

Chapter	Responder	Page	Line	Comment	Notes
General	Fagre			Introduction – use Onion approach – start with big picture at global scale with sudden shifts in global energy balance, so will affect ecosystems, Even gradual change can induce threshold changes, Ecosystem services will be abruptly affected, Our focus will be continental ecosystem thresholds, Make sure we address the so what question?	Accepted - Document revised to be more focused
General	Fagre			Definition – include irreversibility, ecothresholds.. emphasis on small changes with big results	Accepted -
General	Fagre			Better examples of true thresholds and not nonlinear or abrupt responses to abrupt climate change	Accepted -
General	Fagre			Too much detail – in the theory and the case studies, examples, state the threshold driver more explicitly	Accepted -
General	Fagre			Management perspectives – what can you manage at what scales, how far do we go in recommending, i.e. we give array of options?	Accepted - Document revised to be more focused
General	Fagre			We need to backfill in the document to support the implications of management..work back to make connections in the rest of the document.	Accepted - Document revised to be more focused
General	Fagre			Table of other systems to watch, what to watch for	Accepted
General	Fagre			Disturbance not mentioned enough --- disturbance mechanisms shapes the landscape, under climate change, Also Thresholds changing and shifting	Accepted - Document revised to be more focused
General	Fagre			Use example of beetles getting up into spruce in the SE; Frequencies of disturbance, multi-stressor plus cc, AND cc induces changes in the other stressors	Accepted
General	Fagre			Frequencies of disturbance, multi-stressor plus climate change, AND climate change induces changes in the other stressors	Accepted - Document revised to be more focused
General	Fagre			Kenai fjords, SW, SE, elevation -- trigger is drought stress caused by temperature;	Accepted
General	Fagre			Put a heading into Chapter 3 for disturbance	Noted
General	Fagre			Paleoperspectives – we are exceeding the MWP and Anasazi collapse (mention Diamond’s book).	Noted

ES	Fagre	pg 54		true summary, bullets - intro, definition, other concepts, development/what do we know, case studies, examples, management, and recommendations	Accepted
ES	Fagre			Use Topic sentence, italicized, then paragraph to follow with details	Noted
ES	Fagre			Management and recommendations highlighted	Accepted
ES	Fagre			ESA invasive species chapter – David Lodge	Noted
ES	Fagre			Really, really crisp for theoretical development in both text and exec summary	Accepted
ES	Fagre			References really need to be good.. so the science supports our chapters.	Accepted
ES	Fagre			Scott Stein – paleo, drought	Noted
Ch 1	Fagre			Put in observations around world and current state; Statement of objectives next	Accepted
Ch 1	Fagre		130	change abrupt change, distinguish endogenous from exogenous driven changes. We are not doing rapid exogenous triggers. Do word search on abrupt climate change and make sure that it is used properly in the text.	Accepted
Ch 1	Fagre	Sec 1.2		context of USGCRP and IPCC assed to CCSP	Accepted
Ch 1	Fagre			Need a section in CHAPTER 1 of introduction for why we care about thresholds, (urgent because the pace and features of drivers are also changing so things are getting more vulnerable) ecosystem services etc.	Accepted
Ch 2	Fagre			Put the definition upfront and then relate regime shifts back to it.	Accepted
Ch 2	Fagre			initial section is too rambling, just say a lot has been done and pushed the development along, section on regime shift needs to be cleared up to make explicitly clear the difference between regime shifts and threshold. Use 1988 flip flop with Arctic Oscillation and tied to changes in fire, Kenai die back... keep and add Carpenter material; need to keep regime distinction as physical white noise but thresholds process into meaningful signal.	Accepted

Ch 2	Fagre			State and Transition Models – remove subheading, collapse with regime shifts and talk about all as evolutionary progressions to get to our current threshold concepts. Note that regime shifts are real physical changes and STMs are ways of looking at them and biological systems.MOVE ALL TO THEORETICAL DEVELOPMENT SECTION	Accepted
Ch 2	Fagre			motivation in introduction with sudden changes	Accepted
Ch 2	Fagre			Collapse 2.2 and 2.3 into one understanding/theoretical development section that includes the regime/STM	Accepted
Ch 2	Fagre			2.4 paleo stuff can be removed and the material used in examples section to justify	Accepted
Ch 2	Fagre		354	Analogy of Fisheries -- this section can be condensed to one or two sentences and used in Chapter 4.	Accepted
Ch 2	Fagre			Tendency of ecosystems to be at water limiting carrying capacity so if you raise temp and evap loads, you get system collapses.	Accepted
Ch 2	Fagre			Principles summary table at the end of chapter 2	Noted
Ch 3	Fagre			Organize around drivers and systematic phenom so it fleshes out what was in Chapter 2	Accepted
Ch 3	Fagre			Examples of Thresholds, rather than indicators;	Accepted
Ch 3	Fagre			Use Nielson's 1993 paper with variability increase, collapse, recalescing identified for each example, also add the idea of an additional stress creates a new response, i.e. additional temp makes system changeover even with normal drought.	Accepted
Ch 3	Fagre/Charles		443	Use just one example per driver. Use wide array of examples.	Accepted
Ch 3	Fagre			Drought – interdecadal and other convergence makes this just cyclical and not a threshold. Cycles go through thresholds but come back, threshold doesn't come back because of anthropologically-induced climate change	Accepted
Ch 3	Fagre/Charles			PUT CHAPTER 4 IN FRONT AS DETAILED PROOF OF THRESHOLDS, the chapter 3 for other examples, talk about system behavior that is an indicator, difference between cyclicity and thresholds, invokes ecological time and POTENTIAL ones may be witnessing.	Accepted - order of chapters changed
Ch 3	Fagre/Charles			Potentially PPR expand into case study plus add lake example. **PULL OUT ECOSYSTEM SERVICE POTENTIAL IN EACH EXAMPLE.	Noted

Ch 3	Fagre/Charles			Table used to summarize all examples and ecosystem services.	Noted
Ch 3	Fagre/Charles			Bring up that there are many limiting factors such as nutrients and that climate change just puts over the top.	Accepted
	Fagre/Charles			HAVE MAJOR HEADINGS: Temperature increases; Moisture availability; Climate Interactions; Multi-stressor ( include disease and pests); Disturbance	Accepted
					Accepted
Ch 4	Allen/Charles/Chapin			Case studies – 5, shorten and ONLY relevant to thresholds, broader examples, jargon, pull out ecosystem services, put in teasers in text for summary and conclusions, in summary can reference back to case studies.	Accepted
Ch 4	Fagre/Charles			Give author template for case study revisions: Arctic – highest temp; PPR – mid latitude responses with mid-continent drying; Sub-tropical high pressure broadening; SW forest; Colorado; Coral reefs Aim for 10 pages per case studies.	Accepted
Ch 5	Charles/Fagre			Do opening statement - IF WE CAN BARELY IDENTIFY THRESHOLDS, UNDERSTAND AND OBSERVE, THEN MANAGEMENT IS PREMATURE AND DAUNTING.	Accepted
Ch 5	Charles/Fagre		Sec 5.1	Brave new world – integration of management and research to address an unknown world, use text from above	Accepted
Ch 5	Charles/Fagre			Delete current 5.1 and 5.2 with salvaging of key text	Accepted
Ch 5	Charles/Fagre		Sec 5.2	Coping – managing other stressors, triage	Accepted
Ch 5	Charles/Fagre		Sec 5.3	Keep large parts from monitoring section but synthesize down	Accepted
Ch 5	Charles/Fagre		Sec 5.5	Adaptation - Capacity building, stakeholder tolerance for change, use David Welch and Daniel Scott papers for management oriented papers on coping with natural uncertainty and how to adapt; Adaptive management as a framework – is an experiment, requires monitoring, new science is developed	Accepted
Ch 5	Charles/Fagre		Sec 5.6	system level planning, breaking down the barriers; Add applying models from other disciplines	Accepted
Ch 5	Charles/Fagre		2190	Dynamic vegetation models, add sentences from Ron’s notes into that area because they are already doing this	Accepted
Ch 5	Charles/Fagre		2226	modeling of fire and climatic sequences, so variability is as important as increase in temperature, sequences ---	Accepted



