

# **The role of science in making credible policy determinations**

Kevin Stokes

CCC, May 2012, Hawaii

**Context 1: legislation & policy**

**Context 2: risk management**

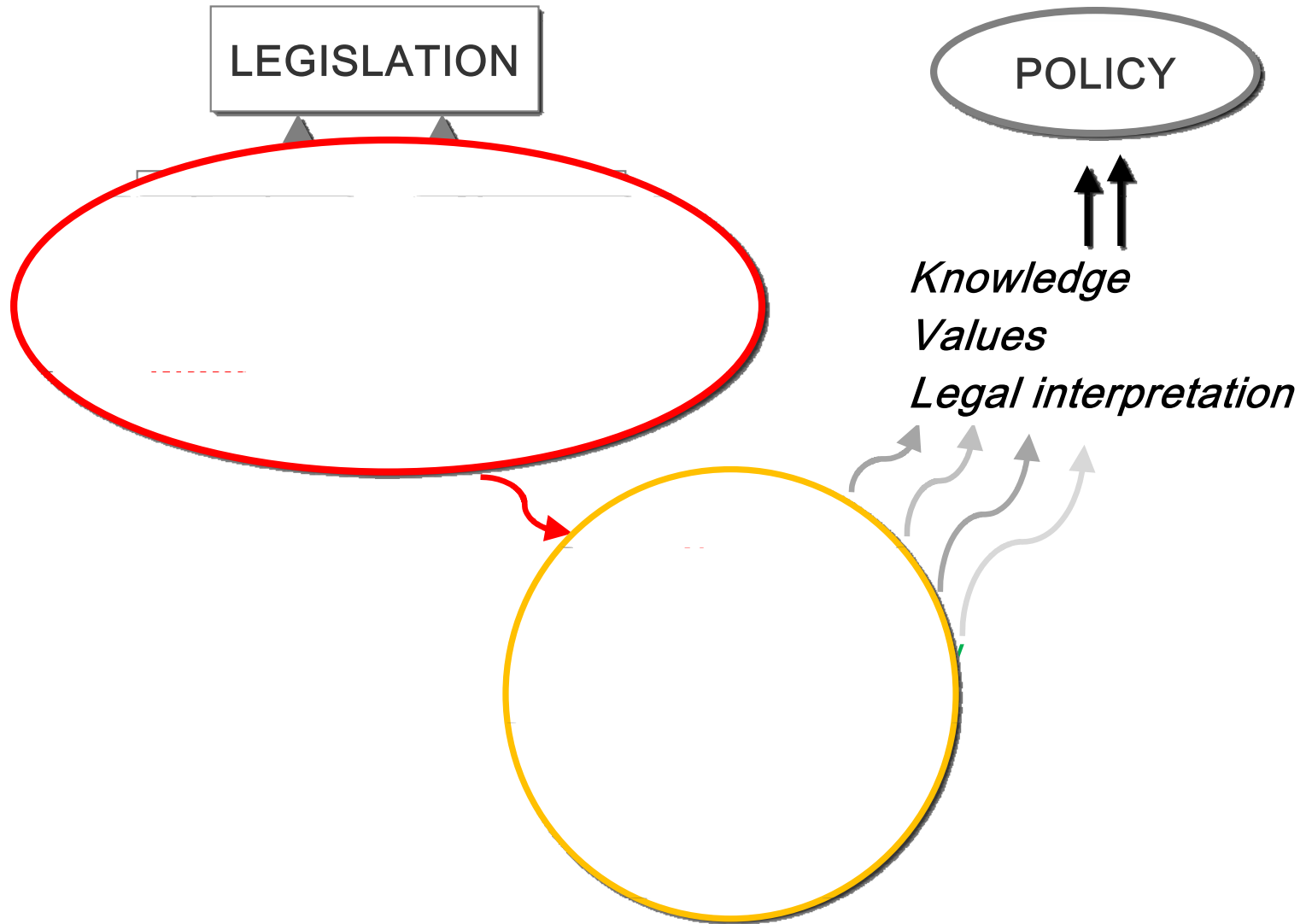
**Science: as risk assessment**

**Science: challenges**

**Science: capabilities**

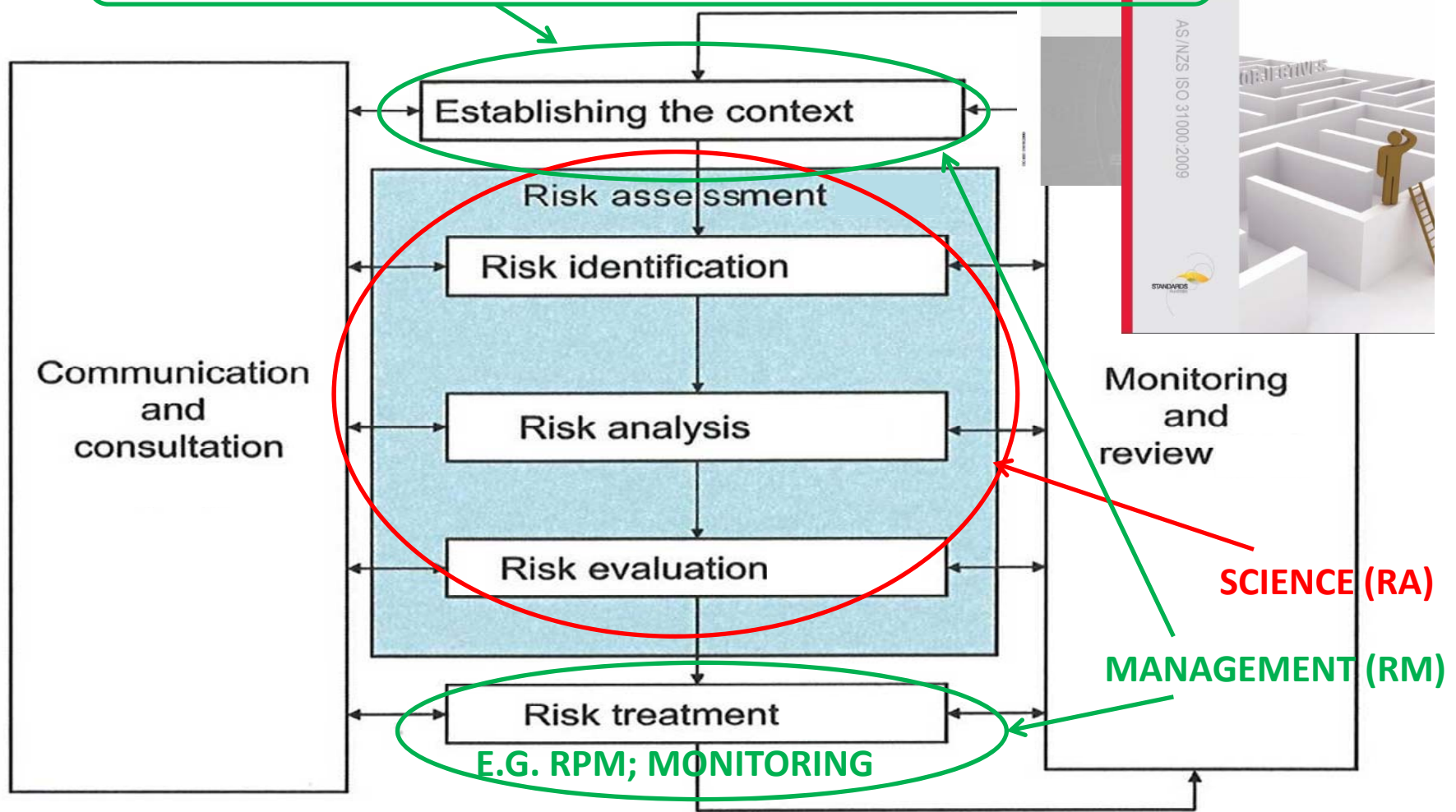
**Summary**

# CONTEXT 1: LEGISLATION and POLICY



# CONTEXT 2: RISK MANAGEMENT

OBJECTIVES; STANDARDS, PERFORMANCE MEASURES; SCENARIOS



**SCIENCE as RISK ASSESSMENT**

**NEUTRAL & OBJECTIVE**

**CONTEXT FOR RISK ASSESSMENT**



**MODELS  
EXPERIMENTS**

**POLITICAL  
SOCIAL  
CULTURAL  
ECONOMIC**

**DATA**

**MANAGEMENT**

Process  
Funding  
Planning  
Doing

**ESTABLISHING THE CONTEXT**

Process  
Planning  
Advising  
Deciding

## SCIENCE CHALLENGES

### NEUTRAL & OBJECTIVE

**\*SCARCE DATA = LOW KNOWLEDGE = UNCERTAINTY** TIME AND MONEY  
ABOUT STRUCTURE, INPUTS, PROCESSES

***NB UNCERTAINTY INHERENT IN COMPLEX, NON-LINEAR SYSTEMS***  
MULTISPECIES etc MAJOR PROBLEM; EAF/EBFM INCL SOCIAL EVEN HARDER

**\*LACK OF CONTEXT - STANDARDS** TIME AND 'POLITICAL WILL'  
CANNOT DO RISK ASSESSMENT WITHOUT STANDARDS

**\*PROCESS - SCIENCE *PER SE* PLUS POLICY, CONSULTATION, LEGAL**  
TRADE-OFFS GALORE....NOT EXPLICIT, LEAVES SCIENTISTS FILLING GAPS

## SCIENCE CAPABILITIES

### **MONITORING TECHNOLOGIES IMPROVING**

*GENETICS; DIRECT CAPTURE; DIRECT COUNTING; TAGGING (MARKS, ELECTRONIC/SATELLITE, GENETIC); TRANSECT METHODS; ACOUSTICS, OPTICAL, ACOUSTIC-OPTICAL; ETC*

## SCIENCE CAPABILITIES

### **MODELLING CAPABILITIES IMPROVING**

*SINGLE SPECIES, MULTI-SPECIES, ECOSYSTEM; ECONOMICS AND SOCIAL SCIENCE; ENVIRONMENTAL; ASSESSMENT, MPE/MSE; DETERMINISTIC, STOCHASTIC; BAYESIAN.....BETTER ABLE THAN EVER (WHERE DATA SUPPORT) TO PROVIDE PROBABILISTIC STATEMENTS ON STATUS OR MAKE PROGNOSES > GOOD BASIS FOR QUANTITATIVE RISK ASSESSMENT; ALSO HAVE QUALITATIVE ERA METHODS*



## SCIENCE CAPABILITIES

**BUT**

*RISK ASSESSMENT, AS AN INPUT TO RISK TREATMENT AS PART OF RISK MANAGEMENT FRAMEWORK, REQUIRES STANDARDS – IN THEIR ABSENCE, SCIENCE PROCESSES ARE FLAWED AND FRAUGHT AND SUBJECT TO CHALLENGE (DURING AND AFTER). TRADE-OFFS NEED TO BE EXPLICIT UP FRONT – CAN'T BE MADE DURING SCIENCE PROCESS. ALSO NEED CLEAR SCENARIOS.*

# SUMMARY

## RISK MANAGEMENT

### SCIENCE

KNOWLEDGE  
STANDARDS  
SCENARIOS

### MANAGEMENT

PROCESS  
ADVICE  
DECISIONS

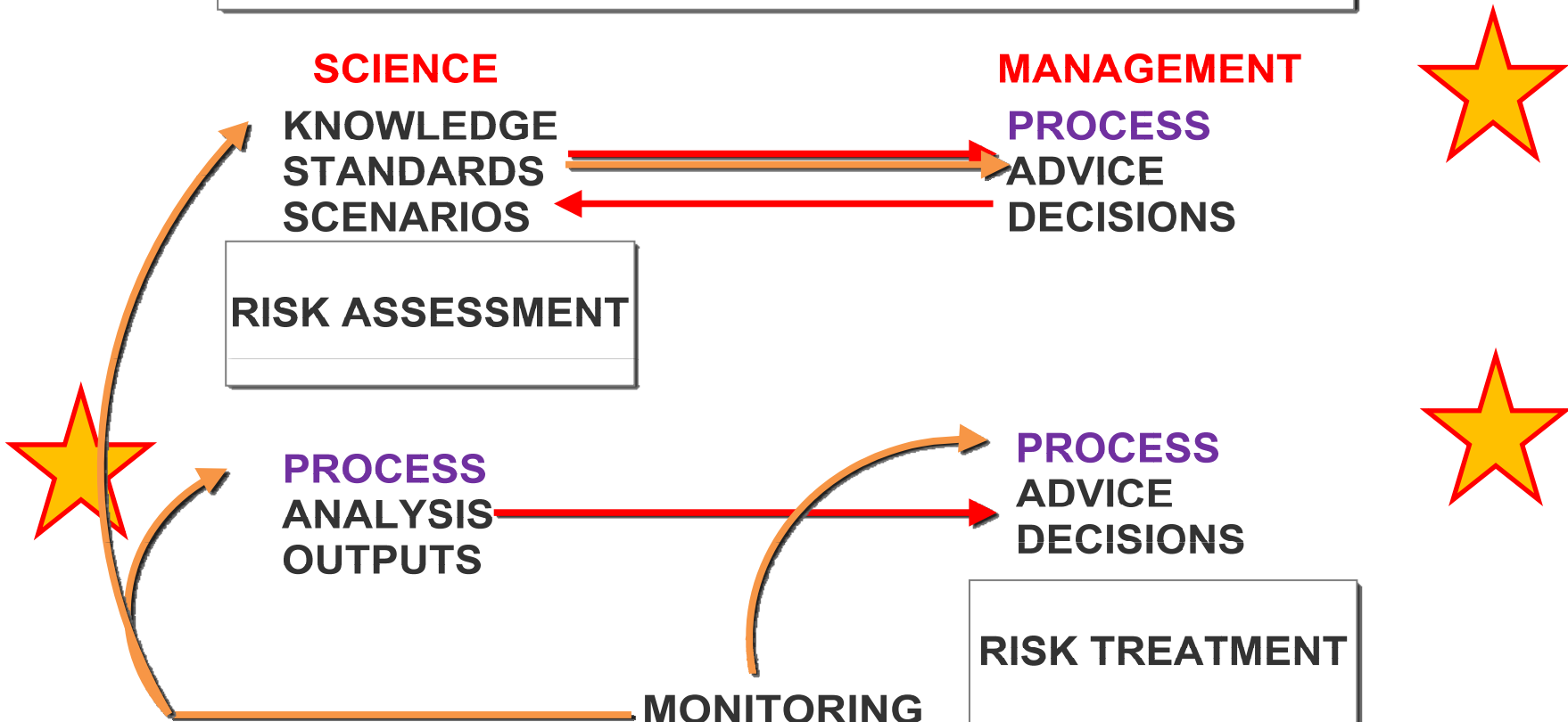
RISK ASSESSMENT

PROCESS  
ANALYSIS  
OUTPUTS

PROCESS  
ADVICE  
DECISIONS

RISK TREATMENT

MONITORING



## SUMMARY

**THE ONLY WAY TO IMPROVE SCIENTIFIC RIGOR IS**  
**A) SET STANDARDS, AND**  
**B) USE INCLUSIVE, TRANSPARENT PROCESSES**