

THE CALIFORNIA CURRENT INTEGRATED ECOSYSTEM ASSESSMENT (CCIEA)

John Stein
Northwest Fisheries
Science Center

Cisco Werner
Southwest Fisheries
Science Center

8 March 2014

California
Current
Integrated
Ecosystem
Assessment
Team



WHAT IS AN IEA?

IEAs provide ‘a *synthesis and integration of information on relevant physical, chemical, ecological, and human processes in relation to specified management objectives*’

IEAs draw on **both the natural and human-dimension sciences**

IEAs determine the status of **coupled Social-Ecological Systems** and to evaluate management options

IEAs are both a process and products

HOW THE CCIEA SUPPORTS PFMC ACTIVITIES

CCIEA products are relevant to and/or provide support for:

- ✓ Annual “State of the California Current” report
- Fishery Ecosystem Planning (ex: forage fish)
- Essential Fish Habitat designations (ex: groundfish)
- Salmon Management
- Environmental Impact Statements

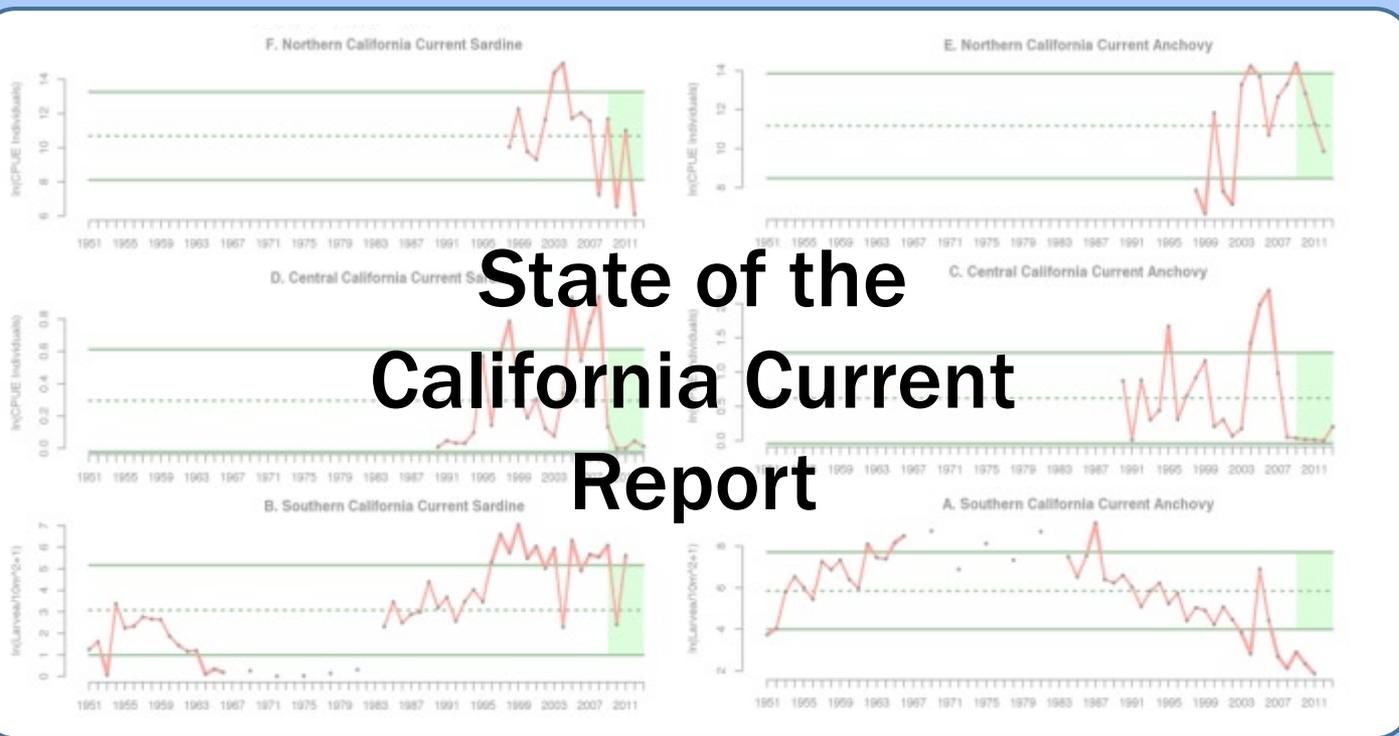


THE CCIEA IN ACTION



Example: forage fish and climate change

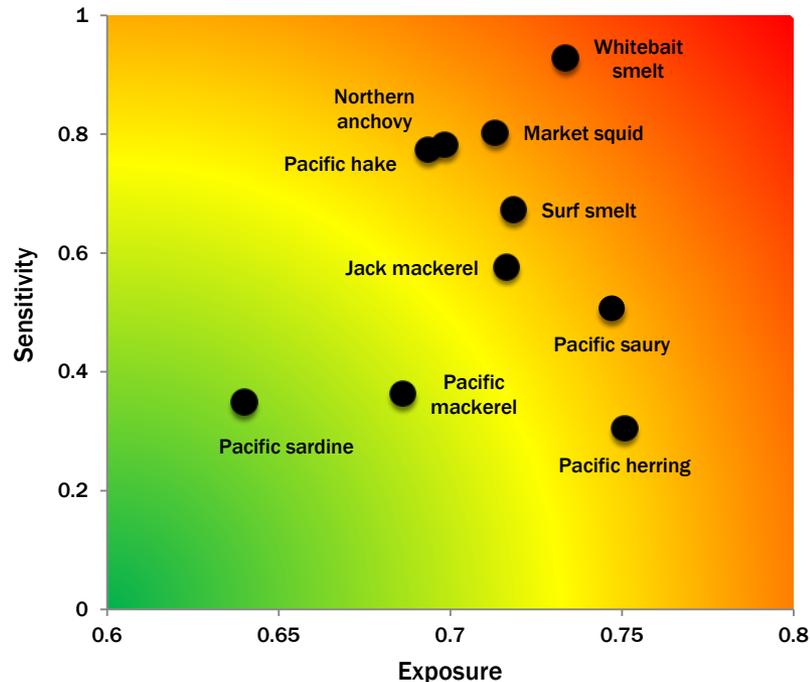
- **Status and trends**
- Risk analysis
- Scenario evaluation



THE CCIEA IN ACTION

Example: forage fish and climate change

- Status and trends
- **Risk analysis**
- Scenario evaluation



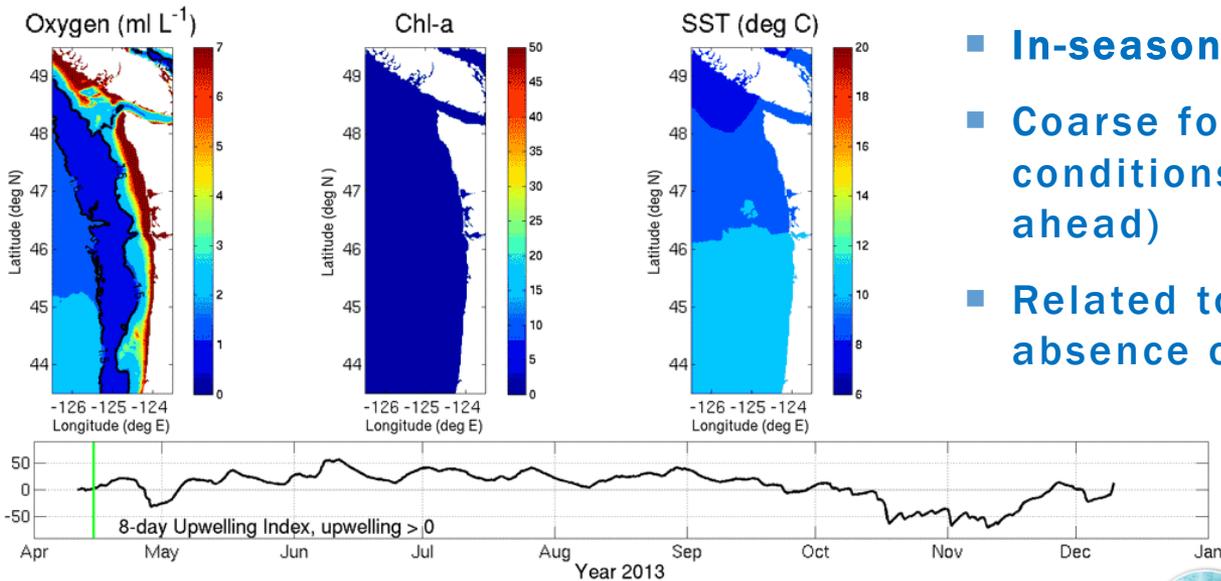
- Risk assessment of forage fish in the California Current to climate change in the coming century
 - SST (average, variability)
 - Chl-a (average, variability)

THE CCIEA IN ACTION



Example: forage fish and climate change

- Status and trends
- Risk analysis
- **Scenario evaluation**

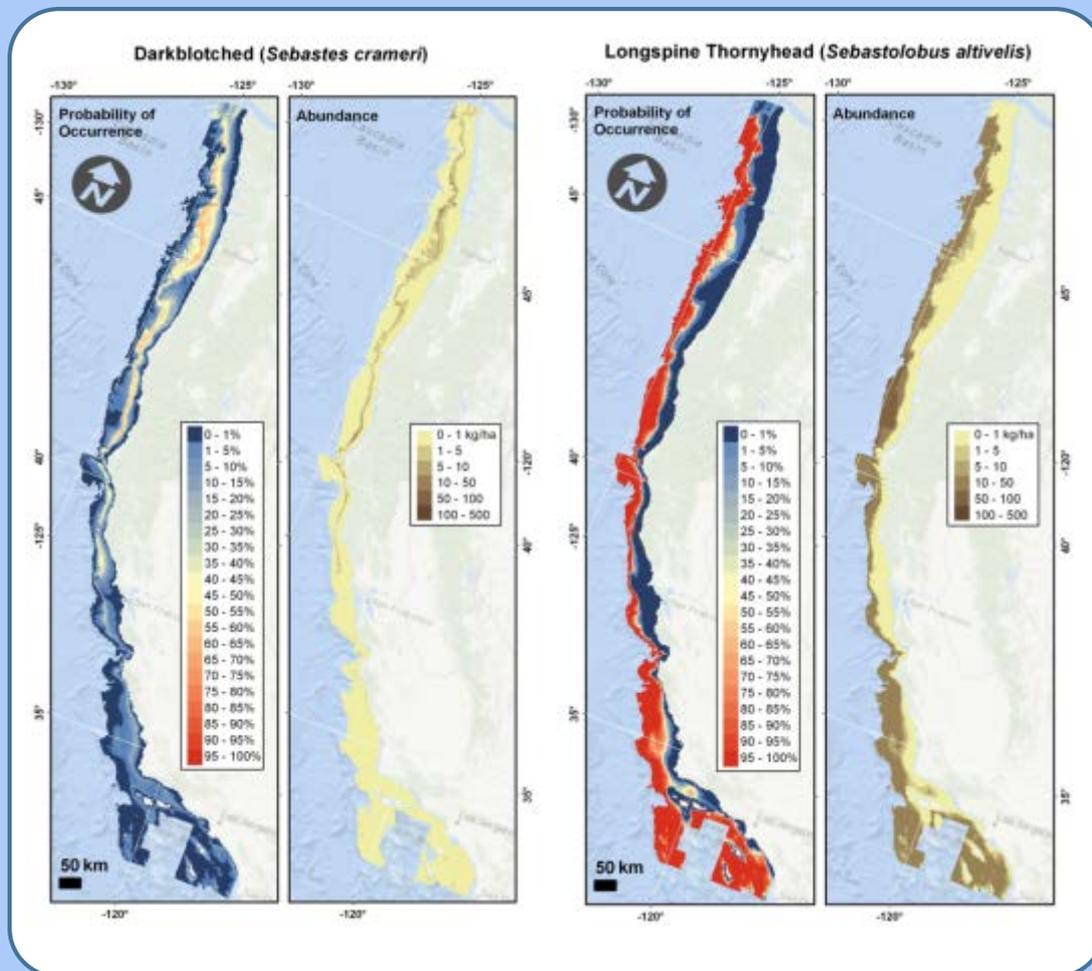


- **In-season climate scenarios**
- **Coarse forecasts of ocean conditions (6-9 months ahead)**
- **Related to presence/absence of sardines**

<http://www.nanoos.org/products/j-scope/forecasts.php>



HOW THE CCIEA SUPPORTS PFMC ACTIVITIES



■ Groundfish EFH

■ Habitat-based predictions of distribution and abundance

■ Predictive models for:

- Darkblotched rockfish
- Yelloweye rockfish
- Greenstriped rockfish
- Petrale sole
- Sablefish
- Longspine thornyhead

THE CCIEA IN ACTION

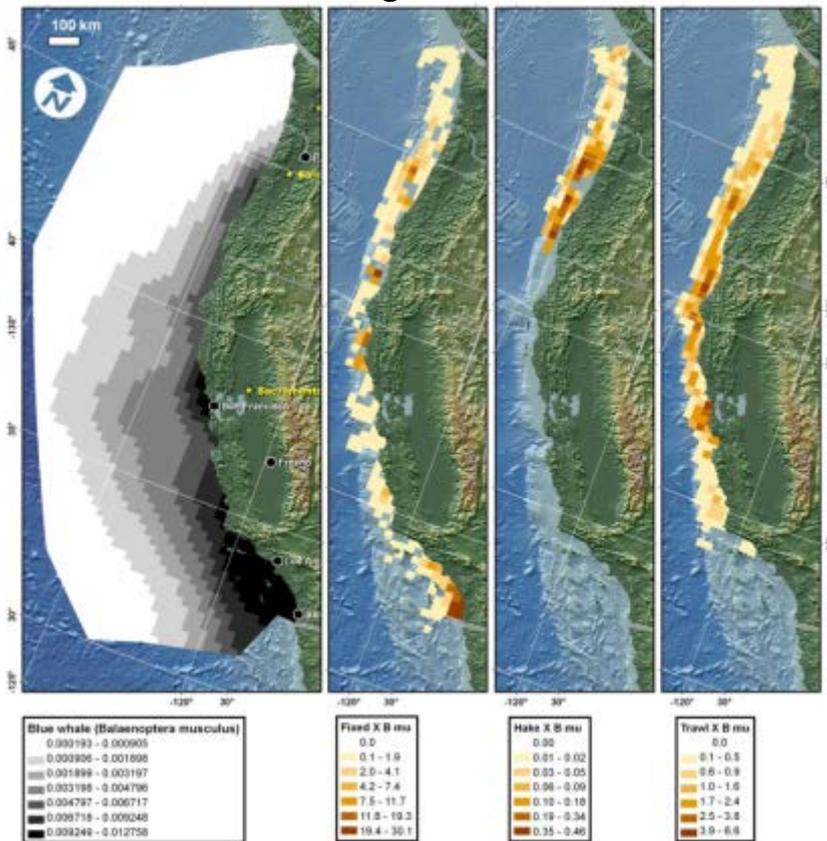
Blue whale overlap with:

Blue whale
distribution

Fixed
gears

Midwater
trawls

Bottom
trawls

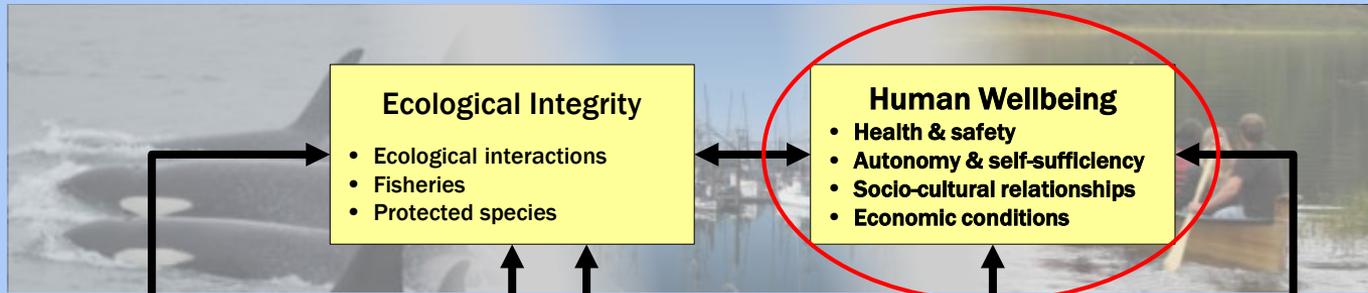


Increased Understanding
As an example:

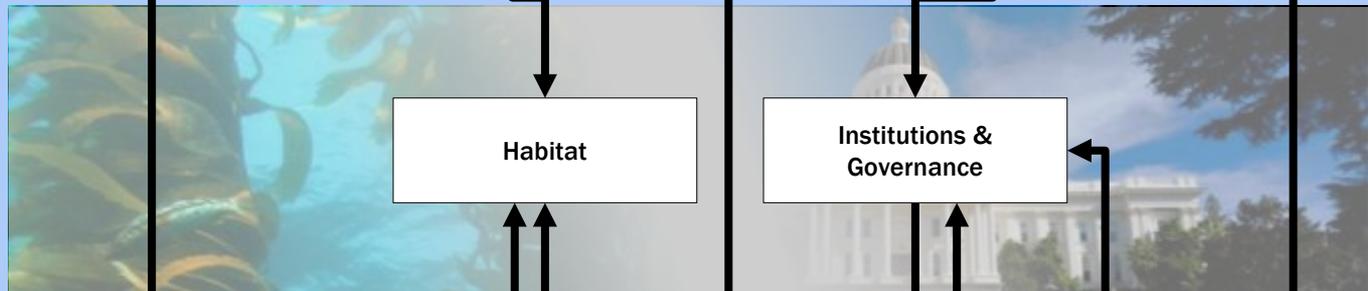
- Potential interactions between groundfish gears and distributions of protected species

SOCIO-ECOLOGICAL SYSTEM OF THE CALIFORNIA CURRENT

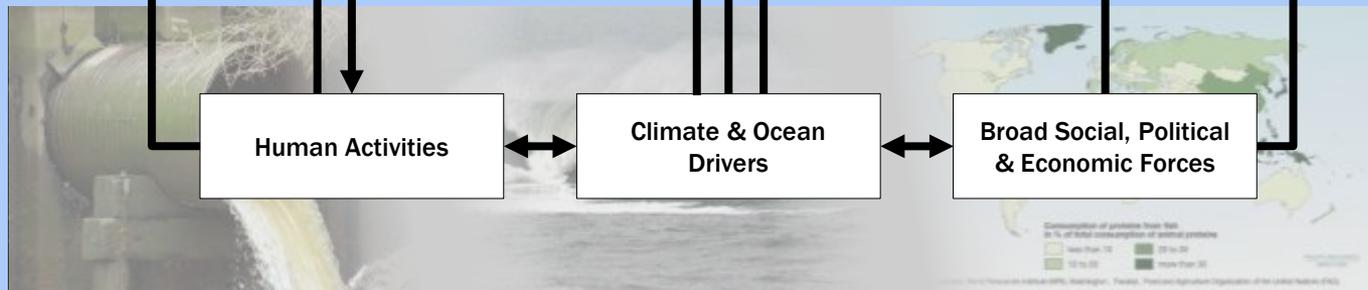
Focal Ecosystem Components



Mediating Components



Drivers and Pressures



HUMAN WELLBEING

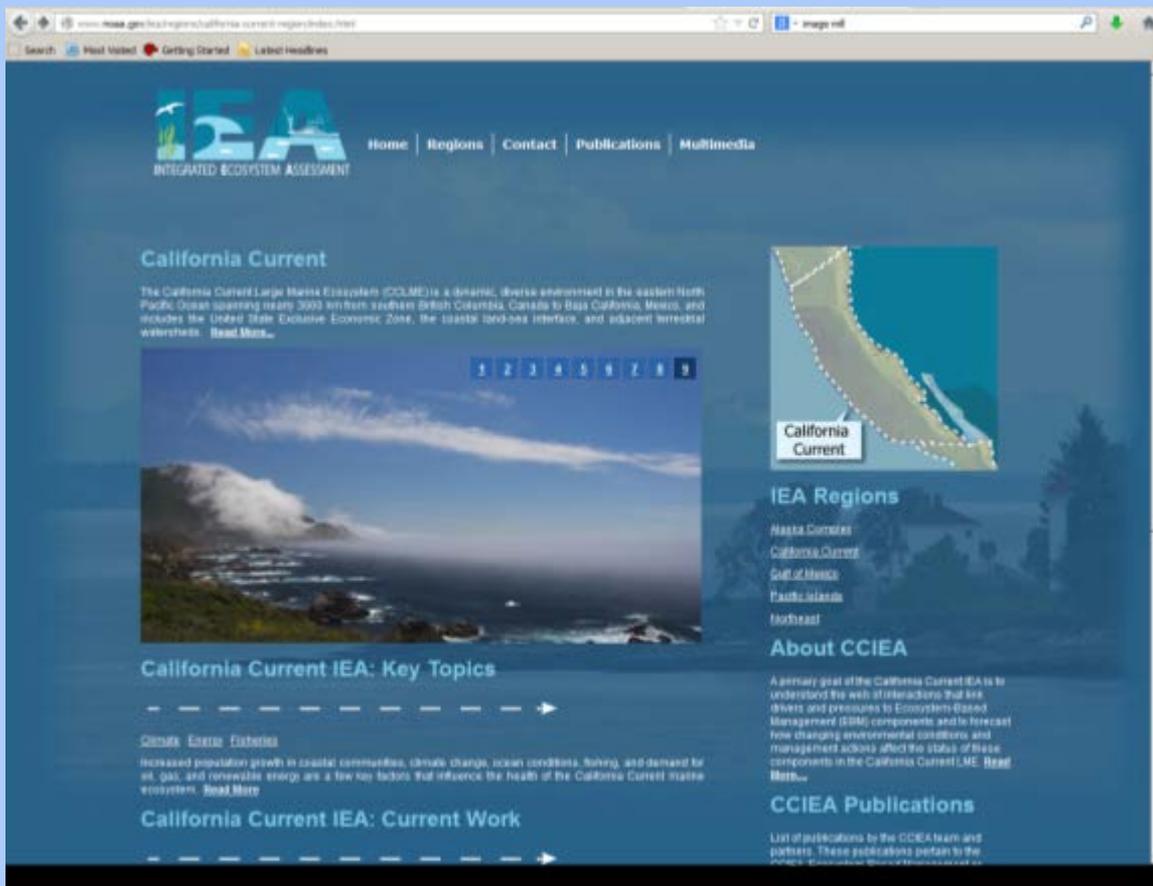


Culture
Community
Continuity
Cash
(eConomy)



CCIEA WEBSITE

www.noaa.gov/iea/regions/california-current-region/



- Up-to-date research priorities and highlights
- Products
 - Findings
 - Reports formatted for easy web-based viewing
 - Peer reviewed
- Coming soon: web-based data portal and visualization tools

PARTIAL LIST OF CCIEA PRODUCTS



- Synthesis products
 - Annual reports on status and trends of major components of ecosystem
 - Indicators and conceptual models for marine spatial planning on Washington Coast
- Fisheries management
 - Evaluation of impacts of fishing on forage fish
 - Evaluation of impacts of new fisheries
 - Evaluation of cumulative impacts of fisheries on ecosystem
 - Evaluation of effects of gear switching and spatial closures
 - Evaluation of potential conflicts between wave energy development and fisheries
 - Evaluation of effects of catch shares on ecosystem, landings, revenues
- Risk assessments
 - Risk assessment to fisheries and habitat from human activities
 - Risk assessment of groundfish fisheries to marine mammals
 - Risk assessment for Monterey Bay National Marine Sanctuary
- Protected resources
 - Salmon return forecast model
 - Evaluation of effects of dam removal on salmon
 - Assessment of drivers leading to sea lion UME
 - Coast-wide marine sturgeon habitat models
- Climate effects
 - Effects of climate change on pelagic system
 - Evaluation of effects of temperature and flow on salmon habitat and survival
 - Summary of salmon and climate change modeling
- Non-fisheries activities
 - Expert-based narrative forecast of shipping trends

NEXT STEPS



- Expansion and completion of:
 - Habitat component
 - Human dimensions
 - HMS
- SSC review of Atlantis ecosystem model (June 2014)
- Developing tactical EBFM tools
- Seeking Council and community input
 - Developing social indicators
 - Developing specific, PFMC-relevant scenarios

REFLECTIONS



- The engagement we desired occurred
- We received critical comments about the science
- What we heard from the SSC, GAP, Habitat Comm, and GMT:
 - Estimates of probability--accuracy and uncertainty; perhaps something that should be elevated to a national level IEA discussion
 - What can we predict/project based on diagnostics, models; what happens as a result of events (ENSOs)
 - We need better ways to visually present/communicate findings

CONFIDENCE AND LIKELIHOOD SCALES

Agreement ↑	<i>High agreement Limited evidence</i>	<i>High agreement Medium evidence</i>	<i>High agreement Robust evidence</i>
	<i>Medium agreement Limited evidence</i>	<i>Medium agreement Medium evidence</i>	<i>Medium agreement Robust evidence</i>
	<i>Low agreement Limited evidence</i>	<i>Low agreement Medium evidence</i>	<i>Low agreement Robust evidence</i>
	Evidence (type, amount, quality, consistency) →		

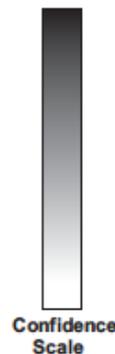


Table 1. Likelihood Scale

Term*	Likelihood of the Outcome
<i>Virtually certain</i>	99-100% probability
<i>Very likely</i>	90-100% probability
<i>Likely</i>	66-100% probability
<i>About as likely as not</i>	33 to 66% probability
<i>Unlikely</i>	0-33% probability
<i>Very unlikely</i>	0-10% probability
<i>Exceptionally unlikely</i>	0-1% probability

<http://www.ipcc.ch/pdf/supporting-material/uncertainty-guidance-note.pdf>

REFLECTIONS



- **What we heard from the SSC, GAP, Habitat Comm, and GMT:**
 - Strategic and tactical “How do we use this work for assessments?”
 - The speed at which some our products are being developed is behind the general knowledge of the system.
 - The fishermen know the system, thus provide good reviews and direction.
 - Quote from GAP: “We’re being regulated out of business”
 - We need to continue and improve engagement to all committees.