How SHARC is built
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Overview

This document provides information on how Resources for the Future (RFF) has developed and maintained the Shale Research Clearinghouse (SHARC). It includes: (1) a description of which impact categories are included; (2) a description of how studies are selected for inclusion in the database and literature reviews; and (3) our approach for rating the quality of studies.

(1) Impact categories

Because of the global environmental effects of fossil fuel consumption, and the centrality of energy to the domestic and global economy, the shale revolution has created ripple effects that touch almost every sector in every corner of the world. Gathering and synthesizing the literature on each of these impacts is beyond our scope. However, SHARC is developed in a modular fashion, allowing it to expand over time. Initially, we scoped topics for 3 phases, described in Table 1:

Table 1: Initial scoping for SHARC topics

Phase	Description
Phase 1	The project team has thoroughly reviewed the literature on this topic. The SHARC website includes a comprehensive collection of relevant studies, along with a literature review and issue brief summarizing key findings.
Phase 2	The project team has partially reviewed the literature on this topic. The SHARC website includes an incomplete collection of relevant studies. The SHARC website does not initially include a literature review or issue brief. Topics in this category will be thoroughly reviewed in future work.
Phase 3	The project team has partially reviewed the literature on this topic, but the topic is not included on the SHARC website. Topics in this category may be included in future work.

To begin, the project team (Raimi, Krupnick, Echarte) developed a list of potential topics. From this list, we identified categories that have been previously major areas of focus for Raimi (in *The Fracking Debate*) and Krupnick/Echarte (in WHIMBY). These topics were tentatively chosen for inclusion in Phase 1. Next, the team contacted members of our target audience (e.g., state regulators, NGOs, industry, press) to gather feedback on the topics to include. Survey respondents rated the importance of different topics, providing guidance for the project team on which topics for focus on.

Table 2: Potential topics and initial phases

Topic	Category	Phase
Climate change	Environmental/Health	1
Human health	Environmental/Health	1
Seismicity	Environmental/Health	1
Local governments	Socioeconomic	1
Local/regional/state economies	Socioeconomic	1
Property values	Socioeconomic	1
State government	Socioeconomic	2
Quality of life/Community impacts (e.g., housing affordability, crime, education, truck traffic, noise, light, recreation)	Socioeconomic	2
Groundwater	Environmental/Health	2
Surface water quantity and quality	Environmental/Health	2
Air quality	Environmental/Health	2
Community-industry interaction	Governance	2
Environmental justice	Environmental/Health	2
Public opinion	Governance	2
Cumulative impacts	Other	2
National (US)/sectoral economy	Socioeconomic	2
Ecosystems, habitats, species	Environmental/Health	3
Occupational hazards	Environmental/Health	3
Federal regulation	Governance	3
State regulation	Governance	3
Economics of shale development	Markets	3

After determining topics, the project team compiled a database of relevant research from the WHIMBY and *The Fracking Debate* databases. It also revisited and revised existing literature reviews of the topics covered, and created a 2-page issue brief for policymakers for every Phase 1 topic. Moving forward, studies will be added as they become available, and literature reviews and briefs will be updated annually. In addition, the project team will complete thorough reviews of additional topics, which initially received only partial coverage.

To further complement the expertise of the RFF team, we have provided a highly-visible option for website users to suggest additional categories (Figure 3). The team will track these suggestions over time and include them as an important element to consider when deciding on expansion of the clearinghouse.

(2) Inclusion of research by type

SHARC offers two key tools for users: (1) a comprehensive catalogue of research relevant to specific impact categories, and (2) literature reviews and issue briefs. For the research catalogue, which has the potential to become quite unwieldy, the focus should be on a relatively narrow set of high quality research, predominately from peer-reviewed journals. For the literature reviews, which allow the team to provide context and analysis, a more flexible standard is appropriate.

Table 3 summarizes which types of work are essential, which are optional, and which are not appropriate for SHARC.

Table 3: Types of research included in SHARC

Literature type	Include in catalogue?	OK to cite in lit review?
Peer-reviewed	Yes	Yes
Governmental report	Optional	Yes
Working papers and white papers	Optional	Yes
Database	Lean no	Yes
News article	No	Lean no
Opinion/blog	No	No

- Peer reviewed work is essential for inclusion in the clearinghouse, and should also be comprehensively cited in the literature reviews.

- Government or inter-governmental reports (such as health studies by state governments or reports from the IPCC) are appropriate for the clearinghouse if they are of high-quality and present relevant findings. They are particularly valuable if peer-reviewed reports are not available for a given topic. These types of reports are also appropriate for citations in the literature reviews, at the discretion of the analyst.

- Working papers and white papers (from RFF, NBER, or other outlets) are appropriate for the clearinghouse if they are of high-quality and present relevant findings. They are particularly valuable if peer-reviewed reports are not available for a given topic. These types of reports are also appropriate for citations in the literature reviews, at the discretion of the analyst.

- Databases are appropriate to use in the literature reviews, as they can provide context and enable analysis. However, because there are thousands of relevant databases, they should not be included in the research catalogue unless there is a very compelling reason to do so.

- News articles should not be included in the research catalogue. Under narrow circumstances, they may be appropriate for the literature reviews. For example, articles demonstrating facts (such as property damage from an earthquake) which are rarely documented in government reports or peer-reviewed journals, may be appropriate for citation.

- Finally, op-ed pieces or blog posts are neither appropriate for inclusion in the research catalogue nor the literature reviews.

(3) Rating research quality

For Phase I of the project, our focus will be on developing the database, website, literature reviews, and issue briefs. We will provide qualitative descriptions of research quality in our literature reviews, as we discuss the relative strengths and weaknesses of a given study. We are not inclined to rate studies according to specific criteria for two main reasons: (1) performing this task would be extremely time intensive and beyond our current scope, and (2) doing so would likely offer a false sense of precision, as any ultimate judgement about study quality is somewhat subjective.

However, to provide a simplified and intuitive overview of research findings, we will summarize results from each literature review area with an infographic similar to those used in RFF's WHIMBY report. This infographic will use a color-coded scheme to summarize key findings from the research. It will also provide qualitative assessments of the strength of evidence on a given topic. The overarching legend for this infographic from the WHIMBY report is reproduced below. We plan to work on updating and improving the design of this system prior to final publication.

FIGURE 1. RISK-BENEFIT MATRIX KEY

	Higher quality: The majority of studies reviewed for an impact are of higher quality. Where there is one study of higher quality, it is marked as such.
	Medium quality: The majority of studies reviewed for an impact are of medium quality. Where there is one study of medium quality, it is marked as such.
	Lower quality: The majority of studies reviewed for an impact are of lower quality. Where there is one study of lower quality, it is marked as such.
	Not reviewed: Research on an impact was not reviewed.
↑	Increase: Studies show a positive, robust association with an impact (an increase in incidence or magnitude).
↓	Decrease: Studies show a negative, robust association with an impact (a decrease in incidence or magnitude).
↑↓	Heterogeneous: Across regions or areas, studies report robust results that differ.
Ø	No association: Studies report results that showed no association.
~	Inconsistent: Studies report differing (contradictory) results.