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Other Social Effects and Social Vulnerability Analysis: Existing Resources

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PURPOSE: The following technical note (TN) provides a summary of existing resources available to the US Army Corps of Engineers' (USACE) districts that address benefits in the Other Social Effects account for evaluating the effects of water resource projects. Consideration of social factors is key to a complete, robust, water-resources analysis, and these resources provide planners and project development teams with approaches and tools for their consideration.

> **social effects—the constituents of life that influence personal and group definitions of satisfaction, well-being, and happiness**
> **—*OSE Primer*, 3**

This TN is limited in scope and does not cover ecosystem goods and services or environmental-quality metrics that can also be used to assess benefits outside of economic benefits from water-resource projects. The following resources and their associated metrics are presented in a manner that is focused on assisting districts during the project-planning phase, although the metrics can be used to assess benefits or impacts during other project phases as well (for example, construction, operations, and maintenance).

BACKGROUND: What are now known as *social effects* have been mentioned as a goal for USACE in laws and policies since the Flood Control Act of 1936.* Their role in project analysis and decision-making has varied greatly over the years. Evaluation of project effects since 1983 has encompassed the four accounts—National Economic Development (NED), Regional Economic Development (RED), Environmental Quality (EQ), and Other Social Effects (OSE)—with NED as the primary decision-making criteria.

The experiences from Hurricane Katrina in 2005—including the loss of community cohesion as people fled the area, the long-term health impacts, the approximately 300,000 homes destroyed, and the slow recovery of businesses and residences because of water damage and delayed return of electricity to the affected regions—renewed USACE interest in addressing social effects. A

* The original language references "benefits to whomsoever they may accrue are in excess of the estimated costs, and if the lives and social security of people are otherwise adversely affected," Act of June 22, 1936, Pub. L. 74-738, 49 Stat. 1570.

series of documents was published between 2007 and 2016 that addresses the use of social effects in project analyses. These documents continue to be relevant to USACE decision-making in water-resources projects and studies and are available to planners and project development teams. This TN highlights several of these documents and discusses their relevance and use in USACE decision-making. The full texts can be found in the Institute for Water Resources (IWR) library and the planner's toolbox and are cited at the end of this document. Policy changes may result in a more definitive incorporation of OSE into decision-making in the future. The documents summarized in this TN apply to project analysis under a wide range of policy.

> **while economic factors are very important in characterizing well-being, there are many more factors which come into play. In particular the distribution of resources; the character and richness of personal and community associations; the social vulnerability and resilience of individuals, groups, and communities; and the ability to participate in systems of governance are all elements that help define well-being . . . . As the figure [below, Figure 1] suggests, a water resources [management] process that is exclusively or even essentially focused on maximizing "National Economic Development" is missing a huge range of important issues that will influence to what degree the water resources solutions that are developed will be judged as effective, acceptable, and fair. In large measure, such issues are the province of the Other Social Effects account.**
>
> **—Dunning and Durden (2007), 13**

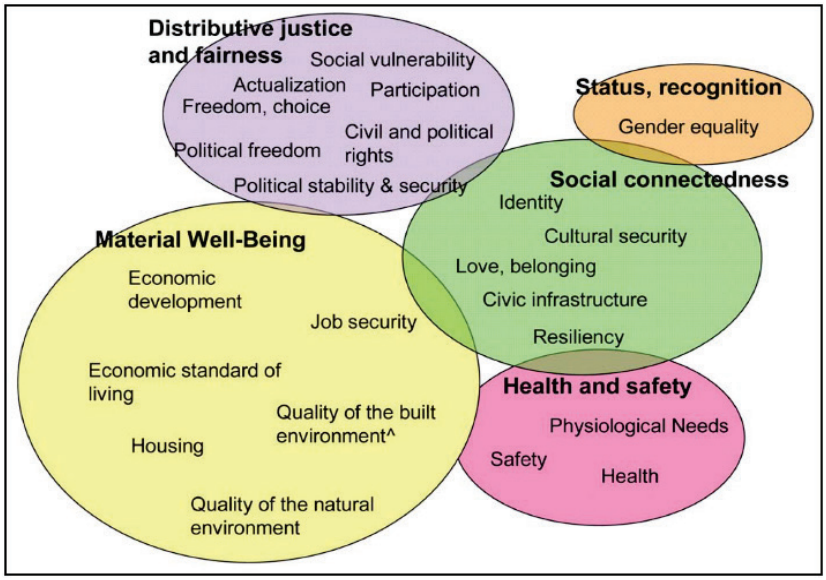

Figure 1. Constellation of well-being concerns (Dunning and Durden 2007, 14). Public domain.

DESCRIPTION OF RESOURCES: This TN offers a curated review of available resources for OSE and social vulnerability analysis. These are listed and then summarized below.

1. OSE
   a. *Other Social Effects: A Primer* (Durden and Wegner-Johnson 2013; IWR 2013-R-02)
   b. *Theoretical Underpinnings of the Other Social Effects Account* (Dunning and Durden 2007; ERDC/CHL SR-07-01)
   c. *Handbook on Applying "Other Social Effects" Factors in Corps of Engineers Water Resources Planning* (Dunning and Durden 2009; IWR Report 09-R-4)
   d. *Applying Other Social Effects in Alternatives Analysis* (Durden et al. 2013; IWR 2013-R-03)
2. Social vulnerability analysis
   a. *Social Vulnerability Analysis Methods for Corps Planning* (Dunning and Durden 2011; IWR 2011-R-07)
   b. *Social Vulnerability Analysis: A Comparison of Tools* (Dunning and Durden 2013; IWR White Paper, 2013)
   c. *Social Vulnerability eXplorer (SV-X) User Guide* (Durden [2015?])
   d. *Identification and Engagement of Socially Vulnerable Populations in the USACE Decision Making Process* (Baker et al. [2016?], IWR White Paper)

Other Social Effects: A Primer. Susan Durden and Maria Wegner-Johnson (2013).

Quick take. Provides an overview of OSE analysis, its role in each stage of USACE planning, and an array of tools and methods available for conducting OSE analysis. In addition, a number of frequently asked questions (FAQs) about OSE analysis are answered.

Since the goal of water-resources projects is to improve people's lives, OSE analysis is a critical tool for understanding the effectiveness of projects in achieving improvements that might not be reflected in the other accounts: NED, RED, EQ. OSE are relevant to all business lines. They may be most intuitively understood in flood risk management but can also be important considerations in ecosystem restoration, navigation, and other projects.

OSE analysis is key throughout the USACE planning process. It is not an add-on at the end to support a particular plan. In general, **it is most important during problem identification**. If the problem has not been properly defined, how can it be solved properly?

OSE analysis plays a role throughout the process and contributes to key planning tasks:

- stating problems, needs, and opportunities—Information about who is affected and how they view the situation is critical. It is particularly important that the interests of those who may be most vulnerable be included.
- forming planning objectives—How can the problems and opportunities be addressed?
- forming and evaluating alternatives—Alternatives need to address social issues of concern. Planners have a special responsibility to ensure that those stakeholders most vulnerable or at risk are afforded the opportunity to participate in the exploration of alternatives.

- assessing choices—Communicating to stakeholders the socioeconomic implications of alternatives can help differentiate the choices that alternatives present. Figure 2 presents an example of how a simple qualitative ranking (−3 is very bad and +3 is very good) can communicate the severity or magnitude a proposed project alternative may have on measurable social factors, such as the impact (both positive and negative) of flood barriers on human health and safety, employment opportunities, and community cohesion.

Planning is a social undertaking. The OSE practitioner is an advocate for communication and the principles of science—careful observation and accurate description—to work for improved understanding of the social effects of project choices.

In the primer a table summarizes OSE analysis questions to be addressed in each step of the planning process (15). Additional matrices summarize OSE analysis tools and techniques and which methods are appropriate for answering which kinds of questions (18–21) (Figure 3).

An FAQs section (25–26) addresses questions such as the following:

- How is OSE linked to National Environmental Policy Act* (NEPA) documentation?
- How should a budget for OSE analysis be developed?

* National Environmental Policy Act of 1970, 42 U.S.C. 55 § 4321 et seq. (2020). https://www.govinfo.gov/content/pkg/USCODE-2020-title42/pdf/USCODE-2020-title42-chap55-sec4321.pdf.

Social Factor and Metrics	Alternatives																					
	Flood Barriers		Diversion Channels		Non-structural Measures		Flood Storage		Tunneling		Bridge Replacement or Modification		Interstate 29 Viaduct		Dredging and Widening		Wetland and Grassland Restoration		Cut-off Channels	
	D	E	D	E	D	E	D	E	D	E	D	E	D	E	D	E	D	E	D	E
Health and Safety																				
Mental Health	2	2	3	3	0	0	2	2	3	3	0	1	3	3	1	1	0	1	1	1
Physical Health	2	2	3	2	0	0	2	2	3	2	0	1	3	2	1	1	0	1	1	1
Physical Safety	0	2	0	2	0	0	0	2	0	2	0	1	0	2	0	1	0	1	0	1
Regional Healthcare	0	2	0	3	0	0	0	2	0	3	0	1	0	3	0	1	0	1	0	1
Economic Vitality																				
Business Climate	2	2	2	3	0	0	2	2	3	3	0	1	3	3	1	1	0	1	1	1
Employment Opportunities	2	2	2	3	0	0	2	2	3	3	0	1	3	3	1	1	0	1	1	1
Financial Impacts	-1	1	-2	1	0	0	-1	1	-2	1	0	0	-2	1	-1	1	0	-1	-1	1
Municipal Services	-1	2	-2	2	0	0	-1	1	0	2	0	0	-1	2	0	1	-1	0	0	1
Social Connectedness																				
Community Cohesion	-1	2	0	2	0	0	0	2	0	2	0	1	0	2	0	1	0	1	0	1
Community Facilities	0	2	0	2	0	0	0	2	0	2	0	0	0	2	0	1	0	1	0	1
Identity																				
Cultural Identity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Community Identify	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	1	0	0	1	1
Social Vulnerability and Resiliency																				
Residents of Study Area	-1	2	0	2	0	0	0	1	0	2	0	1	0	2	0	1	0	1	0	1
Socially Vulnerable Groups	-1	2	0	2	0	0	0	0	0	2	0	1	0	2	0	1	0	1	0	1
Participation																				
Public Participation	1	2	1	2	0	0	0	1	0	2	0	1	1	2	0	1	0	1	1	1
Leisure and Recreation																				
Recreational Activities	-1	1	0	1	1	0	0	1	0	1	0	0	0	1	1	1	1	1	0	1
Notes:																				
- Impacts are measured in comparison to the Without-Project Alternative																				
- D = impacts to daily lifes (no flooding); E = impacts during a flood event																				
- Scores can range from -3 (significant negative impact) to +3 (significant beneficial impact)																				
- No more than 25 percent of the metric scores for an alternative should be either a -3 or +3																				

Figure 2. Comparison matrix of social effects of alternative plan features (Durden and Wegner-Johnson 2013, 14). Public domain.*

* Note: accessible version of this table available here: https://www.iwr.usace.army.mil/Portals/70/docs/iwrreports/2013-R-02.pdf.

Planning Step	OSE Questions	Historical Analysis	Social Profiling	Independent Studies and Projections	Workshops	Stakeholder ID Methods	Interviews	Surveys	Secondary Data Collection	Focus Groups	Delphi Panels	Content Analysis	Charrettes	Shared Vision Planning	Quality of Life Indices
1	What groups have economic, cultural, and other "stakes" in the situation?		X			X	X					X			
	How do stakeholders define the problems, needs, opportunities, and constraints? What are their priorities? What kinds of effects are they interested in achieving/ in avoiding?				X		X	X				X			
	What basic "social statistics" describe the population and portray quality of life factors?	X	X												
	Are "special needs" populations present?	X	X		X		X								X
2	How are social conditions currently being affected by the water resources situation?		X	X	X		X	X		X	X			X	X
	What are social conditions likely to be in the future in the absence of a water resources intervention?			X	X		X			X	X				X
3	What should the future look like with regard to social conditions of concern?				X		X			X			X		
	What needs to be changed? What needs to be preserved or improved?				X		X			X			X		X
	What kinds of measures are needed to achieve desired social conditions?				X		X			X			X		
	Why is (are) the measure(s) preferred? What are key underlying interests?				X		X			X			X		
4	What are plans' social effects in terms of magnitude, location, timing and duration?				X		X			X	X		X	X	
	What risks are associated with each plan?				X		X			X	X		X		
	How adequate are plans with respect to completeness, effectiveness, efficiency, and acceptability?				X		X			X	X		X		
5	How do plans' effects compare on social issues of concern?				X					X	X		X	X	
6	How were the social effects of alternative plans considered in making a determination of the recommended plan?				X								X	X	
	In cases where social effects were deemed significant what was done to minimize and/or mitigate negative effects, and to take advantage of opportunities afforded by the plan to improve social conditions of residents in project areas?				X								X	X	

Figure 3. Common tools for addressing key other social effects (OSE) questions (Durden and Wegner-Johnson 2013, 14). Public domain.*

* Note: accessible version of this table available here: https://www.iwr.usace.army.mil/Portals/70/docs/iwrreports/2013-R-02.pdf.

Theoretical Underpinnings of the Other Social Effects Account. C. Mark Dunning and Susan Durden (2007).

Quick take. Defines OSE account and value for USACE analyses. Illustrates use in other federal agencies, nongovernmental organizations, and international organizations.

Definitions of key concepts

- *Social effects* in a general sense refers to a concern for how the constituents of life that influence personal and group definitions of satisfaction, well-being, and happiness are affected by some condition or proposed intervention (2).
- *Social connectedness* refers to the pattern of social networks within which individuals interact, which largely provides meaning and structure to life (5).
- *Social capital* refers to the capacity of social networks to help people to build "civic infrastructure" that provide individuals greater opportunities for connectedness, improve communication and coordination, and strengthen intergroup relations (5).
- *Social vulnerability* refers to the capacity for being negatively affected by hazards or impacts, inasmuch as this capacity is linked to characteristics such as age, socioeconomic status, gender, ethnicity, and language spoken (5).

Other agencies and intergovernmental organizations make robust use of OSE analysis in their decision-making. The Tennessee Valley Authority (TVA), the National Oceanographic and Atmospheric Administration (NOAA), the US Forest Service, the Natural Resource Conservation Service (NRCS), the European Union, and the World Bank all include OSE as critical component of analyses. The NRCS has used OSE analysis to justify reduction in cost-sharing requirements for low-income communities (21). Lessons from these organizations include the following:

- OSE information is more relevant to water-resources planning and management than has generally been accounted for
- relevant OSE information must be considered from the beginning of the planning process

Multiple frameworks have been developed for measuring social well-being. The OSE analysis should be a process of exploration that includes the issues and concerns of stakeholders (25). Early, substantial coordination with stakeholders and understanding of stakeholder priorities is fundamental to the use of OSE analysis and the success of water resources projects. Key questions for OSE analysis are offered (25), and a table compares the role of OSE information in an NED-centric framework with the role it might play in an all-benefits framework (27).

Handbook on Applying "Other Social Effects" Factors in Corps of Engineers Water Resources Planning. C. Mark Dunning and Susan Durden (2009).

Quick take. Links how to think about OSE with how to do OSE analysis.

This OSE handbook provides tools and methods for developing OSE information and a framework for using such information in the six-step planning process. It describes procedures for formulating and evaluating OSE management measures as part of water-resources plans. A catalogue of OSE assessment variables and tools is presented, including descriptions of research methods and indicators for specific categories and subcategories of OSE, along with suggested sources of data. Case studies demonstrate the uses of these methods in practice, and the application of OSE across business lines is illustrated. The use of census-data-based vulnerability analyses to identify social vulnerability hot spots is showcased for its application to flood-damage reduction and emergency management issues.Throughout the pages of the handbook, tables and figures present useful information in a readily accessible format, such as a quick guide to OSE references in Section 122 of the 1970 Flood Control Act* (6); OSE analysis contributions to planning step 1 (18), step 2 (20), step 3 (22), step 4 (23), step 5 (24), step 6 (25); a framework for presenting information about social issues of concern (27–28); an example of characterizing plans' effects (29–30); an example of a plan-effect matrix across all four accounts (31); and summaries of potential social effects of flood risk management projects (46), navigation projects (47), and watershed studies (49). Indicators are provided in the categories of basic social statistics (55), social vulnerability and resilience (56), social connectedness (57), economic vitality (58), leisure and recreation (59), participation (59), identity (60), and health and safety (60). Examples of typical stakeholders and their interests are provided (65).

Applying Other Social Effects in Alternatives Analysis. Durden et al (2013).

Quick take. This document assists planners by providing a practical framework and approach for the use of OSE in alternative development and evaluation. It provides a method to perform a quantitative assessment of OSE impacts.

Social factors can be grouped into categories as shown in Table 1. Each factor has associated indicators or metrics. A scoring system and matrix have been developed to aid in evaluating the OSE impacts of alternatives. The evaluation relies on a scoring system with a scale of −3 to +3, with −3 indicating significant negative effects on a metric and +3 indicating a significant beneficial effect (see Figure 2). The score is an assessment of the relative impact an alternative would have on a metric in relation to the without-project alternative. The assessment is from an overall planning perspective (not necessarily reflecting impacts to individuals or small groups). In most cases, a limited number of metrics will be significantly affected by an alternative or a project.

* Flood Control Act of 1970, Pub. L. 91-611, 84 Stat. 1829. https://www.govinfo.gov/content/pkg/STATUTE-84/pdf/STATUTE-84-Pg1818.pdf.

Table 1. Metrics categories (Durden et al. 2013, 10).

Social factor	Metric	Description
Health and safety	Mental health	Issues affecting the overall mental health of a person, such as anxiety and stress (for example, threat of flooding, transportation concerns, noise)
	Physical health	Issues affecting a person's physical health (for example, air quality, diseases)
	Physical safety	Safety issues that could cause bodily harm to a person (for example, flood waters, crime)
	Special issues	Special concerns identified during baseline assessment
Economic vitality	Business climate	Issues affecting the ability of a community to retain and attract businesses
	Employment opportunities	Issues affecting the availability to provide employment opportunities for residents
	Financial impacts	Issues affecting a person or group's standard of living (for example, taxes, property values)
	Municipal services	Issues affecting the local tax base and the ability to provide municipal services
	Special issues	Special concerns identified during baseline assessment
Social connectedness	Community cohesion	Issue affecting local social networks, including personal networks
	Community facilities	Issues affecting access to local community related facilities (for example, libraries, community centers, religious establishments)
	Special issues	Special concerns identified during baseline assessment
Identity	Cultural identity	Issues affecting sense of cultural identify within a community (for example, historical or cultural significance)
	Community identity	Issues affecting sense of community identity (for example, local sports, how others see the area)
	Special issues	Special concerns identified during baseline assessment
Social vulnerability and resiliency	Residents of study area	Issues affecting the overall risk to the population within the study area
	Socially vulnerable groups	Issues affecting socially vulnerable groups (for example, low income, minority, elderly, children, disabled)
	Special issues	Special concerns identified during baseline assessment
Participation	Public participation	Issues affecting overall public involvement in community matters (for example, trust in local officials, public interest in community)
	Special issues	Special concerns identified during baseline assessment
Leisure and recreation	Recreational activities	Issues affecting access to, or availability of, recreational activities (for example, parks, trails, view sheds)
	Special issues	Special concerns identified during baseline assessment
Environmental justice	Special issues	Special concerns identified during baseline assessment
Public safety	Special issues	Special concerns identified during baseline assessment

Factors contributing to the successful incorporation of OSE analysis include the following:

- The project management plan, or PMP, includes OSE.
- Adequate funding for OSE analysis is available.
- The project manager and stakeholders accept the value of completing an OSE analysis.
- The project delivery team, or PDT, is prepared to discuss OSE, both internally and with the public.
- OSE is included from the beginning of the planning process.
- Efforts to involve local stakeholders and the public are sincere and sustained.
- OSE is considered in formulating alternatives and in evaluating plans.

Social Vulnerability Analysis Methods for Corps Planning. C. Mark Dunning and Susan Durden (2011).

Quick take. Describes practical methods for identifying socially vulnerable groups and illustrates how the information they provide can be useful for the USACE planning process.

Historically the impacts of disasters on socially vulnerable populations have been overlooked and underestimated. The social impacts of hazard exposure often fall disproportionately on the most vulnerable people in a society—the low income, minorities, children, and elderly. These groups often have the fewest resources to prepare for a disaster, live in the highest-risk locations, and lack the knowledge or social and political connections necessary to access resources that would speed their recovery. This paper presents two practical methods for identifying socially vulnerable groups and their spatial distribution in flood-hazard zones. The two social vulnerability analysis methods described are the Social Vulnerability Index (SoVI) and Social Vulnerability Profiling (SoVP). Methods and procedures are illustrated using a study area in Chatham County, Georgia, as an example.

Multiple tables and figures present key information in an accessible format, including Table 2 and Table 3 below. Others present the social effects of flooding according to standard OSE categories (12), factors contributing to community resilience from NOAA's coastal resiliency index (17), socioeconomic variables used in the SoVI (22) and the SoVP (25), flood impacts on vulnerable populations (41), and flood risk management concerns during and after flooding (44).

Table 2. Social vulnerability factors and implications during and after floods (Dunning and Durden 2011, 8).

Vulnerability factor	During event	Recovery (resiliency)
Low income/poverty level	Lack of resources may complicate evacuation	Lack of resources may hinder ability to recover
Elderly/very young	Greater difficulties in evacuation, more health and safety issues, potential for higher loss of life	May lack resources, willingness, ability to rebound
Disabled	Greater difficulties in evacuation, more health and safety issues, potential for higher loss of life	Lack of facilities and medical personnel in aftermath may make it difficult to return
Female-headed households	Lack of resources and special needs may complicate evacuation	Lack of resources may hinder ability to recover

Vulnerability factor	During event	Recovery (resiliency)
Minorities	Lack of influence to protect interests; lack of connections to centers of power or influence	Lack of influence to protect interests; lack of connections to centers of power or influence
Occupants of mobile homes/renters	Occupy more vulnerable housing	Potential displacement with higher rents
Transient/homeless	Difficult to locate and provide information to; difficult to estimate numbers	

Table 3. Applying Social Vulnerability Analysis (SVA) in the US Army Corps of Engineers (USACE) planning process: key SVA questions and tools (Dunning and Durden 2011, 19).

Six steps and their desired outputs, key questions, and tools	
Step 1: Specify problems and opportunities	
Desired output of analysis	Identification of vulnerable groups. Problems, preferences of vulnerable groups; inputs to planning objectives
Key SVA questions	What groups are especially vulnerable? Who are they? Where are they located in the project area? What factors limit the resiliency of the area? What are the needs and interests of vulnerable groups as relate to water resources issues?
Tools	Social Vulnerability Index (SoVI), Social Vulnerability Profiling (SVP), stakeholder-identification methods, workshops, interviews, historical analysis, content analysis
Step 2: Inventory and forecast conditions	
Desired output of analysis	Descriptions of current and future state of social conditions of concern to stakeholders in the absence of a water resources solution
Key SVA questions	What is the current risk in general and to vulnerable groups? What are likely impacts of events of various magnitudes with special focus on vulnerable groups? How well is the risk understood by those who are at risk?
Tools	Independent studies and projections, focus groups, Delphi panels, workshops, charrettes
Step 3: Formulate alternatives	
Desired output of analysis	Descriptions of desired future social conditions; rankings and priorities among desired future conditions; specific management measures required to achieve a desired social future condition and why measures are preferred.
Key SVA questions	What kinds of measures can best address the needs and interests of vulnerable groups?
Tools	Visioning workshops, focus groups, charrettes, interviews
Steps 4, 5, 6: Evaluate, compare, select plans	
Desired output of analysis	Descriptions of plans' effects on social conditions of concern; evaluation of each plan's adequacy in contributing to desired future social conditions
Key SVA questions	What risk, risk reduction, and residual risk are associated with each plan? What is the distribution of risk; what groups are most at risk; what are social impacts to include benefits, costs, and residual risks associated with measures, plans, and alternatives? How do plans compare with respect to completeness, effectiveness, efficiency, and acceptability (including tolerable level of risk)?
Tools	Workshops, focus groups, expert panels, charrettes

Social Vulnerability Analysis: A Comparison of Tools. C. Mark Dunning and Susan Durden (2013).

Quick take. By comparing it with other tools, this paper demonstrates why the Social Vulnerability Index (SoVI) is the most robust and useful tool for the application of social vulnerability analysis (SVA) in the USACE planning process.

Social vulnerability analysis is one of the most important and widely used methods for informing and addressing OSE in the water resources planning process. Four SVA tools are compared and contrasted: the SoVI, Social Vulnerability Mapping Tools, the NOAA Roadmap for Adapting to Coastal Risk workshop process, and the ESRI USA-Social Vulnerability thematic mapping application. The following information is provided for each tool or method: brief overview, data and methods, and general relevance to USACE water-resources planning requirements. The conclusion is that, while all the tools can profitably be used for USACE's water-resources planning applications, the SoVI—with its extensive history of development and improvement and its wide recognition in peer-reviewed articles and reports—is the best choice as the primary tool for USACE SVA applications.

SV-X: Social Vulnerability eXplorer Data Development Tool and Analysis Tool User Guide. Susan Durden [2015?].

Quick take. An illustrated, step-by-step guide for the installation and use of an SVA tool developed by USACE to describe the geospatial distribution of vulnerable populations in hazard zones.

The Social Vulnerability eXplorer (SV-X) consists of two parts, a desktop data-development application and a web-based data analysis tool. This document details how to install and use these tools. The SV-X tool provides a data-production and analysis capability that was developed by USACE to describe the spatial distribution of vulnerable populations in hazard zones whether from flooding, storm surge, and other hazards. Based on Cutter et al.'s (2000) place vulnerability assessment, this tool provides valuable insights into the kinds of mitigations, preparedness, and response measures needed for areas of high social vulnerability. Using data visualizations and tabular summaries of social vulnerabilities of populations at risk, the SV-X enables social vulnerability assessments and characterizes the benefits and adverse impacts of potential water-resource projects on these populations. Other practical applications include quick and easy identification of vulnerable populations in relation to evacuation efforts, environmental justice, and susceptibility to sea level rise; disaster recovery options based on population characteristics; and assessment of the population that would be affected by drought and reallocation of storage.

Identification and Engagement of Socially Vulnerable Populations in the USACE Decision Making Process. Chris Baker et al. 2016

Quick take. This primer describes strategies, tools, and examples of how to identify and work with socially vulnerable populations in the USACE decision-making process.

This primer is a resource for USACE and those who work with USACE to increase awareness of the importance of engaging people who, because of social, cultural, economic, and physical factors, are more vulnerable to hazards. These concepts can be used across USACE business

lines and are relevant to other government programs. Included are strategies and examples of how to identify and work with socially vulnerable populations; it describes how including them in the decision-making process can improve the formulation of alternatives and water decisions. The primer addresses the following questions:

- Who are *socially vulnerable populations*?
- Why is it important to identify and engage socially vulnerable populations during the decision-making process?
- What tools and techniques are available to identify socially vulnerable populations?
- Where can more information and assistance be found?

SUMMARY: The featured documents are available and applicable to planning studies as well as other work efforts, such as regulatory, emergency operations, water supply, and operations. Though not all are written recently, these documents are appropriate for current studies and are relevant even if policy changes on the role of OSE in decision-making. All have links in the bibliography.

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