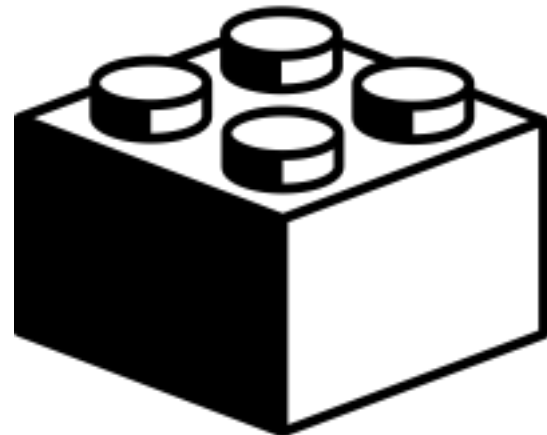
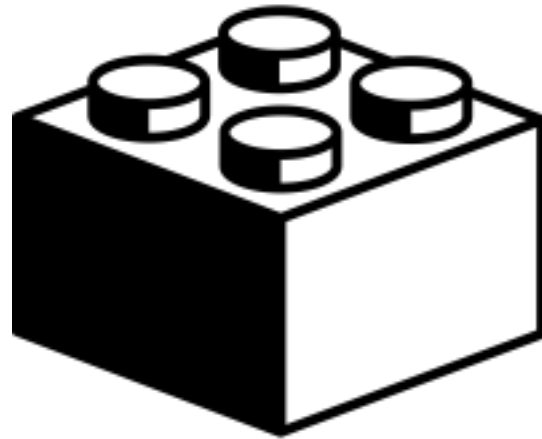


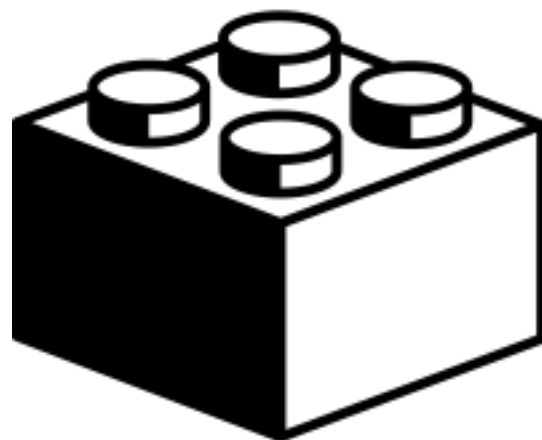
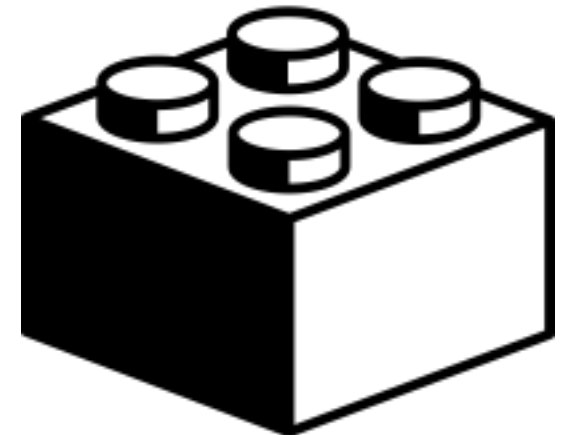
Quantitative Synthesis Tools



@cjlortie



Synthesis is comprised of the
integration of disparate evidence



Challenges are to resolve and compile so as to
enable evidence-informed decision making



Synthesis & Integration |  **Open Access** |  

**Better late than never: a synthesis of strategic land retirement
and restoration in California**

Christopher J. Lortie✉, A. Filazzola, R. Kelsey, Abigail K. Hart, H. S. Butterfield


TNC commissioned review

Quantitative Synthesis Tools



Quantitative Synthesis Tools

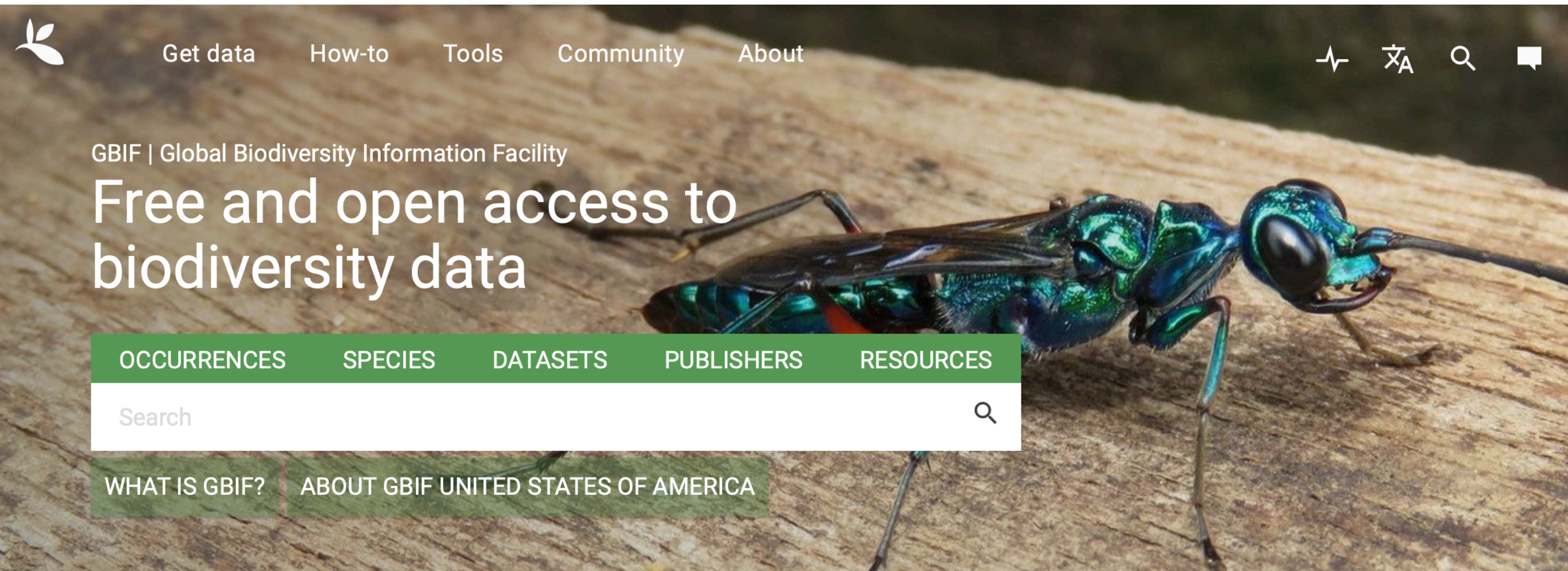
Google Scholar

☒ Articles ☐ Case law

Stand on the shoulders of giants

Goal was to complete a meta-analysis

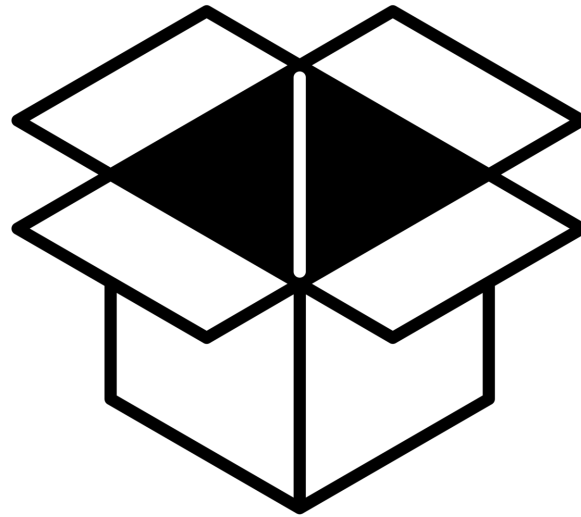


pivot

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GBIF + Systematic Review

Products



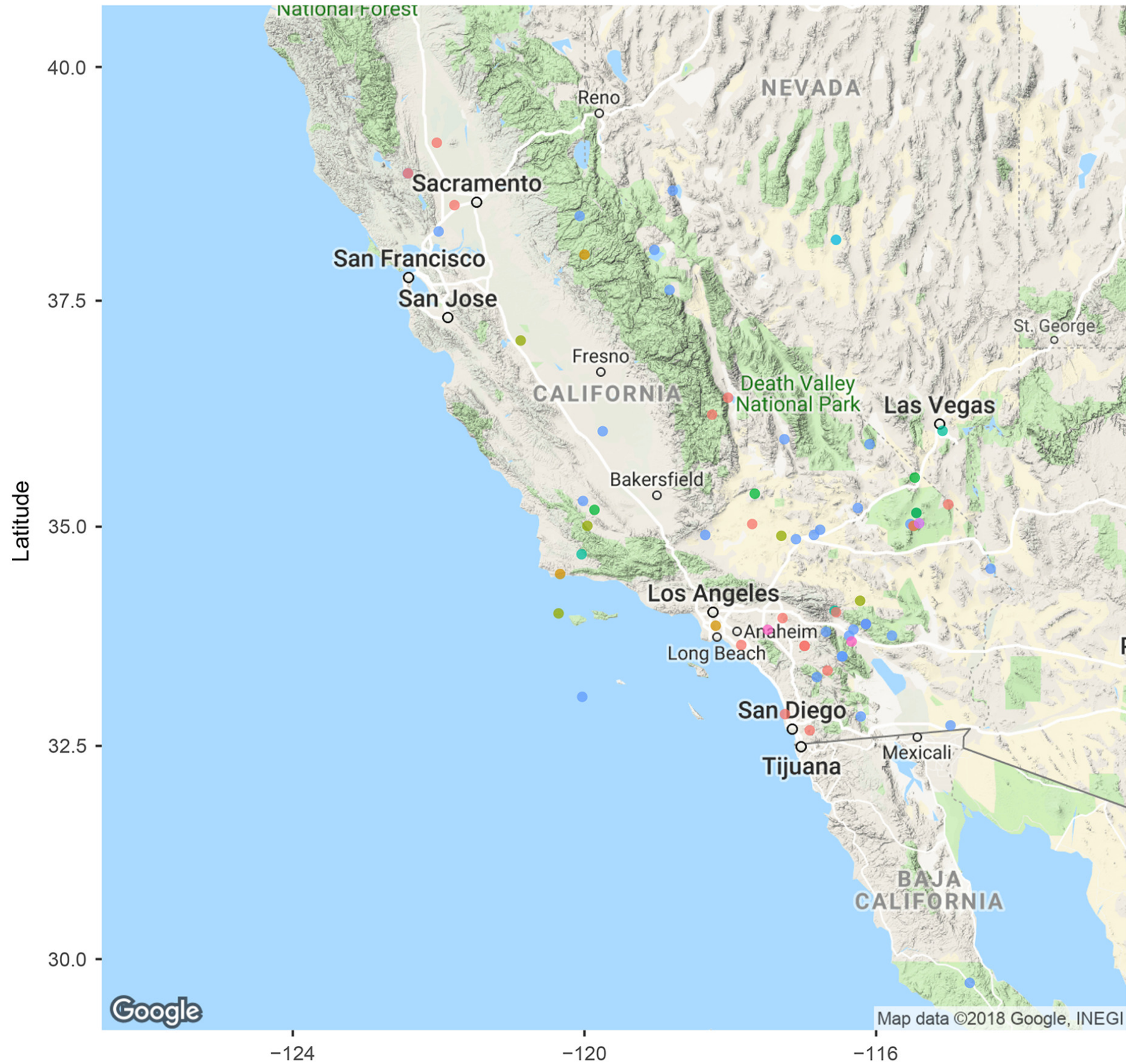
List of flagship studies

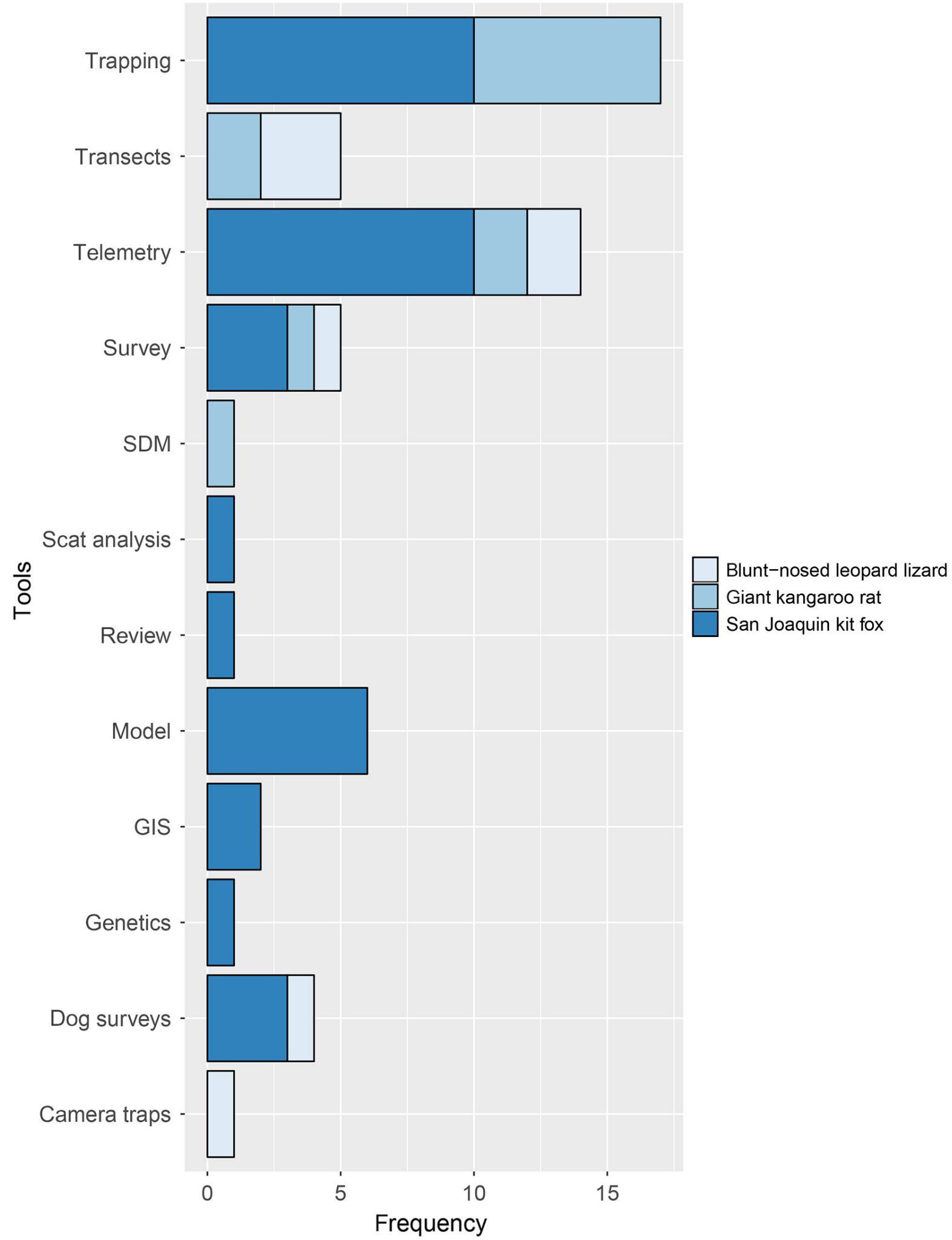
Reported climate profiles for endangered species

List of tools used to study species

Map and relative frequency of reported presence/study

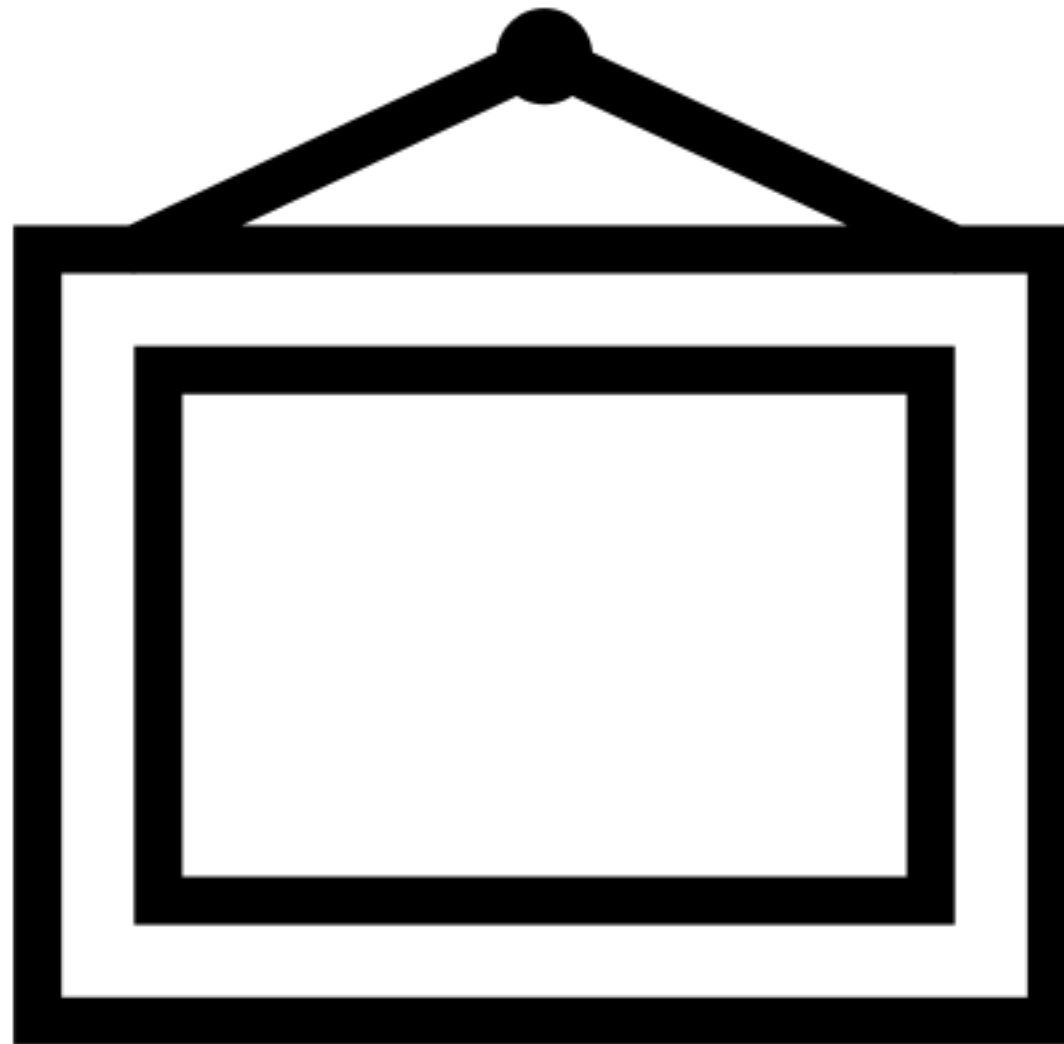
- | | | |
|------------|-------------|-----------|
| Experiment | Monitoring | Survey |
| GIS | Restoration | Telemetry |
| Model | Review | Trapping |





Reframed evidence for synthesis

Evidence framing



Choice architecture theory for synthesis

Choice influences input and output



synthesis	elements	benefits	limitations
narrative review	summary, insights, next steps	more opinion, can be shorter, less detailed processing the research literature	can be less compelling without some specific evidence listed and is difficult to repeat
systematic review	summary, insights, next steps, explanation of how studies were selected in the review, can have counts of ideas tested	more specific, can be repeated, and can be more compelling	need to keep track of how you selected papers, need to sort through papers in more detail in addition to capturing main ideas
meta-analyses	all of above possible but must also include an assessment of the strength of evidence of each study included in the synthesis	gold standard, reader can get a sense of how effective a treatment or intervention is relative to another	need to extract means or measures of efficacy with sample sizes or variance from each study

Typology exceptionally relevant to society



PERSPECTIVE |  **Open Access** |  

An optimistic outlook on the use of evidence syntheses to inform environmental decision-making

Laura Thomas-Walters , Elizabeth A. Nyboer, Jessica J. Taylor, Trina Rytwinski, John F. Lane, Nathan Young, Joseph R. Bennett ... **See all authors** 

Synthesis type	What it does
Causal criteria analysis	Tests specific cause-effect hypotheses
Conceptual models	Depicts the current knowledge of relationships within a system
Narrative/ traditional review	Provides a qualitative review of the literature on a particular topic
Rapid review	Provides rapid evaluation of evidence to test a hypothesis
Stand-alone meta-analysis	Combines multiple, comparable studies to test a hypothesis
Summaries and synopses	Summarizes the evidence-base for a broad management area
Systematic map	Describes the state of knowledge for a particular topic
Systematic review	Provides a transparent, repeatable, and quantitative evaluation of the evidence for a hypothesis
Vote counting	Summarizes the evidence for and against a hypothesis
None	Not familiar with any of these

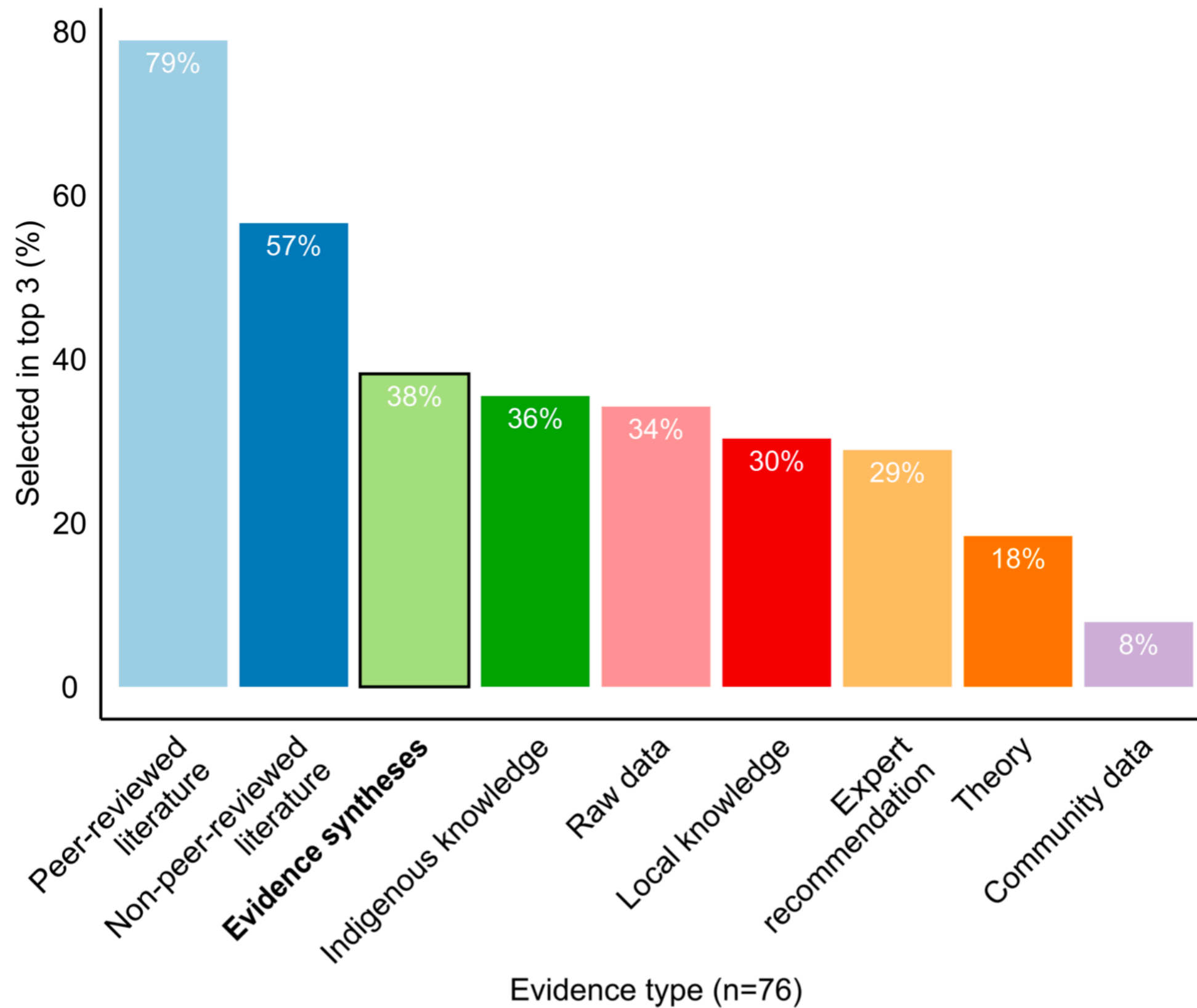
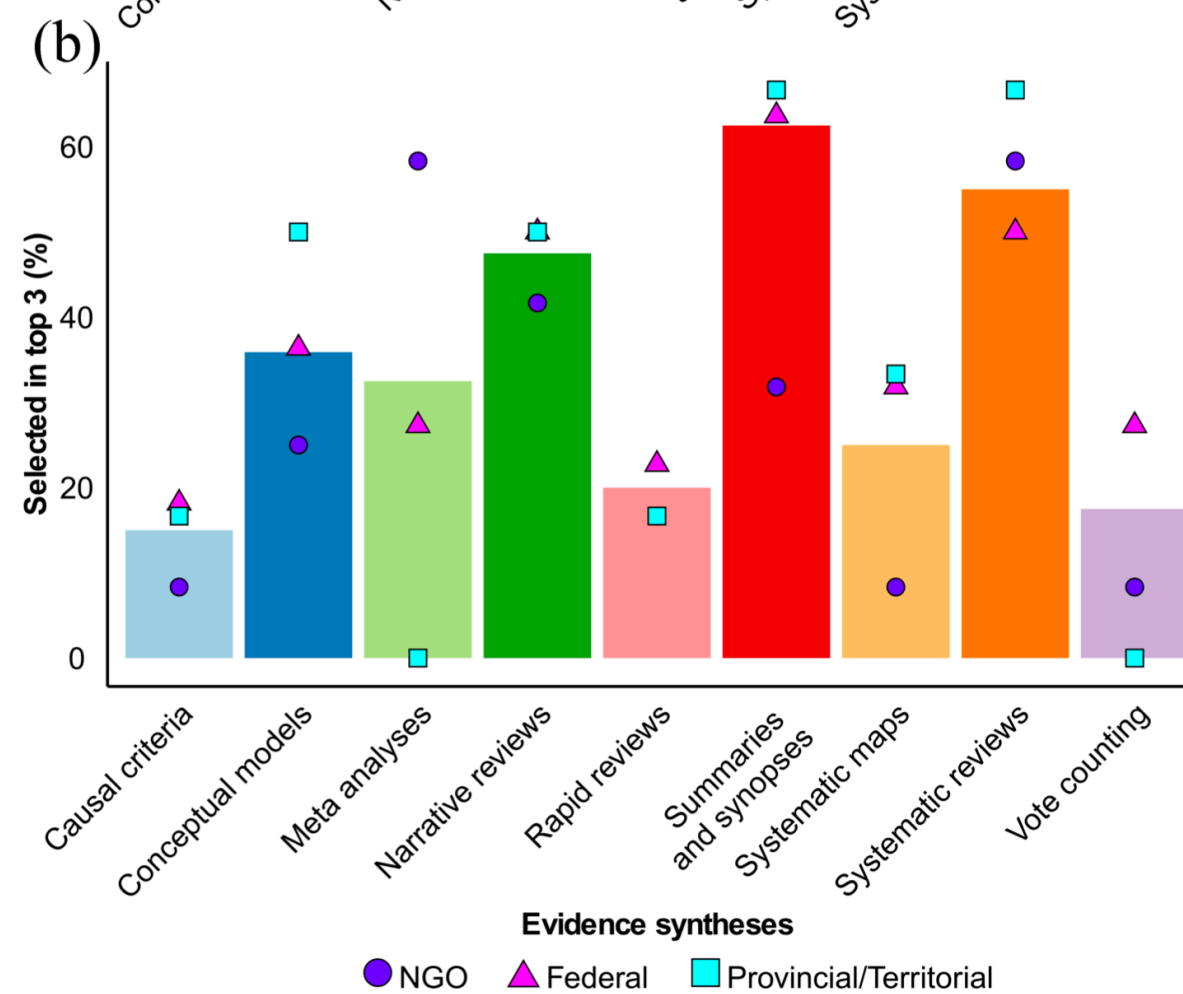
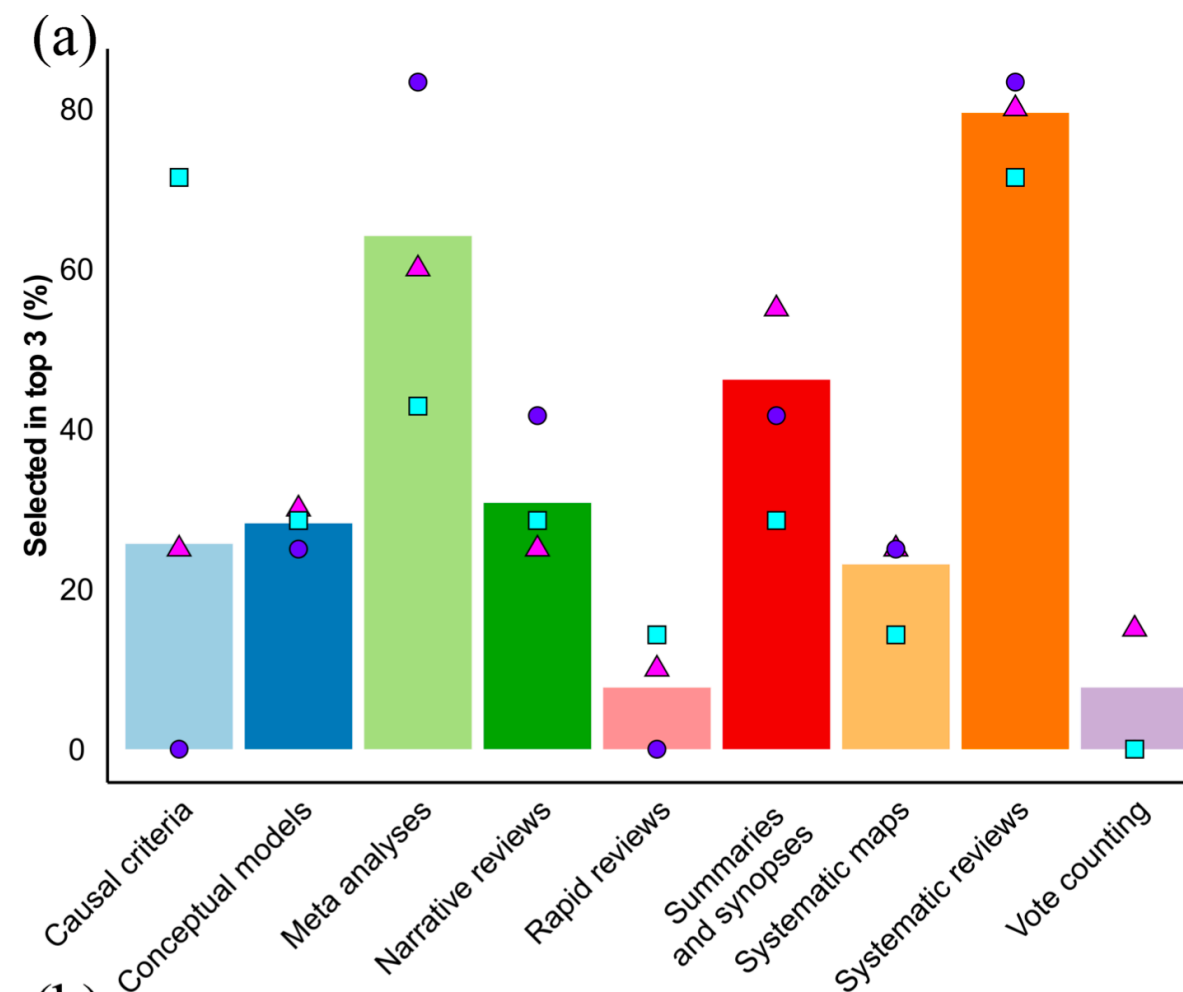


FIGURE 1 Confidence in and use of different evidence types (%)



Evidence maps for evidence gaps

Region	Taxa	MPA Char.	Outcome
Global	Fish	Size	Abund.
Tropical	Invert.	Age	Biomass

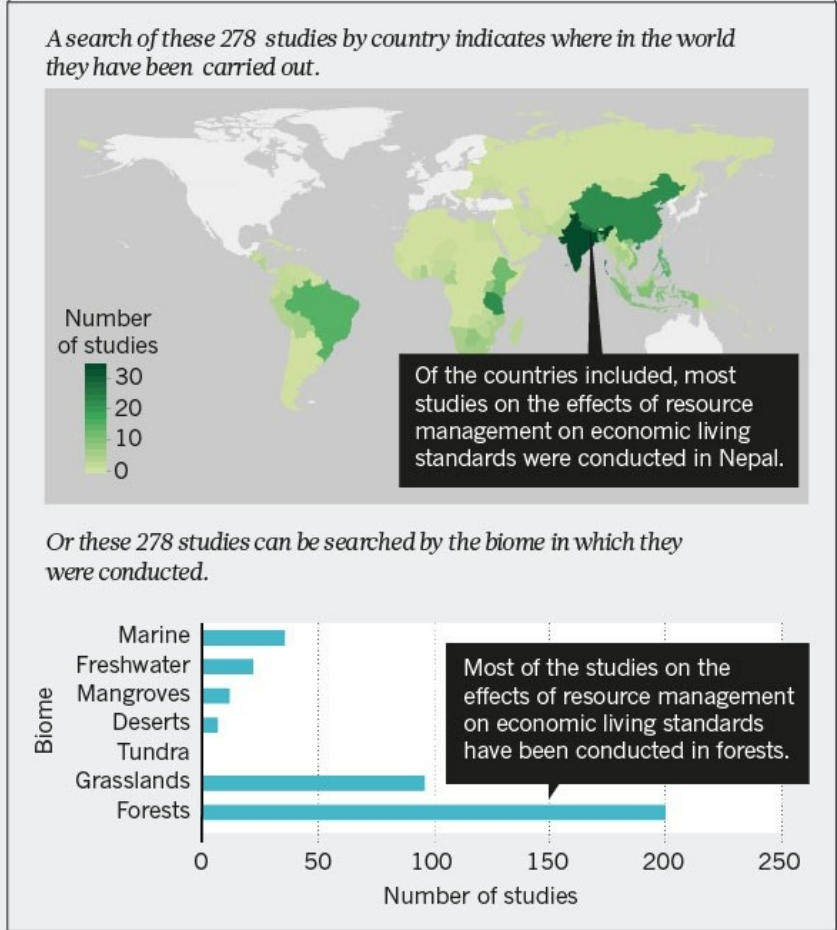
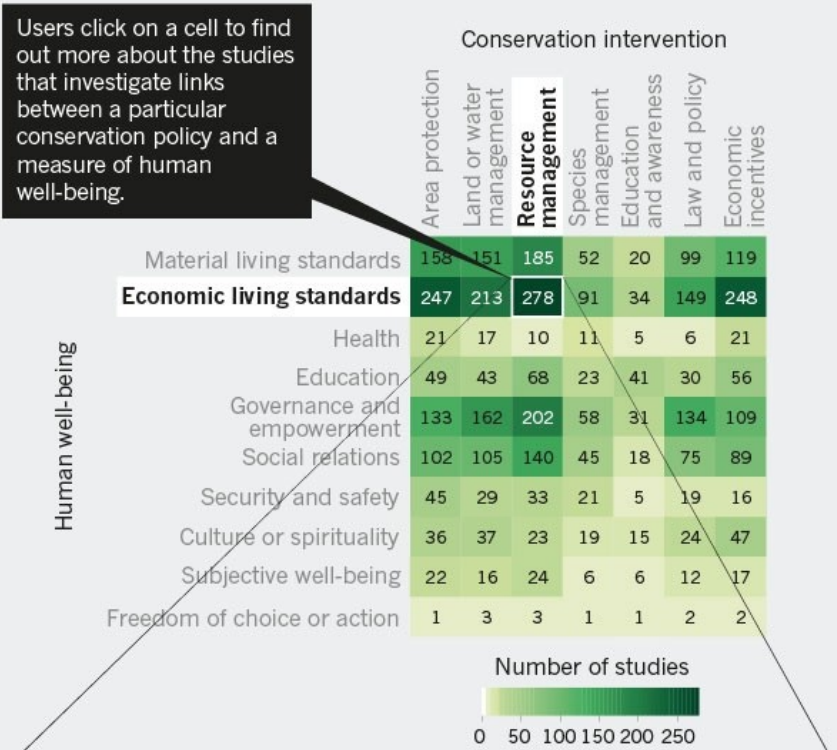


		Outcome	MPA Char.	Taxa	Region
		Abund. Biomass	Size Age	Fish Invert.	Global Tropical
Region	Global				
	Tropical				
Taxa	Fish				
	Invert.				
MPA Char.	Size				
	Age				
Outcome	Abund.				
	Biomass				

NAVIGATING WHAT'S KNOWN

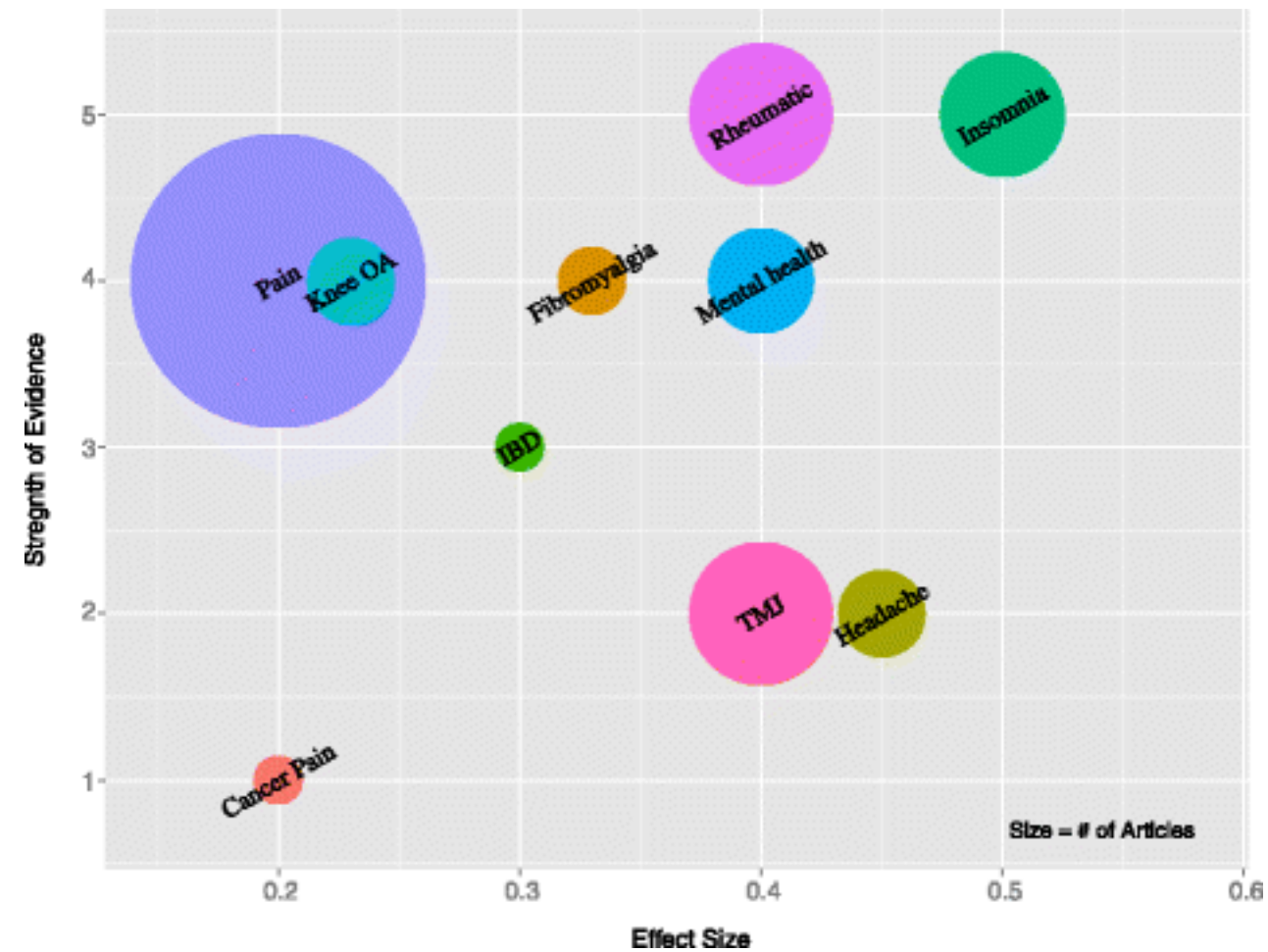
An evidence map is produced by collecting and categorizing studies that probe the link between conservation efforts and human well-being. It reveals where data are available to establish causal pathways, and where there are gaps in the knowledge.

More than 1,000 studies were included in the evidence map on the basis of systematically designed selection criteria.



Evidence maps for maps

Evidence maps for frequency or intensity of study



Synthesis science includes a powerful set
of tools to examine
two fundamental knowledge questions



- (1) What do we know about the world?
- (2) What do we know about the science about the world?

Quantitative Synthesis Tools