

Results of Survey of Workshop Participants Graphs and Summaries Regarding Costs, Feasibility and other Factors

Survey results summarized and graphed for PSMFC by

Marianne Rogers, NOAA

Helpful notes regarding survey and analysis before proceeding:

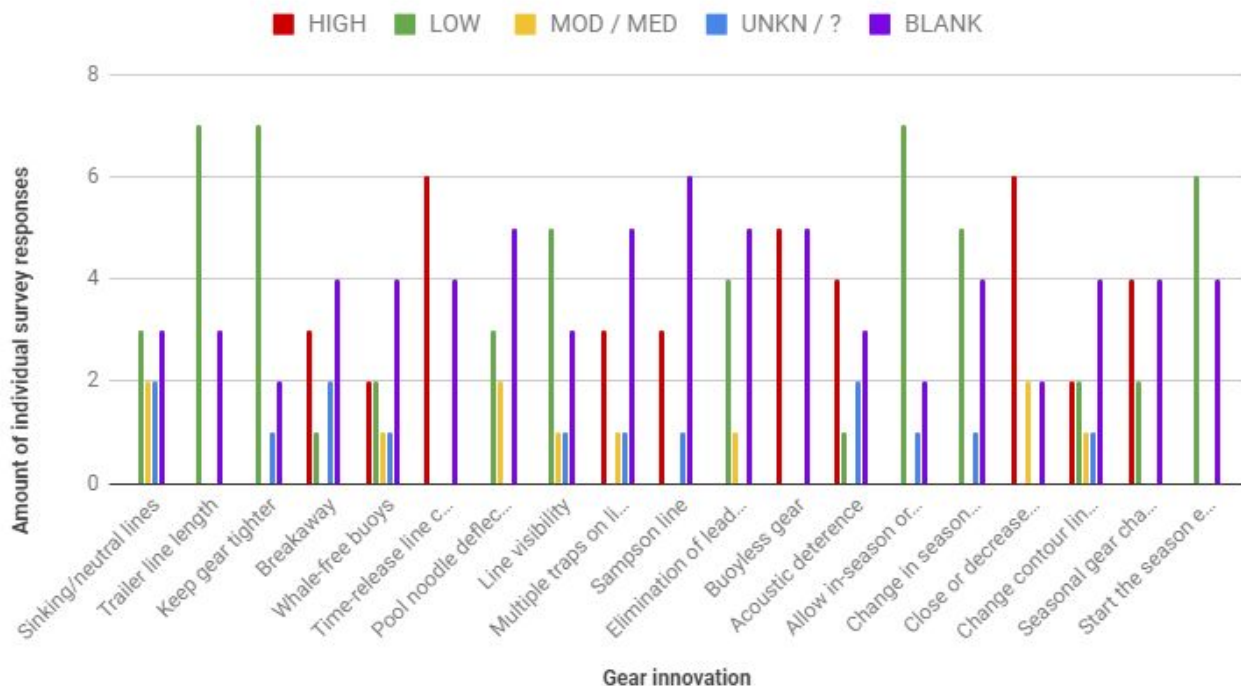
- There were **35** surveys total completed by individuals from the following states:
 - California; Oregon; Washington; WA/OR
 - WA/OR (3) and WA/OR/CA (3) surveys compose the **“Multiple states”** group in this compilation
- On the original survey documents, two categories were both listed as “Expand/change in-season gear retrieval program”, differentiated only by one including “(e.g. allow for in-season or earlier gear recovery).” For the purpose of this compilation, the categories were separated into a more specified **“Allow in-season or earlier gear recovery”** and a more broad **“Change in season gear retrieval program.”**

Q: Which gear innovations are presumed most costly to fisheries?

Note: asterisk* denotes an innovation that was identified in a highlighted category from individuals across multiple states

CALIFORNIA Q: Cost to fisheries?

CA Presumed fishery costs for gear innovations



● Low costs:

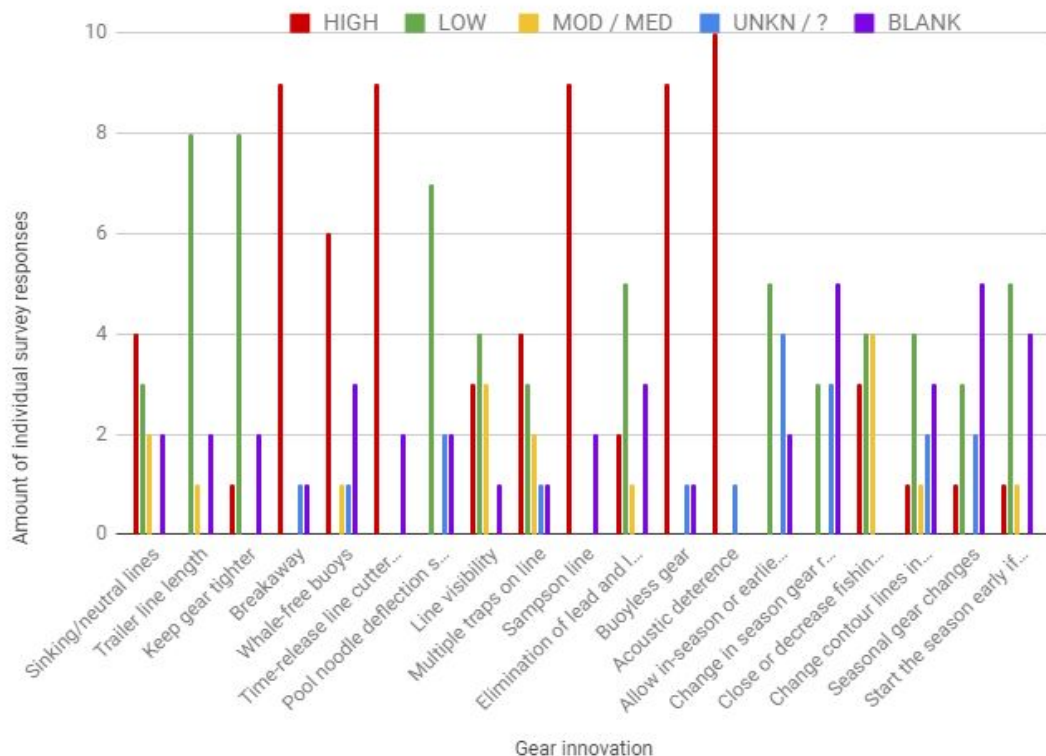
- Allow in-season or earlier gear recovery (88%) *
- Trailer length (88%) *
- Keep gear tighter (88%) *

● High costs:

- Time-release cutter tool (75%) *
- Close or decrease fishing effort in spring (75%)

OREGON Q: Cost to fisheries?

OR Presumed fishery costs for gear innovations



● Low costs:

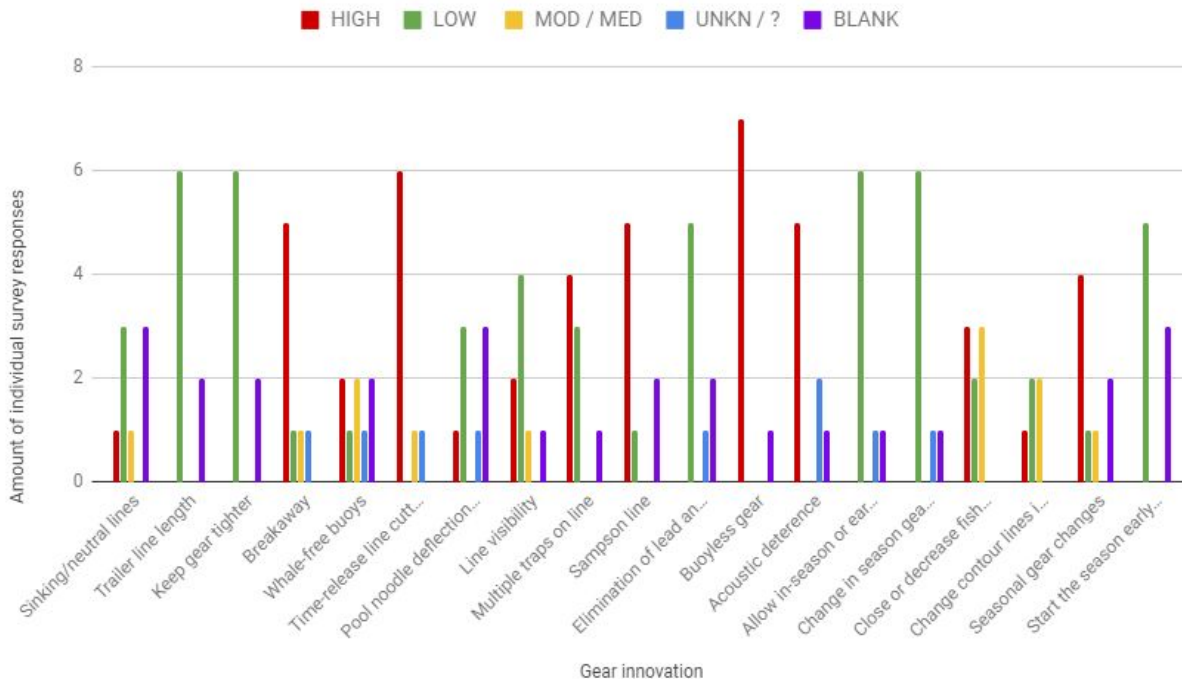
- Keep gear tighter (73%) *
- Trailer length (73%) *
- Pool noodle (64%)
- Allow in-season or earlier gear recovery (45%) *
- Elimination of lead and line splices (45%)

● High costs:

- Acoustic deterrence (91%) *
- Time-release cutter tool (82%) *
- Sampson line (82%) *
- Buoyless gear (82%) *

WASHINGTON Q: Cost to fisheries?

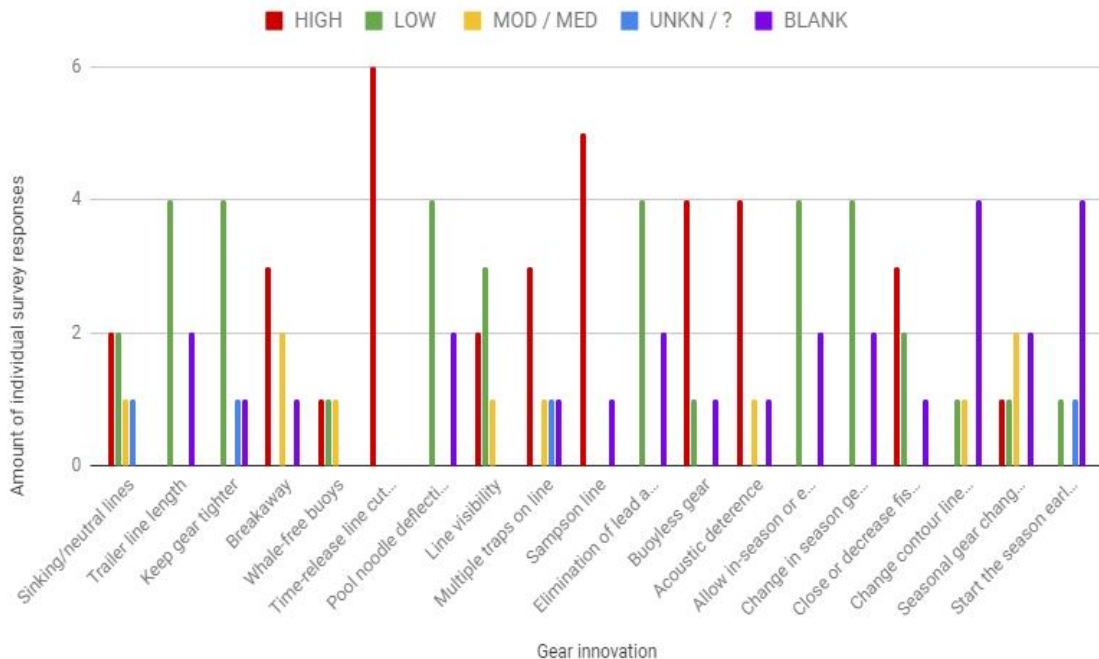
WA Presumed fishery costs for gear innovations



- Low costs:
 - Allow in-season or earlier gear recovery (75%) *
 - Trailer length (75%)
 - Keep gear tighter (75%) *
- High costs:
 - Buoyless gear (88%) *
 - Time-release cutter tool (75%) *
 - Breakaway (63%)
 - Acoustic deterrence (63%) *

MULTIPLE STATES (CA/OR/WA) Q: Cost to fisheries?

CA/OR/WA Presumed fishery costs for gear innovations



● Low costs:

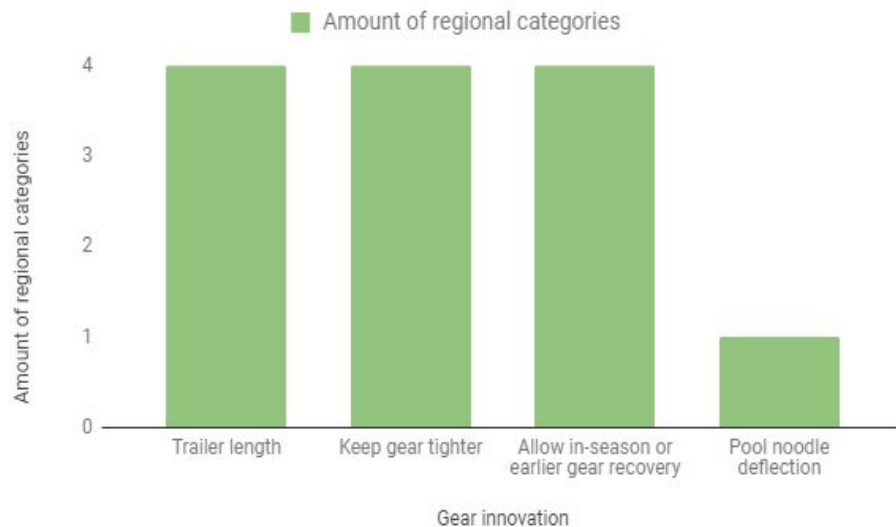
- Trailer length (67%) *
- Keep gear tighter (67%) *
- Pool noodle deflection (67%)
- Elimination of lead and line splices (67%)
- Allow in-season or earlier gear recovery (67%) *

● High costs:

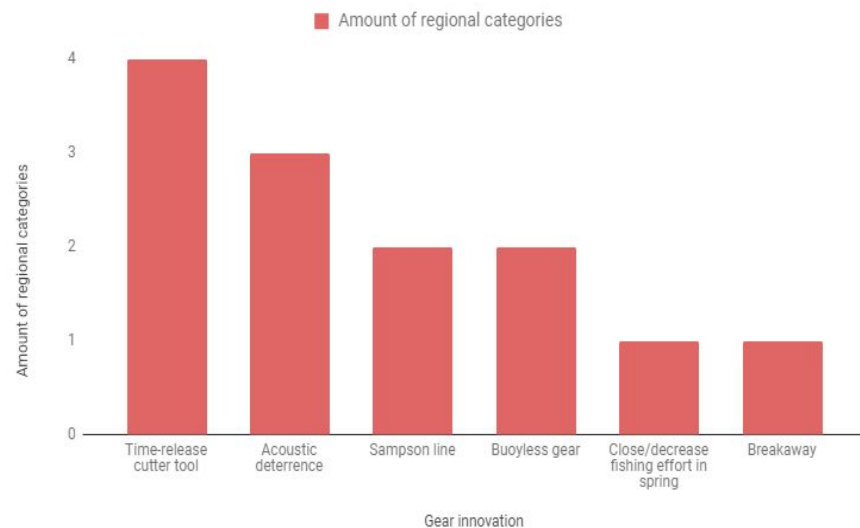
- Time-release cutter tool (100%) *
- Sampson line (83%) *
- Buoyless gear (67%) *
- Acoustic deterrence (67%) *

Trends for cost:

Survey trends for least costly gear innovations

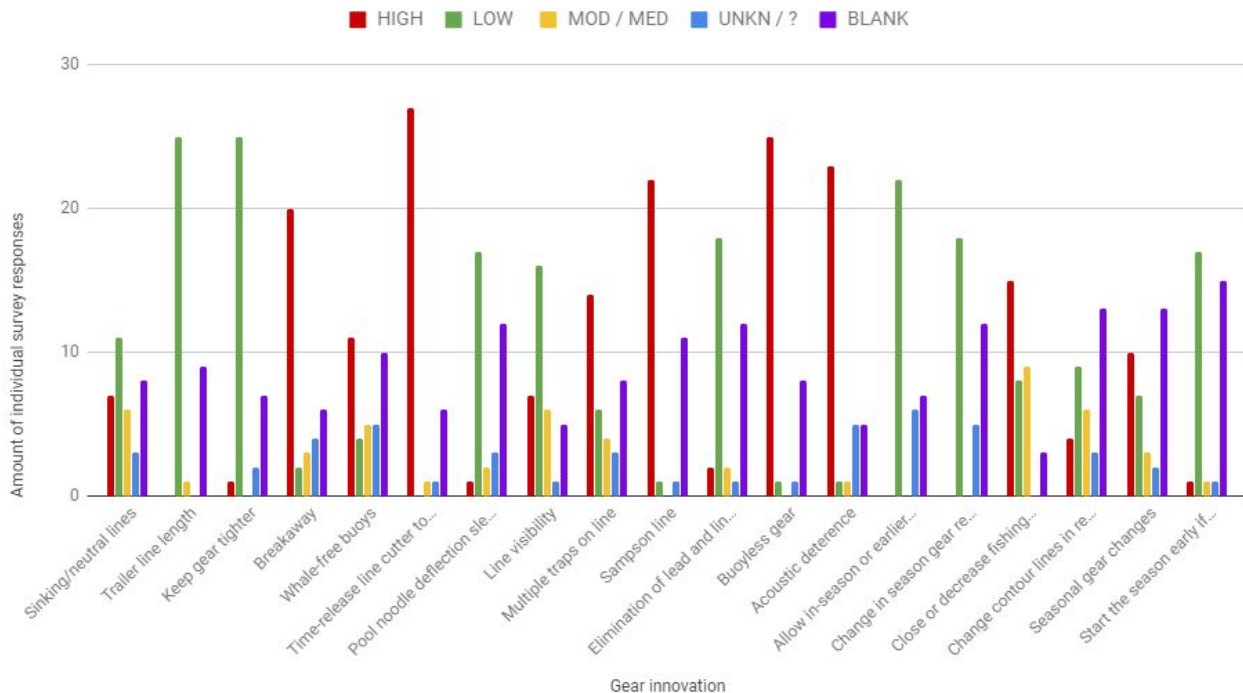


Survey trends for most costly gear innovations



Aggregated trends for cost across all states:

Presumed fishery costs for gear innovations across all states



● Low costs:

- Trailer length
- Keep gear tighter
- Allow in-season or earlier gear recovery

● High costs:

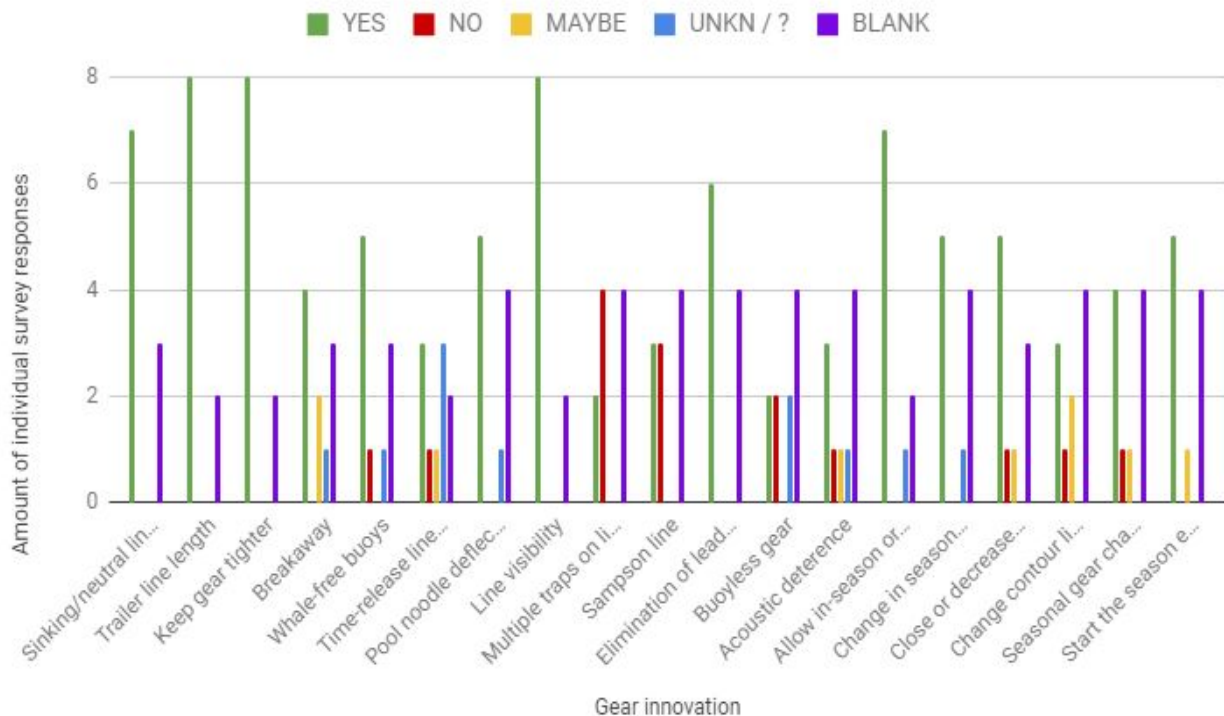
- Time-release cutter tool
- Buoyless gear
- Acoustic deterrence
- Sampson line

Q: What gear innovations are most doable?

Note: asterisk* denotes an innovation that was identified in a highlighted category from individuals across multiple states

CALIFORNIA Q: Is it doable?

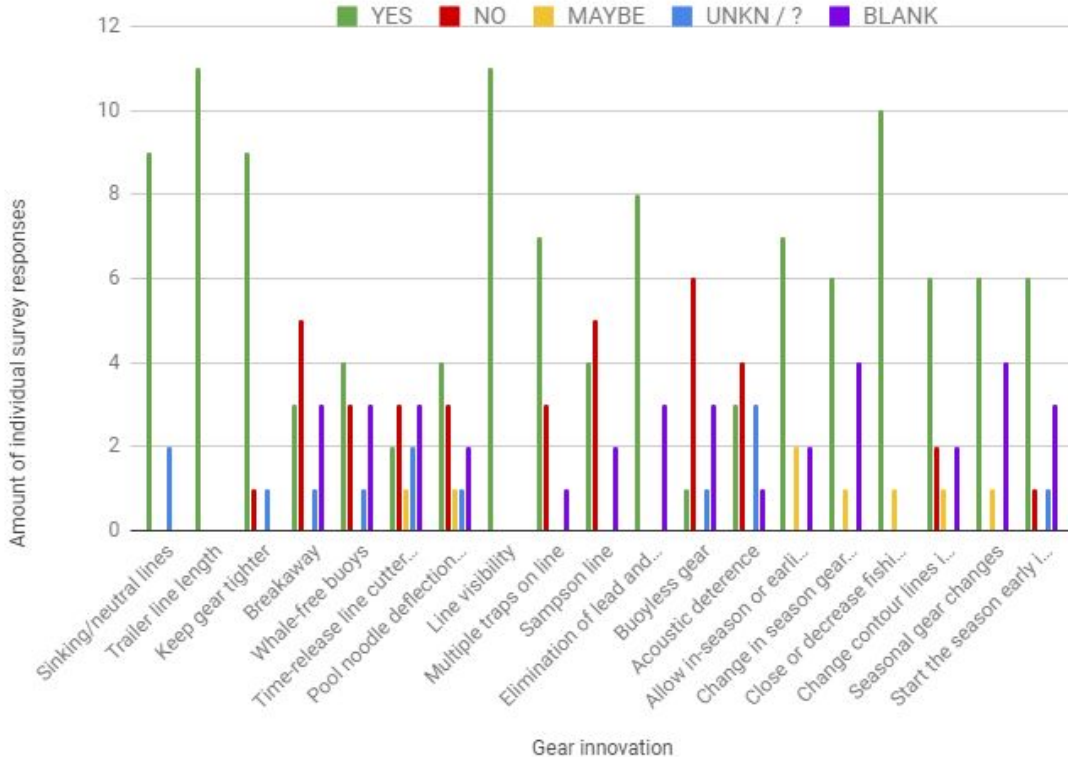
CA Presumed feasibility to implement innovated gear



- Most feasible:
 - Trailer line length (80%) *
 - Keep gear tighter (80%) *
 - Line visibility (80%)
- Least feasible:
 - Multiple traps (40%)
 - Sampson line (30%) *

OREGON Q: Is it doable?

OR Presumed feasibility to implement innovated gear



Most feasible:

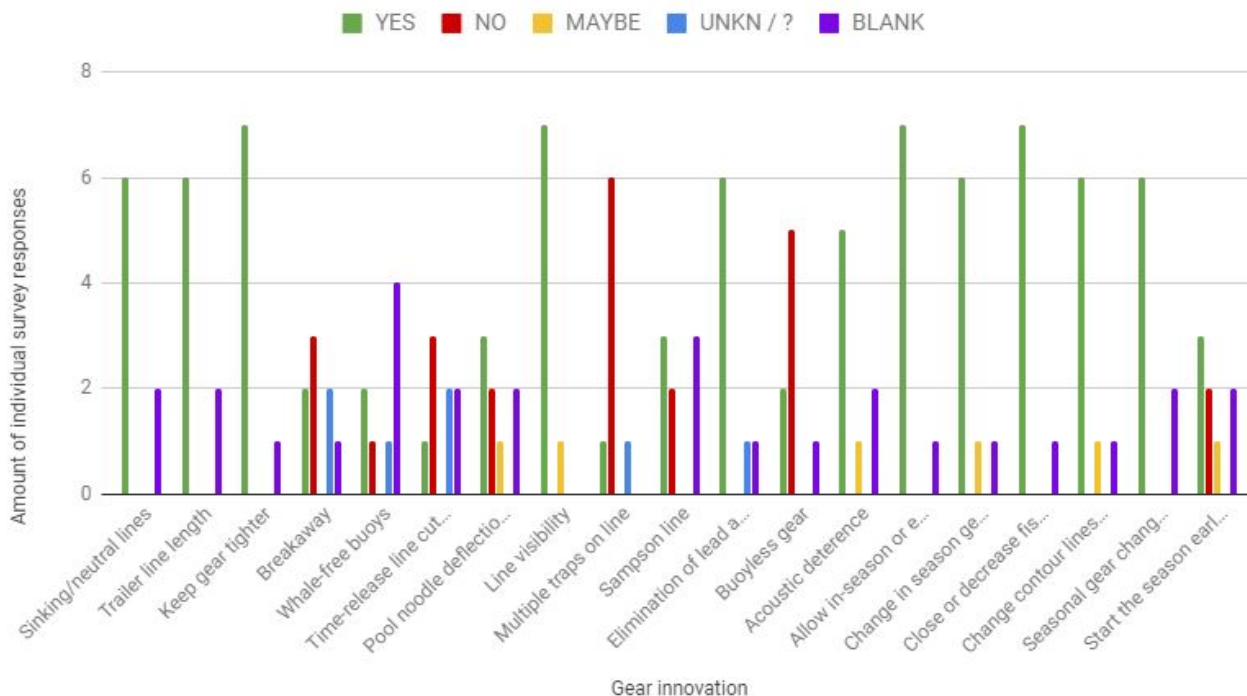
- Line visibility (100%) *
- Trailer line length (100%) *
- Close or decrease fishing effort in spring (91%)
- Sinking/neutral lines (82%)
- Keep gear tighter (82%)

Least feasible:

- Buoyless gear (55%) *
- Breakaway (45%)
- Sampson line (45%) *

WASHINGTON Q: Is it doable?

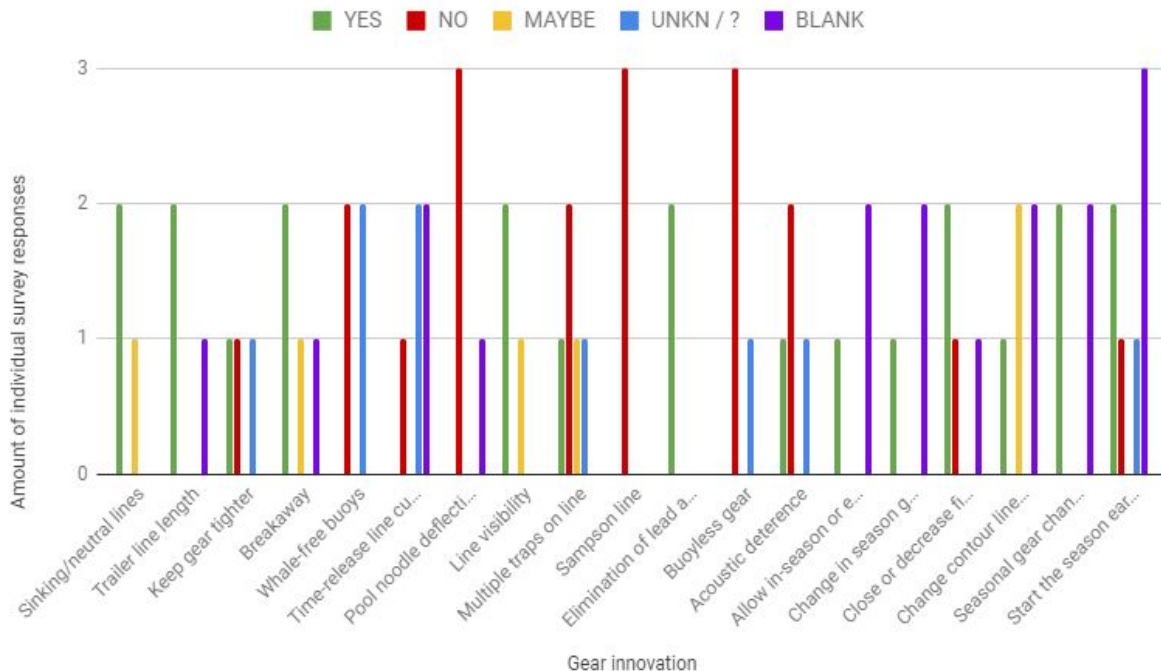
WA Presumed feasibility to implement innovated gear



- **Most feasible:**
 - Line visibility (88%) *
 - Keep gear tighter (88%) *
 - expand/change in-season gear retrieval (88%)
 - Close or decrease fishing effort in spring (88%)
- **Least feasible:**
 - Multiple traps on line (75%)
 - Buoyless gear (63%) *

MULTIPLE STATES (CA/OR/WA) Q: Is it doable?

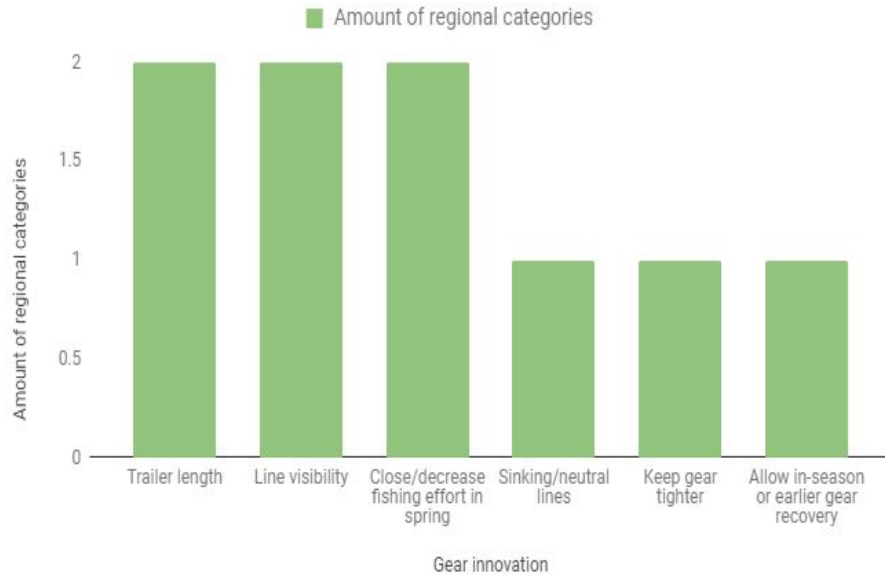
CA/OR/WA Presumed feasibility to implement innovated gear



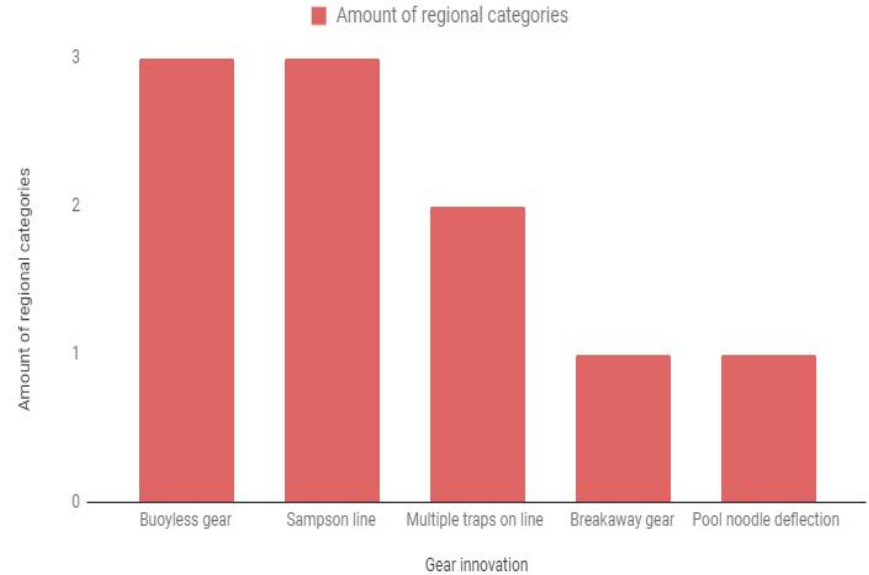
- Most feasible:
 - 50% of responses for most innovations
- Least feasible:
 - Buoyless gear (50%) *
 - Pool noodle (50%)
 - Sampson line (50%) *

Trends for feasibility:

Survey trends for most feasible gear innovations

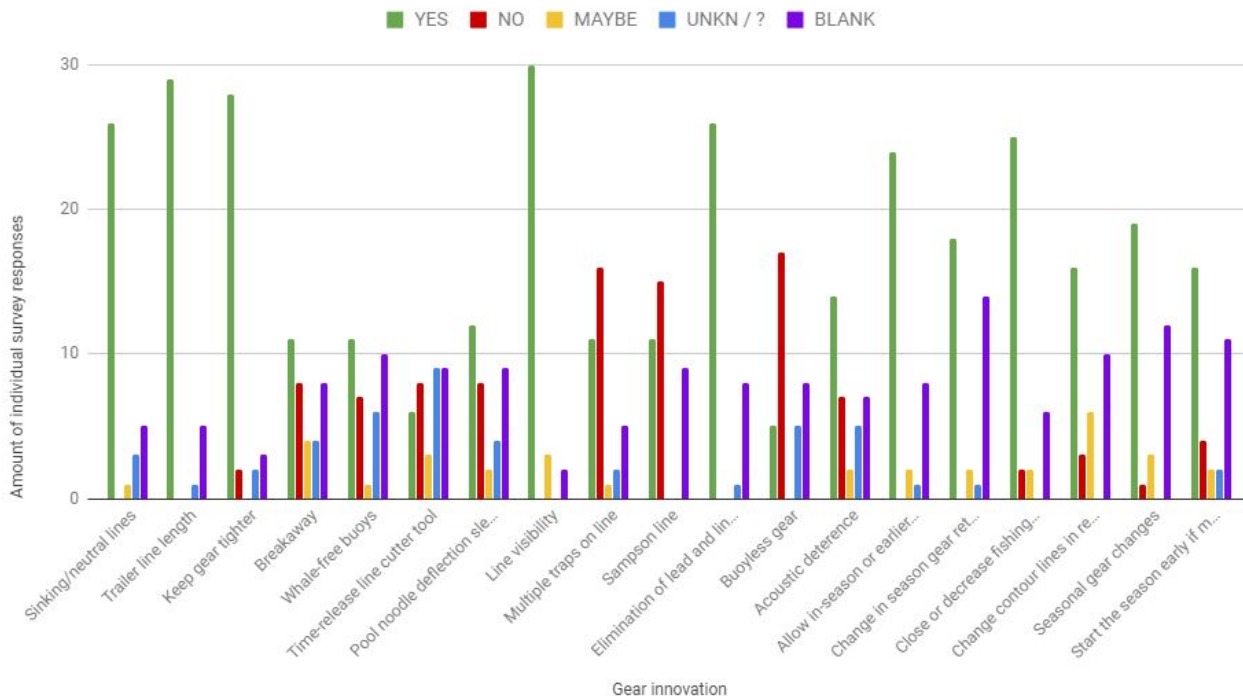


Survey trends for least feasible gear innovations



Aggregated trends for feasibility across all states:

Presumed feasibility to implement innovated gear across all states



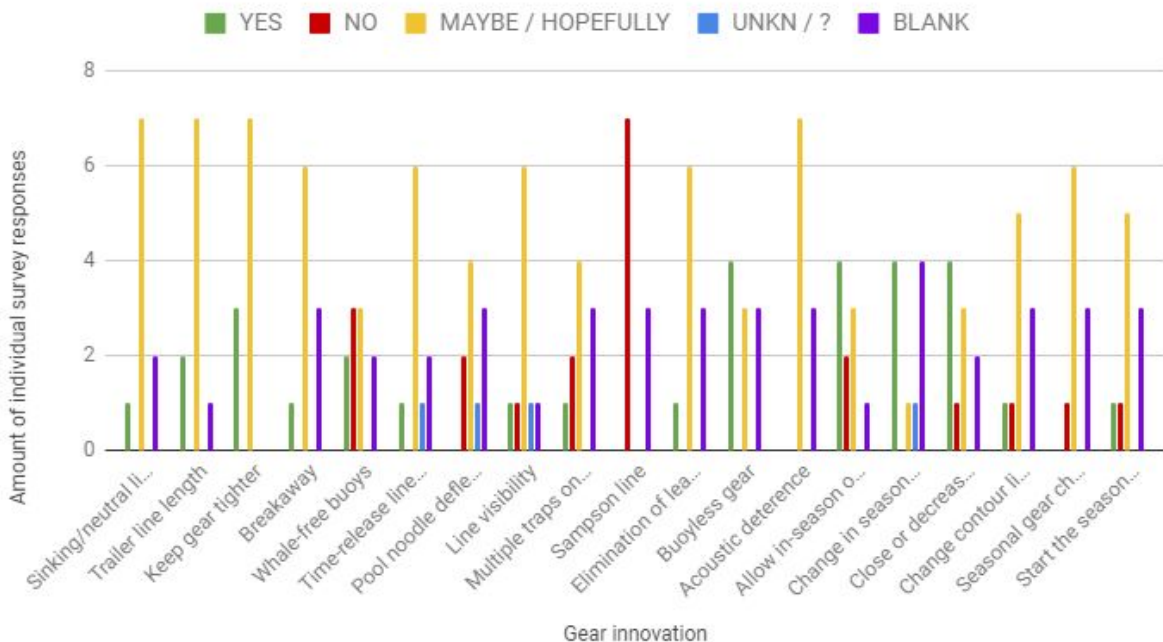
- Most feasible:
 - Line visibility
 - Trailer line length
 - Keep gear tighter
 - Sinking/neutral lines
 - Elimination of lead and line splices
 - Close or decrease fishing effort in spring
- Least feasible:
 - Buoyless gear
 - Multiple traps on line
 - Sampson line

Q: What gear innovations are most likely to make a positive difference for whales?

Note: asterisk* denotes an innovation that was identified in a highlighted category from individuals across multiple states

CALIFORNIA Q: Is it likely to make a difference for whales?

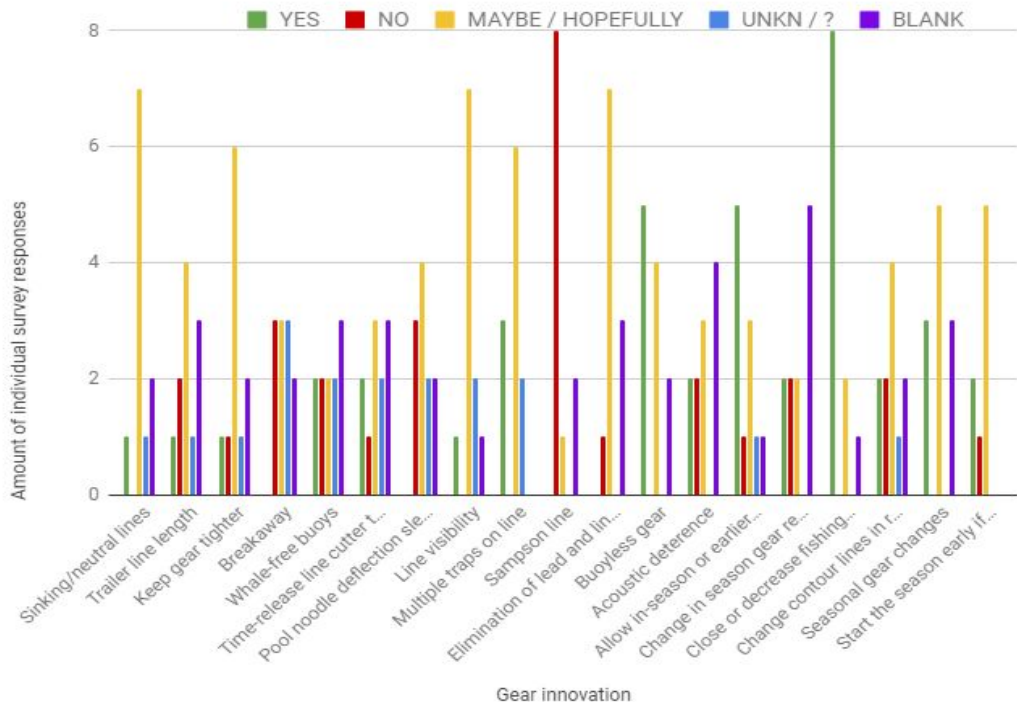
CA Presumed likeliness to make a positive difference for whales



- Will make a difference:
 - Close or decrease fishing effort in spring (36%) *
 - Buoyless (36%)
 - Allow in-season or earlier gear recoveries (36%)
- Will not make a difference:
 - Sampson line (64%) *

OREGON Q: Is it likely to make a difference for whales?

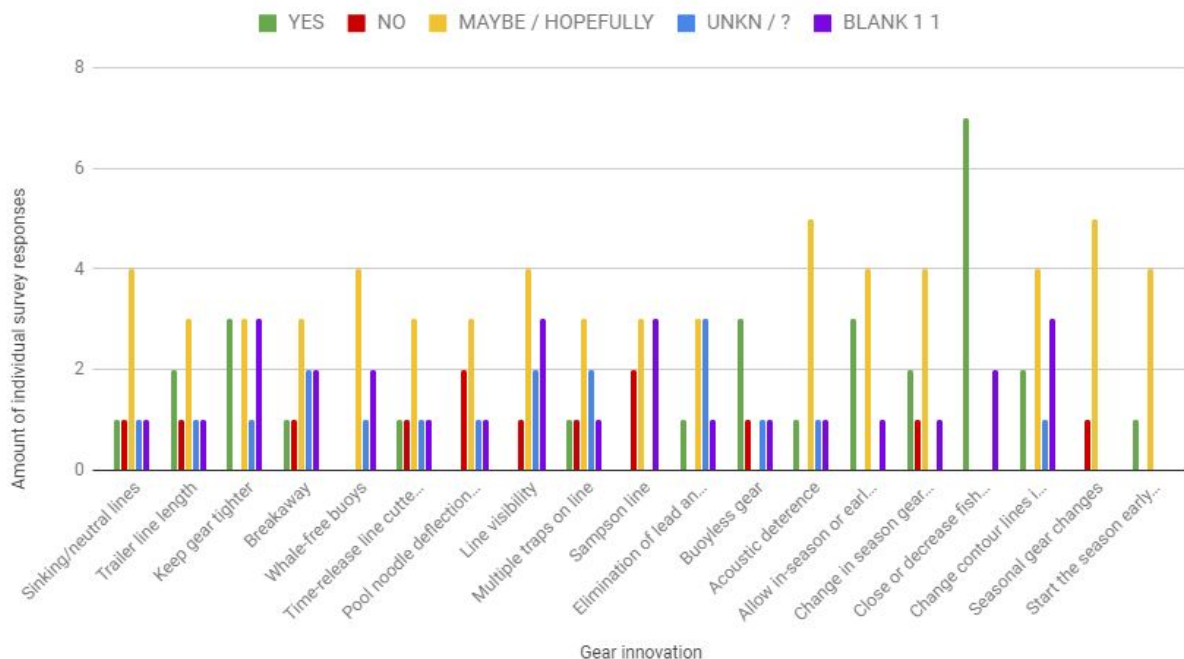
OR Presumed likelihood to make a positive difference for whales



- Will make a difference:
 - Close or decrease fishing effort in early spring (73%) *
- Will not make a difference:
 - Sampson line (73%) *

WASHINGTON Q: Is it likely to make a difference for whales?

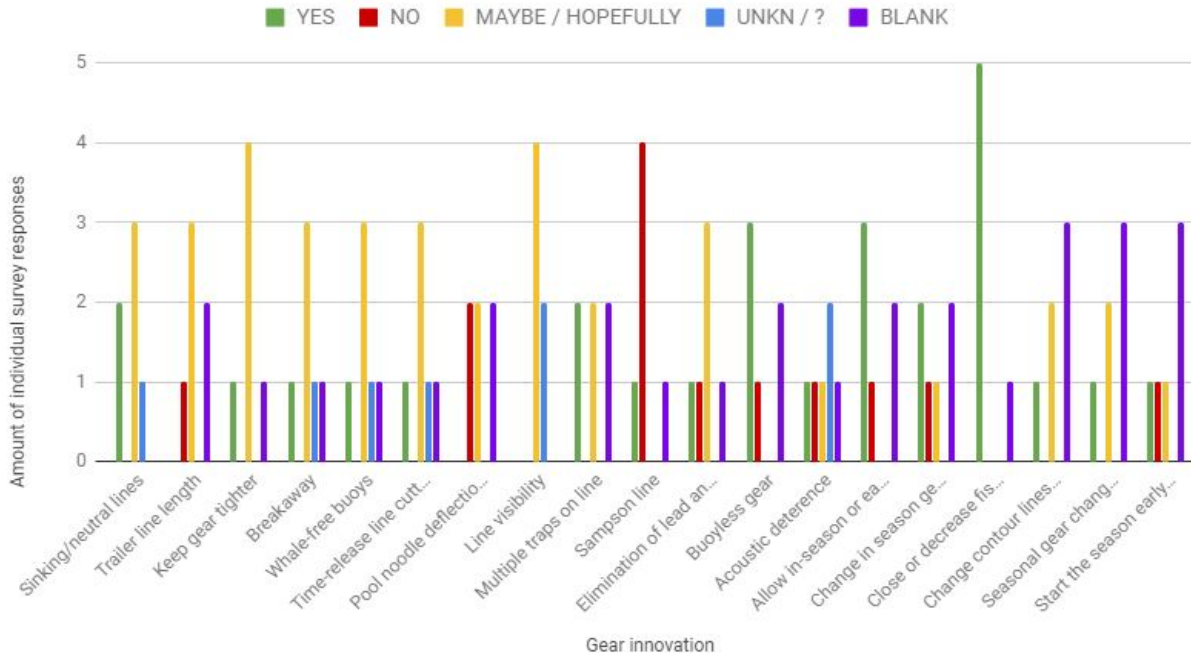
WA Presumed likeliness to make a positive difference for whales



- Will make a difference:
 - Close or decrease fishing effort in early spring (88%) *
- Will not make a difference:
 - Nothing notable

MULTIPLE STATES (CA/OR/WA) Q: Is it likely to make a difference for whales?

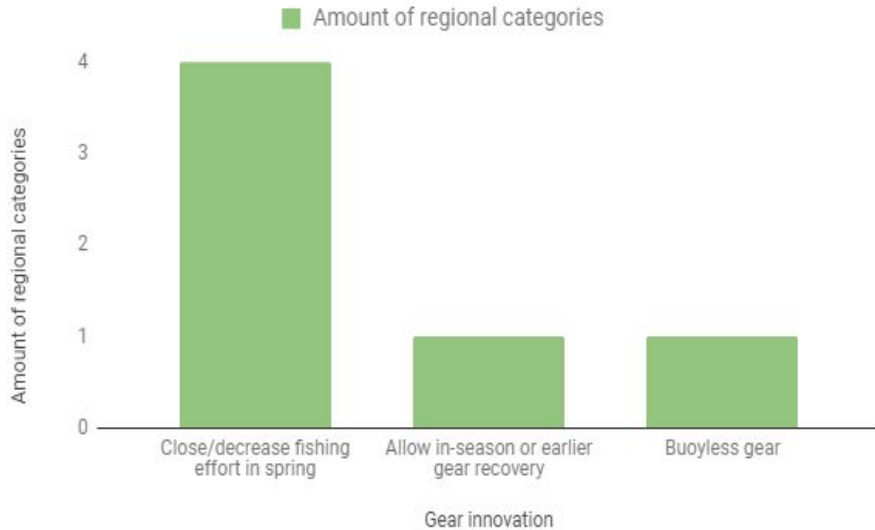
CA/OR/WA Presumed likeliness to make a positive difference for whales



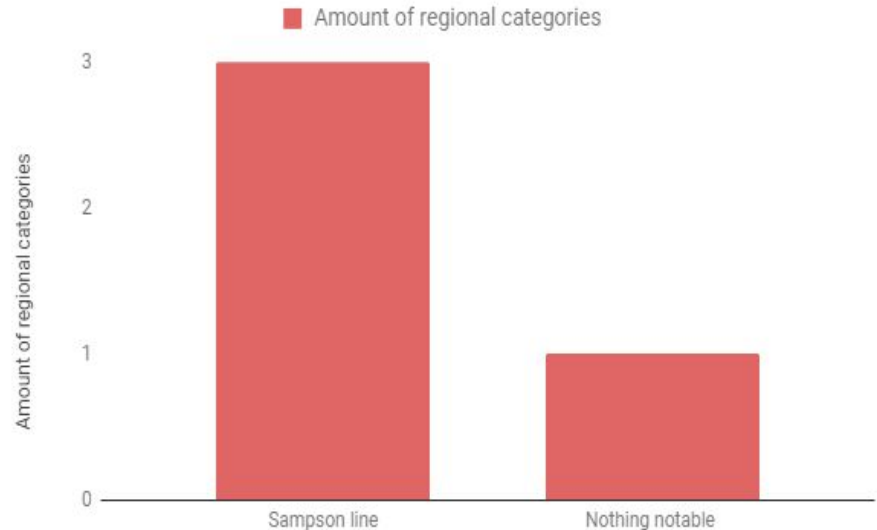
- Will make a difference:
 - Close or decrease fishing effort in early spring (83%) *
- Will not make a difference:
 - Sampson line (67%) *

Trends for impact on whales:

Survey trends for gear innovations most-likely to positively impact whales



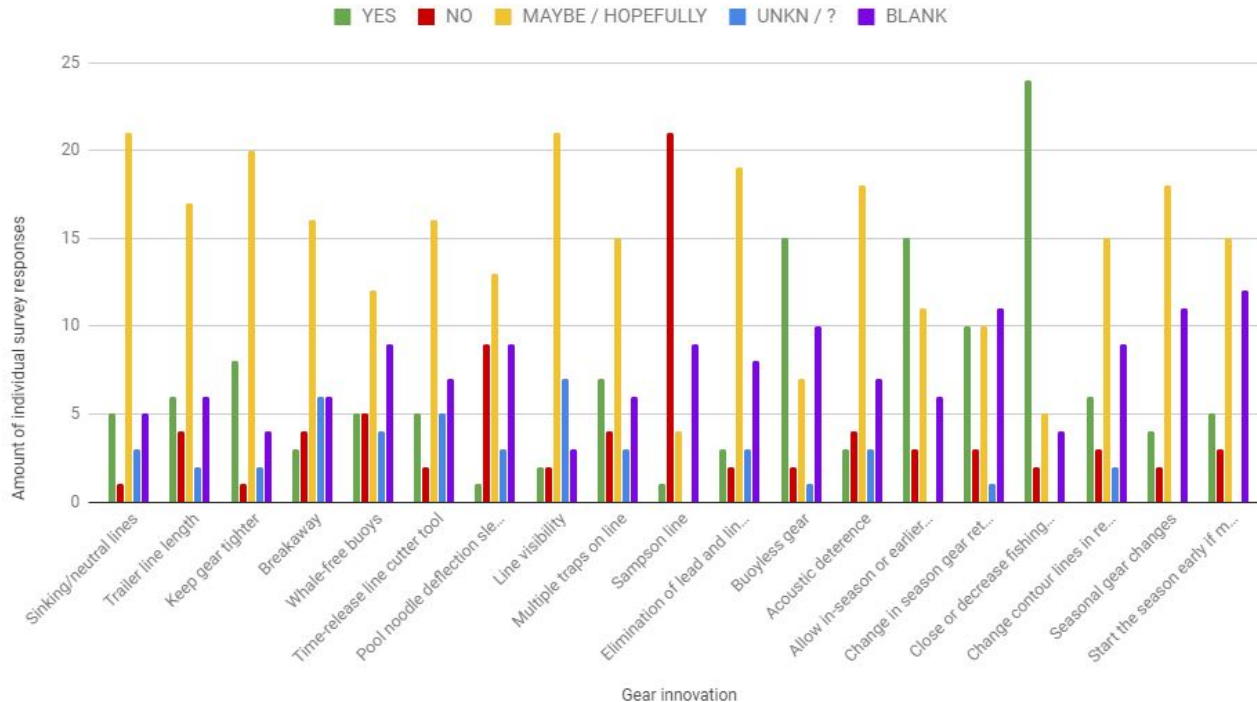
Survey trends for gear innovations least-likely to positively impact whales



Majority of “maybe” and “hopeful” answers from all regional categories. More research and data are required for many individuals to expect any new design to significantly impact whales

Aggregated trends for positive impact on whales across all states:

Presumed likeliness to make a positive difference for whales across all states



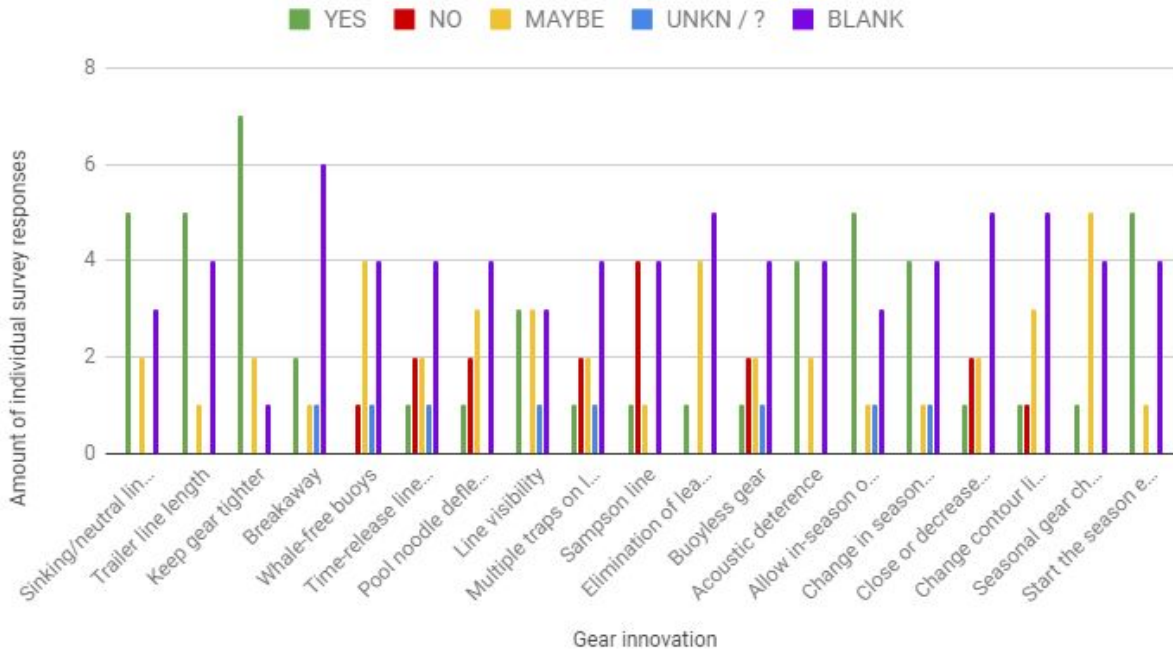
- Will make a difference:
 - Close or decrease fishing effort in early spring
 - Allow in-season or earlier gear recovery
 - Buoyless gear
- Will not make a difference:
 - Sampson line

Q: What gear innovations are most testable?

Note: asterisk* denotes an innovation that was identified in a highlighted category from individuals across multiple states

CALIFORNIA Q: Is it testable?

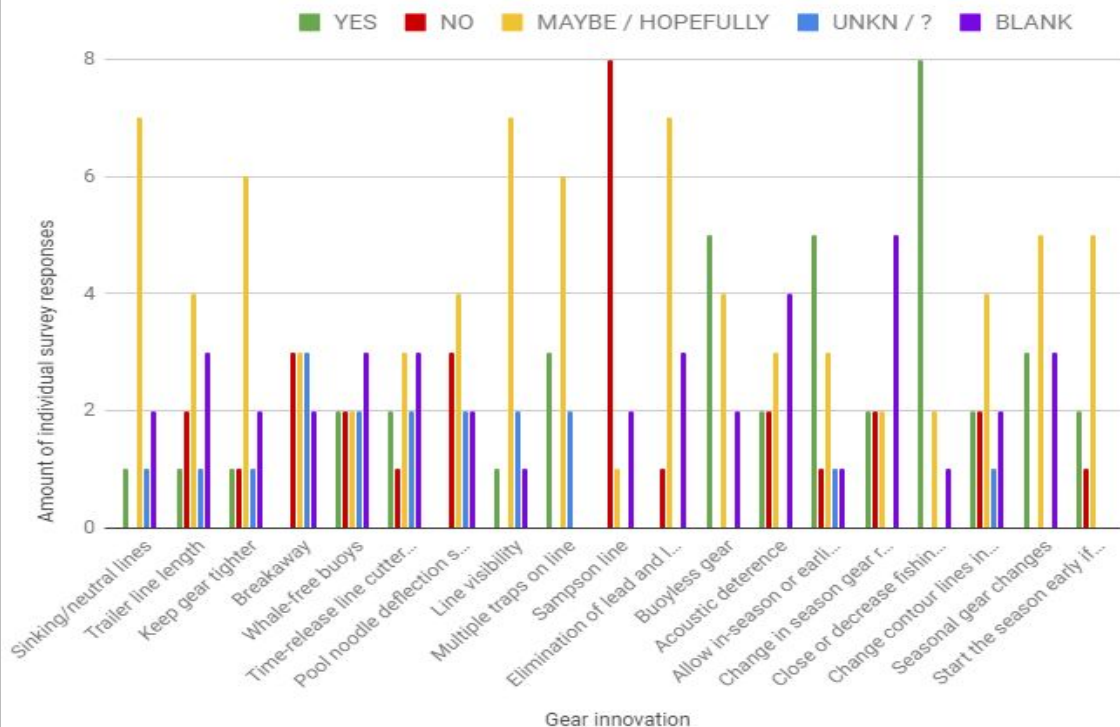
CA Presumed capability to test gear innovations for effectiveness



- **Most testable:**
 - Keep gear tighter (64%) *
 - Sinking/neutral lines (45%) *
 - Trailer line length (45%)
 - Allow in-season or earlier gear recovery (45%) *
 - Start the season early (45%)
- **Least testable:**
 - Sampson line (36%) *

OREGON Q: Is it testable?

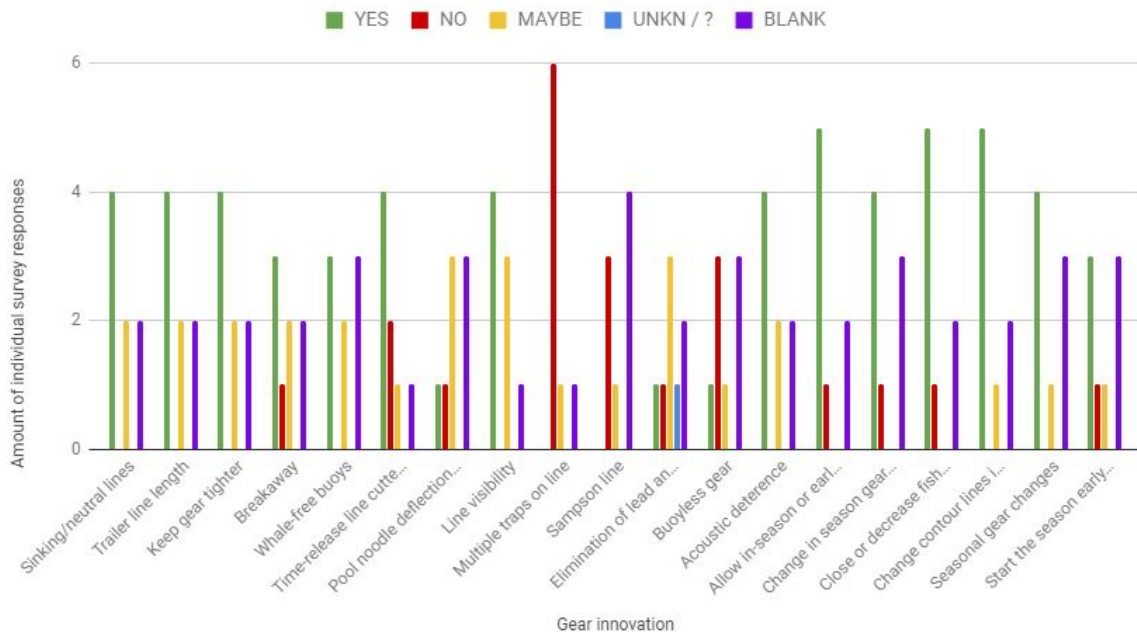
OR Presumed capability to test gear innovations for effectiveness



- Most testable:
 - Close or decrease fishing effort in spring (73%) *
 - Allow in-season or earlier gear retrieval (45%) *
 - Buoyless gear (45%)
- Least testable:
 - Sampson line (73%) *

WASHINGTON Q: Is it testable?

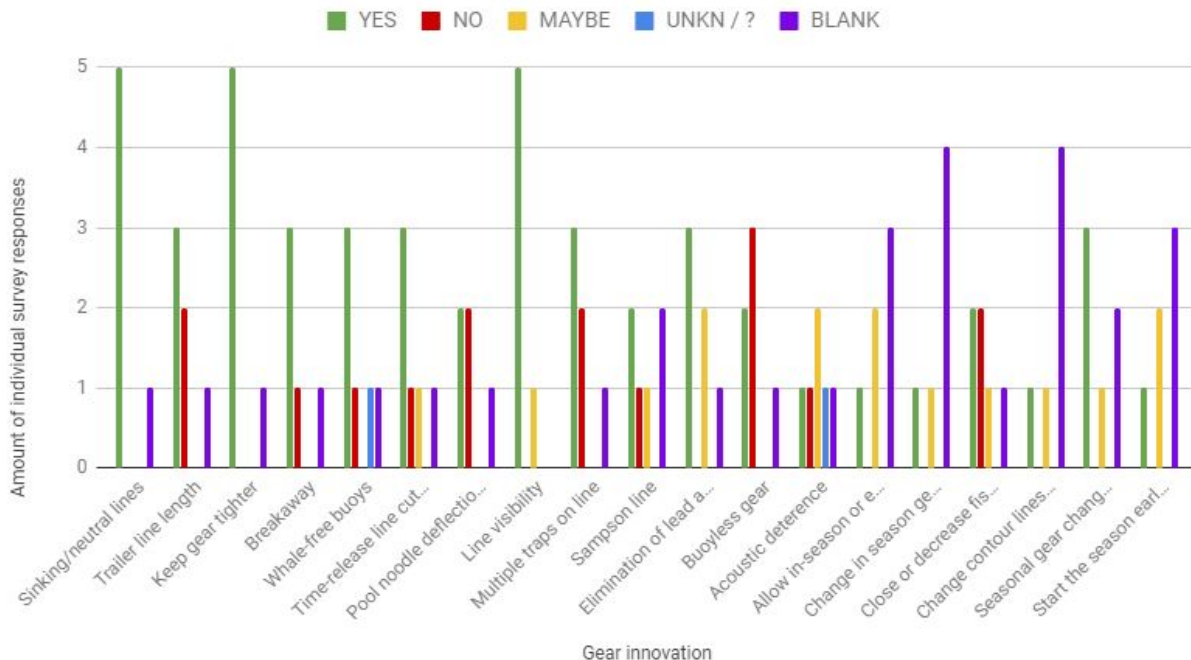
WA Presumed capability to test gear innovations for effectiveness



- Most testable:
 - Close or decrease fishing effort in spring (63%) *
 - Allow in-season or earlier gear recovery (63%) *
 - Change contour lines in response to oceanographic conditions (63%)
- Least testable:
 - Multiple traps on line (75%)
 - Sampson line (38%) *
 - Buoyless gear (38%) *

MULTIPLE STATES (CA/OR/WA) Q: Is it testable?

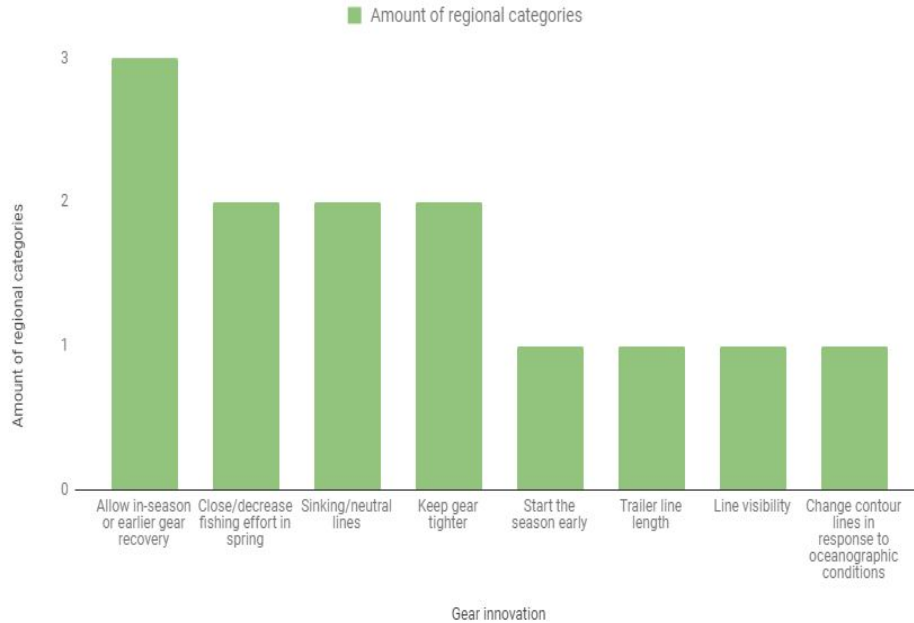
CA/OR/WA Presumed capability to test gear innovations for effectiveness



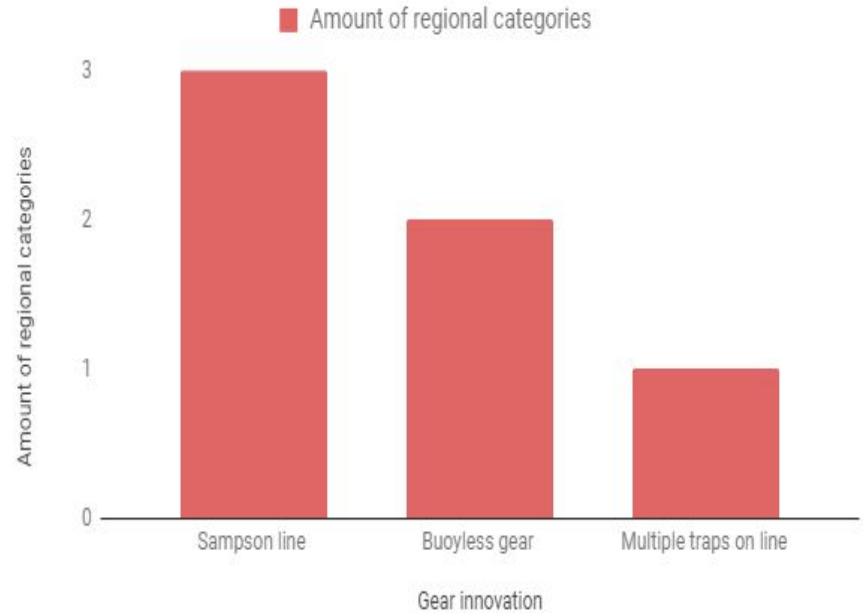
- Most testable:
 - Sinking/neutral lines (83%) *
 - Keep gear tighter (83%) *
 - Line visibility (83%)
- Least testable:
 - Buoyless gear (50%) *

Trends for testability:

Survey trends for most testable gear innovations

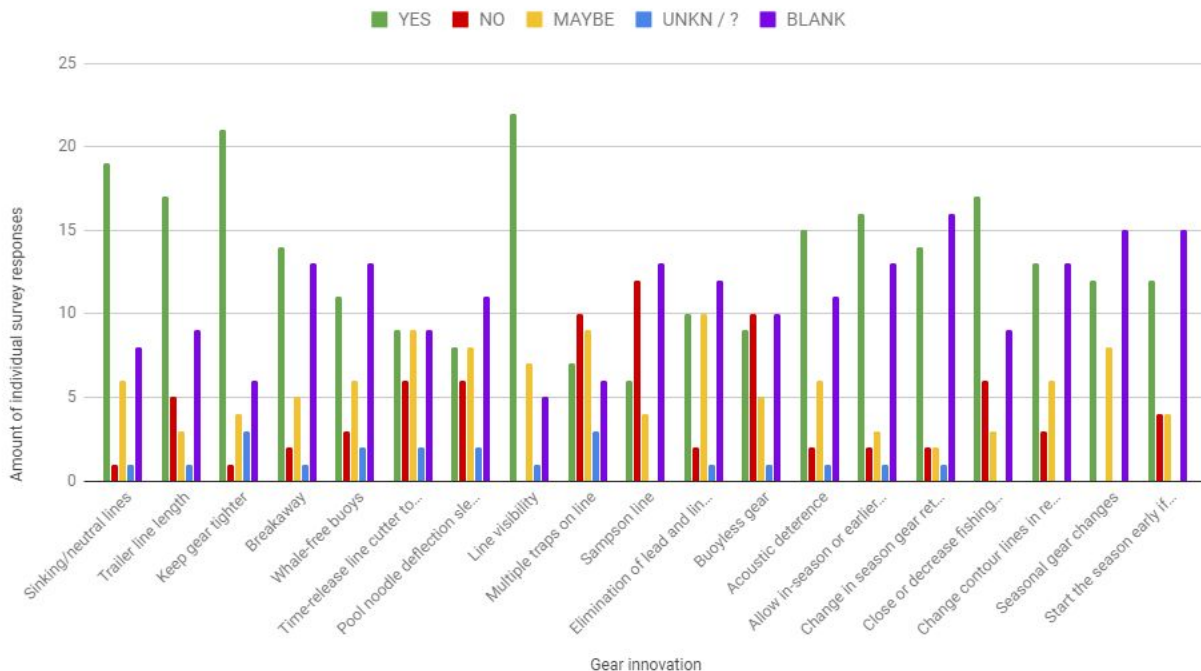


Survey trends for least testable gear innovations



Aggregated trends for testability across all states:

Presumed capability to test gear innovations for effectiveness across all states



- Most testable:
 - Line visibility
 - Keep gear tighter
 - Sinking/neutral lines
 - Trailer line length
 - Close or decrease fishing effort in spring
 - Allow in-season or earlier gear recovery
- Least testable:
 - Multiple traps on line
 - Sampson line
 - Buoyless gear

California summary and comments:

Popular innovations:

- **Close or decrease fishing efforts in the spring**
 - 3 / 10 surveys say costs are variable depending on other factors, like DA outbreak limiting crab fishing even during open months (Large impact on small/seasonal boat/fishermen)
 - 1 survey writes “most beneficial to whales”
 - People want to see models of whale presence

Unpopular innovations:

- **Multiple traps on line**
 - 2 / 10 people wrote they expect this to increase entanglements
 - Other comments included “not legal”, “dangerous”, “requires vessel changes” with unknown results

California summary and comments:

Innovations requesting additional research:

- **Buoyless gear**

- Issue with reliability; backup if retrieval fails? 3 / 10 surveys expressed concern for gear loss or enforcement policies.
- 2 / 10 responses ask to see research; test with fishermen alone first - does this even work?

- **Line visibility**

- 1 / 10 survey asks for more research: depends on whale interactions (attracted or deterred by more visible lines?)
- 2 / 10 surveys say hard to test specifically for entanglement benefits

Oregon summary and comments:

Popular innovations:

- **Expand/change in season gear retrieval program**
 - 4 / 11 say OR already has in-season system
 - 3 / 11 recommend revisions for existing program phrasing and structure to increase incentives
- **Close or decrease fishing efforts in the spring**
 - 1 / 11 says OR already decreases in spring
 - 2 / 11 indicate this could produce for faster and cheaper results than testing lots of gear
 - 1 / 11 asks to specify area; with regional limits
- **Sinking or neutral lines**
 - 3 / 11 say already in use

Unpopular innovations:

- **Acoustic deterrence**
 - 3 / 11 say not presently cost effective
 - 3 / 11 worry it increases noise pollution; not effective; not practical

Oregon summary and comments:

Innovations requesting additional research:

- **Line visibility**
 - Limited research shows success so far (2 / 11 surveys mentioned existing study of right whales in Maine)
 - Need more research per whale species, region, behavior, etc...
 - Highest amount of "yes" for testability and doable
- **Time-release cutter tool**
 - 3 / 11 surveys implicate interest when technology improves and/or cost decreases
 - Lighter, more flexible
- Want to see multi-regional analysis of whale entanglement data

Washington summary and comments:

Popular innovations:

- **Close or decrease fishing efforts in the spring**
 - More than half of surveys explicitly support of this idea; 4 separate individuals write:
 - “Most comprehensive solution”, “best option”, “most effective tool of all”, “give it a shot”
 - 2 / 8 speculate a benefit for fishermen in next year's season
 - crabs could grow larger, molt; fewer soft-shell issues; “positive market results”
- **Sinking/neutral lines**
 - 5 / 8 say it's a viable solution or already in practice in some areas

Unpopular innovations:

- **Acoustic deterrence**
 - 3 / 8 exclaim this will increase only ocean noise and are not in support

Washington summary and comments:

Innovations requesting additional research:

- **Buoyless gear**

- 1 / 8 wrote “should be a higher research priority”
- 3/ 8 expressed concern for a “mass gear loss”

- **Line visibility**

- 1 person writes “needs a lot more scientific research”
 - RQ: Are some whales entangled by playing with lines? (More visible lines appear like kelp?)
- 2 / 8 others are interested in research specifically with lights
 - RQ: Would lights attract prey and increase whale encounters?

- **Whale-free buoys**

- 3 / 8 people wrote they don't know what these are
- 2 / 8 additional people expressed interest in research to determine any effectiveness

Multiple states summary and comments:

Popular innovations:

- **Close or decrease fishing efforts in the spring**
 - 4 / 6 indicate this could help for whales
 - “work 100% and would be immediate”; “could benefit whales”
 - 1 / 6 explains the option seems logical: later in the season there are more soft-shell crabs and fewer fish; “save whales” and remove all unnecessary gear earlier
 - 3 / 6 express costs are more individual but shouldn't be hugely costly for the whole

Unpopular innovations:

- **Sampson line (or stronger, thinner rope)**
 - 4 / 6 firmly voiced this would have a harmful and negative impact on whales ; “more flesh cuts not just chafe scars”

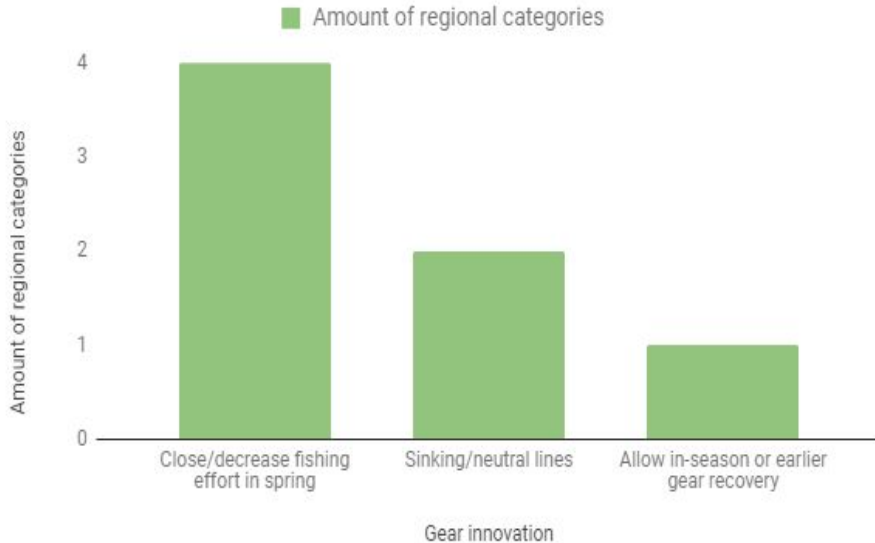
Multiple states summary and comments:

Innovations requesting additional research:

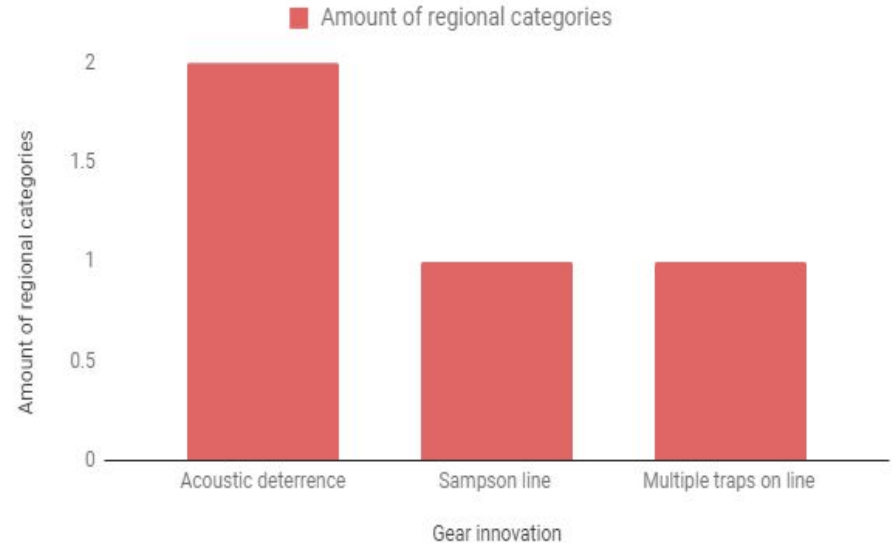
- **Keep gear tighter**
 - 2 / 6 comments see high potential to test this (i.e test line profile)
 - “Collect data on recoveries and entanglements”
- **Sinking or neutral lines**
 - 3 / 6 say research plan underway and/or already in use

Cumulative summary of graphs and comments: According to survey responses...

Popular gear innovation trends across all states

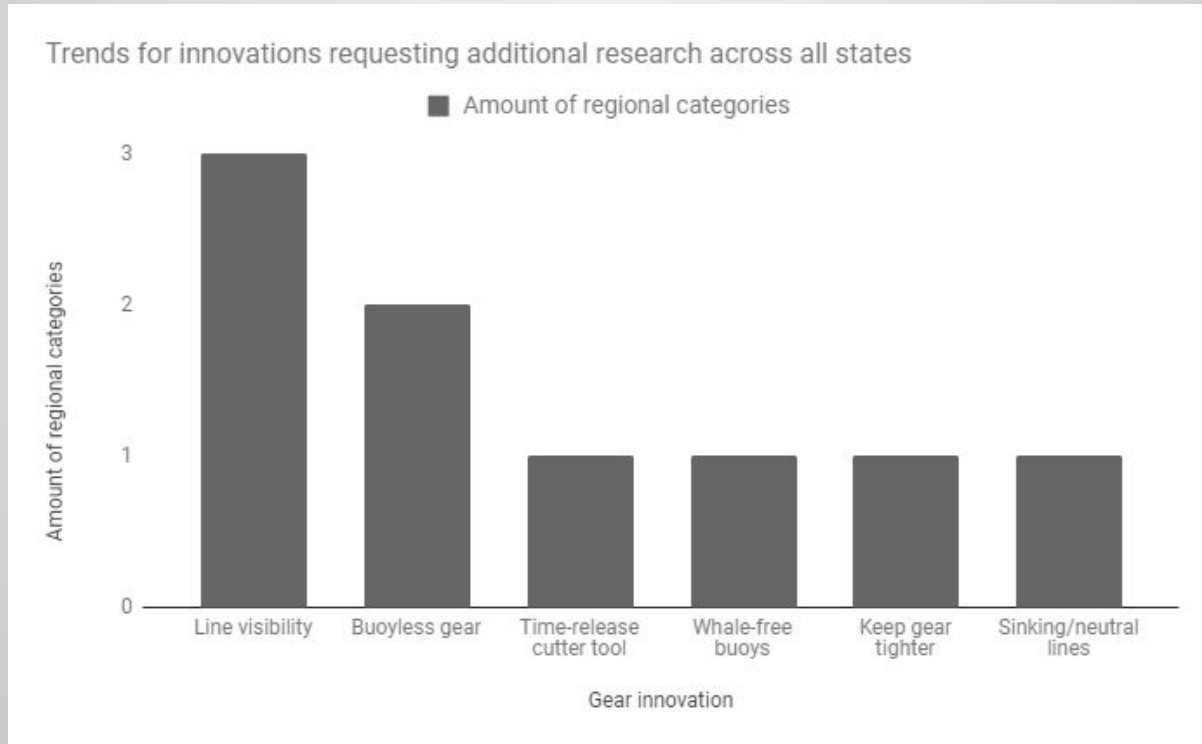


Unpopular gear innovation trends across all states



Cumulative summary of graphs and comments:

According to survey responses...



Notable trends in all comments:

RQ: Further analysis of whale habits and distribution

- Specifics on entanglements
 - When
 - Seasonally, monthly
 - Where
 - Geographically
 - On the whale
- Whale behavior
 - Changes around gear
 - Movement, playfulness, feeding, etc...
 - General feeding habits and trends
 - When
 - Where

Any significance in the blanks?

Gear innovation	# of blank boxes	# of blank lines
Sinking/neutral lines	26	3
Trailer line length	29	3
Keep gear tighter	20	1
Breakaway	33	4
Whale-free buoys	42	6
Time-release line cutter tool	31	4
Pool noodle deflection sleeve below buoy	41	7
Line visibility	15	1
Multiple traps on line	25	3
Sampson line	42	7
Elimination of lead and line splices	40	7
Buoyless gear	36	4
Acoustic deterrence	30	3
Allow in-season or earlier gear recovery	34	5
Change in season gear retrieval program	53	10
Close or decrease fishing effort in spring	22	4
Change contour lines in response to oceanographic conditions	45	8
Seasonal gear changes	51	7
Start the season early if market sizes met in November	53	7
TOTAL (35 surveys total; 19 lines per survey; 76 boxes per survey; 4 boxes per line)	668 / 2660 boxes	94 / 665 lines

Assumptions based on the blanks...

- 376 of the 668 blank boxes are in blank lines
 - 56% or more than half of all blank boxes
- The amount of blank boxes are all relatively similar
 - Many blank boxes are grouped together in the same people's surveys (i.e several individuals didn't feel comfortable answering many of the questions; rushed without time to finish?)
- Because “Allow in-season or earlier gear recovery” and “Change in season gear retrieval program” were originally almost the same on the hard-copies, this likely caused many people to leave the presumed-repeat-row blank
 - “Allow in-season or earlier gear recovery” (34 blank boxes; 5 blank rows) has nearly half as many empty responses as “Change in season gear retrieval program” (53 blank boxes; 10 blank rows)
- “Line visibility”(15 blank boxes; 1 blank row) had the largest amount of responses
 - Perhaps indicating a gear idea many people already know about