



Barriers to Adaptation

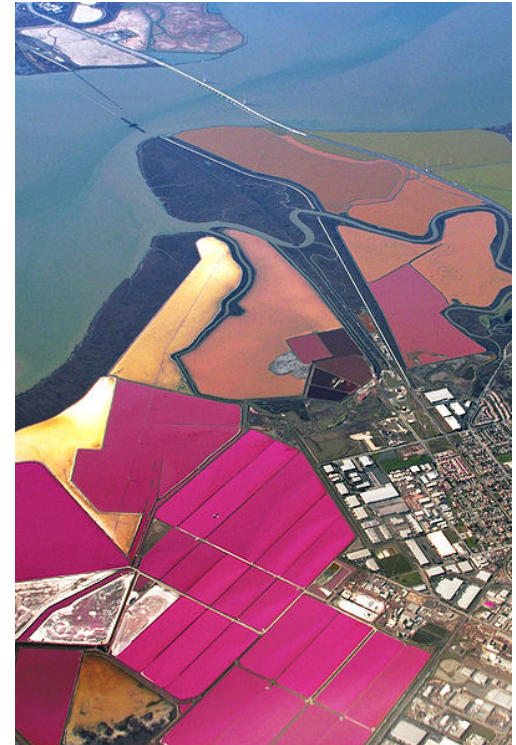
The Challenges of Managing Climate Risks and How Local Communities Can Overcome Them

Susanne C. Moser, Ph.D.

Susanne Moser Research & Consulting
Stanford University

Road map

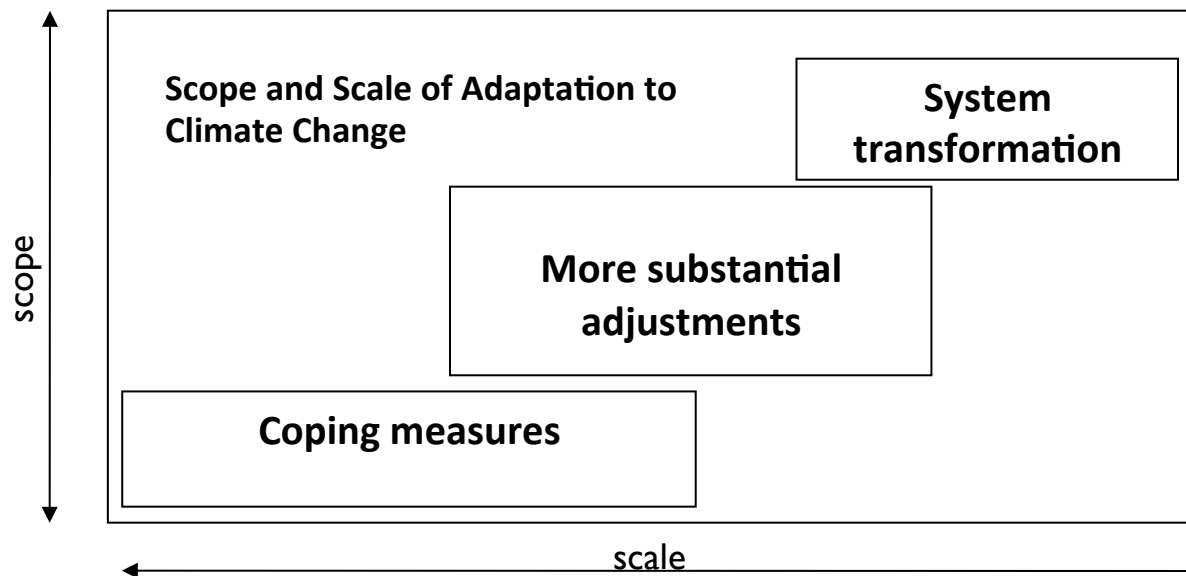
- Adaptation, Limits and Barriers – Some Definitions
- Phase I: Developing a Framework to Diagnose Barriers to Adaptation
- Phase II: Empirical Test of Framework
- Sample Findings
 - “10,000 foot chronology”
 - Barriers by stages in the process
 - Dominance of barriers
 - Avoiding barriers
 - Overcoming barriers
- Conclusions



Adaptation broadly defined

“Adaptation involves changes in natural and human systems (ranging from **short-term coping to longer-term, deeper transformations**) in response to **actual and expected** impacts of climate change and **concurrent and interacting non-climatic changes**, which **may** moderate harm or exploit beneficial opportunities.”

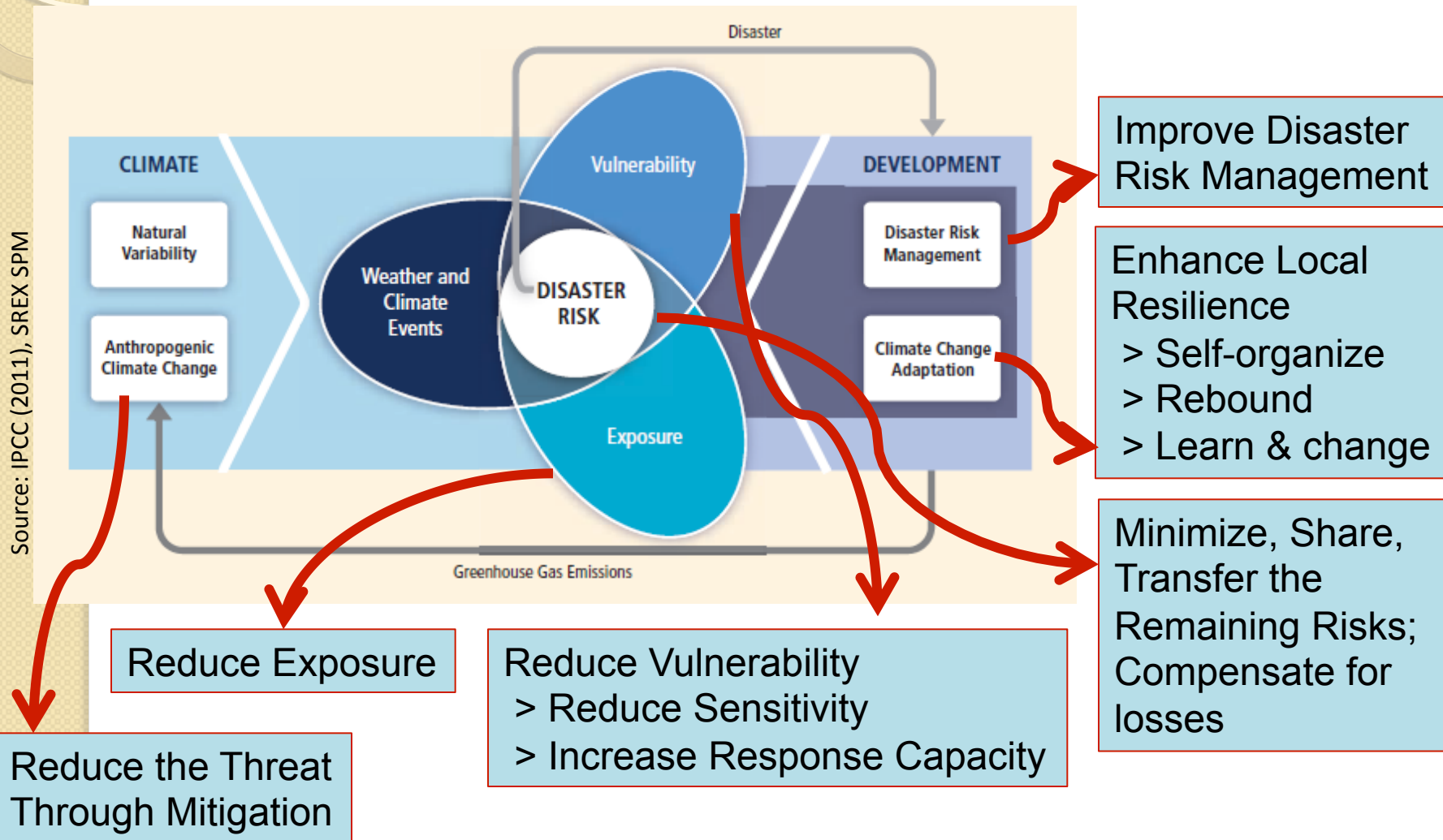
(Moser and Ekstrom 2010 PNAS)



Focus:

*Planned
Adaptation*

Generic adaptation strategies to climate change and extreme events



Adaptation options: Examples

“What is being done, put in place or changed”

■ **Structural/Technical**

- Hard and soft engineering solutions (seawalls, beach replenishment, reservoirs)
- Moving infrastructure inland/higher
- Irrigation
- Ecosystem restoration

■ **Planning & Policy Tools**

- Setback regulations
- Building codes
- Land use policies
- Public access regulations

■ **Financial Mechanisms**

- Insurance pools (risk sharing & transfer)
- Restoration/redevelopment funds
- Ecosystem service payments
- Taxation

■ **Informational & Behavioral Interventions**

- Education
- Disaster Preparedness
- Decision support/climate services
- Storm warning systems
- Stakeholder engagement

Limits and barriers

- **Limits** – absolute thresholds

beyond which existing activities, land uses, ecosystems, species, sustenance or other social benefits cannot be obtained or maintained, not even in a modified fashion.

- **Barriers** – obstacles that can be overcome

with concerted effort, creative management, change of thinking, prioritization and any related shifts in resources, land uses, institutions, etc.

- Result in inefficiency, ineffectiveness, missed opportunities, higher costs, sometimes desirable delays.
- NOT normative, but descriptive
- Barriers may *appear* to individuals participating in the adaptation process as *de facto* limits.



Project Phase I: Literature review

Some barrier “favorites”:

- Costs
- Lack of scientific information
- Technological feasibility
- “Politics”
- Institutional challenges
- Environmental side effects

Range of definitions

But non systematic, complete

Range of theoretical bases

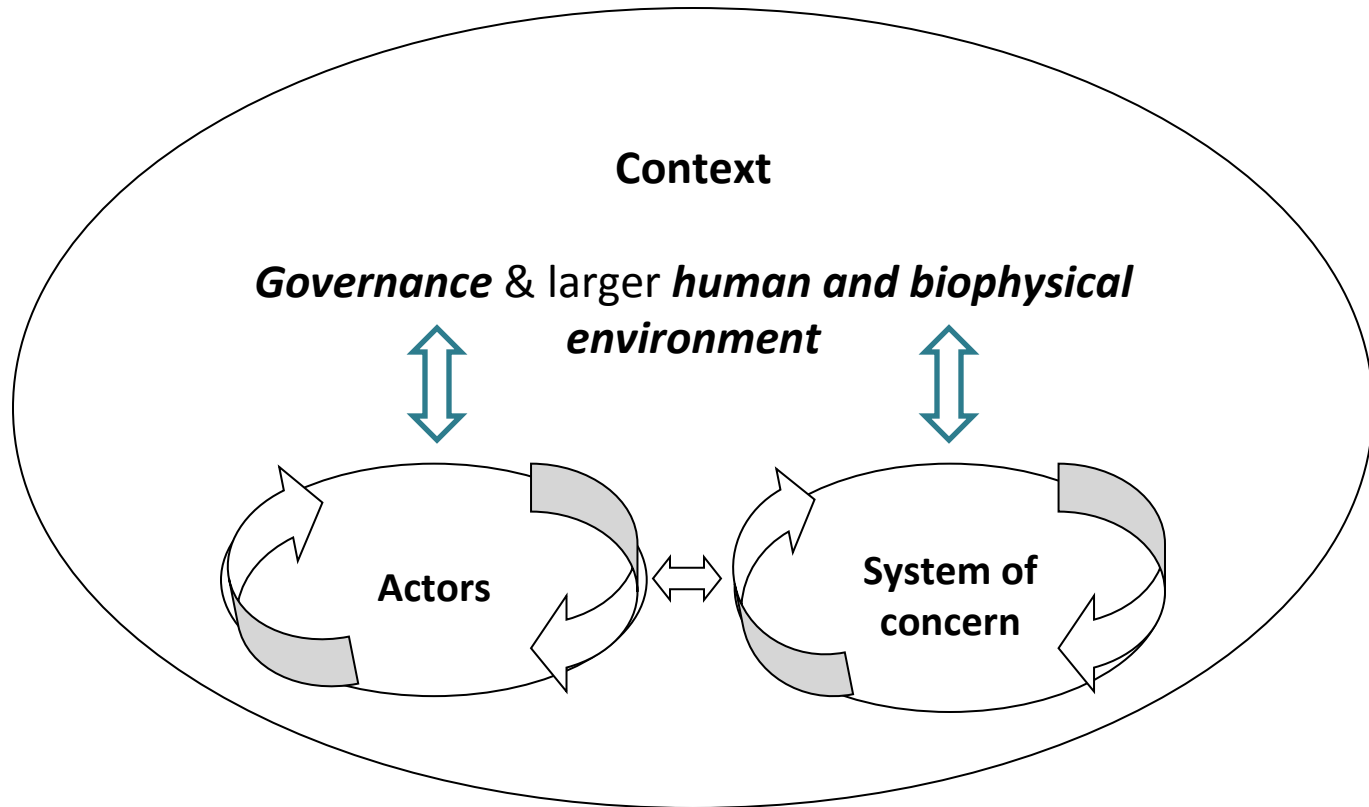
(or none at all)

**No clear guidance on how to
overcome barriers**



Source: www.simonchristy.com/archive/2006_08_01_archive.html

Architecture: Key **structural** elements



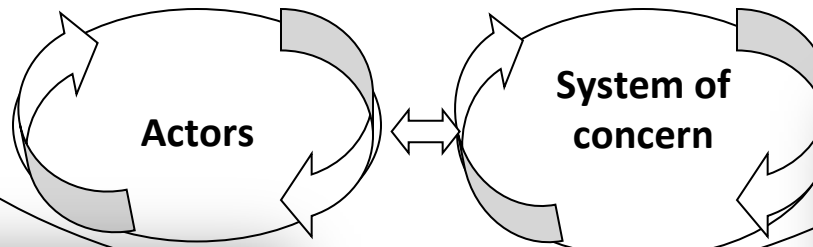
WHO encounters barriers? Doing WHAT? In WHAT context?

Architecture: Key **structural** elements

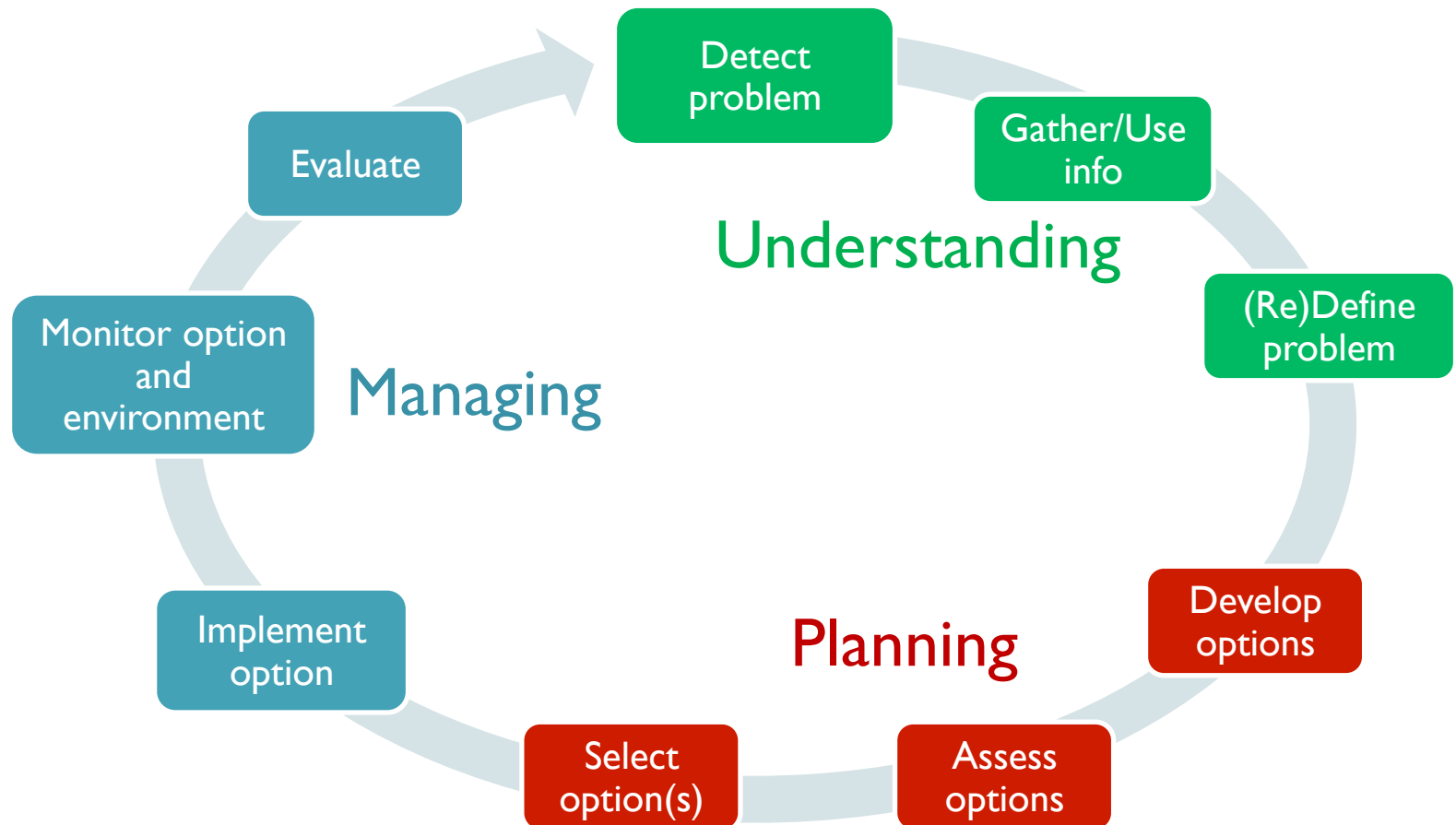


Context

Governance & larger human and
biophysical environment



Architecture: Key **process** elements



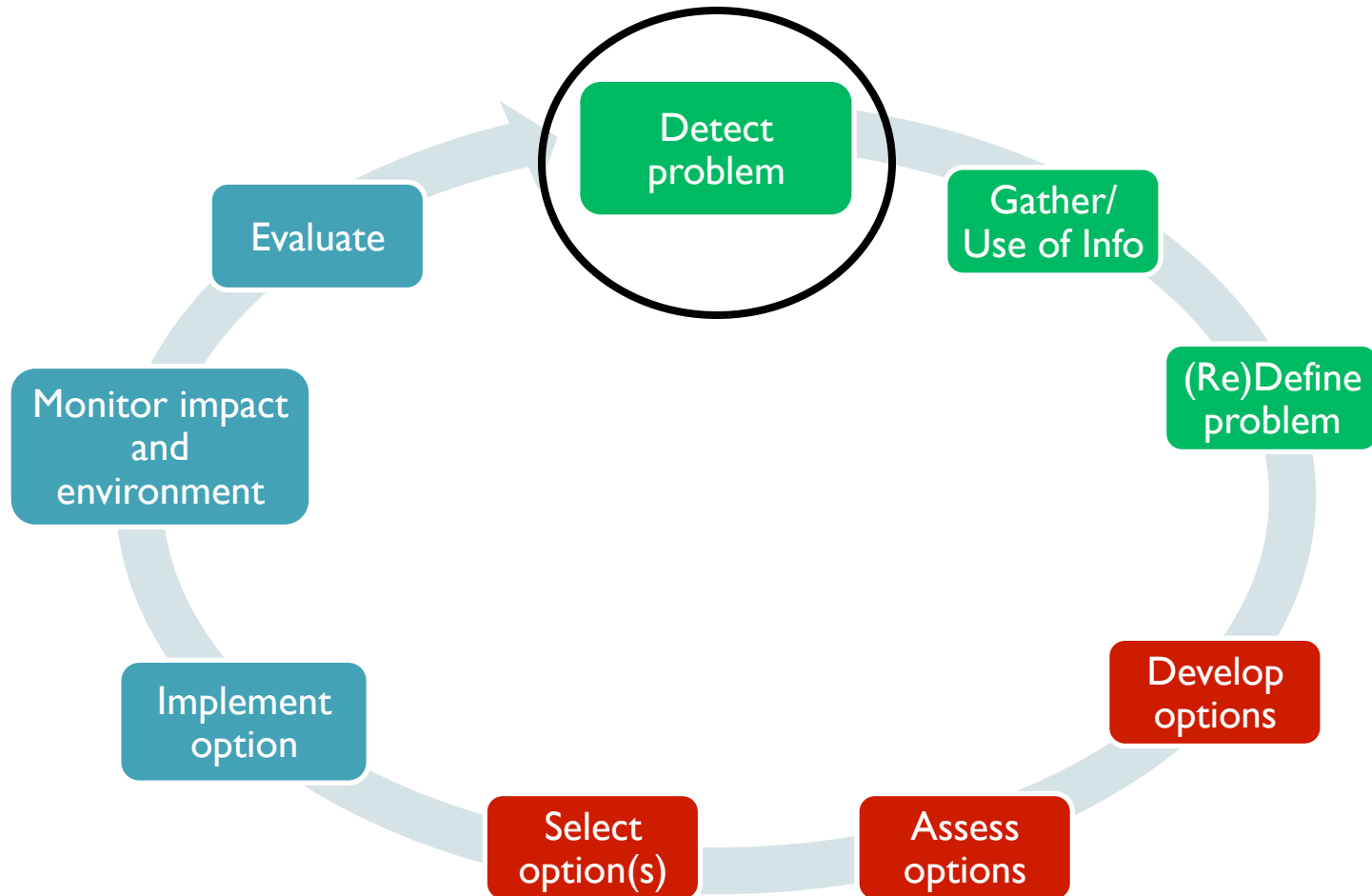
WHEN in the adaptation process does the barrier emerge or impede progress?

Diagnosing barriers to adaptation

Two fundamental questions:

- What can stop, delay, divert the process? (or: At every stage in the process, what must occur for the adaptation process to proceed?)
- What causes the impediments? (or: How do the actors, context [governance and otherwise], and the system of concern contribute to those impediments?)

Example: Problem detection





Example: Problem detection

Barriers and diagnostic questions

What can stop, delay, divert the process?

Key Barriers in the Problem Detection and Initial Framing Phase

- Existence of a signal
- Detection (and perception) of a signal
- Threshold of concern (initial framing as problem)
- Threshold of response need and feasibility (initial framing of response)

Example: Problem detection

Barriers and diagnostic questions

How do the actors, context, and the system of concern contribute to those impediments?

Barriers	Actors	Governance & Context	System of Concern
<i>Understanding</i>			
i. Existence of a signal	- Does the actor receive the signal?	- Does the governance system somehow prevent sending out a signal?	- Does a signal exist and what does it mean?
ii. Detection (perception) of a signal	- Does the actor detect, perceive or recognize the signal?	- How is the signal delivered and by whom?	- What is the nature of the signal?
iii. Threshold of concern (initial framing as problem)	- How does the actor interpret the signal?	- Does the governance system fail to transmit a signal or prevent it from reaching individuals?	- How is or can the signal be identified, seen or experienced?
iv. Threshold of response need and feasibility (initial framing of response)	- Does the actor perceive a need to respond and perceive a response to be feasible in principle?	- Do leaders, norms, or institutions dismiss the issue as a problem? - Do laws, policies and social norms support or prevent taking a problem seriously and responding to it?	- Is the issue/problem novel or familiar? - Are there logical actors to take on the detected problem? - Is there an already agreed upon way of dealing with the detected problem or not?

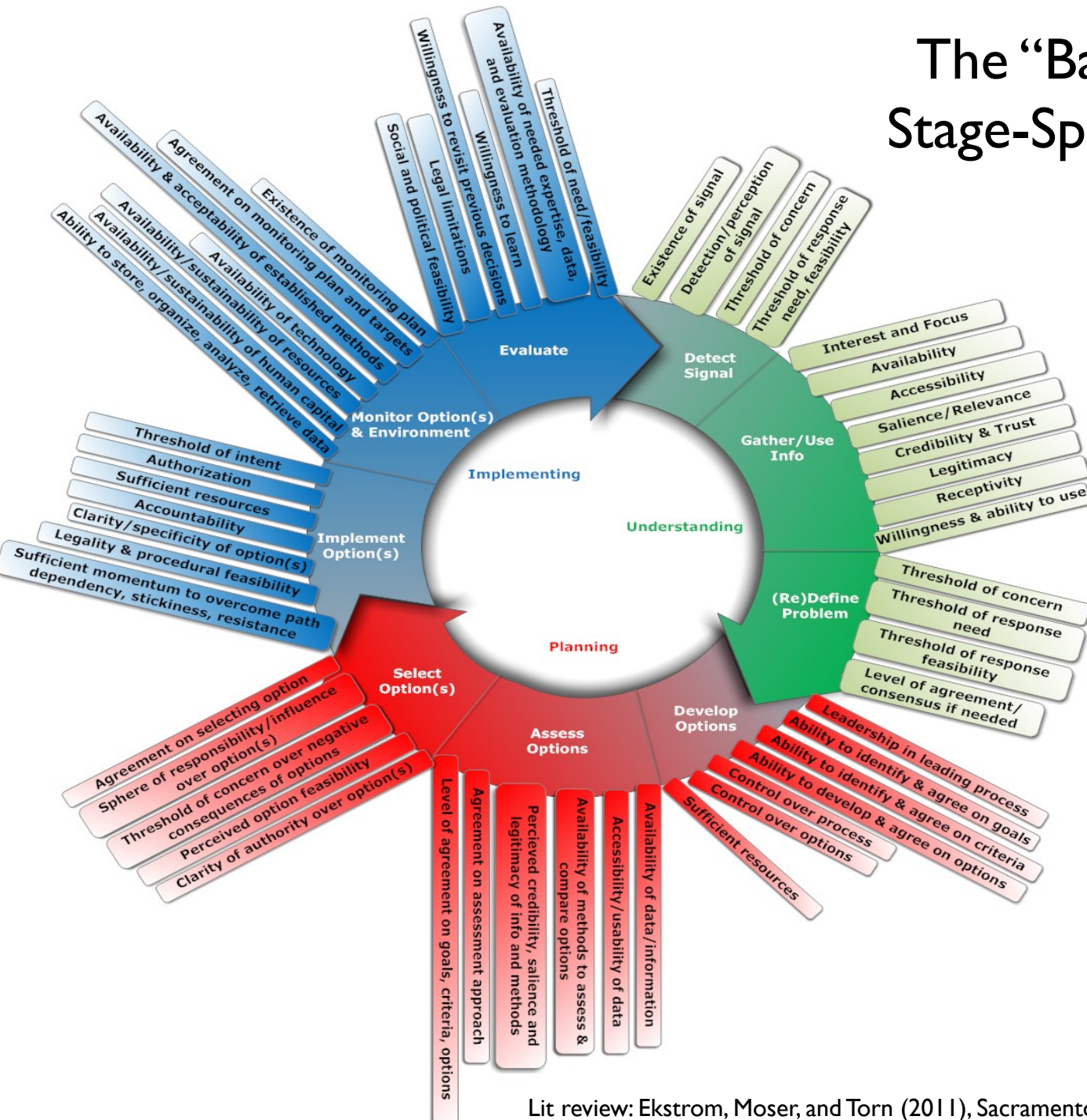
Intervention points: Overcoming barriers

- Where does the barrier originate?
- Where could one intervene to overcome the barrier?

		Temporal	
		Contemporary	Legacy
Spatial/Jurisdictional	Proximate	A	C
	Remote	B	D

The more remote in space and time the barrier is from the actor's sphere of influence, the less opportunity does s/he have to intervene and overcome the barrier.

The “Barrier Rose”: Stage-Specific Barriers



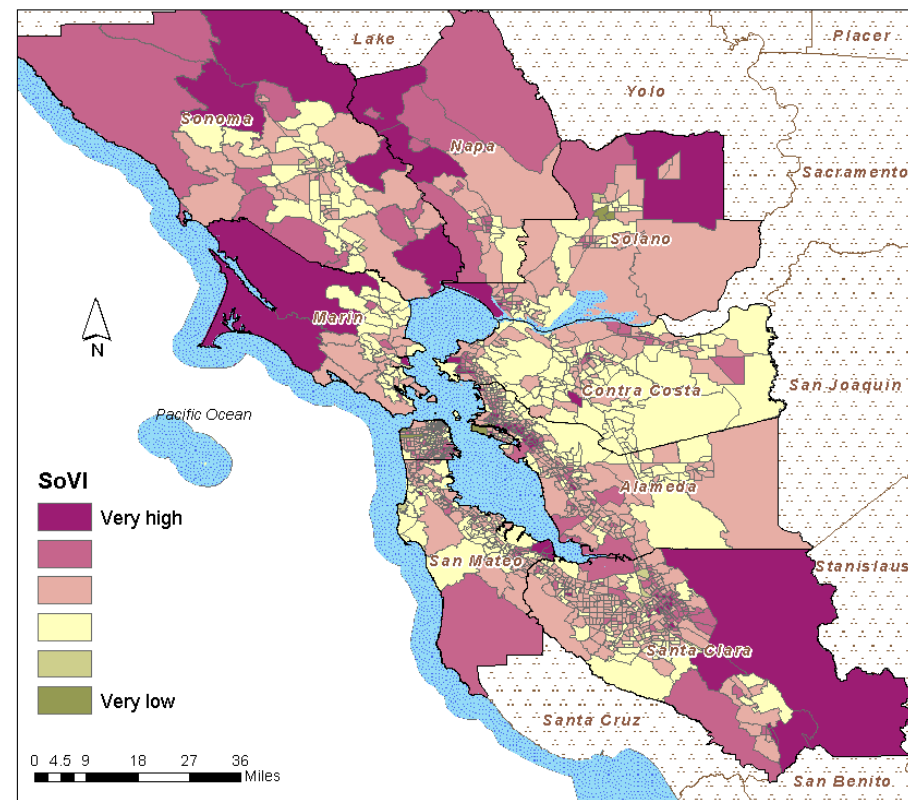
Project Phase II: Empirical study

- Test the usefulness and transferability of the diagnostic framework by:
 - Identifying all relevant barriers to adaptation to SLR and related coastal hazards in real-life case studies
 - Identifying ways to overcome barriers

Study report/published papers available at: <http://www.susannemoser.com>

Choice of case studies

- Variables
 - Exposure to local risks from climate change and sea-level rise
 - Social vulnerability index
- Criteria
 - Adaptation process underway (stages)
 - Inclusion of cities, counties, and regional governance entity
 - Willingness to participate





Case Study Boundary: San Francisco Bay Area

Research approach & methods

- **Preliminary research to inform case study selection**

- review and synthesis of climate change risks
- social vulnerability assessment
- information gathering on local adaptation efforts

- **Comparative case study design**

- 4 local communities, plus regional process
- 43 key informant interviews
- document review
- (participatory) observation of public meetings and workshops

- **Statewide coastal adaptation needs assessment**

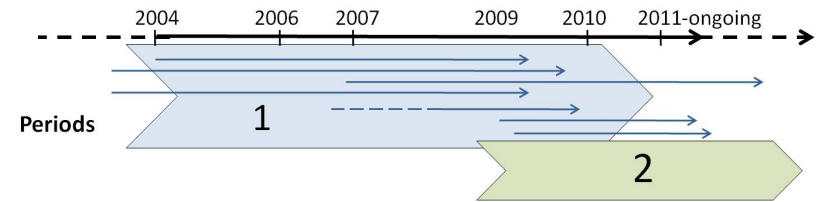
Key informant interviews

Case study	Full interviews
City of Hayward	7
Marin County	6
City/County of San Francisco	10
Santa Clara County	6
JPC and Region	13
State	1
TOTAL	43

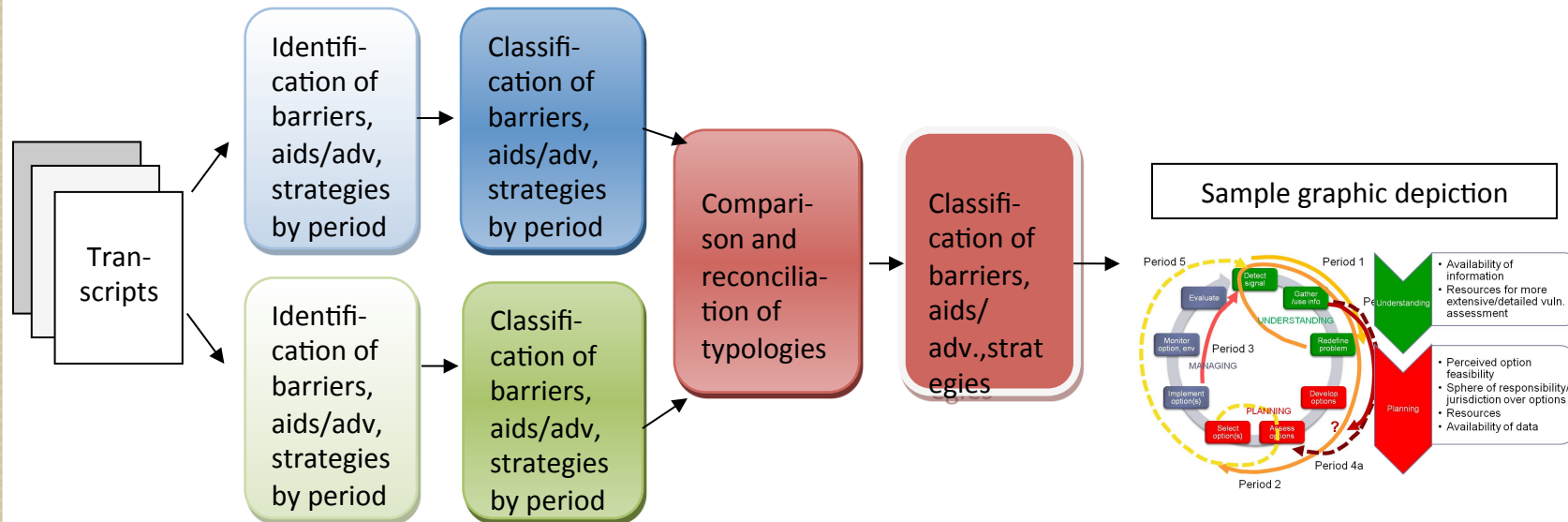
Data analysis

- Adaptation Process Mapping

- Chronology (by periods)
- Decision-making (by stages)



- Barrier Analysis

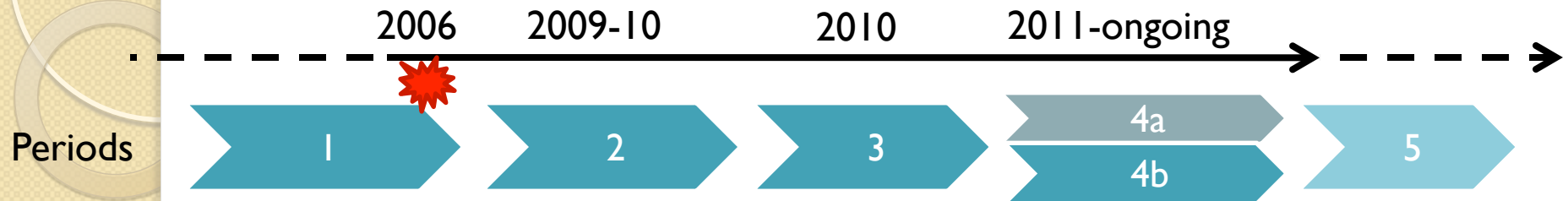


- Comparison and Synthesis

- Statistical Analysis of Relevant Survey Elements

Case studies:

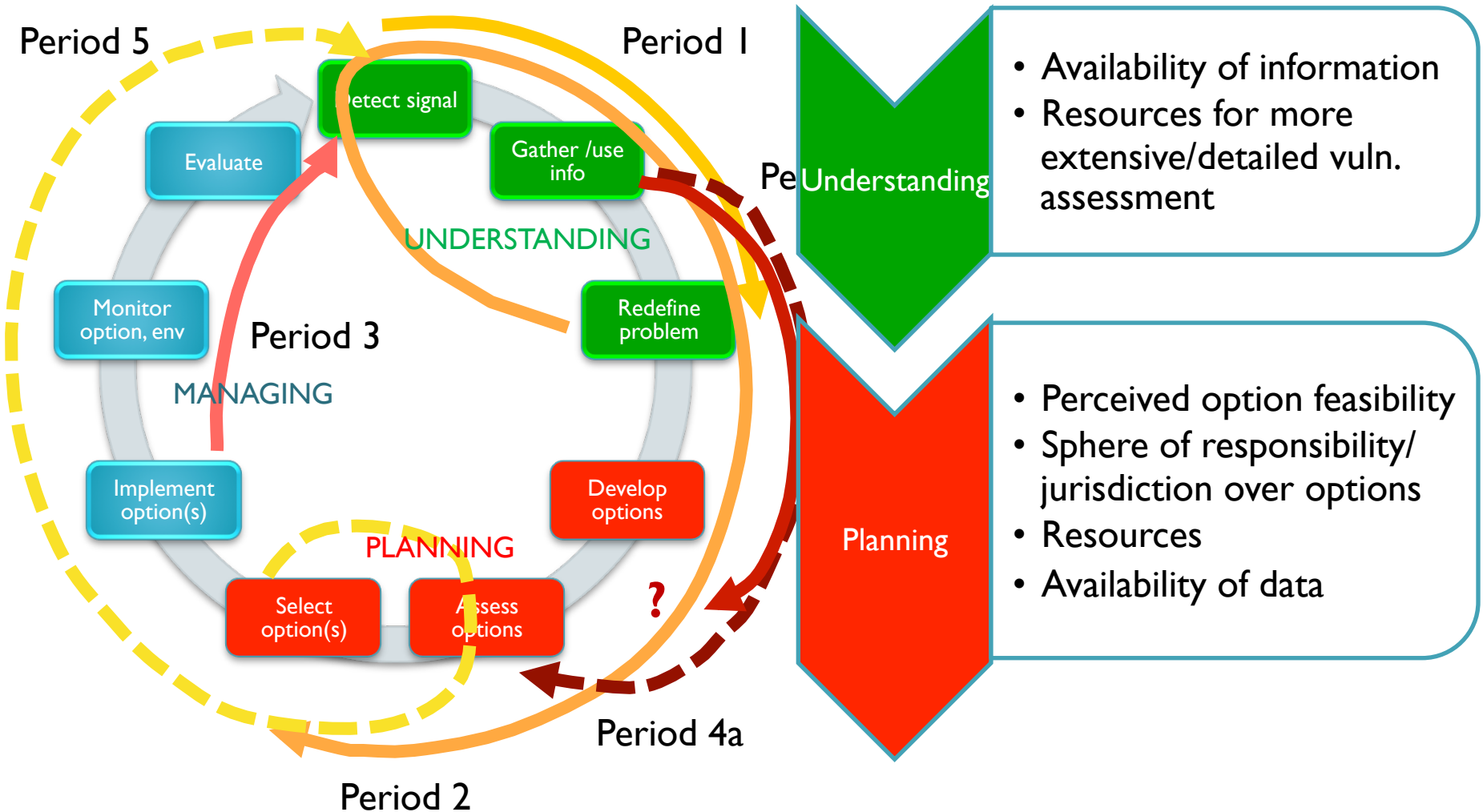
Mapping the adaptation process



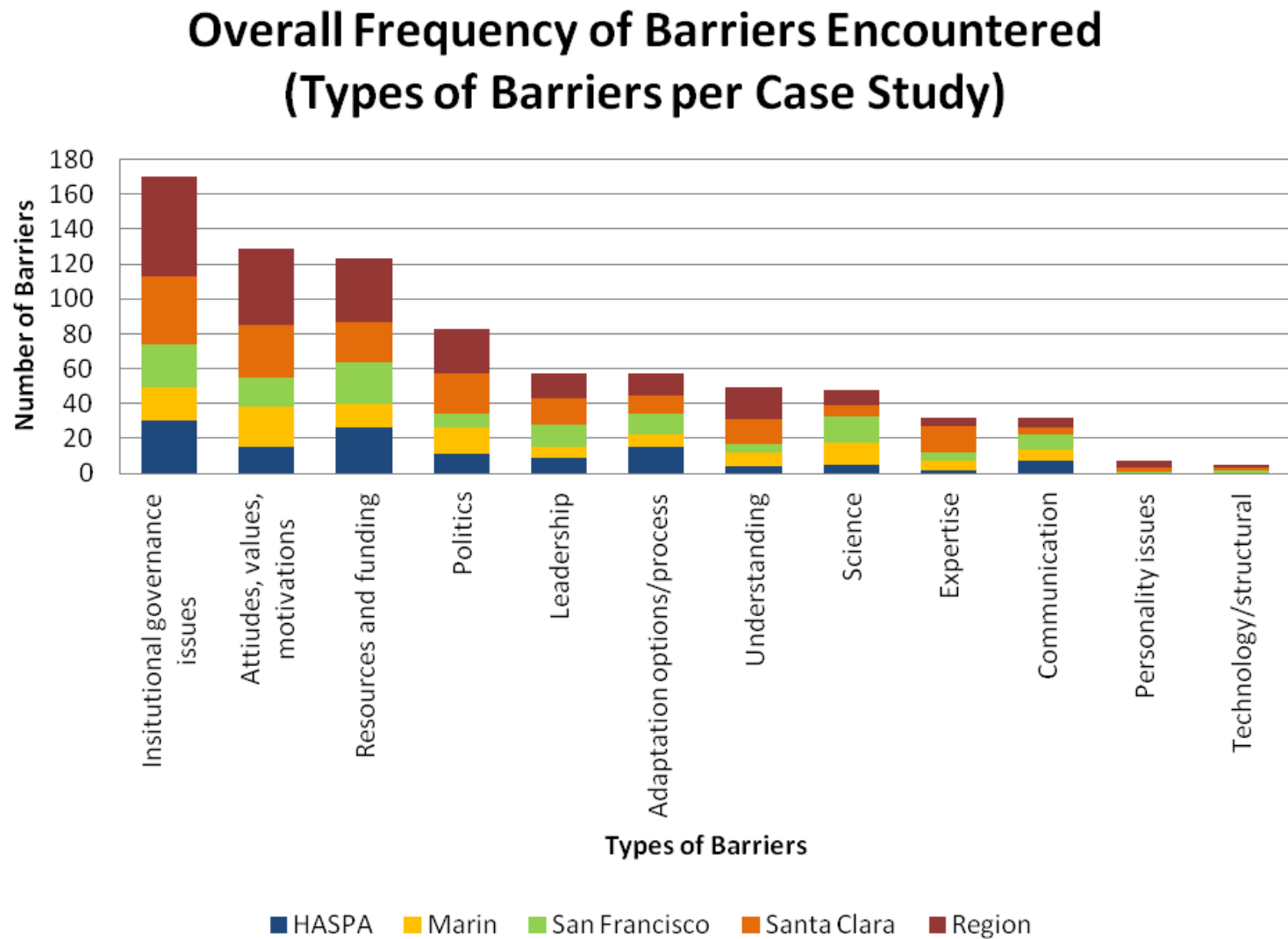
Key Barriers

Lone Voice	Initial SLR Assessment	Coalition Building	Deepening Understanding	Pilot Project
Lack of receptivity	Availability of information	Staff time	Resources for analysis	Funding for study
Lack of concern	Limited resources	Funding	Too much/too little info	Legality & procedural feasibility
Lack of interest	Perceived option feasibility		Analytic capacity	
No local signal	Jurisdictional constraints		Resources to support process	
			Polit. will, buy-in	
			Local ownership	

Barriers by period/phase/stage

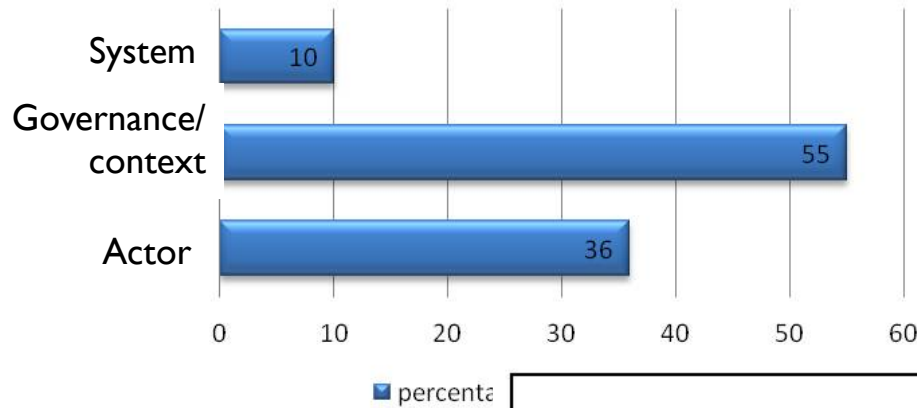


Overall frequency of adaptation barriers encountered



Sources & origins of barriers

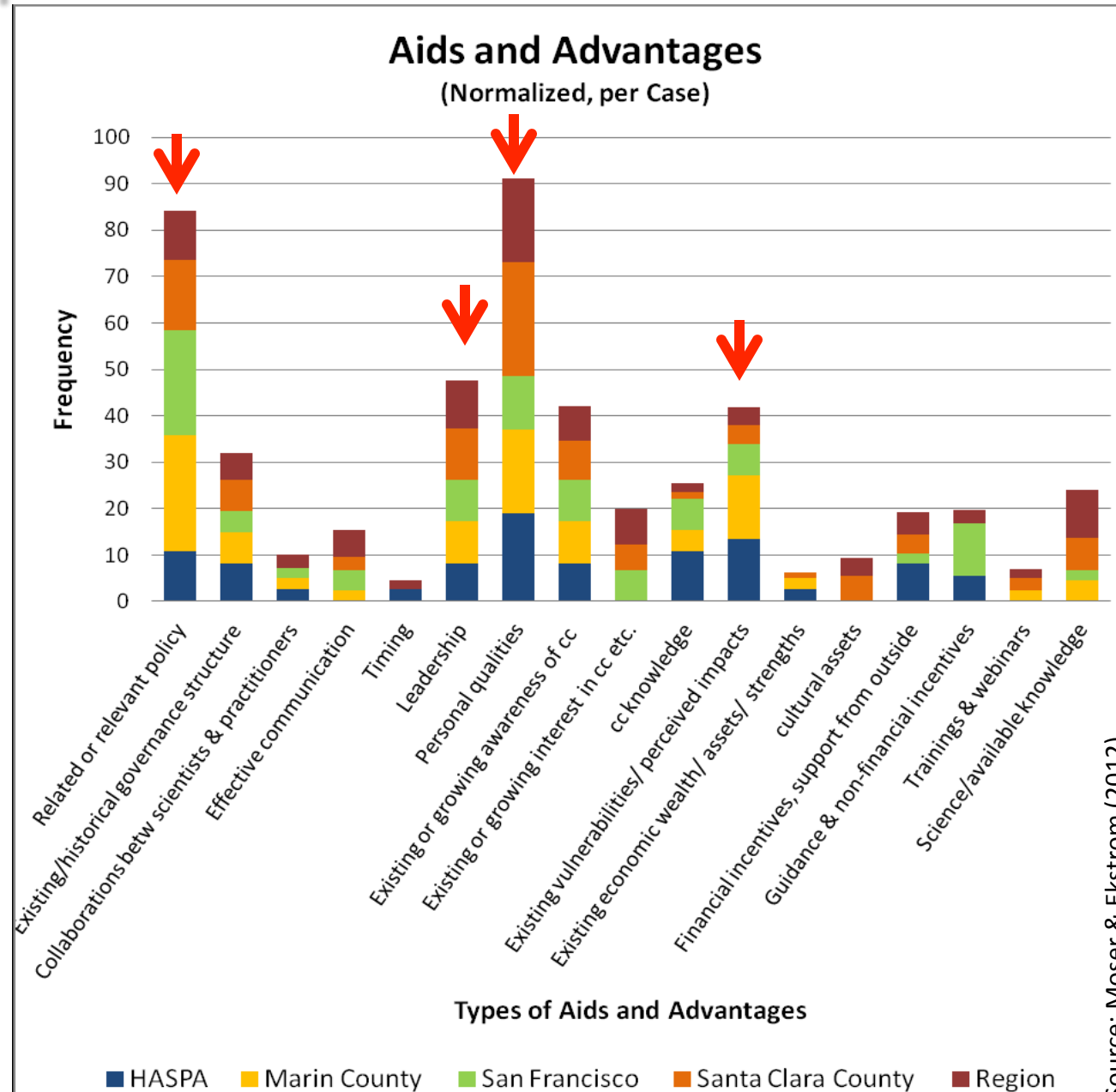
**Sources of Adaptation Barriers
(based on averages in each case)**



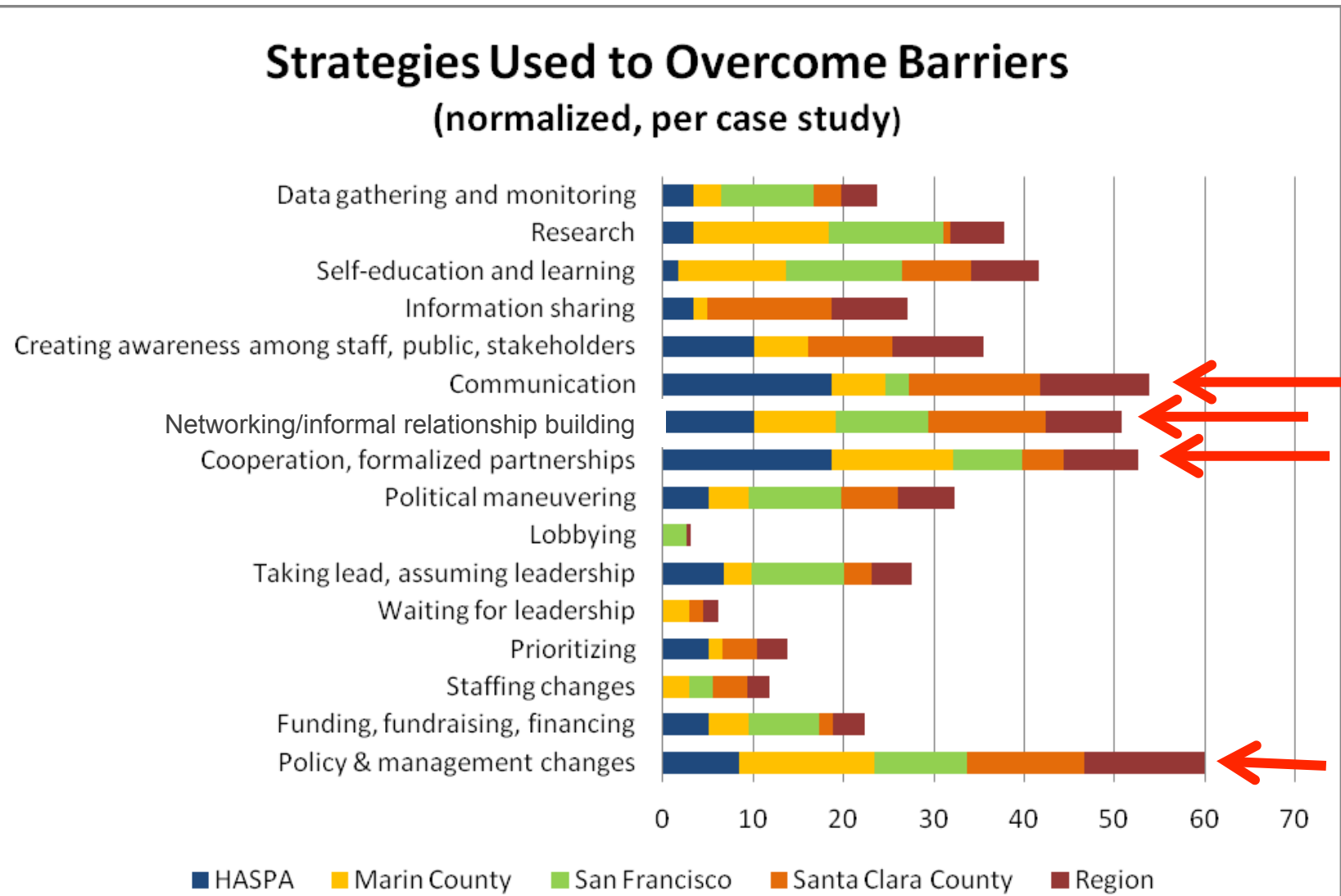
**Summary of the Origins of Barriers (all combined)
(in percent)**

		temporal	
		contemporary	legacy
spatial/ jurisdictional	proximate	A - 31%	C - 36%
	remote	B - 12%	D - 21%

What helps avoid barriers?



Strategies used to overcome barriers



Governance: The Art of Overcoming Barriers

Political calculus

- Timing
- Power/influence
- Political support

Leadership

- Presence
- Quality
- Style

Knowledge

- Availability, access, quality, integration, human capital

Institutional issues

- Laws, regulations, rules
- Procedures
 - Agency culture (transparency, accountability)
 - Stakeholder engagement (quality and degree)
 - Interagency collaboration
- Effective implementation (expertise, efficiency, leverage at point of Intervention, trust, social capital)

Governance

Costs

- Planning
- Implementation
- Monitoring
- Evaluation

Social acceptability

- Deeply held cultural values
- Social justice
- Costs
- Impacts on ownership, rights, entitlements

Conclusions: Diagnostic framework

Produced richer picture of barriers than literature

Served well to identify barriers and deepen understanding of barriers and adaptation process

Some barriers line up well with Phases and Stages of the decision cycle, others span multiple ones

Source of barriers or temporal/ jurisdictional origin sometimes difficult to identify

Need to add:

- Aids and advantages
- Measures of importance, difficulty to overcome barriers

Future possibilities:

- Move toward a simplified tool
- Move from diagnostic/ descriptive tool toward a predictive tool

Thank you!



Acknowledgments:

- **Julie A. Ekstrom, Ph.D.** (case study research)
- **California Energy Commission (PIER Program)** for funding of SF Bay case studies
- **Juliette F. Hart, Ph.D.** (survey co-lead)
- USC and CA Seagrant Programs, CNAP, PIER, and COS/Stanford for financial support of survey
- Participating coastal organizations and survey respondents

Contact:

- **Susanne C. Moser, Ph.D.**
Web: www.susannemoser.com
Email: promundi@susannemoser.com



Additional slides (survey results)

Rising to the Challenge



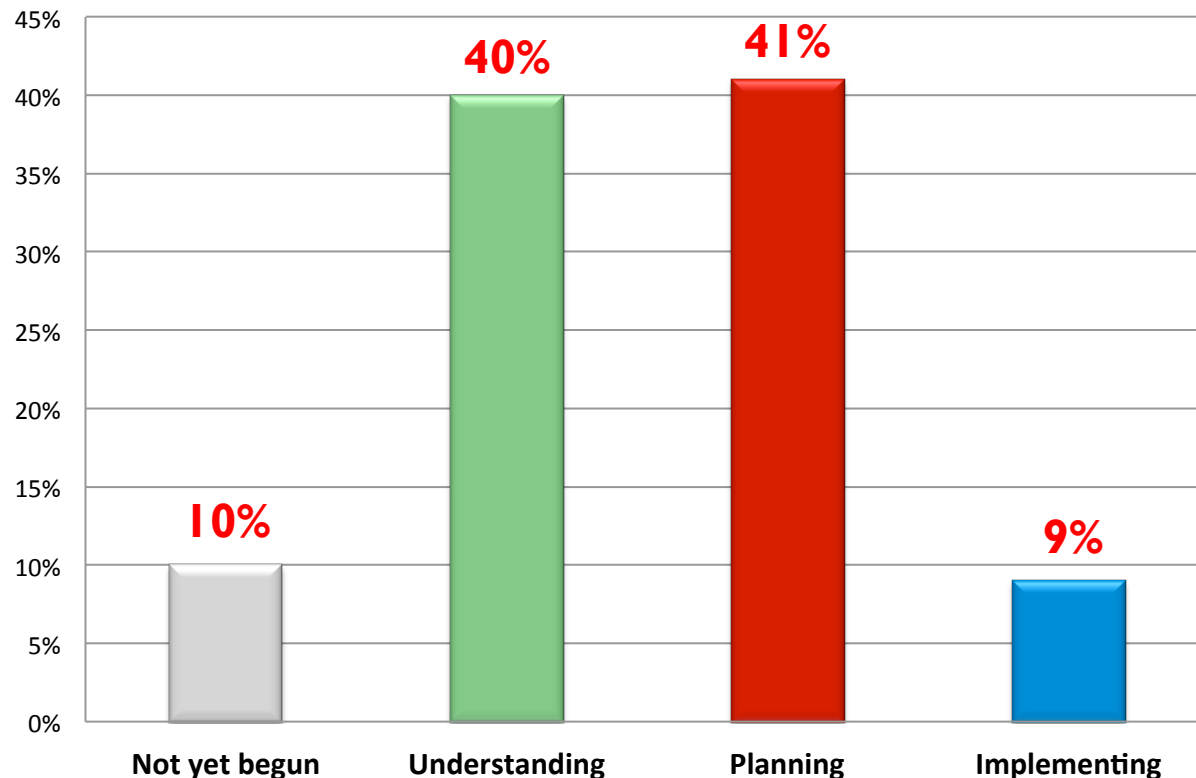
Results of the 2011
California Coastal
Adaptation Needs
Assessment



By Juliette A. Finzi Hart, Phyllis M. Grifman, Susanne C. Moser,
Adina Abeles, Monique R. Myers, Susan C. Schlosser, Julia A. Ekstrom

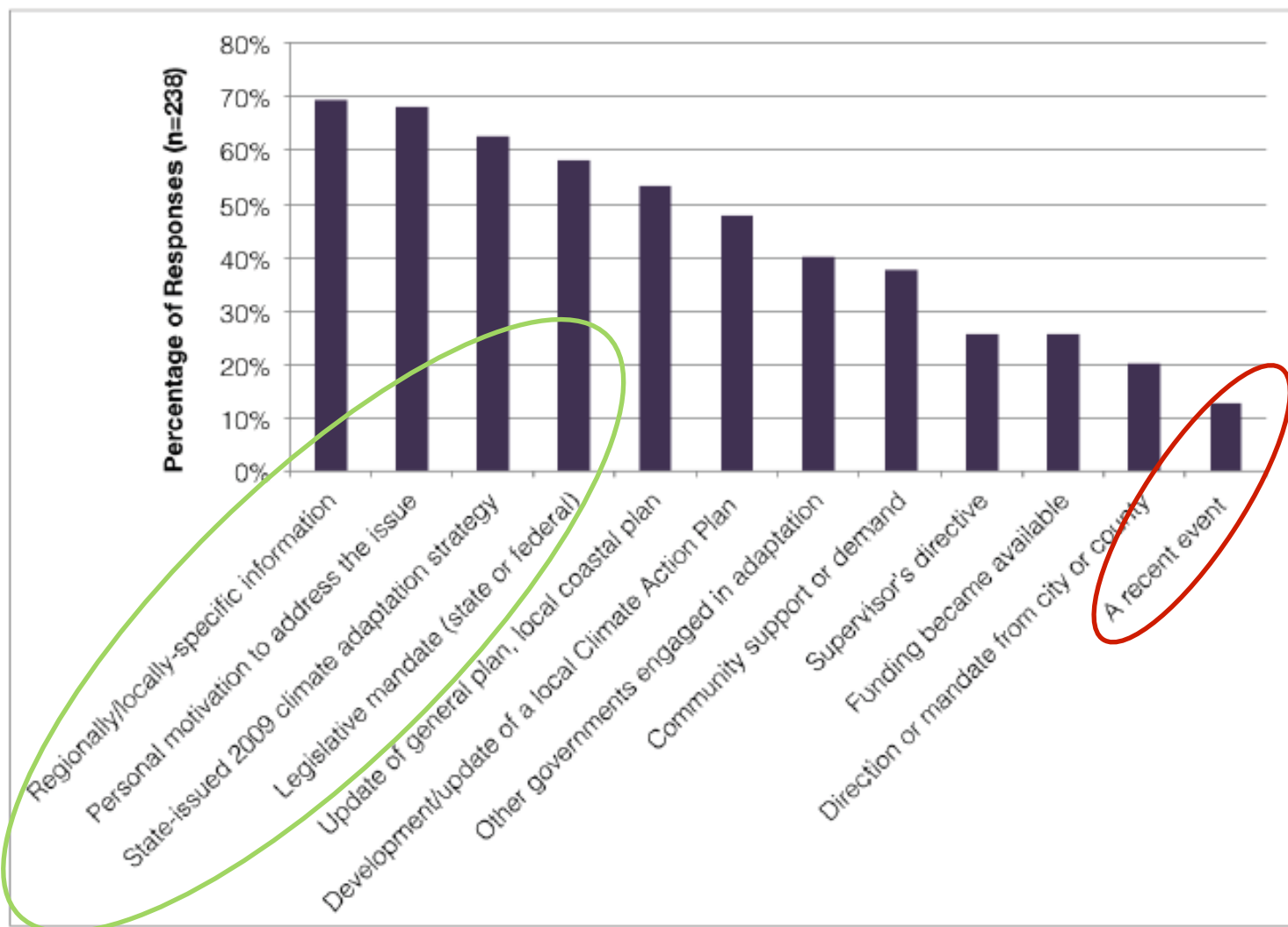
Snapshot of California's coastal communities

Where are California Coastal Communities in the Adaptation Process? (Status: Fall 2011)



Source: Hart, Moser et al. (in preparation)

What got communities started?



source: Moser & Ekstrom (2012); Hart et al. (2012)

Barriers to Adaptation as Perceived by Local Coastal Professionals in California

