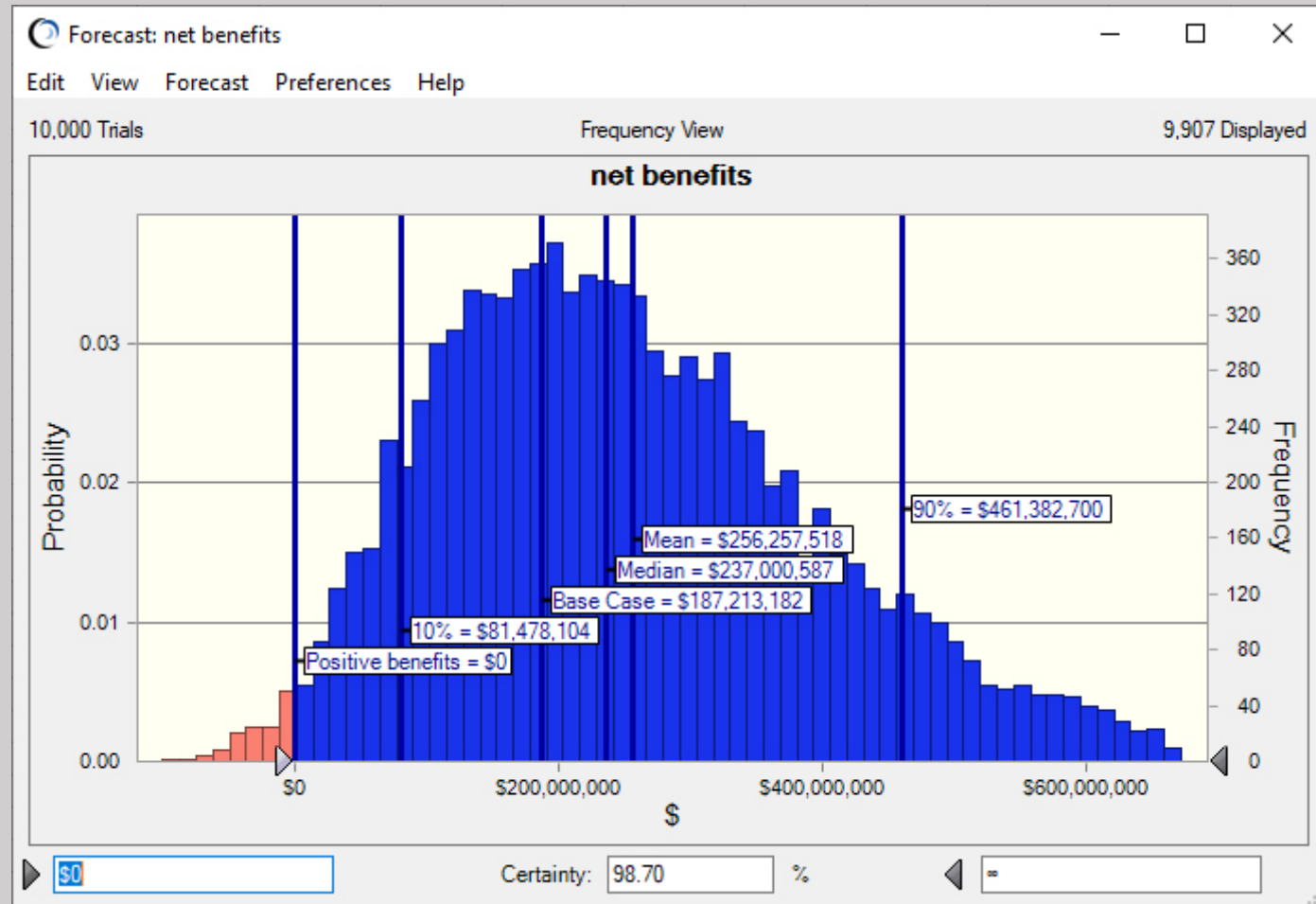
Monte Carlo simulation results

- 20% observer coverage
 - 5% onboard observers
 - 15% EM



Monte Carlo simulation results

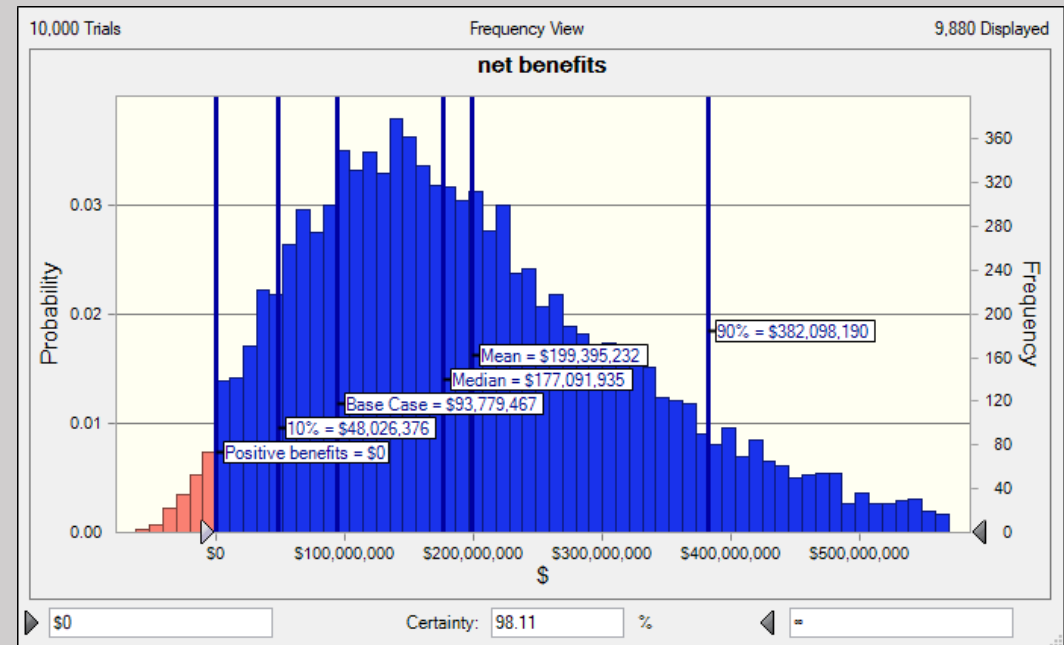
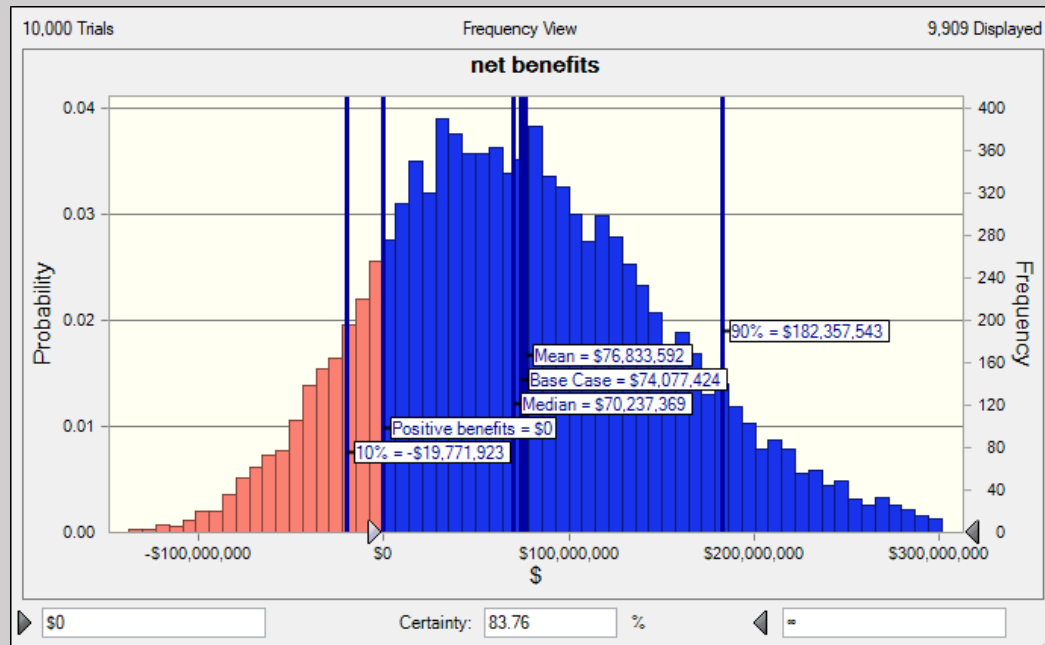
- 20% observer coverage
 - 5% onboard observers
 - 15% EM



Monte Carlo simulation results

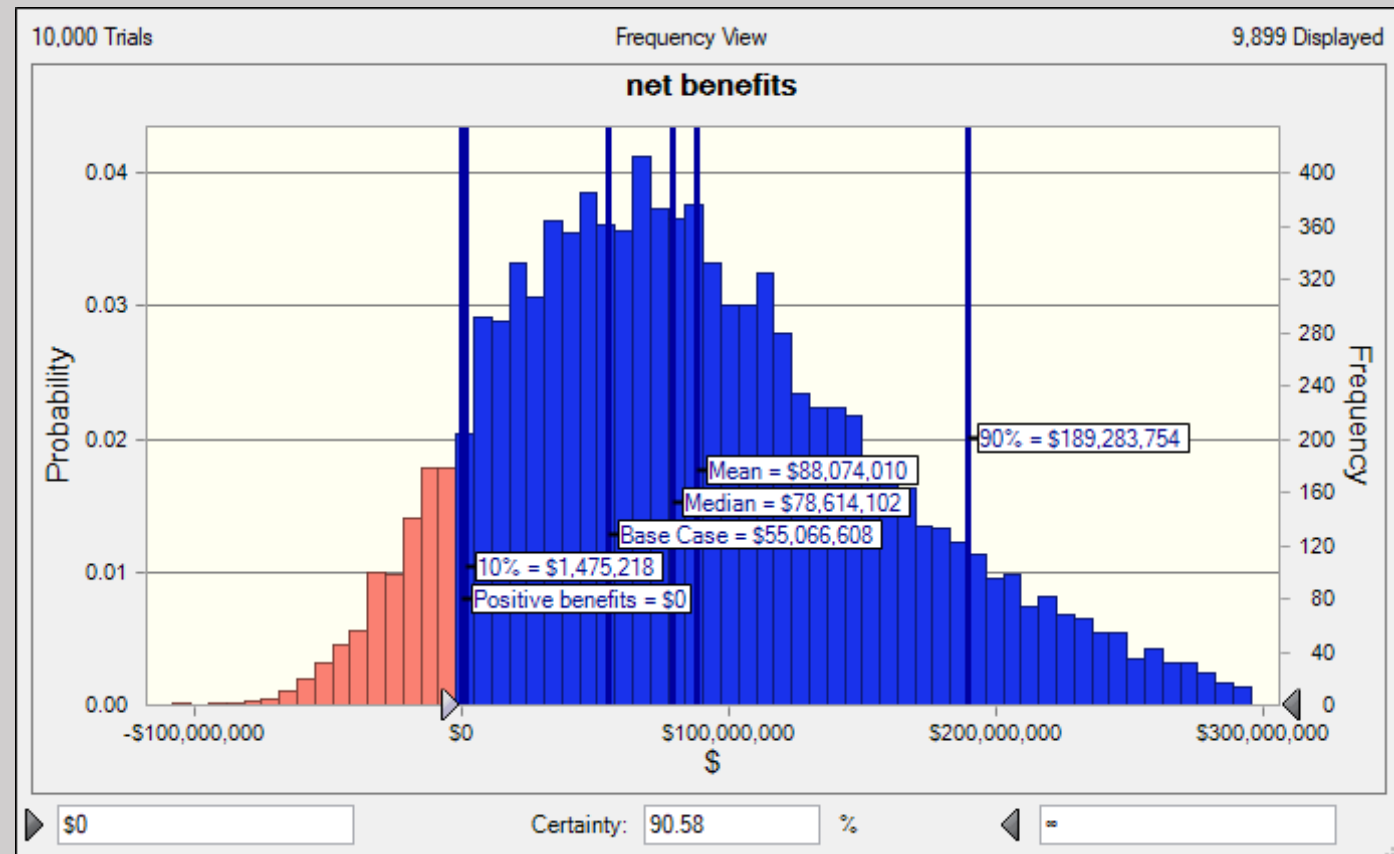
- 20% observer coverage
 - 5% onboard observers
 - 15% EM
 - IUU benefits removed

- 20% observer coverage
 - 5% onboard observers
 - 15% EM
 - Non-market benefits removed



Monte Carlo simulation results

- 20% observer coverage
 - 5% onboard observers
 - 15% EM
 - All benefits reduced by 50%



Key takeaways

1. EM adoption is highly likely to produce net economic benefits
2. The results of this analysis are robust to different cost & benefit choices, and uncertainty from future EM cost changes
3. EM has significant potential to scale up once the initial investment has been made
4. The approach in this analysis can be easily translated to other regions & fisheries
 - But the specific values will be different!

Thank You!

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