Scientist and stakeholder views on the Delta ecosystem

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Outline

- Study goals
- Causes of stress
- Promising actions
- Implications for science policy

Expert and stakeholder-policymaker surveys conducted in summer 2012

- Focus on conditions for native fish:
  - Role of ecosystem stressors
  - Promising actions
- Goals:
  - Synthesize scientific understanding
  - Identify areas of consensus/divergence
- Samples:
  - Experts: scientific publications on Delta ecosystem
  - Stakeholders: participation in Delta Plan or BDCP

Expert surveys can shed light on complex, uncertain scientific problems

- Especially used in risk assessments
- Some methods control for expert knowledge, consistency of expert views
- Others are more democratic (weigh experts equally)
- We take a hybrid approach: democratic weighting but compare results of “lead scientists” with others, test for bias of other expert characteristics

Distribution of respondent groups

- Scientists (n=122):
  - University (50%)
  - State/federal employees (33%)
  - NGOs/consultants (17%)
- Stakeholders/policymakers (n=240):
  - D: Delta-based interests (38)
  - E: Environmental advocates (56)
  - X: Export interests (22)
  - F: Fishing & water-based recreation (14)
  - U: Upstream interests (39)
  - G: State/federal officials (56)
  - *Other (mix of smaller groups) (15)*

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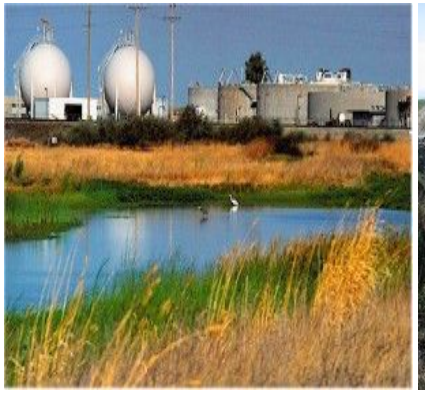
Five broad categories of ecosystem stressors — all related to human actions

Discharges



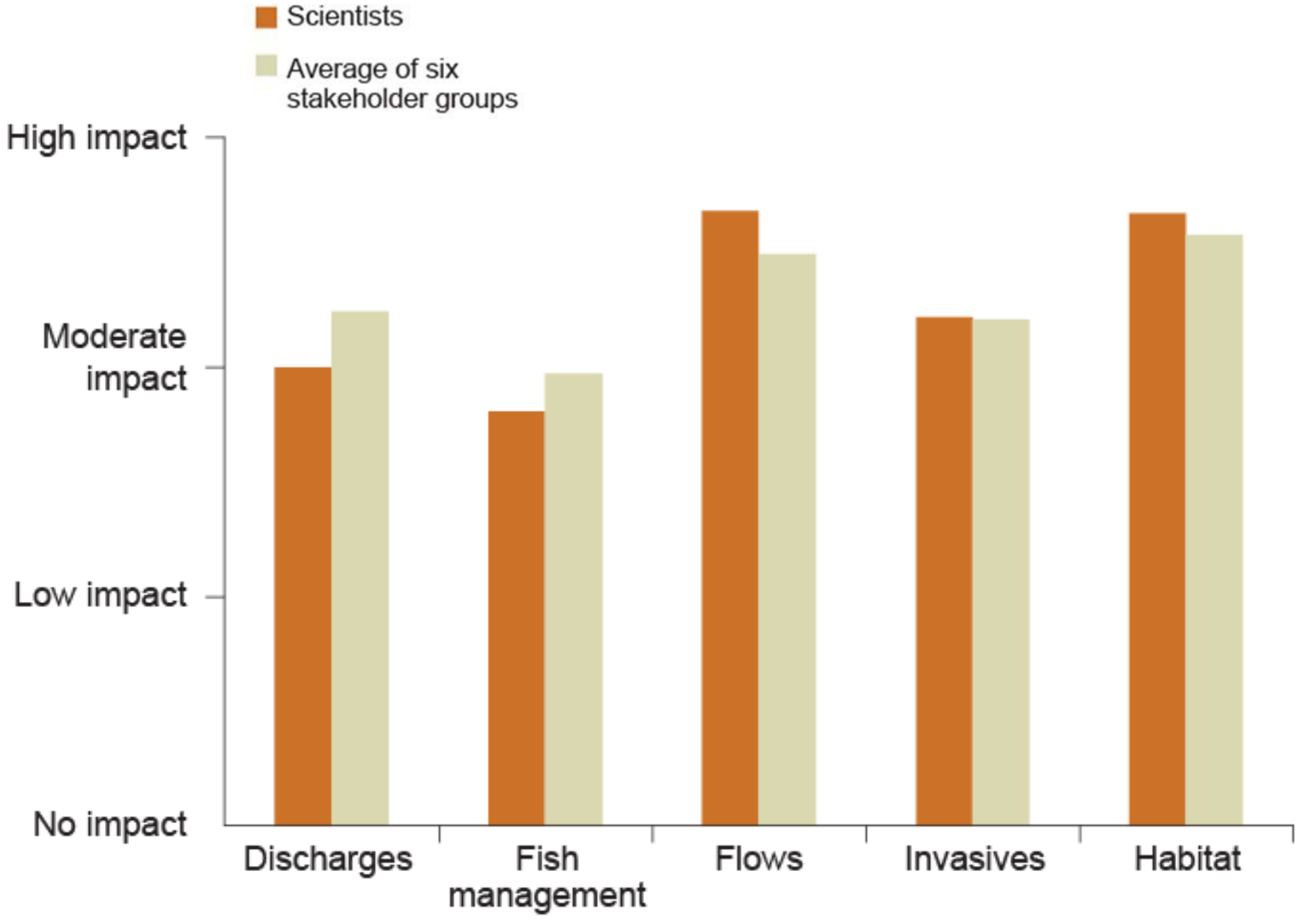
Direct fish management

Flow regime change

Invasive species

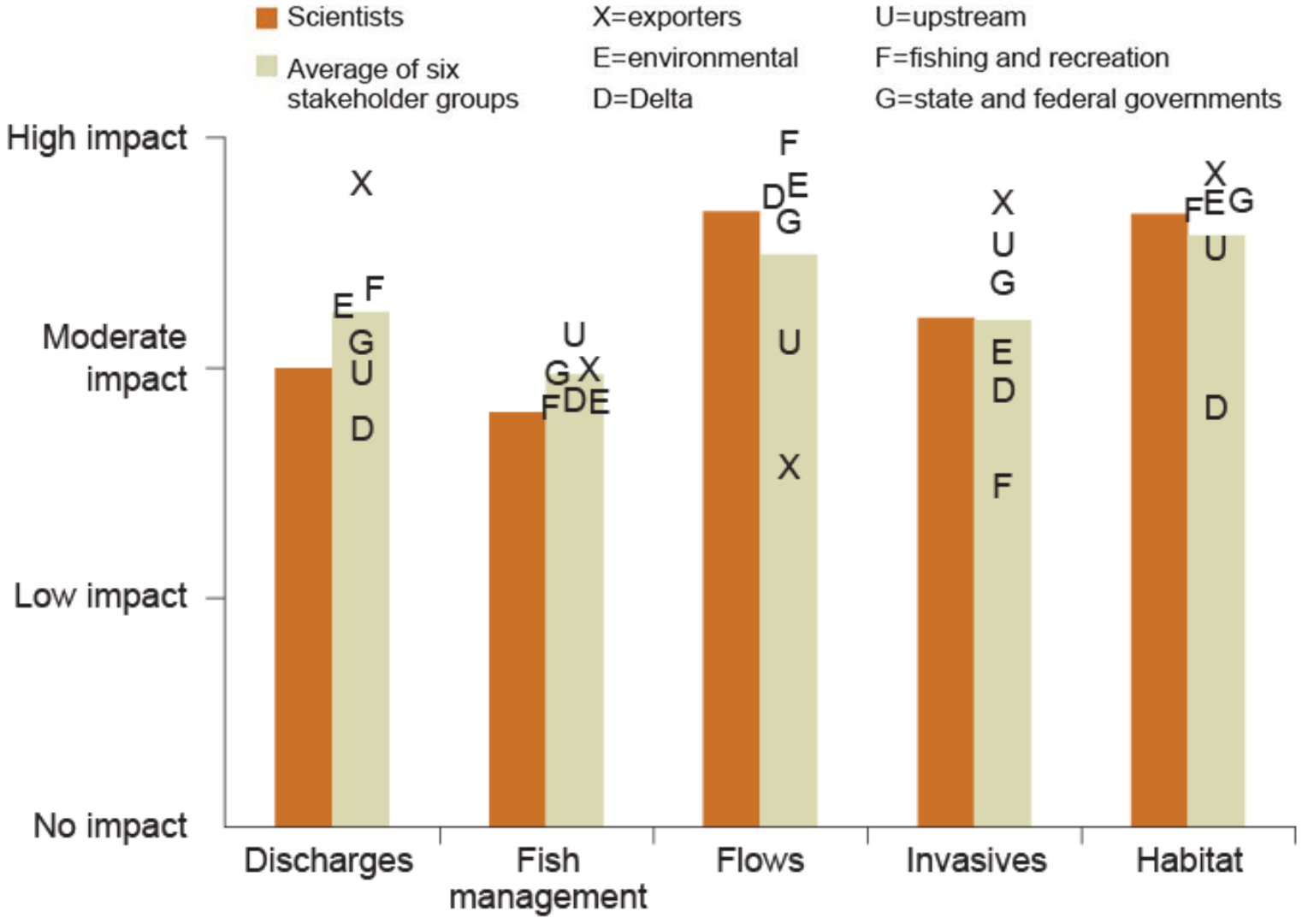
Physical habitat loss and alteration

Scientists and stakeholders agree that all five types of stressors matter



"Please indicate the level of impact you believe each stressor group has had on the historical decline of the Delta's native fishes."

...but groups tend to downplay stressors that benefit them most



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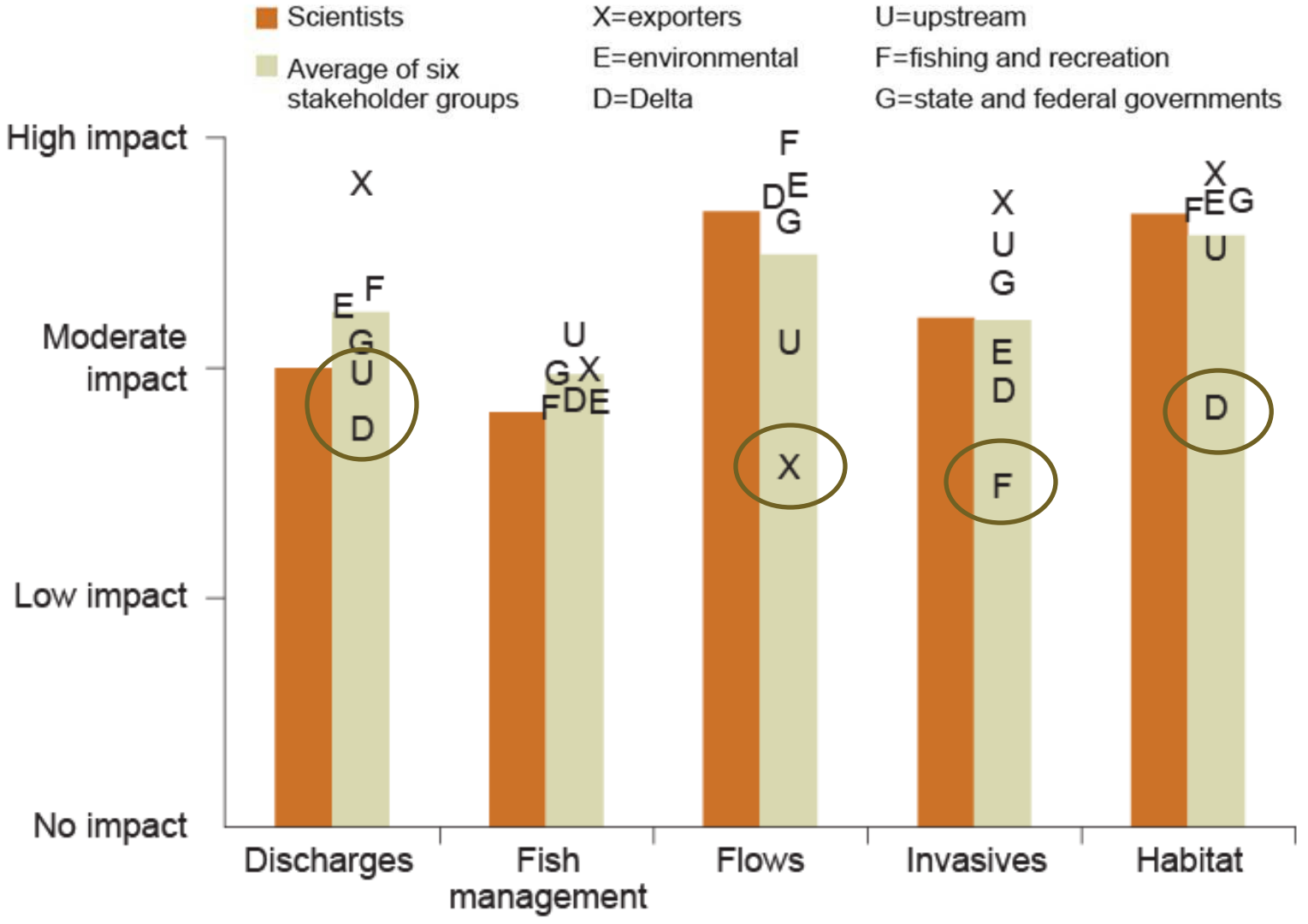

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Our view*: reconciliation offers a realistic and hopeful pathway

- Support ecosystem alongside continued human use of region's natural resources (co-equal goals)
- Restore natural processes where practical
- Infrastructure, technology can also help

Yolo Bypass

* Moyle et al. 2012, "Where the wild things aren't: Making the Delta a better place for native species." PPIC.

Survey sought views on actions to help native fish—some already under way

Discharges	Fish Mgmt	Flow Mgmt	Invasives	Habitat
Reduce toxics	Separate hatcheries	Increase outflows	Control invasive weeds	Tidal marsh, shallow habitat
Reduce farm fertilizers	Use conservation hatcheries	Reduce exports	Control invasive clams	Seasonal floodplains
Reduce farm pesticides	Harvest more predators	Vary flows for native fish	Prevent new invasions	Channel margin habitat
Reduce urban nonpoint	Reduce salmon harvest	Exports with canal/tunnel	Vary salinity	Upstream habitat
Reduce urban point	More fish screens	Use gates to steer fish		Increase sediment
Dilute with more flows	Enforce poaching	Improve upstream flows		Remove selected dams
	Truck fish around Delta/dams	Reduce entrainment		Deep water habitat

Level of implementation: Under way, Planned, Considered, Conceptual

"In your opinion, what is the potential impact of each of the following actions on the Delta ecosystem's ability to support native fishes? Consider implementation relative to current conditions, without changing management of other factors affecting the ecosystem."

Scientists agree on high potential for some habitat, flow actions

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Scientists disagree on potential of some other, highly uncertain actions

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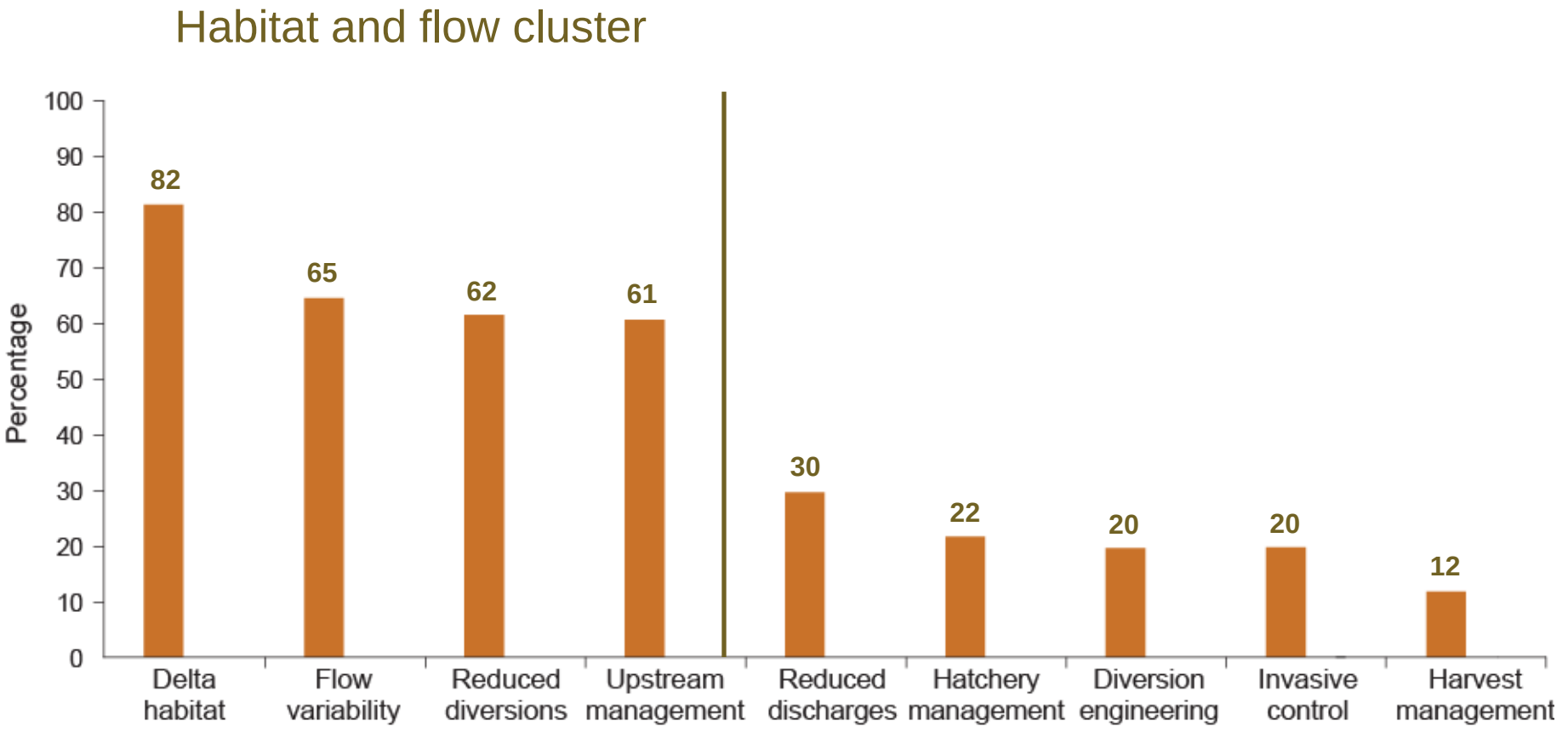
Level of implementation: Under way, Planned, Considered, Conceptual

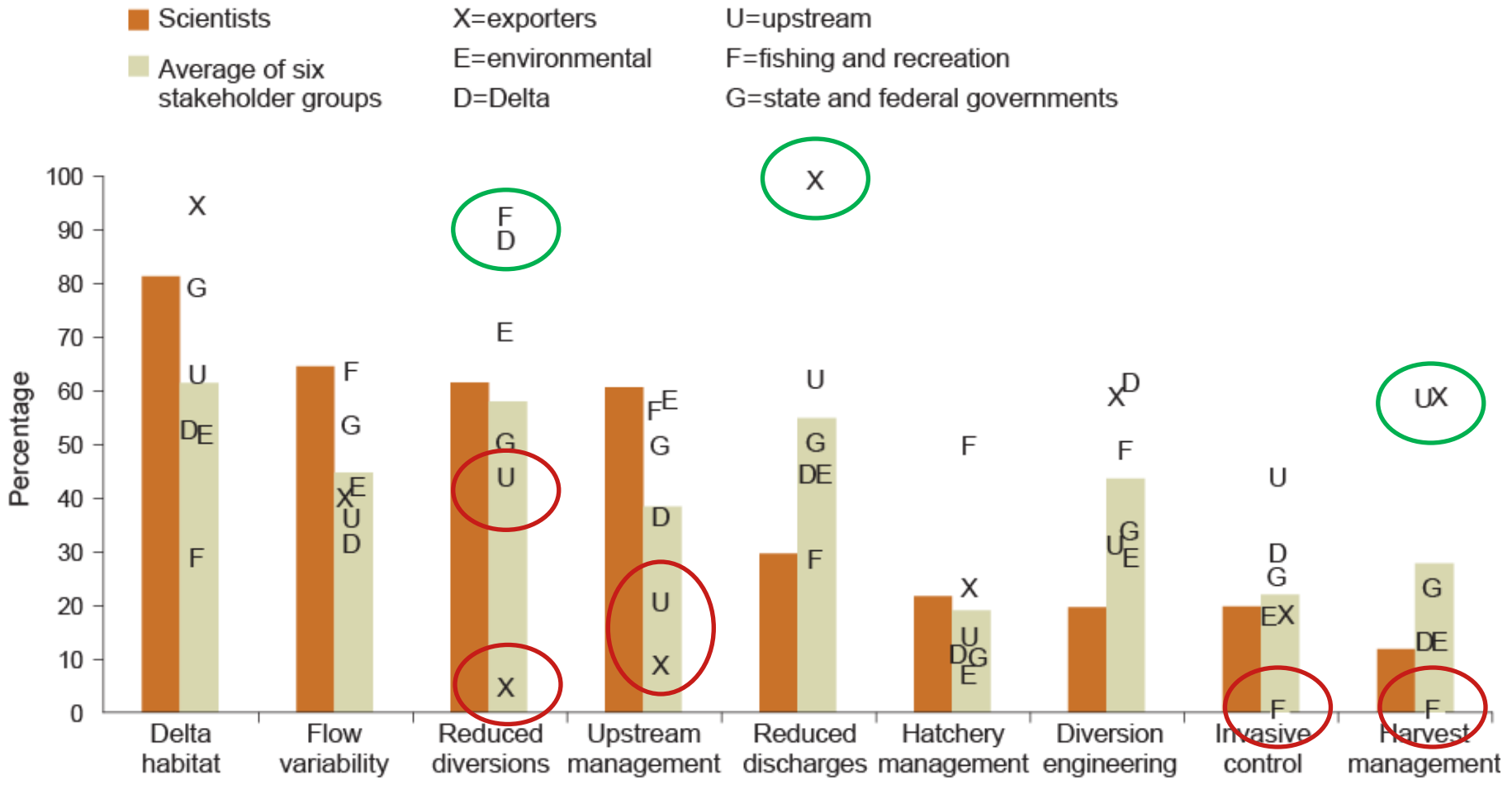
** More than 20% answered "don't know"*

Scientists' top priorities: restoring natural processes within Delta and upstream



"Considering interactions, what are the five actions that would result in the most beneficial impact on the Delta's native fish species? When making your selections, consider potential interactions and assume meaningful implementation of each action you select…We understand that many of these actions could also have other effects – either positive or negative – but for the purposes of this survey we ask that you answer from the perspective of what will positively impact native fish populations." (Answers for 30+ actions grouped here into 9 functional areas)

Again, stakeholder priorities reflect economic interests



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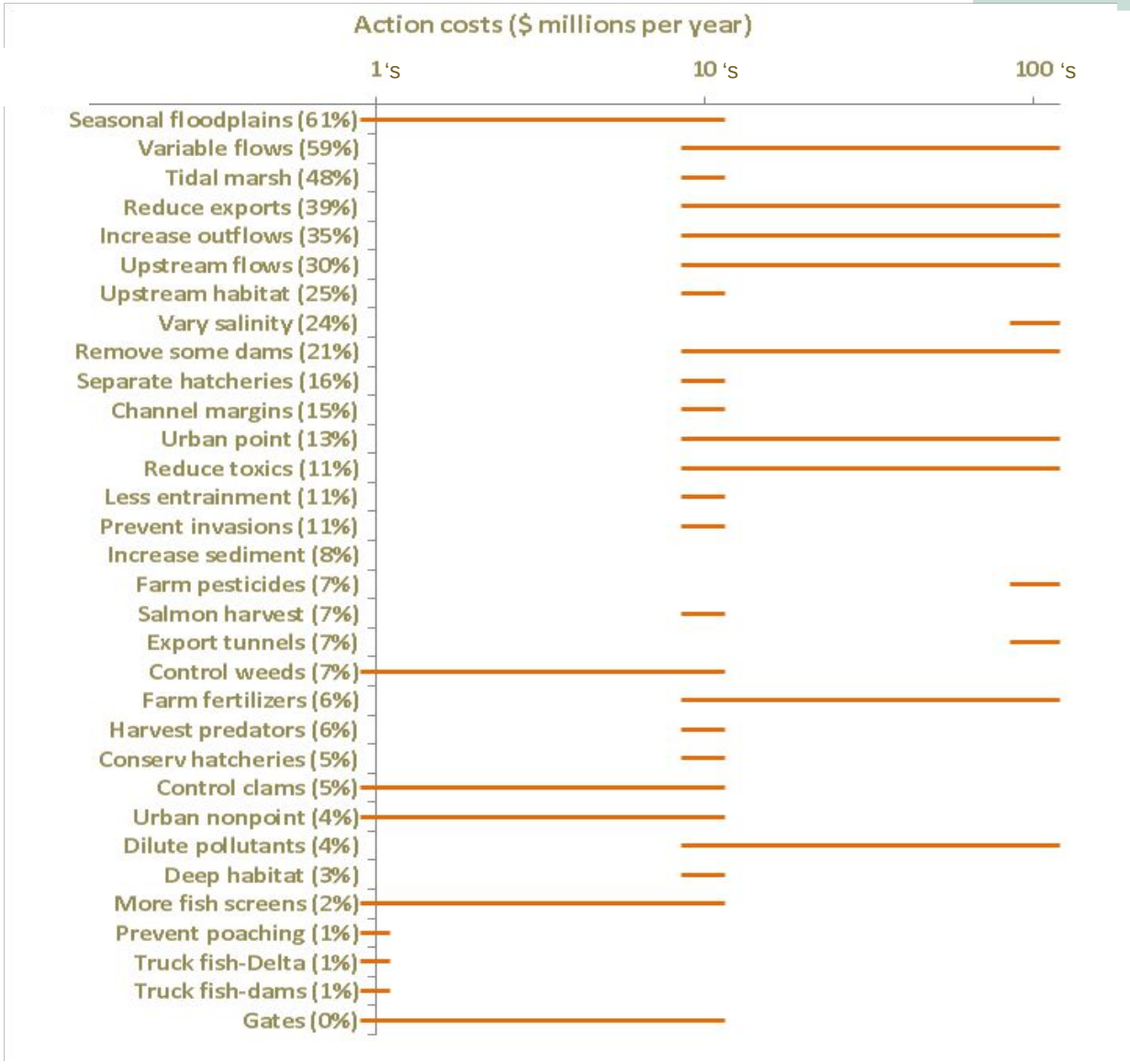
Lack of shared understanding of Delta science is an obstacle to effective policy

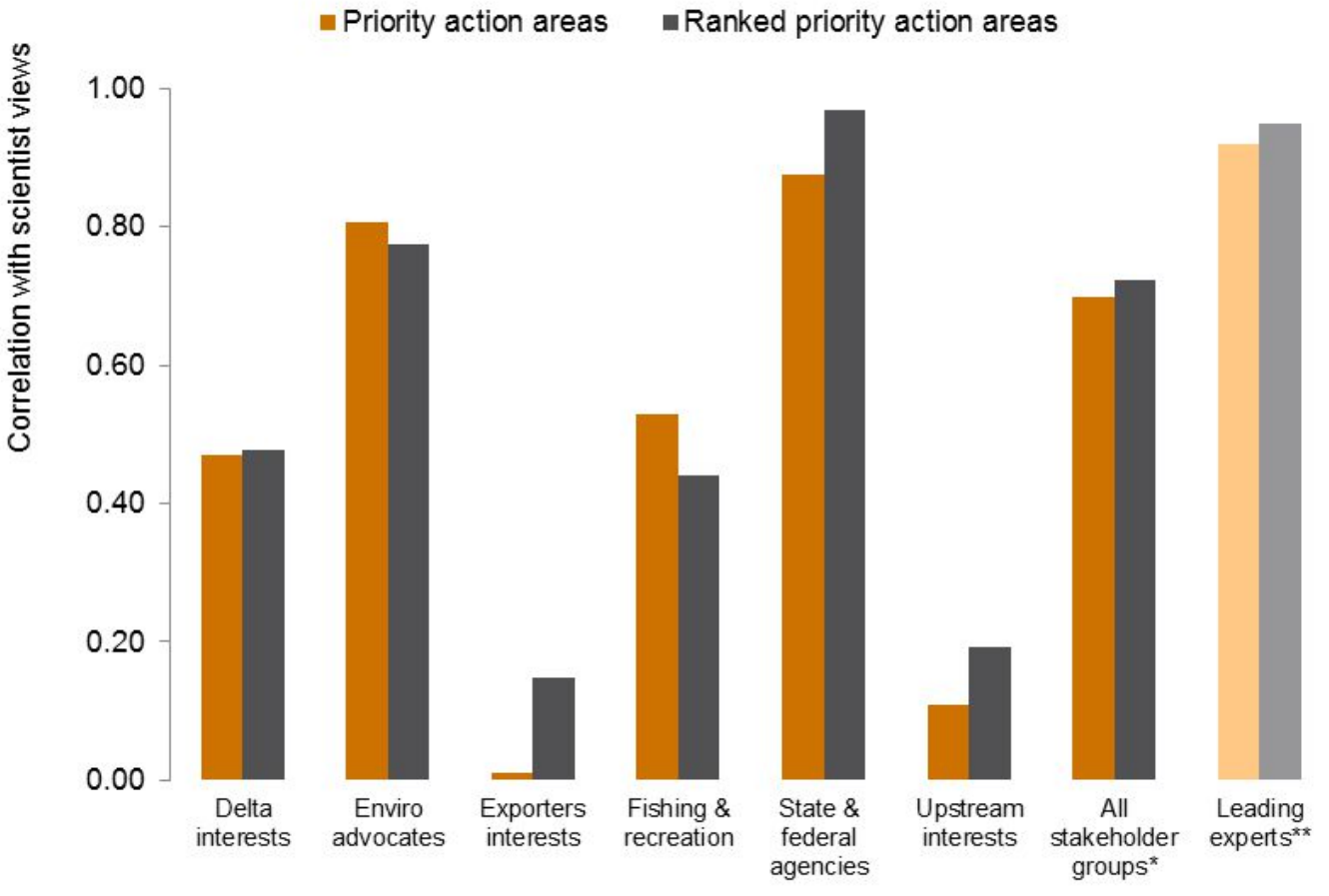
- Engaged stakeholders consult scientific & gov't reports regularly...
- ...but key groups arrive at different conclusions about nature of problems and solutions
- Gaps are widest on actions that could be very costly for some stakeholder groups

Scientists' top priorities tend to be the most costly…



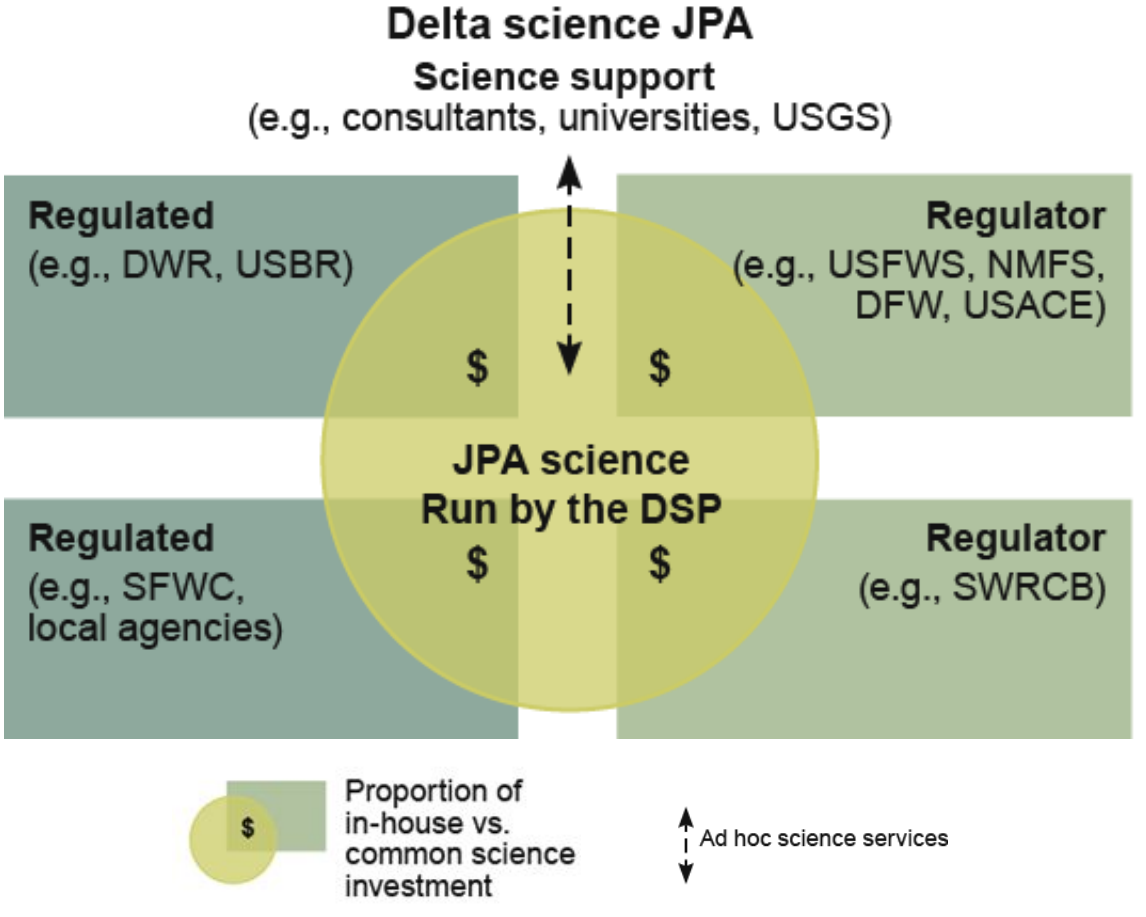
Cost estimates from Medellin-Azuara et al. 2013. Numbers in parentheses show share of scientists who chose the action among their "top 5"

... and groups that would bear the costs disagree most with scientists



** leading experts are those named by at least 5 peers as having exceptional knowledge on the ecosystem (20% of sample)

Build “common pool” science for shared understanding, knowledge



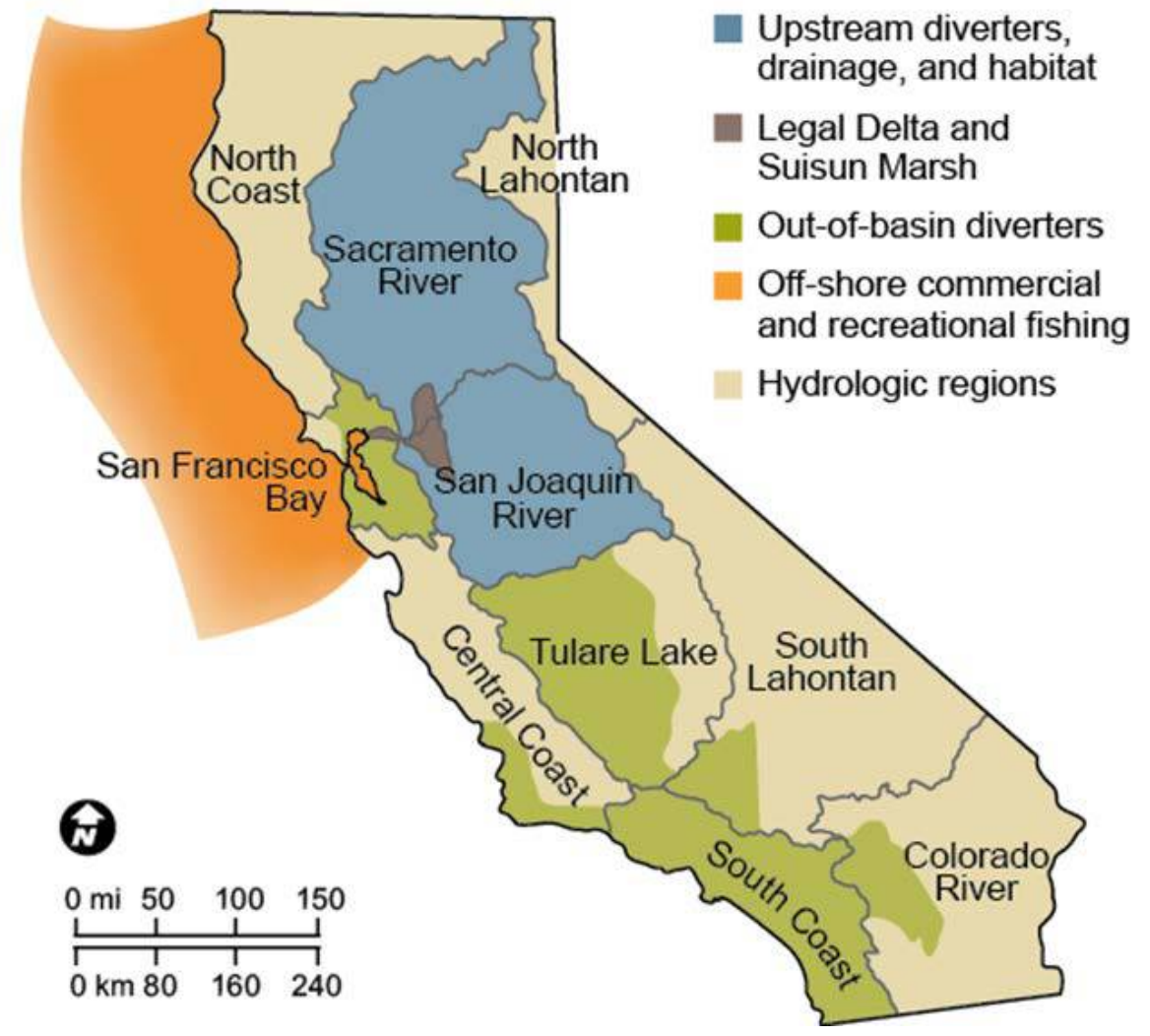
One Delta, one science? Good models are SFEI/ASC & SCCWRP

Some additional ways to improve linkages between science and policy*

- Rapid synthesis to identify research priorities
  - e.g., DSP 6/13 workshop on tidal marsh & fish
- Consensus-based synthesis for policy
  - e.g., SWRCB science panels – make this ongoing, not one-shot deals
- Collaborative efforts to move beyond combat science
  - e.g., CSAMP for biological opinion flows
- Building policy-oriented communication skills and opportunities for scientists

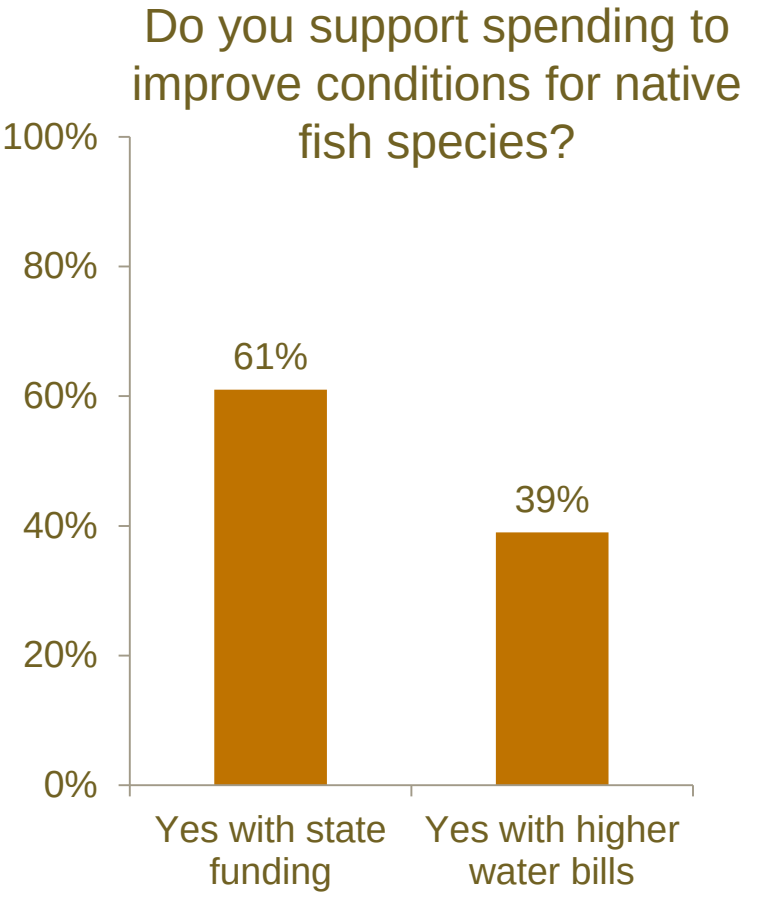
*Cloern and Hanak, "It's Time for Bold New Approaches to Link Delta Science and Policy." *SFEWS* Oct 2013

Most Californians use Delta resources



Achieving ecosystem goals will also require broad public support

- Reconciliation efforts will be costly (at least several hundred million $/year)
- Need to communicate the goals and benefits...
- ...and demonstrate coordinated and cost-effective efforts



SOURCE: PPIC Statewide Survey (Dec. 2012)

More information available at www.ppic.org

Stress Relief: Prescriptions for a Healthier Delta Ecosystem (Hanak et al. 2013) (Overview report)

Aquatic Ecosystem Stressors in the Sacramento San-Joaquin Delta (Mount et al. 2012) (Stressor descriptions)

Where the Wild Things Aren't: Making the Delta a Better Place for Native Species (Moyle et al. 2012) (Reconciled Delta)

Integrated Management of Delta Stressors: Institutional and Legal Options (Gray et al. 2013) (Institutional reforms)

Scientist and Stakeholder Views on the Delta Ecosystem (Hanak et al. 2013) (Details from the surveys)

Costs of Ecosystem Management Actions for the Sacramento-San Joaquin Delta (Medellín-Azuara et al. 2013) (Cost estimates)

Notes on the use of these slides

These slides were created to accompany a presentation. They do not include full documentation of sources, data samples, methods, and interpretations. To avoid misinterpretations, please contact:

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Thank you for your interest in this work.