



Lobster Fishery Management Plan, Control Rule Matrix

Table 5.5 Application of the control rule: Interpretation of different scenarios in which threshold reference points are exceeded, and recommended management responses. Symbols for each reference point are: ↑ (“safe”, does not exceed threshold), and ↓ (exceeds threshold). Note that once $CATCH_{Threshold}$ or $CPUE_{Threshold}$ are exceeded, monitoring CPUE and Catch trends provides valuable information that managers can use to “fine tune” the fishery or to detect overfishing early (i.e., before the stock becomes overfished). However, SPR ($F_{15\%}$) is a backstop that, when exceeded, should trigger immediate restoration of spawning potential via one or more of the control rule mechanisms specified (Table 5.4).

Scenario	Reference Point			Interpretation / possible causes	Suggested management response sequence
	$CATCH_{Threshold}$	$CPUE_{Threshold}$	SPR ($F_{15\%}$)		
1	↑	↑	↑	<ul style="list-style-type: none"> ○ Stock productivity and fishery performance stable and/or increasing 	<p><u>No response required, but optionally:</u></p> <ol style="list-style-type: none"> 1) Monitor reference point (SRP) trends <ol style="list-style-type: none"> a) Make no change (if SRP trends are stable or just above thresholds) b) Ease harvest rate regulation (if SRP trends high/increasing)
2	↓	↑	↑	<ul style="list-style-type: none"> ○ Fishery lightly harvested (i.e., fishing effort and harvest rates are low, could be caused by drop in price or other economic factors) 	<p><u>No response required, but optionally:</u></p> <ol style="list-style-type: none"> 1) Monitor reference CPUE and SPR trends <ol style="list-style-type: none"> a) Make no change (if CPUE/SPR trends stable/just above threshold) b) Ease harvest rate regulation (if CPUE/SPR trends increasing)
3	↑	↓	↑	<ul style="list-style-type: none"> ○ Catchability down (e.g. cold water) ○ Potential economic overfishing ○ Potential early warning of recruitment overfishing 	<p><u>No response required, but optionally:</u></p> <ol style="list-style-type: none"> 1) Confirm/monitor SPR values with multiple models/approaches <ol style="list-style-type: none"> a) No change (if SPR trends are stable/above threshold) b) Harvest rate reduction (if SPR trends declining), regulator options (Table 5.4) c) No change, or ease harvest rate restriction (if catchability is proven to be lower than usual and is causing CPUE decline)
4	↓	↓	↑	<ul style="list-style-type: none"> ○ Catchability down (e.g. cold water) ○ Potential economic overfishing ○ Potential early warning of recruitment overfishing (fewer recruits surviving to adulthood) 	<p><u>No response required, but optionally:</u></p> <ol style="list-style-type: none"> 1) Confirm/monitor SPR values with multiple models/approaches <ol style="list-style-type: none"> a) No change (if SPR trends are stable/above threshold) b) Harvest rate reduction (if SPR trends declining), regulatory options (Table 5.4) c) No change, or ease harvest rate restriction (if catchability is proven to be lower than usual and is causing CPUE decline)
5	↑	↑	↓	<ul style="list-style-type: none"> ○ Stock overfished, and/or ○ CPUE or SPR estimate(s) in error? 	<p><u>Response required:</u></p> <ul style="list-style-type: none"> • Investigate underlying causes • Confirm/monitor SPR with multiple models/approaches • If action is required tailor management response (Table 5.4) to prevailing conditions

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Scenario	Reference Point			Interpretation / possible causes	Suggested management response sequence
	<i>CATCH</i> _{Threshold}	<i>CPUE</i> _{Threshold}	<i>SPR</i> (<i>F</i> _{15%})		
6	↓	↑	↓	<ul style="list-style-type: none"> ○ Stock overfished, and ○ Possible catchability increase (effort creep due to technology, etc.) ○ Disease in stock? 	<p><u>Response required:</u></p> <ul style="list-style-type: none"> ● Investigate underlying causes ● Confirm/monitor CPUE (misreporting?) ● Confirm/monitor SPR with multiple models/approaches ● If action is required tailor management response (Table 5.4) to prevailing conditions
7	↑	↓	↓	<ul style="list-style-type: none"> ○ Stock overfished ○ Probable overfishing 	<p><u>Response required:</u></p> <ul style="list-style-type: none"> ● Investigate underlying causes ● Confirm/monitor SPR with multiple models/approaches ● If action is required tailor management response (Table 5.4) to prevailing conditions
8	↓	↓	↓	<ul style="list-style-type: none"> ○ Stock overfished ○ Probable overfishing ○ Disease? 	<p><u>Response required:</u></p> <ul style="list-style-type: none"> ● Investigate underlying causes ● Confirm/monitor SPR with multiple models/approaches ● If action is required tailor management response (Table 5.4) to prevailing conditions

Table 5.5 (continued...)