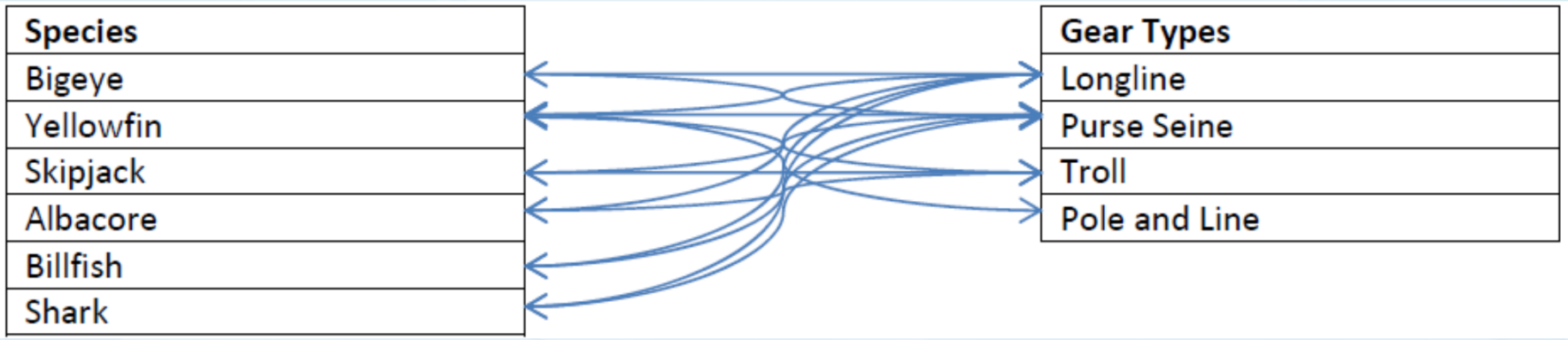
MOW2 WP4: Trade-offs in multi-species, multi-gear fisheries

Background



- Challenge: impossible to manage any one part of the fishery in isolation
- “strawman” concepts require ability to test impact of measures that achieve one objective on achieving others, including those in other fishery sectors, or related to other species
- Example only – current information is insufficient for decision making against the mix of objectives identified at MOW1 and beyond

Trade offs example

% BET overfishing removed relative to status quo (2011)	LL catch level (as % change)			PS ASS effort level (as % change)		
	Scalar on 2011	Scalar on 2001/04 avg	Scalar on 2004	Scalar on 2011	Scalar on 2010	Scalar on 2004
100.12	+19%	+5%	-4%	-53%	-24%	-55%
100.04	+14%	+1%	-8%	-51%	-21%	-53%
99.96	+9%	-4%	-12%	-49%	-18%	-51%
99.89	+4%	-8%	-16%	-47%	-15%	-49%
99.81	-1%	-12%	-20%	-45%	-11%	-47%
100.18	-4%	-15%	-22%	-44%	-10%	-46%
100.1	-9%	-19%	-26%	-42%	-7%	-44%
100.03	-14%	-24%	-30%	-40%	-3%	-42%
99.95	-19%	-28%	-35%	-38%	0%	-40%
99.87	-24%	-33%	-39%	-36%	+3%	-38%
100.16	-32%	-40%	-45%	-33%	+8%	-36%
100.09	-37%	-44%	-49%	-31%	+11%	-34%
100.01	-42%	-49%	-53%	-29%	+14%	-32%
99.93	-47%	-53%	-57%	-27%	+18%	-30%
99.86	-52%	-58%	-61%	-25%	+21%	-28%
100.15	-60%	-65%	-68%	-22%	+26%	-25%
100.07	-65%	-69%	-72%	-20%	+29%	-23%
100	-70%	-73%	-76%	-18%	+32%	-21%
99.92	-75%	-78%	-80%	-16%	+35%	-19%
99.84	-80%	-82%	-84%	-14%	+38%	-17%

- Different options for BET, YFT, SKJ
- Focus on biological sustainability
- Here focus on fleet/fishery profitability, based on catch levels, ‘catch rates’ and values

Fishery value

- Calculated based on catches by species (two methods for purse seine catches)
- LL catch value ‘pre-defined’ by management control
  - Management ‘controls’ catch, so value reductions are directly proportional to the % reductions in catch that management asks for.
- The value of the purse seine fishery is so ‘high’ that relatively substantial changes appear insignificant in the figure
- Does not include changes in market value if supply is constrained
- No consideration of change in the costs of going fishing related to CPUE etc.

Run	% change		Purse Seine (SPC projections)				Purse Seine (Alternative model)				Longline (BET+YFT)	
	FADs	LL Catch	FAD catch *(mt)*	Free Catch *(mt)*	Total Catch *(mt)*	Value *($mill)*	FAD catch *(mt)*	Free Catch *(mt)*	Total Catch *(mt)*	Value *($mill)*	Catch *(mt)*	Value *($mill)*
1	-53%	19%	427,043	1,226,512	1,653,555	2,999	427,043	1,197,260	1,624,303	2,946	139,602	1,355
2	-51%	14%	444,585	1,210,621	1,655,207	3,002	444,585	1,182,837	1,627,422	2,952	134,095	1,302
3	-49%	9%	462,089	1,194,715	1,656,805	3,004	462,089	1,168,372	1,630,461	2,956	128,556	1,248
4	-47%	4%	479,558	1,178,791	1,658,349	3,007	479,558	1,153,860	1,633,418	2,962	122,986	1,194
5	-45%	-1%	496,992	1,162,849	1,659,841	3,009	496,992	1,139,301	1,636,293	2,966	117,384	1,140
6	-44%	-4%	505,712	1,154,960	1,660,672	3,010	505,712	1,132,092	1,637,804	2,969	114,008	1,107
7	-42%	-9%	523,099	1,138,983	1,662,082	3,013	523,099	1,117,456	1,640,555	2,974	108,356	1,053
8	-40%	-14%	540,453	1,122,981	1,663,434	3,015	540,453	1,102,767	1,643,220	2,978	102,673	998
9	-38%	-19%	557,780	1,106,954	1,664,734	3,017	557,780	1,088,025	1,645,805	2,983	96,959	942
10	-36%	-24%	575,079	1,090,899	1,665,978	3,019	575,079	1,073,226	1,648,305	2,987	91,213	887
11	-33%	-32%	600,998	1,066,847	1,667,845	3,022	600,998	1,051,004	1,652,002	2,993	81,956	797
12	-31%	-37%	618,235	1,050,716	1,668,951	3,023	618,235	1,036,059	1,654,294	2,996	76,131	740
13	-29%	-42%	635,450	1,034,550	1,670,000	3,025	635,450	1,021,049	1,656,499	3,001	70,274	684
14	-27%	-47%	652,645	1,018,348	1,670,993	3,026	652,645	1,005,975	1,658,620	3,004	64,387	626
15	-25%	-52%	669,820	1,002,108	1,671,928	3,028	669,820	990,834	1,660,654	3,008	58,468	569
16	-22%	-60%	695,572	977,756	1,673,328	3,030	695,572	968,076	1,663,648	3,012	48,931	476
17	-20%	-65%	712,706	961,412	1,674,117	3,031	712,706	952,759	1,665,465	3,015	42,930	418
18	-18%	-70%	729,827	945,027	1,674,854	3,032	729,827	937,372	1,667,199	3,018	36,897	359
19	-16%	-75%	746,936	928,593	1,675,529	3,033	746,936	921,907	1,668,843	3,021	30,830	300
20	-14%	-80%	764,034	912,112	1,676,146	3,033	764,034	906,366	1,670,400	3,023	24,732	241
SQ	0%	0%	845,804	872,299	1,718,103	3,100	845,804	872,299	1,718,103	3,100	117,851	1,143

To further highlight the potential trade-offs, 4 scenarios have been selected for further assessment:

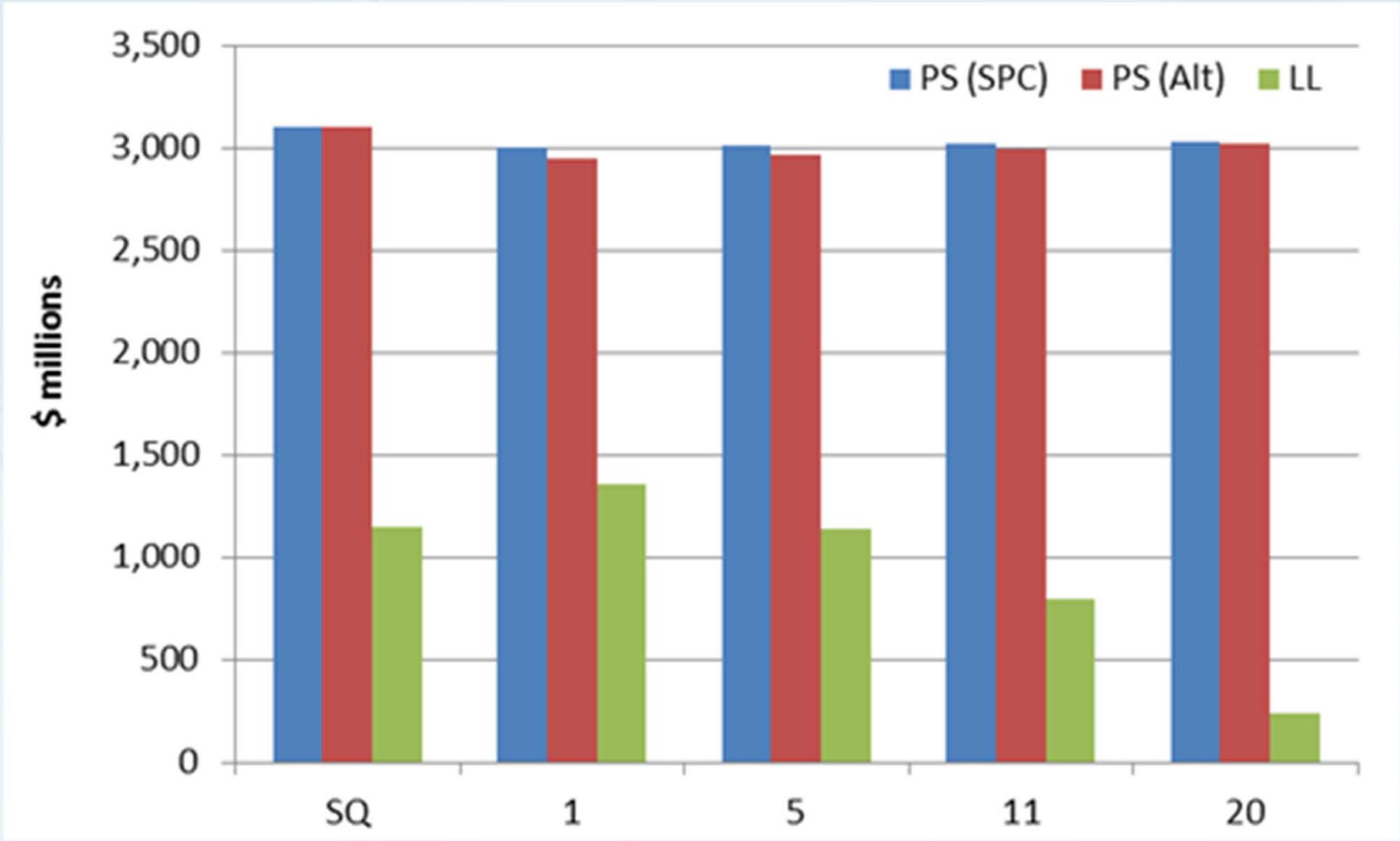
- Status quo – for comparison purposes;
- Scenario 1 because it represents the extreme of achieving both bigeye conservation and longline increases through purse seine management;
- Scenario 5 because it is indicative of a management regime with no additional longline cuts;
- Scenario 11 because it is broadly representative of the 6 month FAD closure that is being discussed and because it represents equal % reductions for FAD sets and LL catch; and
- Scenario 20 because it represents a management regime where purse seine contribution is minimised.

Run	% change FADs	% change LL
1	-53%	19%
5	-45	-1%
11	-33%	-32%
20	-14%	-80%
Status quo	0%	0%

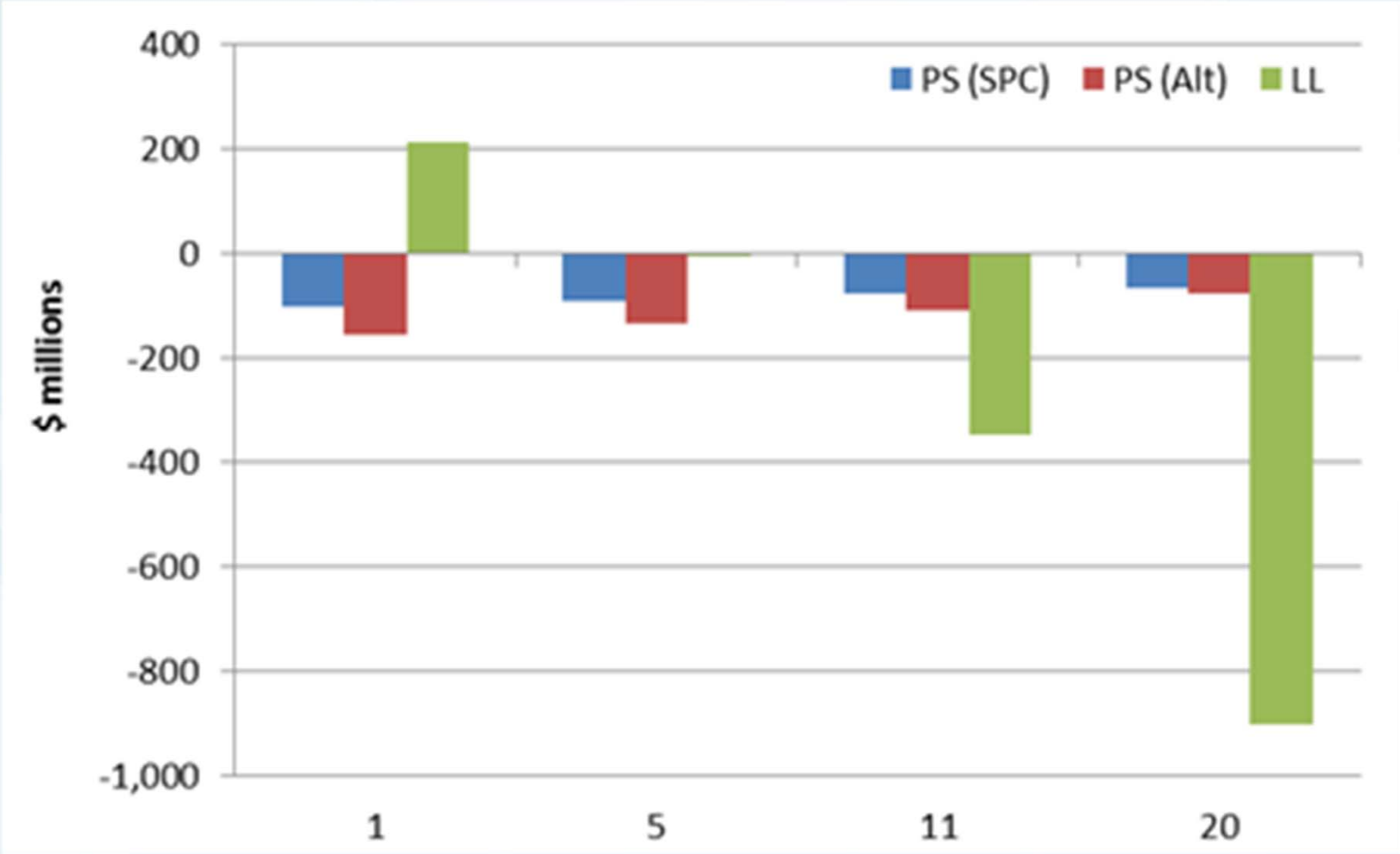
	% Change in		Absolute value ($ mill)			Value change (from SQ) ($ mill)			% CPUE change (from SQ)		
	FAD effort	LL Catch	PS		LL	PS		LL	PS		LL (Bigeye)
			SPC	Alt		SPC	Alt		SPC	Alt	
SQ	0%	0%	3,100	3,100	1,143	0	0	0	0		0.0
1	-53%	19%	2,999	2,946	1,355	-101	-154	+214	+7.8	+5.9	+46.5
5	-45%	-1%	3,009	2,966	1,140	-91	-134	-3	+8.2	+6.6	+41.6
11	-33%	-32%	3,022	2,993	797	-78	-107	-346	+8.7	+7.7	+35.3
20	-14%	-80%	3,033	3,023	241	-67	-77	-902	+9.2	+8.8	+27.1

Need better understanding of how fleets will react to management interventions

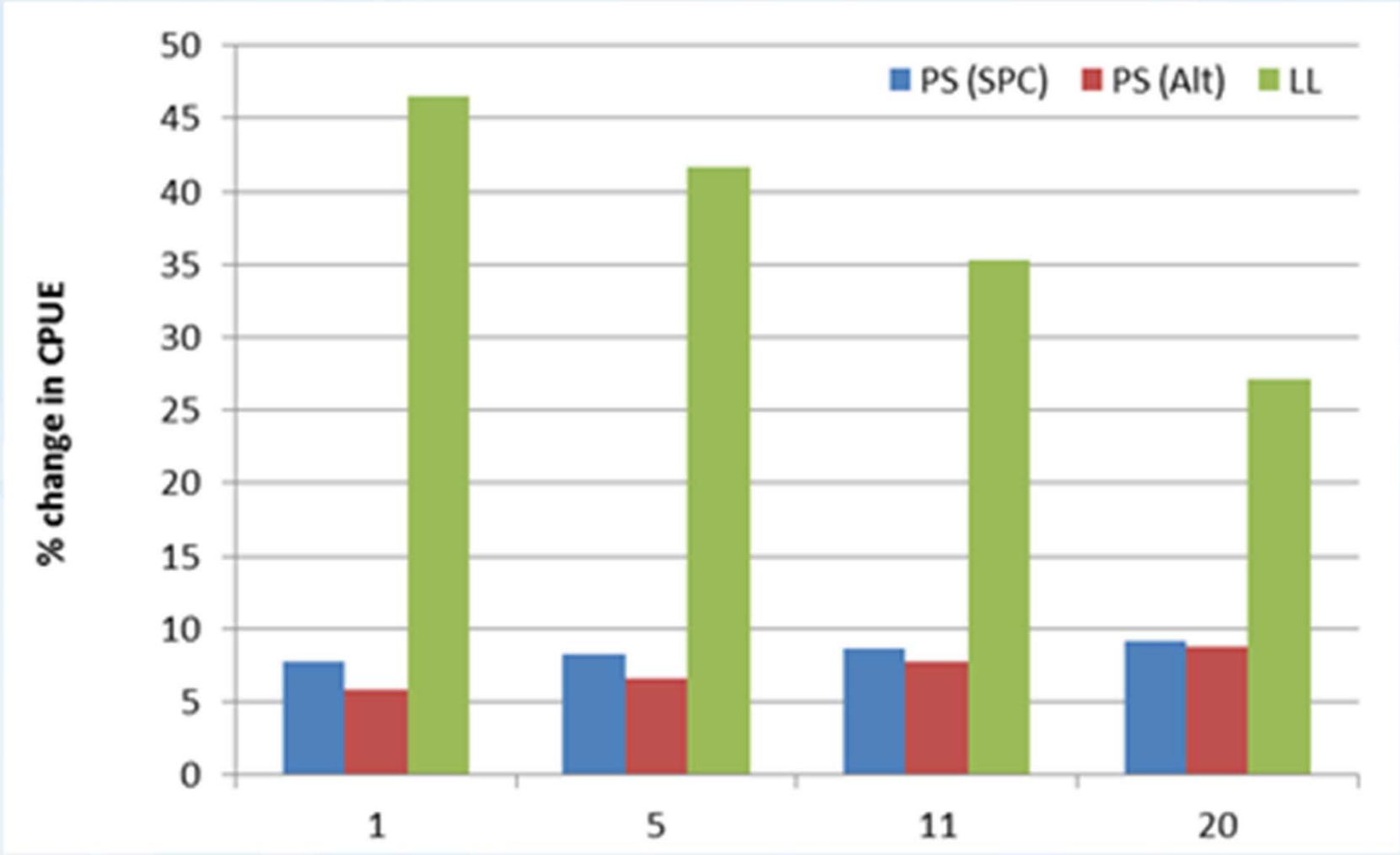
Value of PS and LL fisheries



Changes in the value of PS and LL



Changes in the CPUE of PS and LL



Points to consider

- What is an acceptable trade-off between fisheries?
- Identify a ‘limit’ on acceptable cost involved in management decisions?
  - Allows identification of scenarios that do not exceed an acceptable cost
- Or identify scenarios with equal gains/costs?
- Trade-off between short- and long-term costs and benefits

Other indicators

- If fishery stability is an objective:
  - average relative variation (in catch, value, CPUE etc) by fishery.
- If avoidance of impacts on other fisheries is an objective:
  - estimated bycatch of other species under different scenarios.
- Relative performance and outcome of fisheries could be assessed by EEZ or by flag to assess the Commission's progress on issues such as "islandisation", support for SIDS domestic development and avoiding disproportionate burden.

Discussion points

- How current modelling approaches could be enhanced to provide more meaningful assessments of fishery trade-offs;
- The types of data and indicators that would be needed to allow better inform the Commission's decision making;
- The importance of including economic or financial assessments in the evaluation of proposals and options;
- Mechanisms for the Commission to consider trade-off evaluations to determine whether they are acceptable and if not how they can be rearranged (fisheries management forum)